



**Project Business Case
(Significant) Residual
Waste Disposal -
Southern Landfill
Extension Piggyback
Option (SLEPO) Project**

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Executive summary

Purpose

This business case presents the preferred option for residual waste disposal in Wellington city. It seeks formal approval from Wellington City Council (the Council) to extend the current landfill by constructing a new landfill on the top of the closed Stage 2 landfill. Development of the new landfill will be delivered in 4 Parts (construction phases) from 2024 to 2047. This Business Case seeks approval for 2 Parts only (Parts A and B) to deliver a residual waste disposal solution for the period 2026 to 2031 with design and consenting commencing in 2022 and construction in 2024-2025.

Implementation of Zero Waste Programme initiatives is expected to see Part A and B deliver a residual waste disposal solution that may extend beyond 2031, dependent upon the success of waste minimisation initiatives. On approval of the business case, the design and resource consent application will be completed and submitted to Greater Wellington Regional Council in March 2023.



Parts A and B completed in 2031+



Parts A, B, C and D completed in 2047+

Zero Waste strategic context

Globally there is unmistakable evidence of social, economic, environmental, and cultural benefits for countries to advance the transition to a more resource-efficient and circular economy:

1. Aotearoa New Zealand as a global citizen has started this transition, with the Ministry for the Environment developing a set of proposals for a new national waste strategy and options for developing new, comprehensive waste legislation
2. The proposed national waste strategy will set an innovative, bold direction to transform the way Aotearoa New Zealand thinks about, and manages, waste. The options for new waste legislation support the transition to a more circular economy, and better regulate the management of waste, products and materials circulating in the economy.

Local authorities, including Wellington City Council, have also started this transition. The Council declared an ecological and climate emergency in 2019 and this is a key strategic driver for accelerating zero waste outcomes for Wellingtonians.

Accelerating a waste free transition is a council priority in the 2021-31 Long-term Plan. We are finalising a Zero Waste Strategy, which was presented to council in December 2022. We are also organising all of our waste initiatives within a Zero Waste Programme to deliver on this strategic priority. We've already signalled intentions and begun community conversations and actions through strategies such as: Te Atakura - First to Zero and Tūpiki Ora.

At the 14 October 2021 Pūroro Waihangā | Infrastructure Committee meeting, it was agreed to adopt, in principle, the draft Waste Minimisation Roadmap which will inform the development of the Council's next Waste Management and Minimisation Plan (WMMP) in 2023. The current Regional Waste Management and Minimisation Plan remains the Council's operative waste plan, which will inform and promote the provision of effective and efficient waste management and minimisation within Wellington city until 2023.

Problem statement

The Southern Landfill is the only approved, existing residual waste disposal facility for Municipal Solid Waste (MSW), dewatered sewage sludge and hazardous waste in Wellington city - about 78,000 tonnes of municipal waste per annum goes to the Southern Landfill. It is a listed strategic asset for the Council. The existing resource consents expire in June 2026 and the current operational landfill (referred to as Stage 3) is also projected to reach capacity at the same time, requiring a new residual waste disposal solution to be in place by then to ensure the smooth running of Wellington city and supporting future growth.

We need to decide how we dispose of Wellington's residual waste (what's left after we reduce, reuse and recycle) from June 2026.

Background and organisation overview

The Council has adopted a Regional Waste Management and Minimisation Plan³, which sets an ambitious target of reducing the total quantity of waste sent to landfills by a third. A key action from this work has been progressing the Sludge Minimisation Facility project⁴ which seeks to significantly reduce the volume of waste to landfill and enable waste reduction to accelerate by 2026. As well as dealing with our sludge in a different way, we are also actively investigating how to reduce the volume of organics and plastics entering at our landfill. Construction and demolition solutions also need to be identified to reduce the high and growing volume of waste from the construction sector.

Preferred solution option overview

Work began in 2009 to extend the current landfill to the north side of Stage 3 into a new area known as Stage 4. Public concerns were raised over the proposed Stage 4 landfill. In response, council put Stage 4 on hold in 2021. The Council engaged Beca and Fichtner to perform a technical and suitability assessment of a long list of possible waste technology options. In early October 2021, the initial assessment of possible options for residual waste treatment in Wellington city was completed, and a report published.

The Council passed the resolution below at the 14 October meeting of the Pūroro Waihangā | Infrastructure Committee. This provided the required framework and direction to land on a preferred residual waste disposal solution for Wellington. The resolution states:

Direct officers to progress two parallel work streams (in order to ensure that all reasonably practicable options are available for the Council's consideration of the issue of the disposal of residual waste beyond 2026).

- a. Continue to investigate and analyse further minimisation and waste disposal options and consultation requirements, reporting to Infrastructure.
- b. Undertake the work to initiate and lodge the necessary resource consent applications to extend the Southern landfill.

To arrive at a preferred residual waste disposal solution, a Residual Waste Working Party⁵ was established. Council, the working party and Beca collaboratively completed a detailed investigation and comprehensive Multi-Criteria Analysis (MCA) that considered different technology options in combination with key criteria. The long list evaluation results are summarised on the following page.

After 14 waste management technologies had been assessed, scored and reviewed by the Council and the working party, four were shortlisted as suitable options for Wellington City Council to assess in more detail. These were:

1. Energy from waste
2. Materials recycling facility
3. Mechanical biological treatment
4. Landfilling

A more detailed comparative assessment for the four technologies best suited to the Council and wider Wellington region's requirements was performed. The results and scoring process are outlined opposite.

¹ Please see the following OECD publications: Extended Producer Responsibility: Updated Guidance for Efficient Waste Management | READ online (oecd-ilibrary.org), and Towards a more Resource Efficient and Circular Economy - the role of the G20, G20, 2021 Italy

² Refer The New Zealand Waste Strategy: Reducing harm, improving efficiency | Ministry for the Environment

³ Adoption of the Draft Waste Management and Minimisation Plan (2017- 2023) for Public Consultation, Wellington Region Waste Management and Minimisation Plan Joint Committee, 27 February 2017: Minutes

⁴ The business case for SMF was approved by the Council on 30 June, 2022: Minutes, Sludge Minimisation Business Case.pdf

⁵ This working party was formed in response to the resolution from 14 October; *Continue to investigate and analyse further minimisation and waste disposal options and consultation requirements, reporting to Infrastructure*

Technology	Summary	
	Total Score	Shortlist
Landfill	79	✓
Export (No collection)	64	
Export (Transfer Station)	61	
Energy from Waste	78	✓
Incineration w/o energy recovery	70	
Gasification		
Pyrolysis		
Anaerobic digestion	76	
Material Recycling Facility	82	✓
Mechanical Biological Treatment	82	✓
Composting	72	
Autoclave	58	
Vermiculture		
Insect food cycle		

Assessment Criteria
Local Community Effects
Environmental Effects (water)
Environmental Effects (land)
Environmental Effects (air)
Alignment with Circular Economy
Alignment with Te Atakura First to Zero
Consenting and Planning
Value for money
Robustness/reliability
Maturity of offtake market
Size
Resilience

Technology	Absolute Criteria			Results
	Programme	Technical Maturity	Scalability	
Landfill	✓	✓	✓	PASS
Export (No collection)	✓	✓	✓	PASS
Export (Transfer Station)	✓	✓	✓	PASS
Energy from Waste	✓	✓	✓	PASS
Incineration w/o energy recovery	✓	✓	✓	PASS
Gasification	✓	✗	✓	FAIL
Pyrolysis	✓	✗	✓	FAIL
Anaerobic digestion	✓	✓	✓	PASS
Material Recycling Facility	✓	✓	✓	PASS
Mechanical Biological Treatment	✓	✓	✓	PASS
Composting	✓	✓	✓	PASS
Autoclave	✓	✓	✓	PASS
Vermiculture	✓	✗	✓	FAIL
Insect food cycle	✓	✗	✓	FAIL

Criteria	Stage IV landfill expansion	Piggyback expansion	Energy from waste	Export (no collection)	
1	GHG emissions	3	5	7	3
2	Circular economy	5	5	3	5
3	Community connection	7	7	5	1
4	Scalability	10	10	3	10
5	Technical maturity	10	10	7	10
6	Timeframe	7	10	3	10
7	Local community effects	3	5	7	10
8	Environmental effects (water)	3	3	7	5
9	Environmental effects (land)	3	3	7	3
10	Environmental effects (air)	5	7	3	5
11	Consent and planning	5	7	3	10
12	Value for money	7	10	5	1
13	Robustness/reliability	10	10	7	7
14	Size	10	10	10	10
15	Resilience	10	10	7	1
16	Te Ao Māori	5	7	3	1
	Score (out of 160)	103	119	87	92

As a result of this process three options for residual waste disposal were identified, shortlisted, scored and consulted on via the public Annual Plan (Long-Term Plan Amendment) consultation process⁶:

1. New landfill on top of existing landfill (piggyback option)
2. Waste to energy incineration
3. No residual waste facility in Wellington city

A summary of the shortlisted options can be found in table 1.

Table 1: Summary of shortlisted options

⁶ www.letstalk.wellington.govt.nz/hub-page/annual-plan-2022-2023

Table 1: Summary of shortlisted options

	1. New landfill on top of existing landfill (piggyback option) Preferred option in Long-term Plan	2. Waste to energy incineration	3. No residual waste facility in Wellington city
Option Description	The construction of the new Class A landfill (a site that accepts Municipal Solid Waste (MSW), construction and demolition waste, and industrial wastes and contaminated soils) on top of the Stage 2 area, an area that has been previously landfilled and closed in 1996.	This option refers to the burning of waste to create heat that can be turned into energy, noting that only about 60% can be burned.	Wellington city waste is collected by existing contractors and dropped at a central transfer station for exporting to regional landfills such as Spicers and Silverstream landfills.
Strategic Alignment	<p>Gives effect to the Waste Management and Minimisation Plan and is part of a larger circular economy system focused on transformational change and zero waste aspirations</p> <p>There is no minimum Municipal Solid Waste tonnage volume requirement which therefore enables Wellington's Regional Waste Management and Minimisation Plan, Zero Waste Programme and Sludge Minimisation Facility</p> <p>The Council can directly influence waste diversion at point of disposal. By having direct control of how waste will be disposed of at landfill, the Council can ensure strategic pricing and operations are in place to manage waste flows and support future waste minimisation initiatives</p> <p>Requires no minimum tonnage to operate efficiently and therefore supports the Council's waste minimisation initiatives.</p>	<p>The Council can directly influence some waste diversion at point of disposal.</p>	<p>Reputation: The Council could be perceived as not being responsible for the waste it produces and exporting the related environment impacts elsewhere</p> <p>The Council has less influence on waste diversion and associated zero waste targets.</p>

	1. New landfill on top of existing landfill (piggyback option) Preferred option in Long-term Plan	2. Waste to energy incineration	3. No residual waste facility in Wellington city
Environmental & Community Impacts	<p>Continued disposal of contaminated soil and asbestos contaminated material</p> <p>There will be some leakage of methane (a greenhouse gas) from the landfill outside of the landfill gas capture system</p> <p>The amount of carbon emissions will vary depending on the types of waste received and the efficiency of the gas capture system</p> <p>Ongoing after care of the landfill will be required (leachate, gas management and surface restoration)</p> <p>Some loss of regenerating bush, though this will be compensated with ecological funding or planting schemes off site.</p>	<p>Contaminated soil and asbestos contaminated material will need to be exported to another regional landfill</p> <p>Up to 25% of the resulting bottom ash and hazardous gas flue ash would still need to be transported to another regional landfill</p> <p>The 17% remaining sludge will also be required to be exported to regional landfills</p> <p>Footprint for facility is likely small requiring less removal of regenerating bush to construct</p> <p>Current local community impacts such as traffic, odour and windblown litter will remain.</p>	<p>No requirement to remove on-site vegetation</p> <p>There will be some leakage of methane (a greenhouse gas) from the landfill outside of the landfill gas capture system</p> <p>Less negative effects on the local environment and communities near the current Southern Landfill site, though these effects are transferred to the communities and the environment at the final waste disposal destination</p> <p>Additional emissions associated with transporting the waste over a longer distance.</p>
Carbon Impacts	No change from existing landfill.	<p>Less than Option 1 initially as electricity generated can offset carbon, plus there is no methane generation</p> <p>Likely to have a higher long-term carbon impact than Option 1 as needs minimum volumes of waste to operate.</p>	Slightly higher than Option 1 due to additional carbon used to transport waste to other facilities in, or outside, the region.
Resilience	<p>Greater resilience in an emergency event.</p> <p>Enhancing Wellington's resilience during an emergency by maintaining a disposal site for waste or hazardous materials</p> <p>More resilient in an emergency event than other options.</p>	<p>Reliance on overseas supply chain (facility parts) and expertise to continue to keep the plant operational</p> <p>Less resilient in an emergency as the facility has a limited in-feed capacity and can only process limited types of materials versus a landfill.</p>	<p>Reliant upon other local authorities continuing to accept Wellington's waste</p> <p>This could change in the event of an emergency or other landfill operational constraint, so impact on provision of services to ratepayers</p> <p>The Council will have no guarantees that it will have a place to dispose of large quantities of waste in an emergency.</p>

	1. New landfill on top of existing landfill (piggyback option) Preferred option in Long-term Plan	2. Waste to energy incineration	3. No residual waste facility in Wellington city
Constraints	Extension of resource consents need to be completed and approved (two years is built into the current plan).	Can't treat all waste, such as contaminated soil and asbestos. It only treats the combustible portion of the waste, such as what can be burned Requires a minimum tonnage to operate efficiently. As waste reduces further, waste would be required to be imported to substitute this loss of waste or the council could operate the waste to energy plant less cost effectively Difficult to scale down and remain cost-effective with falling waste volumes likely to be a barrier to further waste minimisation.	Sludge Minimisation Facility is required to be operational due to the 4:1 waste to sludge requirement Security of supply as the other councils can prioritise their own waste over Wellington city's.
Ratepayer Service Levels	No change for Wellingtonians They continue to benefit from having a conveniently accessible Class A landfill and associated services, such as the Tip Shop.	No change (assuming located at Southern Landfill).	Commercial customers will likely need to travel further.
Timeframe	Operational by June 2026 (consenting risks and construction requirements well understood).	While there are examples of these facilities overseas, it is untested from a regulatory perspective in New Zealand High risk of obtaining the required approvals to operate the facility by the expiry of the existing landfill consent in June 2026 (mid-2027 more probable).	Available once the Sludge Minimisation Facility is operational (planned June 2026).
Delivery & Operation Costs	Capex (Part A and B) = \$36M (4+ years) Opex = \$4M p.a.	Capex = \$215.0M (25 years) Opex = \$5M pa.	Capex = \$0 Opex = \$6M pa.

