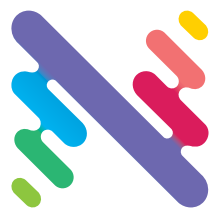


Our **SUSTAINABLE WASTE** Strategy

Appendix 1 White Paper



2023



City of
Newcastle

Welcome

Acknowledgment of Country

'Niirun Yalawa Awabakal and Worimi burrei'

We all sit on Awabakal and Worimi land

The City of Newcastle Acknowledges its Local Government Area (LGA) sits within the Country of the Awabakal and Worimi peoples. We Acknowledge that Country for Aboriginal peoples is an interconnected set of ancient relationships. The City of Newcastle Acknowledges the custodianship of the Awabakal and Worimi peoples and the care and stewardship they have performed in this place since time immemorial.

'Wunyibu wunyibu warra wunyibu wunyibu gkuuba Aboriginal burrei'

Always was, always will be Aboriginal land

Enquiries

For information contact

City of Newcastle

Phone 4974 2000

Published by

City of Newcastle

PO Box 489, Newcastle NSW 2300

Phone 4974 2000 Fax 4974 2222

mail@ncc.nsw.gov.au

newcastle.nsw.gov.au

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City of
Newcastle

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Introduction

City of Newcastle (CN) is intent on being a considerate user of the limited resources we have on our planet. We are committed to empowering our organisation and community to view their 'waste' differently - as resources and materials that can have another life outside of landfill.

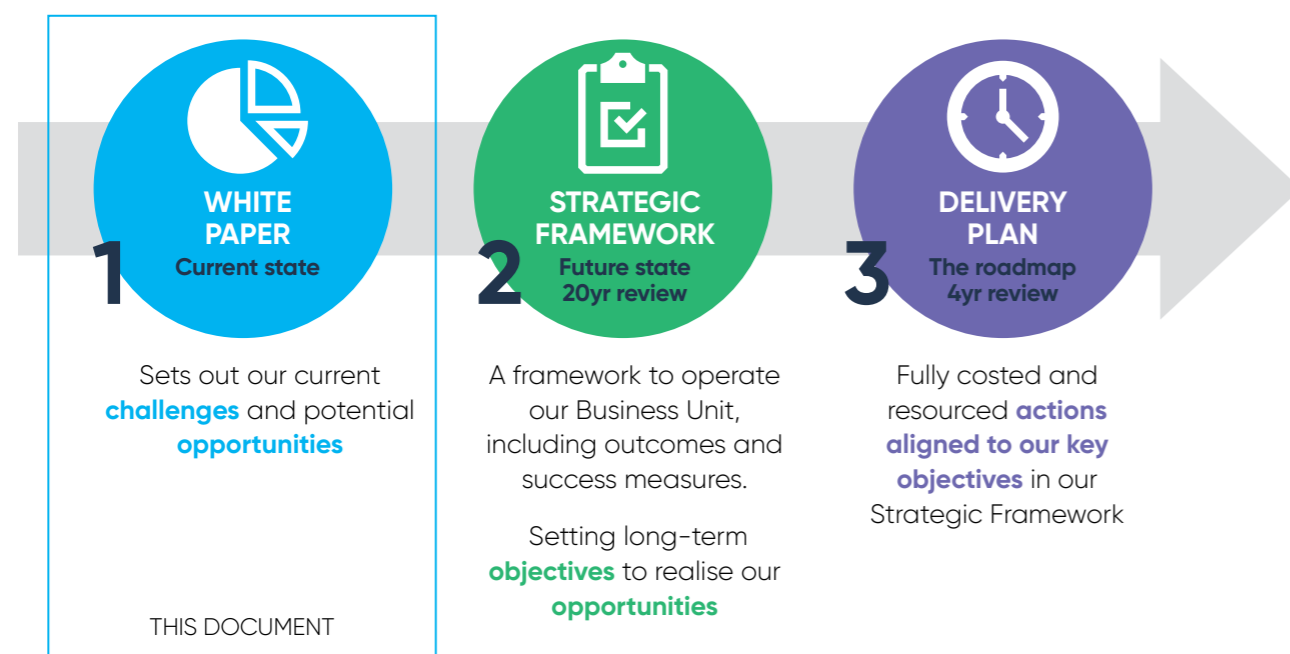
The longer we recirculate recyclable materials in the economy the greater their value and the better it is for the environment. This will produce greater prosperity for our people and our planet. All materials have an embedded value which can be either put to good use and back in the economy via reuse, recycling or recovery, or, be disposed of forever.