	1. New landfill on top of existing landfill (piggyback option) Preferred option in Long-term Plan	2. Waste to energy incineration	3. No residual waste facility in Wellington city
Financial Impact	No impact on rates through continuation of the current self-sustaining financial model The \$4M pa Opex is currently covered by current landfill gate fees Southern Landfill gate fees collected, \$6.0M pa also fund kerbside recycling collections and waste minimisation activities Can be scaled down as waste volumes fall while still generating necessary revenue to operate Costs of after-care required once the landfill is closed.	Gate fees will cover the cost of operation but will not generate the additional \$6M that Southern Landfill contributes to fund kerbside recycling collections and waste minimisation activities The \$6M pa will therefore need to a funding source. Based on 8,155 rateable properties (as at 1 July 2022). This is equivalent to \$73.93 pa rates increase per property Energy produced could provide enough power for 6,340 homes or 8-9% of Wellington's residential demand (based on 8MWh/HH) The Opex cost of \$5M pa includes \$4.8M pa revenue from sales of power generation Less after-care costs once plant is decommissioned.	With no Southern Landfill gate fees being collected, \$6.M pa Opex will be required to fund kerbside recycling collections and waste minimisation activities A proportion of operational costs will likely need to be recovered from rates No capital investment requirement No after-care costs once landfill is decommissioned Can be scaled down as waste volumes fall, becoming more cost-effective.

Mana Whenua partnership

A key aim for Wellington City Council was to underpin the decision-making process with consideration of its obligations to the people and environment within Wellington city and apply a Māori world view when evaluating the benefits and limitations of different options. This directed the selection process to encompass many criteria above and beyond technical and economic benefits, including:

- the Council’s responsibilities as kaitiaki of the proposed development site and surrounding waterways, environment and communities;
- whether the technology being assessed aligned with the Council’s Te Atakura First to Zero plan to reduce the climate change impacts of its operations; and
- whether implementation of each technology would promote more regenerative and circular management of waste products, and support the development of more sustainable waste management practices.

Through its Māori Partnerships Framework, the Council is partnering with Taranaki Whānui and Ngati Toa on this project. A Statement of Work is being progressed with an associated Project Partnership Charter to formalise this arrangement.

The Council has also appointed Taranaki Whānui CEO Lee Hunter to the Zero Waste Steering Committee which will oversee the Zero Waste programme,

including the Residual Waste Disposal - Southern Landfill Extension Piggyback Option (SLEPO) project from August 2022. For more information about the Steering Committee please see the section on Governance and Management below.

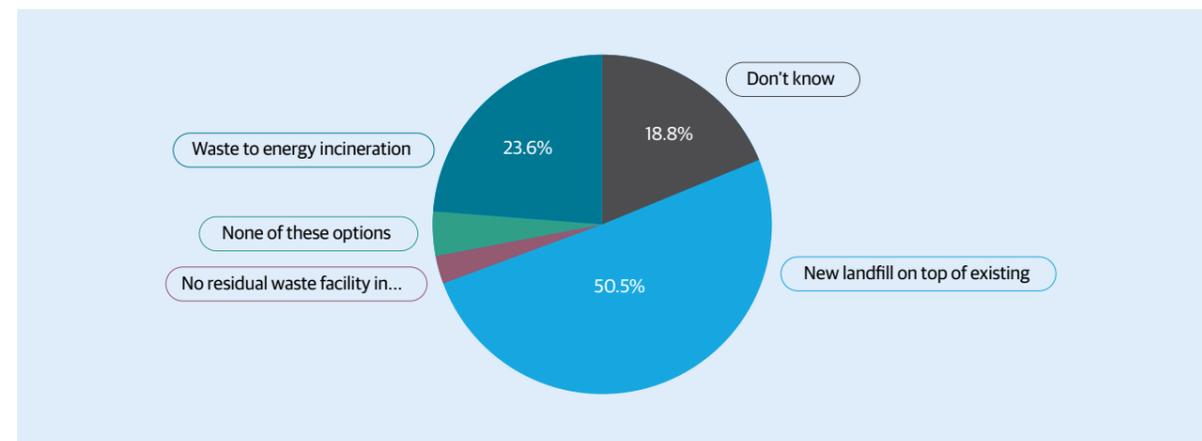
Stakeholder engagement and public consultation

The Residual Waste Working Party was established in November 2021. Its makeup facilitated a range of views that ensured robust discussion and affirmation of the process followed and shortlist of options. The working party consisted of representatives from Owhiro Bay Residents Association, Greater Brooklyn Residents Association, Waste Management, Zealandia, Waste Free Wellington, Friends of Owhiro Stream, EnviroWaste, Zero Waste Network and Para Kore.

As a result of workshops held with the working party and establishment of key criteria for the MCA, the Council created a shortlist of options. After that the formal public consultation (via the Long-Term Plan Amendment - Annual Plan 2022/23 consultation process) and engagement with mana whenua was completed. The working party, having fulfilled its purpose, was disestablished.

As illustrated below, more than 50% of respondents supported a new landfill on top of the existing landfill (piggyback option) over other options.

Diagram 1: Public response on shortlisted options as collated through the WCC 2022/23 Annual Plan consultation process



Community support aligns with Option 1: Southern Landfill Extension Piggyback Option (SLEPO). Our analysis also concludes Option 1 is the best option. Therefore, the recommended option for Wellington is to construct a new landfill on the top of the closed Stage 2 landfill (closed 1996).

In keeping with the above council resolution to *initiate and lodge the necessary resource consent applications to extend the Southern Landfill*, a community working group was established in March 2022 to provide

feedback and input into the design and resource consent application.

The working group is made up of representatives from Owhiro Bay Residents Association, Greater Brooklyn Residents Association, Waste Management, Zealandia and Friends of Owhiro Stream and supported by a Terms of Reference that sets out the purpose, role, responsibility and guiding principles. Regular workshops are being held as outlined in table 2 below.

Table 2: Stakeholder workshop schedule

Workshop	Date	Status	Purpose
1 (kick-off)	6 Apr 2022	Completed	Introduce the project, timeline and proposed concept design
2	4 May 2022	Completed	Introduce and discuss types of investigations for ecology, geology, hydrology and water quality
3	1 Jun 2022	Completed	Introduce and discuss findings for traffic, landscaping, noise and air quality. Discuss summary of feedback received from workshop 2 and any concerns raised, including options for how these could be potentially mitigated
4	6 Jul 2022	Completed	Provide summary of feedback received from workshop 3 and any concerns raised, including options on how these could be potentially mitigated
5	7 Sep 2022	Completed	Provide summary of feedback received from workshop 4 and any concerns raised, including options on how these could be potentially mitigated.
6	30 Nov 2022	Completed	Introduce and discuss the landfill management plan
7	15 Feb 2023	Scheduled	Close out any remaining areas of concern

On 1 June 2022 the Council’s Annual Plan/Long-Term Plan Committee agreed, as part of the annual plan process, that the preferred option for the future of the Southern Landfill was a “new landfill on top of existing landfill (piggyback option)”.

On 30 June the Council adopted the Annual Plan 2022-23 which included the Long-term Plan amendment for the “piggyback option”.

Benefits

The key benefits from adopting this recommended SLEPO solution include:

- **Waste diversion:** The Council can directly influence waste diversion at the point of disposal and implement strategically aligned waste reduction and minimisation initiatives
- **Resilience:** The Council will have a strategic asset to dispose of large quantities of waste in an emergency event
- **Value for money:** This is best value for money to deliver the Council's climate change targets compared to alternative options
- **Environmental:** Close alignment with delivery of *Te Atakura - First to Zero* and the Wellington City Council Zero Waste Programme whereas the other two options (Waste to energy incineration and no residual waste facility in Wellington city) do not.

Investment objectives

The SLEPO project has been established with three key investment objectives:

1. Provide a landfill solution that minimises environmental and social impacts and enables the transition to a circular economy that encourages and promote waste management and minimisation activities
2. Safely dispose of residual waste from both residents and commercial operators in keeping with best practice and the requirements of the Resource Management Act
3. Be a cost-effective waste management solution.

Financial

Design, Consenting and Construction of Part A and B requires a capital budget of \$36M which is made of a \$32.7M Base Case and \$3.2M (9.7%) contingency. The current LTP has \$19.6M available from 2022 to 2028 and \$16.3M available from 2029 to 2031. A LTP amendment is required to align the LTP funds with the expected Capital spend.

The project capital forecast cost has been estimated by industry leaders Tonkin + Taylor, experienced in the design and construction of landfills, and peer reviewed by independent Quantity Surveying organisation Bond Construction Management Limited, also suitably experienced and qualified.

The independent peer review came within 2.5% of the cost estimate by Tonkin + Taylor, providing a high level of confidence.

Given the project is at the preliminary stage, the level of uncertainty will reduce significantly once the detailed design and procurement activities have been completed. This is planned for June and September 2024 respectively.

Procurement

Procurement for SLEPO relates primarily to the preparation and construction of the landfill cells, the associated earthworks and the supply of materials, including substrates, drainage and landfill liner. The preferred procurement option is an open tender with early contractor engagement and a separate material purchase contract for specialist materials.

The design of the landfill will be very prescriptive as the key design elements will form the basis of the resource consent approvals. Departing from the design may risk triggering unintended consent conditions or require the Council to relitigate the design. In this context, a more traditional procurement is beneficial and provides the opportunity for elements of risk-sharing built into the contract. Early contractor engagement allows the Council to secure the necessary resources to complete the project given the current market conditions. Performance-based contracts will be tailored to the supply relationship and reflect Wellington City Council risk tolerances.

Key procurement deliverables are:

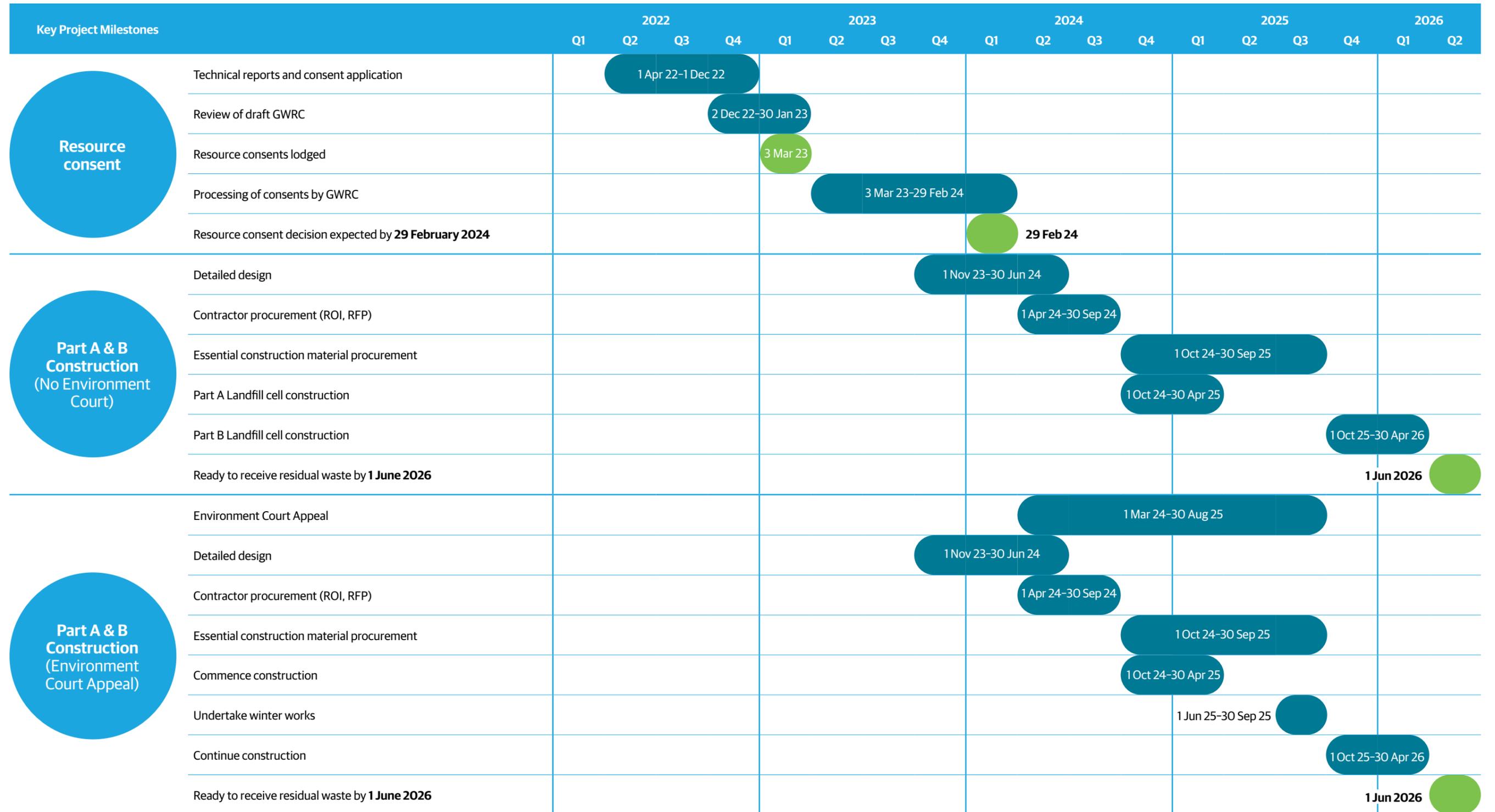
- Procurement Plan is targeted for approval by June 2023. This will detail the approach to be taken to secure the required suppliers for the detailed design and construction phases of the project
- Procurement of the main contractor for the construction phase will be completed by September 2024
- The procurement of specialist materials

The SLEPO project team has developed a schedule for the delivery of the project by June 2026.

The following diagram outlines the project stages and key decision gates. The Programme Schedule illustrates two different timelines, one in the event of no environment court appeal and one if there is an environment court appeal. This is covered in the risk section. Both timelines will ensure that the new landfill will be operational by June 2026.



Diagram 2: Programme Schedule



■ Task ■ Milestone



Strategic case: Making the case for change

Zero waste strategic context

Strategic overview

As global economies and populations grow, continued pressure is put on Papatūānuku and rawa taiao - natural resources to produce the range of products available on the market. The Platform for Accelerating the Circular Economy has reported that the global increase in material resource use is predominantly due to several factors, including:

- Global reliance on virgin materials rather than making better use of existing resources
- Lack of end-of-life processing and poor design of products limiting the opportunity to recover and reuse as many products and materials as possible.

It is clear that continued global and country specific, for example Aotearoa New Zealand, population growth and demand for products and services will continue to place pressure on rawa taiao - environmental resources and the climate. To limit this, countries will need to implement policies that support climate change initiatives, improve whakahaere rauemi - resource management and ensure sustainable materials management building on the principles of the pūnaha whakarōpū para - waste hierarchy of reduce, reuse and recycle.

While countries around the globe, including Aotearoa New Zealand, are making, and will continue to make, improvements in resource productivity, these changes will likely not be sufficient to offset the global increase in material use and resultant carbon emissions. To support a step change in resource productivity and use, further efforts will be needed to increase resource efficiency, including:

- supporting a circular economy, an alternative to the traditional linear economy in which we keep resources in use for as long as possible, extract the maximum value from them while in use, then recover and regenerate products and materials at the end of each service life (see Figure 1), and
- improvements in the sustainable management of materials.



Figure 1: Design out waste and pollution. Keep products and materials in use. Regenerate natural systems.

Wellington City Council strategic alignment

Accelerating Zero Waste is a Council priority in the 2021-31 Long-term Plan. Wellington City Council is in the process of writing a Zero Waste Strategy. The outcomes and goals will be co-created with the community. We will be focusing efforts on where we can have the greatest impact to accelerate towards zero waste. To deliver the zero waste outcomes we are embarking on a significant Zero Waste Programme. The Zero Waste Strategy will acknowledge the global and national context and trends, such as shifting to a circular economy, depleting natural resources and carbon emissions.

In 2019 the Council adopted *Te Atakura - First to Zero*, a blueprint which aims to ensure Wellington is a net zero emission city by 2050 and commits to making the most significant carbon reductions in the first 10 years. The implementation plan was approved in June 2020. At the same time the Council declared an ecological and climate emergency, accepting scientific evidence that there remains about a decade to take urgent action to reduce greenhouse gas emissions to avoid disastrous consequences for the environment and society.

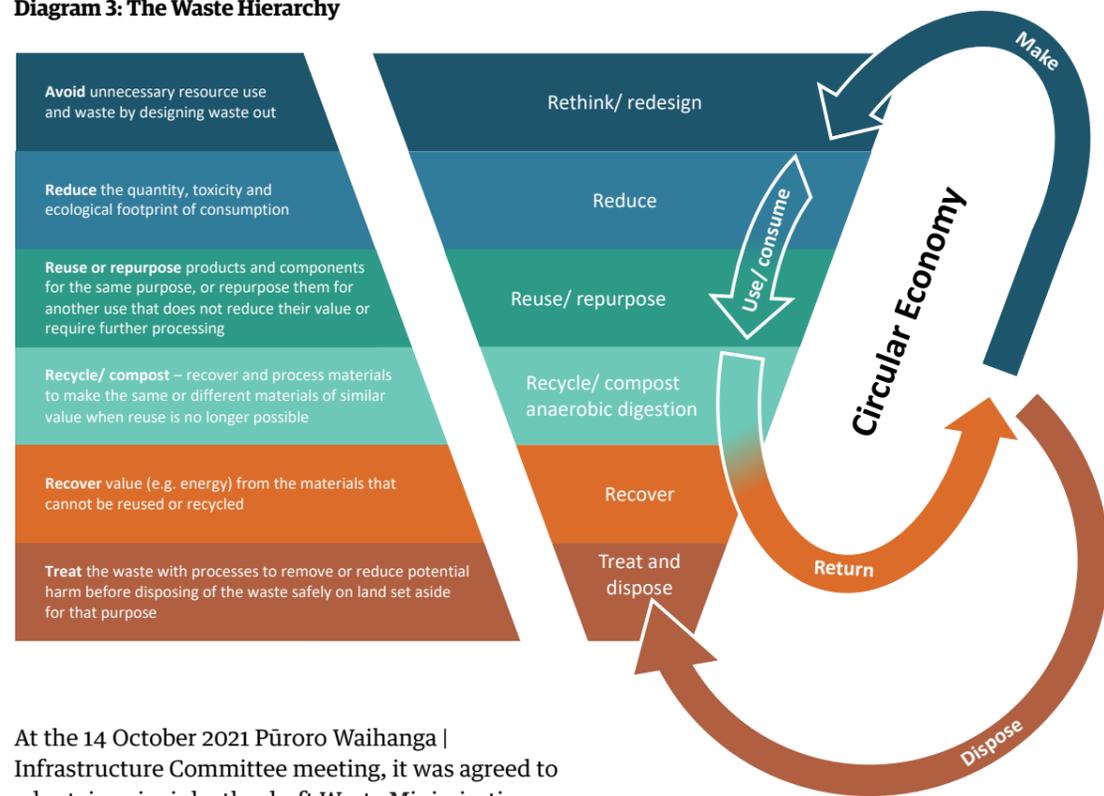
In 2022, the Council adopted the *Economic Wellbeing Strategy*, which recognises the role of the economy in environmental, social, cultural and economic outcomes. One outcome is “Transitioning to a zero-carbon, zero-waste circular economy”. It is asking for businesses and organisations to play their part.

In 2022 the Council also adopted the *Tūpiki Ora - Māori Strategy*, which recognises the importance of mana whenua, Māori and the Council working collectively and cohesively together, and it will set a precedent for our future partnership work.

The vision of Tūpiki Ora - Māori Strategy is that the vitality of our environment is nourished, the wellbeing of our whānau is fostered, te ao Māori is embraced and celebrated. Wellington City Council chose to participate in the Regional Waste Minimisation and Management Plan 2017-2023, rather than preparing its own plan. This plan focuses on increasing the amount

of waste diverted from landfill through reuse, recovery and recycling, taking into consideration the waste hierarchy (see diagram 1 below). The action resulting from this plan for Wellington City Council is the progression of a business case for the Sludge Minimisation Plant.

Diagram 3: The Waste Hierarchy



At the 14 October 2021 Pūroro Waihanga | Infrastructure Committee meeting, it was agreed to adopt, in principle, the draft Waste Minimisation Roadmap which will inform the development of council's next Waste Management and Minimisation Plan in 2023. The current regional WMMP remains the council's operative waste plan, which will inform and promote the provision of effective and efficient waste management and minimisation within Wellington city until 2023.

Diagram 4 illustrates how this project fits within the Council's strategic framework.

Diagram 4: Strategic context



This business case sets out a key step towards achieving this goal. It provides a residual waste disposal solution that supports the delivery of initiatives that minimise use of resources and maximising whakamahi anō - reuse and recovery. It also sets out a step change in the future management of the Southern Landfill while recognising its current importance in the transition to a net zero emission city by 2050.

Problem statement

The Southern Landfill is the only approved existing residual waste disposal facility for Municipal Solid Waste (MSW), dewatered sewage sludge and hazardous waste in Wellington city - about 96,000 tonnes per annum of municipal waste goes to the Southern Landfill. It is a listed strategic asset for Wellington City Council. The existing resource consents expire in June 2026 and the current operational landfill (referred to as Stage 3) is also projected to reach capacity at the same time, requiring a new residual waste disposal solution to be in place by then to ensure the smooth running of Wellington city and supporting future growth.

We need to decide how we dispose of Wellington's residual waste (what's left after we reduce, reuse and recycle) from June 2026.

Background and organisation overview

The Southern Landfill is the only approved existing waste disposal facility in Wellington city for Municipal Solid Waste, dewatered sewage sludge and hazardous waste, for safe disposal in compliance with the environmental standards in keeping with the Resource Consent granted by Greater Wellington Regional Council.

Wellington City Council owns the Southern Landfill located at Carey's Gully and operates this via a third-party supplier arrangement. It is considered a strategic asset for the Wellington City Council.

The current resource consent expires in June 2026 and the current landfill (referred to as Stage 3) is also projected to reach capacity at the same time, requiring a new residual waste disposal solution to be in place by then.

Work began in 2009 to extend the current landfill to the north side of Stage 3 into a new area referred to as Stage 4. Table 3 (page 25) provides an overview of the developments and activities between 2009 and where we are today in 2022.

Table 3: Timeline of activities from 2009 to 2022 to secure a residual waste disposal solution by June 2026

Year	Description	Outcome
2009	The Long-term Plan included an extension of the landfill.	Work began to prepare a design and consent for the extension of the landfill post-2026.
2013	The Council lodged consent with the Greater Wellington Regional Council (GWRC) for a landfill extension on undeveloped land, north of the existing landfill, with a top to bottom of valley filling concept.	Negative feedback from local residents around the extent of the landfill expansion coincided with a change in waste portfolio managers, prompting the Council to place the consent on hold and review the concept of this extension.
2017-2019	The Council began work to develop a new landfill extension concept in the same area but this time filling from the bottom of the valley to the top of the valley. The concept considered removal of the need for the stream to continually run into the stormwater tunnel and be redirected around the landfill at a higher elevation through a new man-made stream.	After opposition from local residents saw the Council challenged, the project was put on hold and the process was restarted.
2020-2021	The Council starts analysing options to determine a preferred option on how the city will dispose of residual waste once the current landfill consent expires in 2026. A longlist of 14 possible options was shortlisted to three through a two-step MCA process.	Council officers directed to undertake the work to initiate and lodge the necessary resource consent applications to extend the Southern Landfill.
2022	The Council publicly consults on three possible residual waste disposal options as part of the Long-term Plan Amendment - Annual Plan 2022/23 consultation process.	Elected members receive feedback from the public consultation and in June 2022 the preferred option is adopted into the Long-term Plan.

In summary, given the concerns raised about the proposed Stage 4 landfill, in 2021 the Council put Stage 4 on hold. A comprehensive MCA was undertaken in 2021 to identify the best residual waste disposal solution for Wellington.

We need to decide how we dispose of Wellington's residual waste (what's left after we reduce, reuse and recycle) from June 2026.

Investment objectives

The SLEPO project has been established with three key investment objectives.

1. Provide a landfill solution that minimises environmental and social impacts and enables the transition to a circular economy that

encourage and promote waste management and minimisation activities

2. Safely dispose of residual waste from both residents and commercial operators in keeping with best practice and the requirements of the Resource Management Act
3. Be a cost-effective waste management solution.

Table 4: Description of key investment objectives

Investment objective 1: Reduction of waste	In keeping with delivery of <i>Te Atakura - First to Zero</i> , Wellington City's blueprint for reducing greenhouse gas emissions to zero by 2050 That provides a landfill solution that minimises environmental and social impacts while facilitating essential waste management and minimisation activities and enables the transition to a circular economy and zero carbon future.
Investment objective 2: Safely dispose of residual waste	As a primary objective, security of supply and capacity for the continued safe disposal of Municipal Solid Waste (MSW) and dewatered sludge, acknowledging the outputs of the proposed sludge minimisation facility has not been finalised, is a priority. The security of supply has a direct influence on the costs to supply Council's kerbside waste services as well as other waste management directives. The solution should also be able to safely dispose of hazardous materials where possible, primarily, asbestos contaminated material and contaminated soils. It is acknowledged that such waste is produced as part of general development in the city including large scale infrastructure projects. The new landfill operation will be required to be designed to meet current standards to reduce and mitigate any environmental effects.
Investment objective 3: Cost effective waste management solution	The Council should at least cover the costs of construction and operation of the new waste facility through revenue generated from the waste disposal facility. Separate to this, Council may wish to continue to use surplus funds to contribute towards strategically aligned waste minimisation or diversion initiatives.

Preferred option assessment process overview

Assessment overview

To arrive at a preferred residual waste disposal solution, Council, community stakeholders and Beca undertook a detailed investigation and comprehensive multi-criteria analysis (MCA) that considered different technology options in combination with key criteria.

The Council engaged Beca and Fichtner in 2021 to perform a technical and suitability assessment of a long list of possible waste technology options to implement post-2026 and evaluate the relative advantages and disadvantages of applying each technology in a WCC context.

After the longlist of waste options had been assessed at a high-level and the best options identified, a more detailed comparative assessment for the four technologies best suited to the Council and wider Wellington region's requirements was performed.

In October 2021, the initial assessment of possible options for residual waste treatment in Wellington city was completed, and a report published to support public consultation on the shortlisted options.

The detailed analysis and MCA were completed in collaboration with community stakeholder groups in November and December 2021, and Beca prepared a "Future Waste Management Options" report for Council in January 2022. These two Beca reports are linked under Appendix 1 (a) and 1 (b).

Waste characteristics and constraints

The waste received at the Southern Landfill comes from a variety of different sources and contains multiple streams with different components. A summary of these is in Table 5 below.

Table 5: Landfilled Waste Characteristics

Stream	Category	Tonnage (average of previous 3 yrs)	Approximate%	Description
A	Domestic to transfer station	8383	9%	This is general waste received at our transfer station - usually residential customers
B	Mixed commercial	55874	58%	This is generally mixed commercial tonnages
C	Sludge/screenings to tip face	14286	15%	De-watered sludge
D	Special waste	17750	18%	Other types of unusual waste (approval upon application) - generally asbestos contaminated material

Separate from the waste that is landfilled on-site, the landfill also receives contaminated soil which is placed into dry cells instead of being mixed and landfilled with the other waste streams:

Stream	Category	Tonnage (average of previous 3 yrs)	Information
E	Contaminated soil	28297	This material linked to the amount of construction activity in the city - material uncovered is generally one-off - once contaminated material is gone; it is not reproduced

As seen in the tables above, about 37% of the total waste received is contaminated soil and special waste (generally asbestos-containing material) which fluctuates depending on construction activity in the city, and just over half of the total waste is mixed commercial and domestic waste. Wastewater treatment sludges make up 11% of the total waste received and 18% of landfilled waste.

Waste treatment solutions are limited for streams D and E, due to the hazardous nature of these wastes. These streams can't be processed to remove contaminants or recycled without extremely careful

processing, so it is realistic to assume that for the foreseeable future these streams will need to continue being disposed of in sealed, well-managed landfills. However, for other streams (especially streams A and B), there are a number of alternatives to landfilling. Most of the long list of options were focused on handling WCC's domestic and commercial wastes, as well as sludge.