At CN, we provide waste minimisation and recycling solutions to our community while ensuring the long-term sustainability of our waste and resource recovery operations. Underpinning all these activities is the key theme of 'efficient use of resources'. This means the

safe and efficient collection of waste and recycling from residents, recovering as many recyclable and reusable materials as possible from all of the waste we manage, providing opportunities to businesses to reduce their waste and work with us to divert waste from landfill, and the safe and effective disposal of those materials for which no other option exists.

We are committed to avoiding the generation of waste across our operations and maximising the value obtained from all materials we use - at CN and across our community.

Key Documents



Purpose of this White Paper

This White Paper explains our current position and achievements in waste and resource management across our operations and our community.

It sets out information about the context of the waste and recycling landscape, CN's historic performance and current position, as well as potential opportunities. It also contains information we have used to develop Our Sustainable Waste Strategy in line with the Sustainable Newcastle Theme within Newcastle 2040 Community Strategic Plan (CSP) and the Circular Economy Priority to Design out Waste by:

- Creating sustainable material cycles through the city's economy
- Establishing resource recovery industries and circular economy precincts
- Increasing recycling and productive reuse of organics

The scope of this White Paper and corresponding Our Sustainable Waste Strategy (the Strategy) is focused on:

- the operations of the Summerhill Waste Management Centre (SWMC),
- CN's waste collection services,
- and customer interfaces with CN residents regarding waste services (public place bins and Community Recycling Centres).

These are the areas of influence of CN's Waste Services (WS) Business Unit which will be responsible for implementing the Strategy. The WS Unit's area of influence does not control CN's broader sustainability initiatives, such as energy, water and sustainable procurement, however, the WS Unit intends to play a significant role in supporting these wider initiatives and demonstrating the benefits that can come from them.

We have also developed a Waste and Resource Recovery Policy that will support Our Sustainable Waste Strategy to provide long-term direction and commitment toward improved waste and resource management for the city.

The Strategy will see us pivot our operations toward resource recovery, with landfill as a support service, focussing on how we deliver a balanced outcome (cost, service levels and environmental outcomes) for the community, customers and CN.



Developing this White Paper

This White Paper draws on information from:

- Best practice Waste and Circular Economy Strategies prepared by other local councils in Australia and internationally
- Existing and upcoming CN Strategies and Plans
- Consultation with CN's waste management team and technical staff members
- Consultation with the waste and resource recovery industry
- Consultation with other key government organisations such as the Department of Planning and Industries (DPIE), NSW Environmental Protection Authority (EPA), and the Hunter Joint Organisation of Councils (HJOC).

We engaged experienced consultants to work with us and provide an independent perspective on the preparation of the White Paper.

The following table provides a high-level overview of what we did and what we wanted to know.

Table 1: Overview of consultation, engagement and studies

	Market analysis and consultation	Policy review	Community and regional consultation	Organisational diagnostic and consultation
What did we do and who did we engage with?	<ul style="list-style-type: none"> • Several economic studies commissioned • Market sounding for recyclables commissioned with private and public sector 	<ul style="list-style-type: none"> • Over 30 key policies and strategies reviewed • Grants funding scan 	<ul style="list-style-type: none"> • 3,313 CN residents engaged for early strategy input¹. Consultation with: <ul style="list-style-type: none"> • Hunter Councils • CN Advisory and Standing Committees • Local Waste and Resource Recovery businesses 	Organisational diagnostic and consultation with: <ul style="list-style-type: none"> • 88 Waste Services Staff • Various CN technical staff; CEO, Transport Planners, Strategic Planners, Environmental and Economic Development Officers, Finance team, Corporate Affairs team, Assets and Projects team
What did we want to know?	<ul style="list-style-type: none"> • The current market environment, what the gaps are and how we can fill those gaps • Our customer needs and constraints • Customer expectations on service levels 	<ul style="list-style-type: none"> • What's important at an international, federal, state, regional and local level? • How to create alignment • What funding opportunities are and will be available? 	<ul style="list-style-type: none"> • What's important to the community? • Community expectations on service levels • Regional needs and capacity • Gauge interest in regional collaboration 	<ul style="list-style-type: none"> • How do we use our resources to meet customer needs at the best value? • What structures and systems we use to manage technical systems and achieve our objectives? • The way people think and feel about their work and conduct themselves