Multi-criteria analysis process

An evaluation process was used to assess potential options and score their suitability. This included completing an “absolute criteria” assessment on a long list of options before scoring against a wider range of objectives.



Absolute criteria

Three “absolute criteria” were developed as bottom lines for option inclusion; technical maturity, timeframe and scalability. These were informed by what the Council considered fundamental to the aims of the project and were included as a first check for inclusion of any technology. Scores were categorised under “yes” (complies), “marginal” and “no” (does not comply). Technologies that did not align with any of the absolute criteria were not investigated further because:

- **Timeframe:** The consent for the Southern Landfill expires in June 2026 and as such future waste management options must be constructed and operational before this date. Alternatively, should the Southern Landfill reach capacity before June 2026 it would be expected that new technology could operate by this point
- **Technical maturity:** Implementing a process that is already established will reduce the technical risks involved. Where a technology has had 10 or more successful uses it is likely to be well understood with suitable parts, operators and expertise. Any option that has been implemented in less than five sites globally or is still in the research phase indicates that this process is novel and presents a higher risk for Wellington City Council. Where this is the case, the technology has been eliminated from further analysis
- **Scalability:** Some future waste solutions can be specific to certain tonnages and compositions, such as the amount of sludge or organics, which can make them more challenging to scale. However, to meet Wellington’s needs, technology needs to be able to adapt to possible shifts in waste disposal needs.

Table 6: Absolute criteria for option assessment scoring

Absolute criteria	Scoring rationale
Timeframe	Yes = Likely operational within timeframe Marginal = Likely operational with an acceptable interim solution of 1-2 years No = Not likely to be operational within timeframe.
Technical maturity	Yes = 10 or more successful references globally Marginal = 5 or more successful references globally No = Fewer than 5 successful references globally.
Scalability	Yes = Easily scalable/no requirements in terms of tonnages or composition Marginal = With some additional infrastructure/commitment the option can be adapted No = Can’t be scaled.

General objectives

Options that passed the absolute criteria were then scored against the general objectives developed by WCC and Beca. These objectives reflected the investment outcomes the Council wanted, alongside the considerations required under the Local Government Act 2002 and Resource Management Act 1991.

In general, the below measurable criteria work together to accomplish three main overall objectives:

- Minimise the effects of the waste management technology on the surrounding community and environment, including odour and air, water, land pollution as well as social impacts like noise and traffic
- Provide a proven, sensible and fiscally-responsible method for managing waste created in the Wellington region
- Align with WCC’s future vision for Wellington city, where sustainable and regenerative economies

are encouraged and the city transitions to net zero emissions by 2050 in line with science-based emissions reduction targets

- Following the completion of the stakeholder groups two workshops and survey (outlined below), community stakeholder feedback resulted in the final criteria being redefined and used to evaluate the long and short list of waste options.

Please see Table 7 below for a summary of these criteria.

Table 7: Assessment criteria (includes absolute criteria)

Criteria	Description
1 GHG emissions	Te Atakura First to Zero is the Council’s blueprint for reducing greenhouse gas emissions produced in Wellington city to zero by 2050. As such, WCC’s final waste option should align with this ambition.
2 Circular economy	The final waste option should support a transition to a circular economy that reflects natural systems and puts the wellbeing of Papatūānuku first.
3 Community connection	The final waste disposal option enables and supports community connection and understanding of residual waste management, and is not a barrier to waste minimisation initiatives
4 Scalability	The final waste option will need to support and enable future waste minimisation activities which are likely to reduce tonnages and can significantly change the composition of the waste received.
5 Technical maturity	Implementing a final waste option that is already established will reduce the technical risks involved. Where a technology has had 10 or more successful uses it is likely to be well understood with suitable parts, operators and expertise. Any option that has been implemented in less than 10 sites globally or is still in the research phase indicates that this process is novel and presents a higher risk for Wellington City Council.
6 Timeframe	The consent for the Southern Landfill expires in June 2026 and as such the Final Waste Option will need to be constructed and operational before this date.
7 Local community effects	The final waste option should minimise effects on the local community, including odours, noise, and traffic impacts that will disrupt residents, workers and visitors of the surrounding area.
8 Environmental effects (water)	The final waste option must uphold tikanga and Te Ao Māori to minimise adverse effects to waterways and surrounding aquatic environments, such as emissions to watercourses.
9 Environmental effects (land)	The final waste option must uphold tikanga and Te Ao Māori to minimise adverse emissions and contamination to surrounding land.
10 Environmental effects (air)	The final waste option must uphold tikanga and Te Ao Māori to minimise adverse emissions to air, including from transport, for example particulate or VOC emissions.
11 Consent and planning	The final waste option should have a strong likelihood of approval given existing policies, and alignment with central policy direction.

Criteria	Description
12 Value for money	The final waste option should provide overall value for money for Wellington city ratepayers and ensures any financial investments takes into account intergenerational costs considerations
13 Robustness/reliability	The final waste option should be robust and reliable enough to handle changes in incoming waste content, and any equipment should be available and online for as close to 100% of its required operational hours as possible.
14 Size	The final waste option should be able to fit within the existing site or be able to integrate into existing waste network.
15 Resilience	The final waste option should also have resilience in case of short-term significant increases in waste due to emergency situations like earthquakes or other natural disasters. This will consider day-to-day waste transport corridors including whether the solution is based locally or outside the Wellington region
16 Te Ao Māori	The final waste option should uphold Te Ao Māori and the commitments of Te Tiriti o Waitangi, to ensure the protection of tapu, the wellbeing and restoration of Papatūānuku, and provide options suitable for the physical and cultural environment of Aotearoa. As part of this, a strong partnership with Mana Whenua must be embedded within the foundation of the option.

MCA scoring

Each option was scored against the criteria with a score between 1 and 10 for its relative performance. An explanation of the meaning of each score is outlined in Table 8:

Table 8: Scoring Categories

Score	Meaning
1	Much worse than other options
3	Slightly worse than other options
5	Neutral
7	Slightly better than other options
10	Much better than other options

Long list of options

An overview of the long list of the 14 technologies considered is listed under Appendix 1 (a).

Absolute criteria assessment

Before assessing each option against the scoring criteria, an initial assessment was done against the three absolute criteria.

Table 9: Assessment of long list options against absolute criteria

Technologies option	Absolute criteria		
	1	2	3
	<i>Timeframe: Will be fully operational by the time the Southern Landfill reaches capacity or before June 2026; whichever occurs first?</i>	<i>Technical maturity: Has the technology been successfully applied overseas in similar cases?</i>	<i>Scalability: Can be easily scaled up or down to meet Wellington city's future waste disposal needs</i>
Energy from waste	Marginal (financial close in June 2022 would give you operation by 2026)	Yes	Marginal
Incineration w/o energy recovery	Marginal (financial close in June 2022 would give you operation by 2026)	Yes	Marginal
Anaerobic digestion	Yes	Yes	Marginal
Material recycling facility	Yes	Yes	Yes
Mechanical biological treatment	Yes	Yes	Yes
Composting	Yes	Yes	Yes
Autoclave	Yes	Yes	Marginal
Export (no collection)	Yes	Yes	Yes
Export (transfer station)	Yes	Yes	Yes
Gasification	Marginal (financial close in June 2022 would give you operation by 2026)	No	Marginal
Pyrolysis	Marginal (financial close in June 2022 would give you operation by 2026)	No	Marginal
Vermiculture	Yes	No	Marginal
Insect food cycle	Yes	No	Marginal
Landfill	Yes	Yes	Yes

Based on the above assessment, gasification, pyrolysis, vermiculture and insect food cycle were removed from the long list of options before scoring due to the lack of successful examples of these technologies internationally on waste similarly managed by the Council.

Long list evaluation results

Based on Beca’s assessments of each technology, a summary of the long list of options evaluation process results is provided on the following page.



Diagram 5: Evaluation process results

Technology	Absolute Criteria			Results
	Programme	Technical Maturity	Scalability	
Landfill	✓	✓	✓	PASS
Export (No collection)	✓	✓	✓	PASS
Export (Transfer Station)	✓	✓	✓	PASS
Energy from Waste	✓	✓	✓	PASS
Incineration w/o energy recovery	✓	✓	✓	PASS
Gasification	✓	✗	✓	FAIL
Pyrolysis	✓	✗	✓	FAIL
Anaerobic digestion	✓	✓	✓	PASS
Material Recycling Facility	✓	✓	✓	PASS
Mechanical Biological Treatment	✓	✓	✓	PASS
Composting	✓	✓	✓	PASS
Autoclave	✓	✓	✓	PASS
Vermiculture	✓	✗	✓	FAIL
Insect food cycle	✓	✗	✓	FAIL

The score of each identified option, and high level strengths and weaknesses is shown below in Table 10. All objectives were weighted equally with options scored out of 10 for each (giving a maximum of 120 points).

Assessment Criteria
Local Community Effects
Environmental Effects (water)
Environmental Effects (land)
Environmental Effects (air)
Alignment with Circular Economy
Alignment with Te Atakura First to Zero
Consenting and Planning
Value for money
Robustness/reliability
Maturity of offtake market
Size
Resilience

Technology	Summary	
	Total Score	Shortlist
Landfill	79	✓
Export (No collection)	64	
Export (Transfer Station)	61	
Energy from Waste	78	✓
Incineration w/o energy recovery	70	
Gasification		
Pyrolysis		
Anaerobic digestion	76	
Material Recycling Facility	82	✓
Mechanical Biological Treatment	82	✓
Composting	72	
Autoclave	58	
Vermiculture		
Insect food cycle		

The final scores were not intended to assign final rankings to the long list options - the scores were only used to select the four options that would be evaluated in detail.

Table 10: Long list scoring summary

Option	Strengths	Weaknesses	Score (out of 120)
Energy from waste	<ul style="list-style-type: none"> Recovery of energy/ash product Slightly reduced GHG emissions (compared with landfill) Reduced emissions to land/water Well-proven technology 	<ul style="list-style-type: none"> High capital cost Some air/particulate emissions Difficult to consent 	78
Incineration w/o energy recovery	<ul style="list-style-type: none"> Slightly reduced GHG emissions (compared with landfill) Reduced emissions to land/water Well-proven technology 	<ul style="list-style-type: none"> Some air/particulate emissions Difficult to consent Non-circular waste solution 	70
Anaerobic digestion (AD)	<ul style="list-style-type: none"> More circular waste solution Reduction in waste emissions 	<ul style="list-style-type: none"> High capital cost Not suitable for waste without treatment, less reliable AD solids will still need to be landfilled due to contaminants 	76
Material recycling facility (MRF)	<ul style="list-style-type: none"> More circular waste management solution Creation of potentially saleable material streams 	<ul style="list-style-type: none"> Lack of NZ market maturity for recycled material 	82
Mechanical biological treatment (MBT)	<ul style="list-style-type: none"> More circular waste management solution Creation of potentially saleable material streams 	<ul style="list-style-type: none"> Lack of NZ market maturity for recycled material 	82
Composting	<ul style="list-style-type: none"> More circular waste solution Reduction in waste emissions 	<ul style="list-style-type: none"> Compost will still need to be landfilled due to contaminants More expensive to operate for contaminated materials 	72
Autoclave	<ul style="list-style-type: none"> Decreased land and water pollution Decreased waste volumes 	<ul style="list-style-type: none"> Increased energy consumption without GHG emissions benefits Not a standalone technology Technically challenging and expensive 	58
Export (no collection)	<ul style="list-style-type: none"> No effects on local community No consenting required Mature market in NZ for this service 	<ul style="list-style-type: none"> Not resilient Higher operational cost Non-circular waste solution Increased GHG emissions 	64
Export (transfer station)	<ul style="list-style-type: none"> Few odour/traffic effects on local community No consenting required Mature market in NZ for this service 	<ul style="list-style-type: none"> Not resilient Higher operational cost Non-circular waste solution Increased GHG emissions 	61
Landfill	<ul style="list-style-type: none"> High value for money Mature market in NZ for this service Resilient 	<ul style="list-style-type: none"> Non-circular waste solution Will create GHG emissions Water/land emissions 	79

Short list of options

The options that passed the absolute criteria and scored highest against the remaining criteria were as follows:

1. Landfill extension (piggyback expansion and Stage 4)
2. Energy from waste
3. Materials recycling facility
4. Mechanical biological treatment.

The Council added a fifth option to no longer have a landfill but continue to operate the transfer station services and transport the waste to other landfills in the region, such as Spicers and Silverstream.

Options that met the criteria and carried forward from the first phase were as follows:

- Southern Landfill extension
- Energy from waste incineration
- Materials recycling facility
- Mechanical biological treatment
- Closure of the landfill - maintaining transfer station service.

On further analysis it became evident that the Material Recycling Facility and Mechanical Biological Treatment options are effectively waste reduction options and would still produce a significant amount of waste that would still need to be disposed of at a landfill. As a result, these two options were removed from further consideration but will be considered as part of Council's waste minimisation-focused work programmes.

There were also two options for a landfill extension - a greenfield development known as Stage 4 located to the north of the current Stage 3 landfill, and an alternative option, a smaller landfill extension that would sit on an older closed stage (Stage 2) of the landfill, referred to as the Southern Landfill Extension Piggyback Option.

After the 14 waste management technologies had been assessed and scored, four were shortlisted as suitable options for Wellington City Council to assess in more detail. These were:

1. Stage IV landfill expansion
2. Landfill piggyback expansion
3. Energy from waste
4. Export (closure of landfill).

... it became evident that the Material Recycling Facility and Mechanical Biological Treatment options are effectively waste reduction options and would still produce a significant amount of waste that would still need to be disposed of at a landfill.

Short list evaluation results

The results of this scoring process can be seen below in Table 11. For descriptions of the technologies assessed please see the Waste Technologies Assessment Matrix in Appendix 1 (c).

Table 11: MCA scoring summary for four options

	Criteria	Stage IV landfill expansion	Piggyback expansion	Energy from waste	Export (no collection)
1	GHG emissions	3	5	7	3
2	Circular economy	5	5	3	5
3	Community connection	7	7	5	1
4	Scalability	10	10	3	10
5	Technical maturity	10	10	7	10
6	Timeframe	7	10	3	10
7	Local community effects	3	5	7	10
8	Environmental effects (water)	3	3	7	5
9	Environmental effects (land)	3	3	7	3
10	Environmental effects (air)	5	7	3	5
11	Consent and planning	5	7	3	10
12	Value for money	7	10	5	1
13	Robustness/reliability	10	10	7	7
14	Size	10	10	10	10
15	Resilience	10	10	7	1
16	Te Ao Māori	5	7	3	1
	Score (out of 160)	103	119	87	92

None of the four options score perfectly against the identified criteria from the MCA assessment, and each has its own distinct advantages and disadvantages when compared with the other identified options.

Short list sensitivity analysis

Initially, all objectives were weighted equally with options scored out of 10 for each (giving a maximum of 160 points). This allowed for comparison between initiatives across all objectives. To account for relative importance of objectives as identified by WCC and community stakeholders, five different weighting scenarios were applied to understand the sensitivity of the findings and gain a better understanding of what the preferred options were. These scenarios were:

- Raw score (all objectives equal)
- Weighted for GHG emissions

- Weighted for alignment with Te Ao Māori
- Weighted for scalability
- Weighted for environmental emissions
- Weighted for resilience.

To conduct this assessment, an extra 20 points was assigned to the critical criterion in each sensitivity case, raising its total value to 30 points while others were kept at a value of 10 points.

The results of this comparison are given below in Table 12.

Table 12: Sensitivity weighting comparison

Option	Stage IV landfill	Piggyback landfill extension	Energy from waste (Efw)	Waste export
Raw score (%)	64%	74%	54%	58%
Weighted for GHG emissions (%)	61%	72%	56%	54%
Weighted for alignment with Te Ao Māori (%)	63%	74%	52%	52%
Weighted for scalability (%)	68%	77%	52%	62%
Weighted for environmental emissions (%)	61%	71%	55%	56%
Weighted for resilience (%)	68%	77%	56%	52%

These sensitivity analyses show the relative position of each option stays relatively constant throughout the sensitivity analysis process. Of the two local landfill extension options, SLEPO consistently ranks ahead of the Stage IV expansion. Both local landfill expansion options score higher than either energy from waste or waste export to landfill throughout all sensitivities.

Selecting a preferred option

Based on the results of this assessment process, the option identified as the preferred option for Wellington city's final waste management is the Southern Landfill Expansion Piggyback Option. It scored highest overall, showing that it performs strongest against the range of criteria considered.

This option leads in a number of categories, and in areas where it does not fully meet the ranking criteria it still performs similarly to other options. Its total score of 7.4 out of 10 available points (119 out of 160) is a full point ahead of the next nearest option (Stage IV landfill extension with 6.4 out of 10), and its position at the top of the list is repeated in each sensitivity test.

One of the main benefits of the piggyback landfill is that it aligns with the Council's intentions to increase waste diversion and recycling practices and reduce final waste volumes over the time the piggyback landfill would be operational. Providing a flexible end location for different kinds of waste over time would enable development and implementation of circular economies for different kinds of materials such as organic wastes, plastics and glass, when feasible.

The option is one of few that would be readily implementable within the required timeframe and would not pose any large barriers to consenting. In addition, SLEPO provides reasonable value for money due to the relatively low capital cost to construct and low ongoing operational cost (compared to other options and waste management projects).

Another big advantage of landfilling over alternate waste treatment technologies is that it is able to receive almost any kind of waste. Energy from waste, for example, is unable to receive and process contaminated soil and special waste streams. Therefore energy from waste would need to be employed in tandem with landfilling to provide appropriate coverage for the different wastes generated in Wellington city.

This option was also supported by community stakeholder groups, reflecting its well-rounded performance against nominated assessment criteria.

As a result of the MCA process, two options were identified and finalised as shortlisted. A third option, landfill closure (in combination with exporting waste to other landfills), was added at councillors' request.

The three options shortlisted and taken forward were:

1. New landfill on top of existing landfill (piggyback option)
2. Waste to energy incineration
3. No residual waste facility in Wellington city.

Council publicly consulted on the three options through the Long-term Plan Amendment - Annual Plan 2022/23 consultation process. In addition to promoting the opportunity and encouraging the public to provide feedback, Council also engaged with the public via a webinar. Questions and clarifications received were responded to.

At the Annual Plan/Long-term Plan Committee meeting held on 1 June 2022, the 2022/23 Annual Plan and Long-term Plan Amendment was deliberated and a recommendation made. The Council agreed to the LTP amendment preferred option on the future of Southern Landfill - the Southern Landfill Extension Piggyback Option. This was ratified at the subsequent Annual Plan/Long-term Plan Committee meeting on 30 June:

Underpinning the assessment process with a Māori world view

A key aim for Wellington City Council was to underpin the decision-making process by considering its obligations to the people and environment within Wellington city and apply a Māori world view when evaluating the benefits and limitations of different options. This directed the selection process to encompass many criteria above and beyond technical and economic benefits, including:

- The Council's responsibilities as kaitiaki of the proposed development site and surrounding waterways, environment and communities
- Whether the technology being assessed aligned with its *Te Atakura - First to Zero* plan to reduce the climate change impacts of Wellington City Council's operations
- Whether implementation of each technology would promote more regenerative and circular management of waste products, and support the development of more sustainable waste management practices.

Mana Whenua partnership

Through the Council's Māori Partnerships Framework, it is partnering with Taranaki Whānui and Ngāti Toa on this project. A Statement of Work is being progressed with an associated Project Partnership Charter to formalise this arrangement.

Council has also appointed Taranaki Whānui CEO Lee Hunter to the Zero Waste Steering Committee that has oversight of this project.

Stakeholders and engagement

Working party 2021

After submission of the first Beca report on 4 October 2021 and after the decision to no longer proceed with the Stage 4 landfill extension option, the 14 October Infrastructure Committee made the decision to undertake the work to initiate and lodge the necessary resource consent applications to extend the Southern Landfill.

A residual waste working party was established with representatives from Owhiro Bay Residents Association, Greater Brooklyn Residents Association, Waste Management, Zealandia, Waste Free Wellington, Friends of Owhiro Stream, EnviroWaste, Zero Waste Network and Para Kore.

MCA workshop process with community stakeholder groups

The MCA criteria and option evaluation process were refined in conjunction with the working party. This collaborative process involved two workshops in November and December 2021 to:

- Define and discuss the scope and objectives of the MCA assessment process
- Review the design and format of the MCA assessment process and criteria used in the assessment
- Re-examine the list of options to be evaluated.

These workshops were organised by Council and facilitated by Beca in-person and online to accommodate any COVID-19 restrictions.

Workshop attendees

The workshops were attended by a number of community interest groups, including:

- Owhiro Bay Residents Association
- Zero Waste Network
- Greater Brooklyn Residents Association
- Waste Free Wellington
- Para Kore
- Friends of Owhiro Stream
- Zealandia
- EnviroWaste Wellington
- Waste Management.

First workshop

The first workshop on 18 November 2021 was held at Wellington City Council, 113 The Terrace, Wellington. Beca facilitated a discussion on the original report, the aims and objectives of the original study, and the assessment process used to evaluate options for the Council's final waste management. The working group then gave feedback on the nature of the initial assessment and the structure of the MCA process employed by Beca and Fichtner to compare the options.

A full copy of the minutes of this discussion is available in Appendix 1 (d).

Second workshop

The second workshop on 14 December 2021 was also held at Wellington City Council, at 113 The Terrace, Wellington. Beca facilitated a discussion on numerous topics, including:

- The focus of the assessment in the context of Wellington's WMMP and overall waste management roadmap
- Options being considered as part of the assessment process
- Timeline for following consultation process and sensitivities surrounding existing landfill consent timelines.

Workshop participants then took part in a criteria feedback exercise to evaluate whether the existing criteria were fit for purpose, and highlight any gaps to be filled in the next round of analysis.

A full copy of the minutes is available in Appendix 1 (e).

Follow-up survey

To close out remaining actions from the second workshop, an online survey was submitted to workshop participants to collect additional feedback. The survey was designed to collect feedback on three topics:

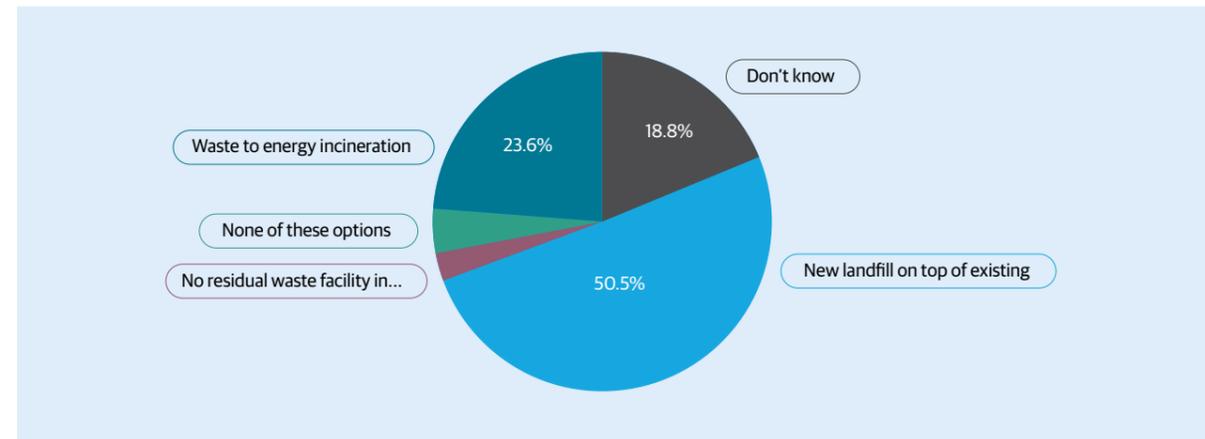
- The wording of existing criteria
- Any additional criteria that should be included
- Which criteria are most critical to success of the final waste option
- Any additional options that should be considered as part of the analysis.

Based on the stakeholder groups’ two workshops and survey feedback, the final criteria used to evaluate the long and short list of waste options was refined. As a result the council could create a shortlist of options. The working party, having fulfilled its purpose, was disestablished.

Public consultation

Council publicly consulted on the three options through the Long-term Plan consultation process. In addition to promoting the opportunity and encouraging the public to provide feedback, Council also engaged with the public via a webinar. Questions and clarifications received were responded to. Formal public consultation (via the 2022/23 Long-term Plan consultation process) and engagement with Mana Whenua was completed in early 2022, the responses to the question: *“Do you prefer a new landfill on top of the existing landfill (piggyback option), or waste to energy incineration or having no residual waste facility in Wellington city?”* Support was 50.5%, 23.6% and 2.8% respectively, with 4.3% in favour of “none of these options” and 18.6% as “don’t know”, as illustrated in the chart below.

Diagram 6: Public response on shortlisted options as collated through the WCC 2022/23 Long-term Plan consultation process



Working group 2022

In keeping with the Council resolution of 14 October 2021 to *initiate and lodge the necessary resource consent applications to extend the Southern Landfill*, a new community working group was established in March 2022.

This working group is made of representatives from Owhiro Bay Residents Association, Greater Brooklyn Residents Association, Waste Management, Zealandia and Friends of Owhiro Stream. The details and purpose of the working group are set out in the terms of reference, which can be found here. In summary, the key purpose is to consider and provide feedback, which covers:

- **The proposed design:** Provide feedback, including identifying any improvements that can be made to the design, noting that Council and its experts are responsible for ultimate decision-making owing to the associated liability this carries
- **Review of findings:** Provide feedback on the findings prepared as part of the resource consent application 2

- **Identifying impacts:** Identify impacts of the proposed design including, but not limited to, the effect on the environment and community
- **Mitigation:** Suggest options to mitigate any impacts that the proposed design may have including, but not limited to, the effect on the environment and community
- **Other:** Help to provide feedback on the operation of the piggyback option going forward through suggestions that will form part of the landfill management plan.

The working group is an advisory not a decision-making body, which means it can't independently commission reports or incur expenses but may recommend such actions to the Council. Regular workshops are being held as outlined in table 13 below.

Table 13: Stakeholder workshop schedule

Workshop	Date	Status	Purpose
1 (kick-off)	6 Apr 2022	Completed	Introduce the project, timeline and proposed concept design
2	4 May 2022	Completed	Introduce and discuss types of investigations for ecology, geology, hydrology and water quality
3	1 Jun 2022	Completed	Introduce and discuss findings for traffic, landscaping, noise and air quality. Discuss summary of feedback received from workshop 2 and any concerns raised, including options for how these could be potentially mitigated
4	6 Jul 2022	Completed	Provide summary of feedback received from workshop 3 and any concerns raised, including options on how these could be potentially mitigated
5	7 Sep 2022		Provide summary of feedback received from workshop 4 and any concerns raised, including options on how these could be potentially mitigated.
6	30 Nov 2022	Completed	Introduce and discuss the Landfill Management Plan. Close out any remaining areas of concern.
7	15 Feb 2023	Scheduled	Close out any remaining areas of concern

Potential scope and services

In scope:

Consideration of three alternative disposal options:

1. Implementation of the final option selected (June 2022)
2. Progress Option 1 now, specifically design and securing required resource consents
3. Stakeholder engagement, including Iwi, local community representatives.

The table below provides an overview of the scope of services to be delivered by the preferred disposal solution, in order of priority.

Table 14: Scope of Services

Priority	Services
1	Facility for the safe disposal of commercial quantities of Municipal Solid Waste (MSW) and sewage sludge Facility for the safe disposal of residential quantities of waste and hazardous waste, including materials from a transfer station
2	The facility must minimise any negative environmental impacts in line with current acceptable standards in keeping with best practice. This includes reducing the carbon footprint and emissions compared to the current operation
Optional priority	Services
3	Facility for the safe disposal of commercial quantities of contaminated soil and asbestos contaminated material

Out of scope:

Though out of scope for this business case, the Piggyback option will support delivery of the associated zero waste projects and initiatives under the Zero Waste Programme, and waste strategy and minimisation initiatives, specifically initiatives and opportunities to reduce the volume and types of materials to be disposed of. These are covered by the Regional Waste Minimisation and Management Plan.

Benefits

Having a proven residual waste disposal solution in place by June 2026 will provide the following benefits:

Table 15: Project benefit description

ID	High-level benefit	Description	Strategic imperative, KPI linkage, indicator framework
1	There is no minimum municipal solid waste tonnage volume requirement which contributes to achieving the Regional Waste Management and Minimisation Plan and Te Atakura (the Council's Zero Carbon Plan)	This enables Council to deliver on its waste reduction goals by putting in place a residual waste disposal solution option that has no minimum volume disposal requirement and is part of a larger circular economy system focused on transformational change and zero waste aspirations	LTP, Objective 5 (An accelerating zero carbon and waste-free transition) KPI linkages: WCC CEO KPIs: the Zero Waste Strategy and associated Action Plan is approved by the Council by 30 April 2023, and the Southern Landfill Resource Consent lodged by June 2023. Waste minimisation activities) Volume of waste diverted from landfill (tonnes) Te Atakura: Reduction in landfill waste by a third by 2026 Investment-level indicators: Progress on achievement of Te Atakura implementation plan
2	Ratepayer-convenient access to Council strategic asset and services that reduce residual waste to the landfill	Wellingtonians continue to benefit from having a conveniently accessible Class I landfill and associated services, such as the Tip Shop, providing the level of service expected from the Council	LTP Infrastructure Strategy
3	Council has control over access to the Southern Landfill which contributes to the Regional Waste Management and Minimisation Plan	By having direct control of how waste will be disposed of at landfill, Council can collaborate regionally and ensure strategic pricing and operations are in place to manage waste flows and support future waste minimisation initiatives	LTP, Objective 5 (An accelerating zero carbon and waste-free transition) KPI linkages: (Waste minimisation activities) Volume of waste diverted from landfill (tonnes) Te Atakura: Reduction in landfill waste by a third by 2026 Investment-level indicators: Progress on achievement of Te Atakura implementation plan
4	No or minimal rates impact	The Council should at least cover the costs of construction and operation of the new waste facility through the revenue generated from the waste disposal facility	WCC Financial and Cost Minimisation Strategy KPI linkages: Maintenance and operational costs Financial and health impacts on Wellingtonians and on Council (LTP) Investment-level indicators: Maintenance and operational costs
5	Greater resilience in an emergency event	This will enhance Wellington city's resilience during an emergency by maintaining a disposal site for waste or hazardous materials	Wellington Resilience Strategy KPI linkages: WCC Risk Register (Strategic Risks) Investment-level indicators: A maintaining of the risk rating expressed as per council's risk standard

ID	High-level benefit	Description	Strategic imperative, KPI linkage, indicator framework
6	Provide certainty of security of supply and capacity	For the continued disposal of Wellington’s waste, including dewatered sewage sludge, or the future outputs from the proposed sludge minimisation facility and other hazardous waste while we transition to low waste society	Wellington Resilience Strategy KPI linkages: WCC Risk Register (Strategic Risks) Investment-level indicators: A maintaining of the risk rating expressed as per the Council’s risk standard

Risks

The waste minimisation initiatives described in this business case sit within a range of treatments that contribute to addressing the Council’s strategic risk of inadequate climate change response. Other treatments planned or in progress include sludge minimisation, reductions in energy consumption and Let’s Get Wellington Moving projects.

The key risks identified in proceeding with the proposed Southern Landfill Extension Piggyback

Option are outlined below. Note, this excludes the Cost Risks listed in Table 17 under the Financial Case section, which are specifically related to the funding contingency provision.

Residual Risk Matrix

The matrix shows the residual rating for all main risks, for example, the rating when all mitigations have been implemented, versus planned.

Figure 2: Residual risk ratings on main risks

Likelihood	Impact			
	Minor	Moderate	Major	Severe
Almost certain				
Likely	#4 High leachate table	#3 Technical specialists		
Unlikely	#5 Supply costs	#2 Ecological concerns	#1 Resource consent not granted	
Rare		#6 Resource consent delayed	#6	

Figure 3: Ratings and mitigations for main risks in order of highest to least residual risk

#	Main risk descriptions	Initial rating		Residual rating		Comments & risk management strategies (mitigations)
		Likelihood	Impact	Likelihood	Impact	
1	Resource consent is not granted (opposed at the hearing, Environment Court and potentially Court of Appeal). While no certainty can be provided or guaranteed, the probability of this risk being realised is considered unlikely	Unlikely	Severe	Unlikely	Major	Through the public consultation process and ongoing engagement with various community groups in the resource consent process and addressing areas of concern, the probability of Council’s application being appealed beyond the Environment Court is considered unlikely. The reason for no change in the overall rating is that no certainty can be given here as, under NZ RMA legislation, the right exists to a party wishing to appeal a GWRC hearing or Environment Court decision, albeit at great cost, particularly if unsuccessful and costs are awarded against the party objecting
2	Ecological concerns are not adequately mitigated to a level that meet the expectations of the community or Greater Wellington Regional Council, escalating the resource consent application to the Environment Court	Likely	Moderate	Unlikely	Moderate	The project has provided for an ecological compensation package to fund initiatives to offset environmental impacts and undertaking additional water quality monitoring
3	Lack of availability of technical and specialists required for the construction of the landfill	Likely	Moderate	Unlikely	Moderate	Early engagement and procurement with the market will be undertaken to secure required resources and specialists
4	A high leachate table in Stage 2 landfill compromises integrity of piggyback design and ability to deliver the project	Almost Certain	Major	Likely	Minor	Engage specialist to design the solution and implement this before lodging consent so that this risk/issue is removed Work is currently under way to design and install deep wells in Stage 2 to access and pump leachate to trade waste. This will mitigate the risk

#	Main risk descriptions	Initial rating		Residual rating		Comments & risk management strategies (mitigations)
		Likelihood	Impact	Likelihood	Impact	
5	If supply costs increase beyond current budget, as in what is being asked for in the business case, then this will require a request for additional funding or reworking of project outputs to fit the available budget Risk that there is inadequate supply of materials to construct the landfill which then delays delivery of the proposed solution	Likely	Moderate	Unlikely	Minor	Contingency increased from 5% (\$2M) to 10% (\$6M) of the new preliminary design base case (associated risk of not being approved) Business case risk will be priced to determine contingency - supply chain and market constraints will be factored in Aim to procure early and stockpile where practicable Council will undertake early procurement of materials (2023) and store these to mitigate this risk. Materials included landfill liner and pipes
6	Resource consent is not granted in a timeframe that allows the facility to be constructed and operational by 2026	Unlikely	Moderate	Rare	Moderate	Resource consent application is planned to be lodged in March 2023. The timeline builds in 12 months for the consent hearing and 18 months for any appeal to the Environment Court. Construction of the landfill will be staged. In the event of the landfill not being operational by June 2026, waste will need to be disposed of at neighbouring landfills, such as Silverstream and Spicers
7	Prior to lodging the resource consent application to GWRC, council becomes aware that there is strong opposition by a party(s) to the Piggyback option who are likely to appeal a decision by GWRC to grant consent.	Unlikely	Moderate	Rare	Moderate	Council has the option to by-pass the GWRC hearing process and go direct to the Environment Court, saving time and cost but noting that the Environment Court decision is final (can only be appealed on points of law). Going direct to the Environment Court would not be viewed favourably by the community vs first going through a public hearing process and still having the option to appeal any decision to the Environment Court. Any decision to by-pass the GWRC hearing process should therefore be carefully considered.

Key constraints, dependencies, assumptions and SMF project

Constraints

The main constraints are:

- **Timeframe:** The residual waste disposal solution needs to be in place and operational by June 2026. If this requires new infrastructure to be constructed, then all regulatory processes, consents and procurement to construct must be in place by December 2024
- **Resources:** The necessary technical resources and construction expertise must be available at the time to construct and commission the landfill
- **Materials:** Specialist construction materials need to be available, specifically, landfill liner fabric and High Density Polyethylene (HDPE) pipes. The landfill liner will need to be imported.

The preferred residual waste disposal option will affect the availability of land at the Southern Landfill for any planned future waste diversion facilities that could potentially exist on the same Stage 2 closed landfill area.

Surplus landfill operation funds are currently used to fund other council activities, such as waste minimisation and kerbside recycling collection services. The Piggyback Option will allow this to continue versus the other two options.

Dependencies

The two dependencies are:

1. Stability of Stage 2 landfill. As identified in the Main Risks section above, the stability and design of the Piggyback option is dependent upon reducing the leachate table in Stage 2
2. Strength of existing tunnel to support the Piggyback option. The Piggyback option will be constructed on top of an existing tunnel that diverts a stream from the north of the Stage 3 landfill to the Carrey's Gully stream to the south of the Stage 2 area. An area of the tunnel has been identified as having potentially low rock cover which, without additional strengthening, may impact the ability to support the weight of the piggyback option. Work is under way to confirm this and, if required, additional strengthening will be undertaken in the tunnel.

Sludge Minimisation Facility (SMF) project inter-relationship

With the business case approved on 30 June 2022 to build a Sludge Minimisation Facility (SMF) at Moa Point, the SMF project will seek funding approval from Council to proceed with construction.

Building the SMF will enable the Council to materially decouple the disposal of sewage sludge from the Southern Landfill before the resource consent lapses. The relevant technical information must be provided to ensure outputs of the proposed sludge minimisation plan can be disposed in this new facility (dried pallets and, in the event of a SMF process failure, wet sludge).

The Wellington SMF is expected to come online at the same time as the Southern Landfill extension, which would mean the landfill could take treated bio-solids immediately. The Wellington Sludge Minimisation Project team and the SLEPO project team are working together to co-ordinate their activities, including ensuring incorporating any treated sludge/bio-solids disposal requirements into the consenting documentation for the landfill extension. Generally, Grade A bio-solids like those produced from the new Wellington Sludge Minimisation Facility can be disposed of without consent.



Financial case

Funding approach overview

Design, Consenting and Construction of Part A and B requires a capital budget of \$36M which is made of a \$32.7M Base Case and \$3.2M (9.7%) contingency. The current LTP has \$19.6M available from 2022 to 2028 and \$16.3M available from 2029 to 2031. A LTP amendment is required to align the LTP funds with the expected Capital spend shown in 16 table below.

The project operational and capital forecast costs have been estimated by industry leaders Tonkin + Taylor, who are experienced in the design and construction of landfills.

The Tonkin + Taylor forecasts have also been independently peer reviewed by quantity surveyor (QS) organisation Bond Construction Management Limited (Bond CM), considered one of the most experienced and qualified in the industry.

The independent review undertaken by BondCM determined that the construction cost estimate to construct the Piggyback Landfill is less than 2.5% than the construction estimate prepared by Tonkin + Taylor. Note, this excludes; resource consents, project delivery costs and costs specific to WCC.

At this relatively early stage of the project, the cost estimate difference of less than 2.5% provides a high level of confidence in the Tonkin and Taylor estimate.

A summary of the base estimate (including 9.7% contingency) is presented in Table 16.

Given the project is at a preliminary stage, the level of uncertainty will reduce significantly once the detailed design and procurement activities have been completed. This is planned for June and September 2024 respectively.

The project operational and capital forecast costs have been estimated by industry leaders Tonkin + Taylor, who are experienced in the design and construction of landfills.

Table 16: Budget estimate breakdown to design, consent and construct Parts A and B.

	Base Case Estimate (Part A + Part B) (2022 \$)
Resource Consent	
Prelim Design, Planning, Investigation, Water Quality Monitoring, Stakeholder Engagement	\$ 2,991,569
Total (Resource Consent) =	\$2,991,569
Landfill Engineering	
Landfill Development	\$ 16,516,296
Ecological Compensation (Terrestrial + Freshwater)	\$ 7,123,976
Roading Improvements	\$ 845,824
Stage 2 Leachate Table Reduction	\$ 1,075,200
Total (Landfill Engineering) =	\$ 25,561,295
WCC Misc. Costs	
Compost Relocation	\$ 290,000
Weighbridge and new kiosk	\$ 450,000
Existing sewer improvements	\$ 900,000
Total (Wcc Misc. Costs) =	\$ 1,640,000
Project Delivery Post Consent Approval	
Detailed Design, Tender and Construction Administration	\$ 2,556,130
Total (Project Delivery Post Consent Approval) =	\$ 2,556,130
Total Contingencies (sum of the above)	
Total Contingency Value, \$	\$ 3,167,675
Overall Contingency Percentage, %	9.7%
Base Rate (excluding contingencies)	\$32,748,994
Grand Total (including contingencies)	\$ 35,916,669

Table 17: This table below presents the recommended scenario capital spend between 2022 and 2047 noting that the cost is spread over this period to reflect the construction of multiple landfill cells.

Financial Year	Part B										
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	
Description	Design and Consenting / Consent Processing"		Consent Processing / Detail design	Construct Part A	Construct Part A"	Construct Part B"					
LTP Provision	1,309,900	4,895,834	7,396,985	1,438,133	1,479,650	1,522,712	1,567,207	6,580,438	8,056,206	1,710,145	35,957,210
Capex spend	600,000	1,697,608	1,551,358	13,124,597	3,990,025	7,821,478	7,131,603	-	-	-	35,916,669
Difference	709,900	3,198,225	5,845,626	-11,686,464	-2,510,375	-6,298,766	-5,564,396	6,580,438	8,056,206	1,710,145	40,541
Cumulative spend	-	-	9,753,751	-1,932,712							
Current LTP Provision 2022-2028	1,309,900	4,895,834	7,396,985	1,438,133	1,479,650	1,522,712	1,567,207				19,610,421
Current LTP Provision 2029-2031	-	-	-	-	-	-	-	6,580,438	8,056,206	1,710,145	16,346,789
Cumulative Difference	709,900	3,908,125	9,043,851	-1,932,712	-2,510,375	-8,809,141	-11,863,161				
Future LTP alignment requirement	none	none	none	1,932,712	2,510,375	6,298,766	5,564,396	none	none	none	16,306,248
Current LTP Provision 2022-2028 + Future LTP alignment requirement	1,309,900	4,895,834	7,396,985	3,370,845	3,990,025	7,821,478	7,131,603	none	none	none	35,916,669

The table below presents the capital spend between 2022 and 2030/31 and alignment with the LTP noting that the cost is spread over this period to reflect the construction of Parts A and B. An LTP amendment is required to align the LTP funds with the expected Capital spend.

Cost risks

The preliminary design of the Piggyback Option includes a range of potential future risks that may need to be provided for by the contingency provision. The table below provides a breakdown of the risk

items that may contribute to a future cost increase, as outlined in the Tonkin + Taylor report (Appendix 2(a)).

Table 18: Significant risk items for SLEPO landfill construction works for PART A and Part B including enhanced Stage 3 Landfill cap ecological as compensation due to terrestrial ecology effects of SLEPO

Risk item	Major items requiring contingency allowance
Erosion and Sediment Control (ES)	<ul style="list-style-type: none"> Water retaining structures located above Stage 2 closed landfill (Sediment retention pond and polishing wetlands) Conceptual stage for design of polishing wetlands More stringent ESC measures may be required after consent review process
Earthworks	<ul style="list-style-type: none"> Increase in unsuitable soil material Lack of suitable soil material for Low Permeability Fill (LPF) Increase in earthwork quantity due to settlement of the Stage 2 closed landfill General increase in earthmoving cost Surface preparation to receive the landfill lining system is more complicated than envisaged during preliminary design stage
Slope stability (Provisional)	<ul style="list-style-type: none"> Require additional slope stabilisation measures such as rock bolt/dowel and sprayed concrete facing
Roading	<ul style="list-style-type: none"> Increase in material cost (AP65 sub-basecourse / AP40 basecourse) due to shortage of supply from quarries within the greater Wellington region
Groundwater system	<ul style="list-style-type: none"> Not at detail design stage. Pipes and trench dimensions are based on assumptions. Risk in changes to material type and size.
Stormwater system	<ul style="list-style-type: none"> Not at detail design stage. Drain, pipes and trench dimensions are based on assumptions. Risk in changes to material type and size.
Landfill lining system	<ul style="list-style-type: none"> Risk of design change and/or increase in quantity due to the unknown nature of the legacy Stage 2 closed landfill. E.g. highly compressible asbestos in old landfill would require significant reinforcement geotextile to manage differential settlement in the landfill basal lining system. Risk of significant material cost increase. Note: HDPE liner / Pozidrain material is not available from NZ or Australia.

Leachate collection system	<ul style="list-style-type: none"> Increase in material cost (40 / 20 gravels) due to shortage of supply from quarries within the greater Wellington region Not at detail design stage. Pipe dimensions are based on assumptions. Risk in changes to material type and size. Risk of significant HDPE pipe cost increase
Stage 2 closed landfill leachate pumping system	<ul style="list-style-type: none"> Design is at concept level and is subject to the performance of the leachate pumping trials yet to be undertaken Increase in material cost (40 / 20 gravels) due to shortage of supply from quarries within the greater Wellington region
Freshwater ecology offset / compensation	<ul style="list-style-type: none"> Ecological compensation is at an early stage of development and is subject to requirements following the consenting process
Landscape and revegetation. Terrestrial ecology offset / compensation	<ul style="list-style-type: none"> Ecological compensation is at an early stage of development and is subject to requirements following the consenting process. General increase in earthmoving cost
Stage 2 closed landfill gas collection system	<ul style="list-style-type: none"> Increase in material cost (40 / 20 gravels) due to shortage of supply from quarries within the greater Wellington region Risk of significant HDPE pipe cost increase Design is at concept level and is subject to change following better understanding of the condition of the existing Stage 2 landfill. Items that could impact design are: <ul style="list-style-type: none"> Presence of asbestos Elevated leachate level - when leachate is lowered, there is potentially a significant increase in LFG generation and emission Uncertainty of historical waste fill and prediction of LFG generation model
Stage 2 closed landfill gas collection system	<ul style="list-style-type: none"> Increase in material cost (40 / 20 gravels) due to shortage of supply from quarries within the greater Wellington region Risk of significant HDPE pipe cost increase Design is at concept level and is subject to change following better understanding of the condition of the existing Stage 2 landfill. Items that could impact design are: <ul style="list-style-type: none"> Presence of asbestos Elevated leachate level - when leachate is lowered, there is potentially a significant increase in LFG generation and emission Uncertainty of historical waste fill and prediction of LFG generation model

Operational/pre & post-project funding

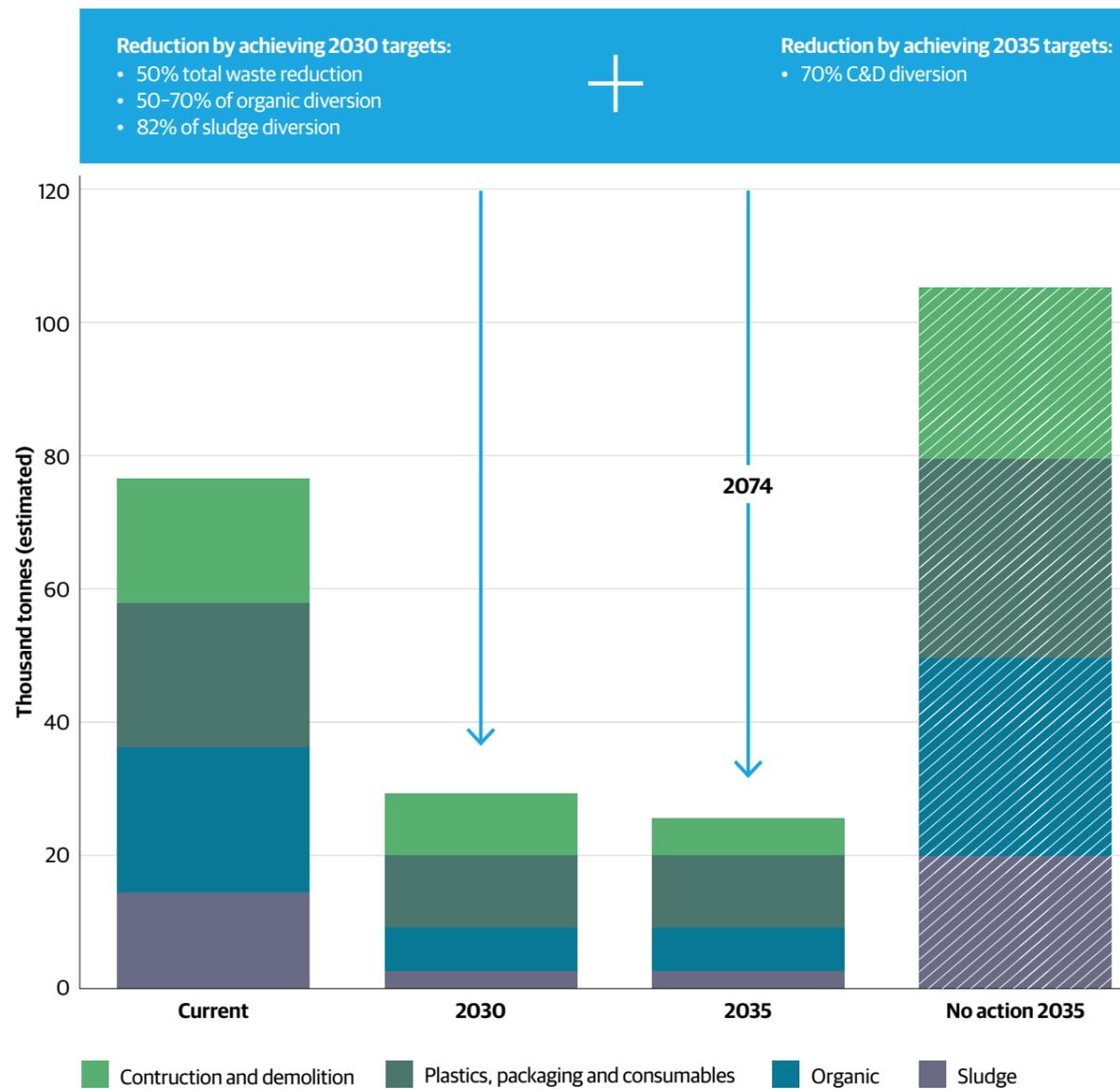
The Southern Landfill follows a self-sustaining operating business model, and user gate fees cover operational and infrastructure costs. Landfill fees subsidise the Council’s kerbside recycling services, processing of collected recyclables, waste minimisation personnel, initiatives and activities. Operational budget models are prepared for the existing landfills and will be used to support gate fees to cover operational costs and waste minimisation

related activities. These are prepared and approved by council as part of the Annual Plan and Long-term-Plan budget cycles.

Post-closure of the Piggyback option (2046+), funding from the Closed Landfill Provisions would be required for about 30 years for the after-care of the landfill.

This includes monitoring of leachate and disposal to trade waste, gas capture and integrity of landfill cap.

Figure 4: Southern Landfill Waste Reduction Plan





Commercial case

Procurement approach

Procurement of services to deliver the preferred option, the Southern Landfill Extension Piggyback Option, requires the following to be undertaken:

- **Part 1: Resource consent.** Preparation and lodgement of resource consent application to Greater Wellington Regional Council (GWRC) and Outline Plan of Works to WCC (Regulatory), followed by preparation and presentation of technical reports and supporting evidence to the resource consent hearing
- **Part 2: Landfill construction.** Construction of landfill cells and associated earthworks including supply of materials (substrates, drainage and landfill liner), design, project management and quality assurance.

The procurement approach to Part 1 and Part 2 are covered below.

Part 1: Procurement approach for resource consent application (GWRC) and Outline Plan of Works (WCC)

Tonkin & Taylor have been appointed by the Council to prepare and lodge the application for resource consent, with Beca sub-contracted to Tonkin & Taylor to prepare the Outline Plan of Works. The appointment is effectively an extension (variation) to the Southern Landfill Stage 4 resource consent application undertaken by Tonkin & Taylor.

Back in 2019, Tonkin & Taylor was appointed to undertake the Stage 4 resource consent via an open-market competitive tender process. In 2020 the Stage 4 consent process was put on hold and later abandoned in favour of the Piggyback Option. The decision to continue with Tonkin & Taylor, in keeping with the procurement process at the time, was based on the following reasons:

- A competitive tender process had been undertaken and awarded to Tonkin & Taylor for Stage 4 and therefore the benefits of the competitive offer (pricing, experience, resourcing, methodology) would continue and apply to the Piggyback Option

- The resource consent application for Stage 4, specifically assessment of environmental effects, was well advanced, enabling unique learnings and findings to be carried over to the Piggyback Option providing a level of efficiency that would be lost if the Council engaged another supplier.
- Owing to the relatively tight timeframe to secure resource consents before June 2026, going back to the market to recommence a procurement process risked not having a residual waste disposal solution in place by June 2026
- Acknowledging the tight timeframe, the instruction was given by Council for officers to immediately proceed with progressing the resource consent application for the Piggyback Option in parallel with working through alternative options and the Long-term Plan Amendment Annual Plan public consultation process
- The revised budget estimate from Tonkin + Taylor for the Piggyback Option was consistent (relative to) the budget estimate provided for the Stage 4 resource consent application.

Part 2: Procurement options for the construction of the Southern Landfill Extension Piggyback Option

The options considered to procure the services of a supplier to construct the landfill are:

- Option 1:** Open tender - with early contractor engagement and separate material purchase contract for specialist materials
- Option 2:** Open tender
- Option 3:** Closed tender
- Option 4:** Existing preferred supplier agreement
- Option 5:** All of Government contract
- Option 6:** Existing syndicated contract.

Preferred procurement option for Part 2, construction of the Southern Landfill Extension Piggyback Option

Option 2: Open tender - with early contractor engagement and separate material purchase contract for specialist materials, is the preferred approach. There are currently no existing preferred supplier agreements in place at WCC for this type of work. There are also no All-of-Government contracts or syndicated contracts the Council could sign up to in relation to this work. A closed tender is not appropriate because there are sufficient contractors who can undertake this, given the value of the construction and the nature of work being sufficiently complex to engage in an open procurement process. The design of the landfill will be prescriptive with minimal room to depart from this - the key design elements will form the basis of the resource consent approvals. Typically, once consent has been approved there will be resource consent conditions that require the landfill to be constructed in keeping with the design documents lodged.

Departing from the design may risk triggering unintended consent conditions or require the Council to relitigate the design.

In this context, a more traditional procurement is beneficial and provides the opportunity for elements of risk-sharing built into the contract. Risk-sharing would be based on risk assigned to the party best positioned to manage and mitigate the risk.

Early contractor engagement with close monitoring from a quantity surveyor (BondCM) allows the Council to secure the necessary resources to complete the project given the tight timeframe.

Given current global supply and freight challenges, a separate material purchase contract for specialist materials, such as the landfill liner fabric that will sit beneath the new landfill to prevent loss of leachate, will ensure potential overseas supply chain risks can be minimised, particularly given the time-sensitive nature of the project. The council will get early indication of the type of liner that will be required with certainty from technical experts working on behalf of the consenting authority to ensure the right liner is purchased. The early procurement and delivery of materials that will be taken will mitigate the material supply risk.

The design of the landfill will be prescriptive with minimal room to depart from this - the key design elements will form the basis of the resource consent approvals.

Market analysis

There are four major elements to the work for Part 2, construction of the Southern Landfill Extension Piggyback Option, as listed in the table below:

Table 19: Construction elements

Elements	Contractor supply	Local contractor demand	Comments
Earthworks	High	High	Contractor must have appropriate plant and machinery to construct the landfill with experience and track record undertaking similar type of earth works
Liner installation	Low (specialist)	Medium	Contractor must have a proven and successful track record in liner installation
Gas collection systems	Low (specialist)	Medium	Council has a 25-year supply agreement with LMS Ltd, a landfill gas specialist, to manage the biogas produced as a by-product of the landfill. Through the agreement LMS Ltd has exclusive rights to the biogas which it uses to produce electricity. The agreement provides LMS Ltd with an incentive to maximise the efficiency of biogas collection and management which, in turn, benefits the council by reducing the amount of carbon emitted into the atmosphere and the fees associated with these emissions
Drainlayers	Medium	High	Council will require an appropriately-sized and proven drainlayer to install new leachate collection drains and leachate lines Demand for such a specialist will be high given the amount of drainage work in the city over the coming years. We understand the required lead times and can start procurement early to mitigate risks associated with this

Given the above, early engagement with the contractor is key to successful delivery of the project.

Liner installation will require specialist contractors and these materials are not manufactured locally, which means early contractor engagement and buying liners from overseas early could reduce the risk of delays to construction.

The procurement strategy for the preferred option

The procurement plan for Part 2, construction of the Southern Landfill Extension Piggyback Option, is proposed as a two-stage process for the main contractor; a Registration of Interest (ROI), including early market briefings, and a Request for Proposals (RFP), which will be either an open or closed tender depending on the level of response to the ROI.

This approach has several benefits. It informs the market of what is coming and informs council on where the market is at regarding the level of interest shown in the project, the likely number of parties that may submit proposals and learnings that can be shared with council that may influence the ROI, RFP and form of contract documents. This approach has been successfully used on other projects of this scale.

The following services will need to be procured through an open tender in advance of the main contractor procurement:

- Engineer to the contract
- Project manager
- Quantity surveyor.

Requirements

Council will seek interested and suitability qualified and experienced contractors to undertake all earthworks and installation of materials and substrates in strict accordance with the detailed design, as approved by Council and the Greater Wellington Regional Council.

Earthworks, by nature, is seasonal and, given the scope of work, will require two earthwork seasons. Council, through a third party engineer to the contract, will oversee the construction and implementation of the required work to ensure it adheres to the detailed design, including ensuring any variations remain within the tolerance of resource consent conditions and approval of Greater Wellington Regional Council.

Risk allocation

Risk allocation between the main contractor awarded the contract to construct the Piggyback Option and Council includes, but is not limited to, the following:

Main contractor

1. Risks associated with undertaking and delivering all physical earthworks and installations in accordance with the required design
2. Risks associated with delivery of the required earthworks within the agreed timeframe
3. H&S compliance associated with undertaking the physical works and in accordance with WCC PBCU responsibilities and obligations
4. Risk associated with resourcing the project (suitably qualified people, equipment) to meet items 1-4.

Third-party engineer to the contract

1. Risk and liability associated with ensuring construction milestones and deliverables align with the approved design and resource consent conditions.

Council

1. Risk associated with financing the project
2. Risk associated with securing resource consents and any delays
3. Risk of timely decision-making
4. Risk associated with an alternative temporary disposal solution should the Piggyback option not be completed in time for reasons outside the control of the main contractor and engineer. This could include, for example, a situation of force majeure or unforeseen weather events reducing available time in the construction season
5. Securing supply of materials that require a long lead time, before awarding a contractor.

Contractual approach

It is envisaged this will be a measure and value contract with clear assignment of risk and responsibility sharing. Under a measure and value contract, payment to the contractor is determined by measuring the work carried out and valuing this in accordance with the schedule of rates stipulated in the contract agreement.

Council's preference is for a single main contractor to be responsible for managing the whole project and engaging sub-contractors with pre-determined rates as part of the ROI and RFP process. Examples of sub-contractors include installation of the landfill liner and supply and installation of the gas collection system.

The procurement plan will set out the final contractual approach and arrangements. This will include incentives for on-time and early completion of the project combined with liquidated damages for late delivery.

Contract management

The Zero Waste Programme governance framework (refer section 8.1) will oversee the contract management with support from commercial partnerships and ensure any additional assurance activities are established and monitored for the construction and implementation phase, with clear definitions of roles and responsibilities.





Management case

Planning for successful delivery

There are two stages to deliver this project:

Stage 1: Secure resource consent from Greater Wellington Regional Council and approval of the Outline Plan by Wellington City Council for the Southern Landfill Extension Piggyback Option

Stage 2: Construction and commissioning of the piggyback option. Stage 2 is conditional upon resource consent being granted with consent conditions that are acceptable to council.

The approach to project management will be in keeping with the requirements of the Investment Delivery Framework (IDF).

Stage 1: Secure resource consent

Stage 1 has started and if this business case is approved, then this work will continue. If an alternative option is preferred, work will discontinue.

Council has engaged Tonkin + Taylor to secure resource consents for this project. A project team has been established, including Beca, other technical specialists and Wellington City Council. The programme of works detailing the scope and timeline is provided in Appendix 3a

Fortnightly meetings are being held to bring the project team together. Key decisions and actions are recorded in meeting minutes. All project documents, including risk register, technical reports and meeting minutes, are stored on Sharepoint for all project team members to access. Internal reporting occurs on a weekly basis and project risks and issues are recorded on the project risk register.

Stage 2: Construction and commissioning of the piggyback option

Implementation of the project is dependent upon resource consent being granted, including consent conditions that are acceptable to council.

For completeness, even if consent is granted this could be appealed to the Environment Court. Any notice of appeal must be lodged within 15 working days of receiving the hearing decision. Any appeal after the closing date will require a waiver of the time limit by the Environment Court.

Programme management of the piggyback option will be similar to Stage 1, with Council also engaging an external engineering expertise to fulfil the role of engineer to the contract. The programme of works providing an overview of the key milestones and timeline is provided in Appendix 3b.

Governance arrangements

To oversee the project, the council has established a Zero Waste Programme structure being led by a steering committee that consists of a mix of external and internal members with a balance of skills, experience and industry knowledge. The steering committee will be chaired by the council's Waste, Water and Resilience Manager. The SLEPO project team comprises a mixture of external and internal technical resources. The council will maintain overall project control and direction through the Zero Waste Programme management team and steering committee and will procure operational elements from suitably qualified organisations.

Diagram 7: Programme Organisation Chart

Programme RASCI View by project (hence some team members may appear twice)

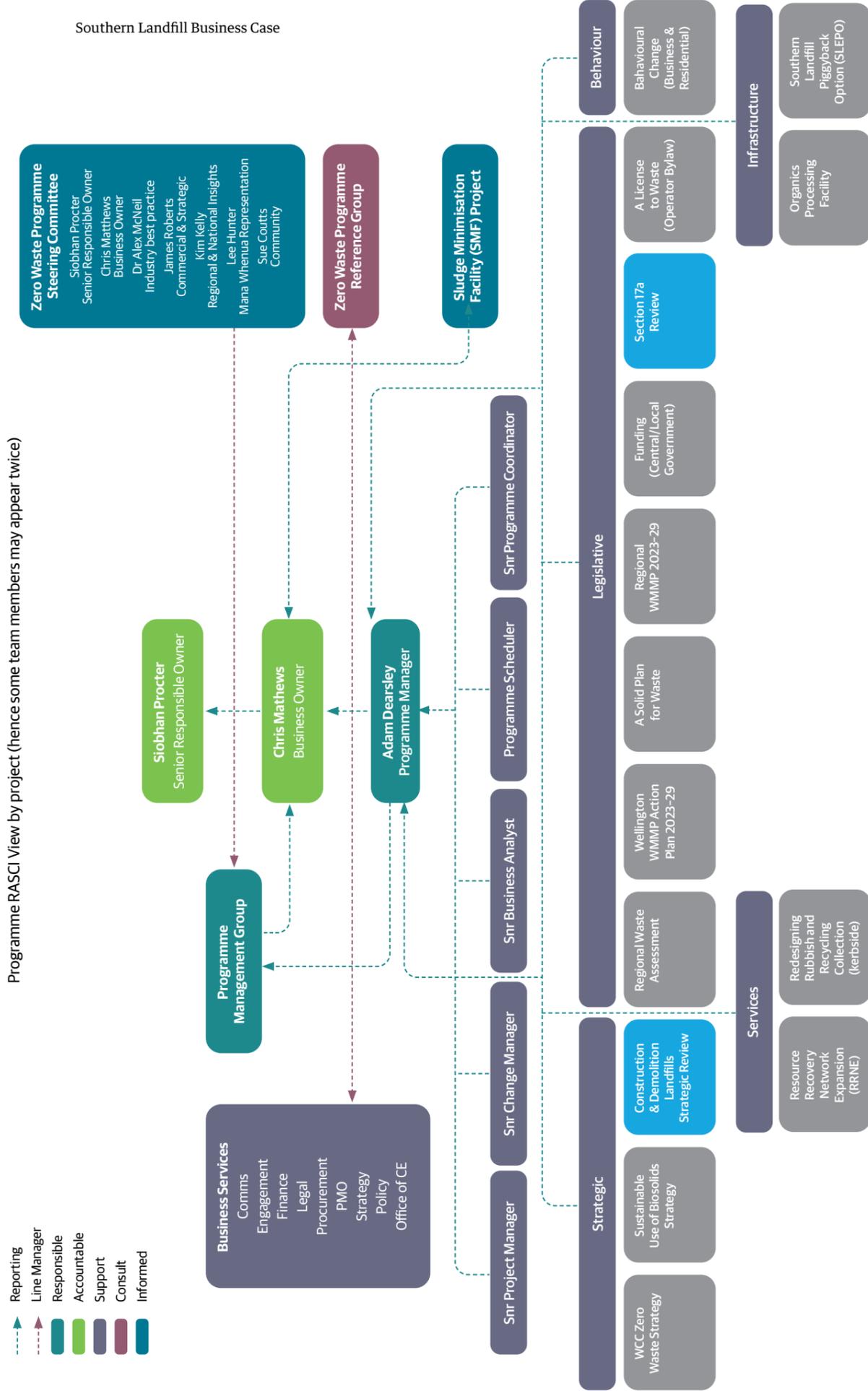


Table 20: Programme governance

Body	Membership	Board type
Priority Investment Steering Group	CIO, CFO, CCCO, CPO, CDO, PMO Manager	Executive leadership team (monthly)
Infrastructure Committee	Elected members	Governance (3 monthly)
Zero Waste Programme Steering Committee	Siobhan Procter, Chief Infrastructure Manager (Chair)	Governance (monthly)
Zero Waste Programme team meeting	Adam Dearsley, Zero Waste Programme Manager (Chair)	Management (weekly)
Residual waste - SLEPO project team meeting	George Fietje, Project Manager	Management fortnightly'

Risk and issues management

The approach to all project risks and issues consists of:

- i) Identifying risks and issues at any time during the management and delivery of the project
- ii) Assessing the probability of each risk or issue and the impact this may have on the project and outcome
- iii) Determining current controls in place to manage the risk or issue and mitigation required to address this
- iv) Implementing the steps required to mitigate the risks.

Risk and Issues are identified and recorded as follows:

- v) Project risk and issues register kept in the project folder (SharePoint)
- vi) Key project risks and issues are identified and communicated to the Zero Waste Programme manager.

Schedule management

Key project milestones are provided in the table below for Stage 1 (resource consent) and Stage 2 (construction).

Table 21: Project milestones by stage

Key project milestones	
Stage 1: Resource consent	Planned completion date
Long-term Plan Amendment (2022-23 Annual Plan) accepted (decision to proceed with project)	30 June 2022
Complete technical reports and assessment of environmental effects	1 December 2022
Draft resource consent application reviewed by GWRC	2 December 2022
Feedback received from GWRC	30 January 2023
Design with working party concludes	28 February 2023
Resource consents lodged	3 March 2023
Processing of resource consent completed by GRWC	29 February 2024
Resource consent decision	29 February 2024
Stage 2: Construction of Parts A and B (no appeal to the Environment Court)	Planned completion date
Procurement plan finalised (note, this represents early commencement before knowing if resource consent has been granted)	30 March 2023
Detailed design completed	30 June 2024
Contractor procurement completed	30 September 2024
Essential material procurement completed	30 September 2025
Construction season 1 (1 October 2024-30 April 2025) <ul style="list-style-type: none"> Relocation of existing infrastructure Construct sediment pond and polishing wetlands Construct ground water and stormwater system Commence earthworks 	April 2025
Construction season 2 (1 October 2025 to 30 April 2026) <ul style="list-style-type: none"> Install landfill lining system 	April 2026
Part A landfill cell completed and ready to receive residual waste	1 June 2026
Part B landfill cell completed and ready to receive residual waste	1 June 2027

Key project milestones

Stage 2: Construction of Parts A and B (appeal to the Environment Court)	Planned completion date
Procurement plan finalised	30 March 2023
Detailed design completed	June 2024
Contractor procurement completed	30 September 2024
Essential material procurement completed	30 September 2025
Construction season 1 (1 October 2024 to 30 April 2025) <ul style="list-style-type: none"> Relocation of existing infrastructure Construct sediment pond and polishing wetlands 	30 April 2025
Winter works (1 May-30 September 2025) <ul style="list-style-type: none"> Site clearance Construct ground water and stormwater system Ecology compensation/mitigation 	30 September 2025
Construction season 2 (1 October 2025 to 30 April 2026) <ul style="list-style-type: none"> Commence earthworks Install landfill lining system 	1 June 2026
Part A landfill cell completed and ready to receive residual waste	1 June 2026
Part B landfill cell completed and ready to receive residual waste	1 June 2027

Change management

Change management practices are in place.

Refinement of these practices to suit the relevant parties will be made throughout the procurement phase to align with the contractual agreement for the main works contractor.

Change management will be facilitated through the Zero Waste business owner, programme manager and SLEPO project manager. The Zero Waste Programme has identified stakeholders for each project to ensure that updates, including any changes, are appropriately communicated. At this stage no change management requirements have been identified to the operation of the piggyback option, effectively a continuation of the current Stage 3 landfill operation.

Stakeholder communications and engagement management

A SLEPO engagement and communication plan has been developed, refer; Comms & Engagement Plan - Residual Waste Disposal DRAFT v1.docx. This will be a living document reflecting the need for the SLEPO project to be capable of delivering relevant and positive information to all interested parties during the various stages.

A Zero Waste Programme overarching engagement and communications strategy and plan is under development to align the SLEPO project with other zero waste projects and initiatives.

Reporting and assurance

Reporting process and control

The SLEPO project will report in accordance with the Investment Delivery Framework (IDF) guidelines set out by the council's Project Management Office (PMO). This includes a suite of reports covering the breadth of traditional project reporting. Reporting cycles will align with monthly steering committee meeting and WCC PMO reporting timelines.

Monitoring and assurance

The SLEPO project team and Zero Waste Programme team are working closely with the WCC PMO and will follow all guidance and assurance activities required, as instructed by the PMO, in line with agreement from the Zero Waste Programme business owner and senior responsible owner.

For the detailed design and construction phase, the council will appoint an external and independent engineer to the contract to represent its interests and provide assurance project delivery is in accordance with scope, specifications, quality, budget and timelines, including any contract variations.

Project milestones

Preliminary project milestones are outlined in the schedule summary under section 7.2. The schedule and key milestones will be further developed as part of Stage 1.

Post-project evaluation

A post-project evaluation plan will be developed in line with the IDF in due course.

Benefits management

To ensure the project's benefits are realised, periodic reviews will be undertaken and reported via the Priority Investment Report and to the Zero Waste Programme steering committee.

Next steps

After approval of the business case, council will formalise continuation of Stage 1 to secure resource consent with the project team, Mana whenua and community stakeholder groups.



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Me Heke Ki Pōneke