¹Additional engagement will occur leading up and during the Public Exhibition stage of the strategy. This will include schools, CN community, industry and stakeholder groups

In this White Paper



This document is broken down into five core chapters. This includes:

- 1. Market Drivers**
The waste and resource recovery industry are governed by the global and local commodity market. Any disruption in this market impacts our ability to manage our waste and resources. Eg China National Sword Policy.
- 2. Policy Drivers**
Key policy at international, national and state levels describe key aspirations. This provides CN with strategic organisational direction.
- 3. CN and Hunter Region Needs**
Waste and recycling needs are not isolated to CN. The Hunter Region also shares similar needs.
- 4. CN Waste Services Capability**
CN owns and operates a collection and large waste management facility.
- 5. Our Opportunity**
By understanding the gaps, constraints and strengths in each of the areas above allows us to understand Our Opportunity.

Our Core Principles

In forming Our Sustainable Waste Strategy, we were guided by two core principles that we believe best capture what our community has told us they want, what our regional needs are now and into the future, and what the waste and recycling market and policy framework are driving towards for the City of Newcastle (CN).

Waste Hierarchy

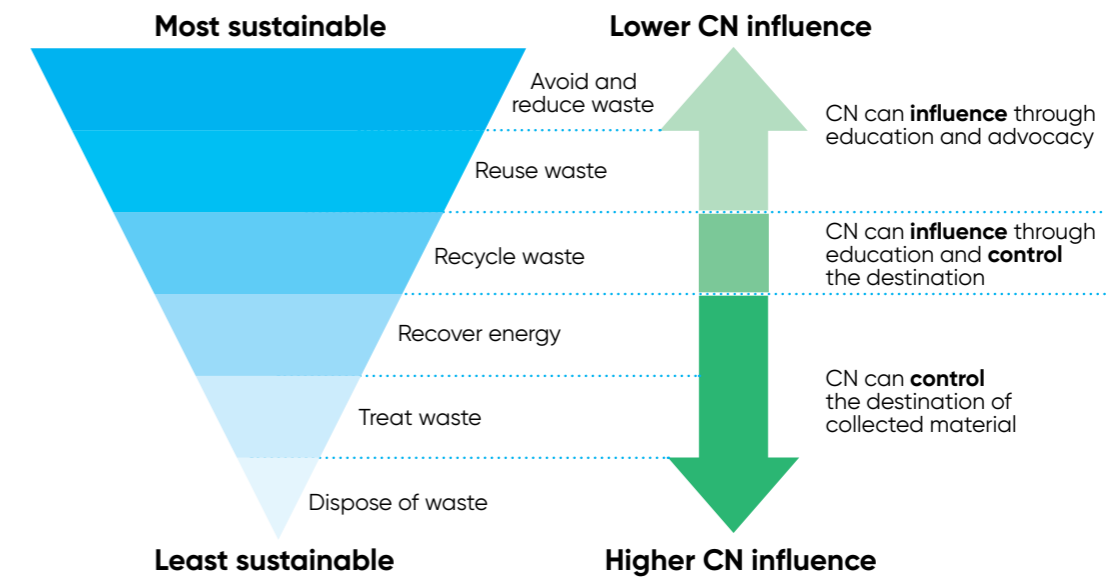
The waste hierarchy sets out the priorities for the most efficient and most sustainable use of resources, establishing the framework under which all waste decisions should be made and all waste managed. The waste hierarchy prioritises waste avoidance and reduction as the most preferable option for waste management, then addresses the different options for managing waste that can't be avoided, in order of best environmental value, with disposal to landfill as the least preferable option. In considering the priorities in the waste hierarchy, efficiency and sustainability of the chosen options must also be considered.

While waste avoidance is most preferable, it is also the aspect over which local government has the least influence. Local governments typically have more control over the lower portion of the waste hierarchy as they have a responsibility to provide waste collection, processing and disposal services for municipal waste and can influence the final destination of the material they collect. Mechanisms for change are important to consider when developing actions for a strategy. The following table describes what is in CN's sphere of control to manage change.

Table 2: City of Newcastle Waste Services sphere of control

Control CN can directly impact	Influence CN can indirectly impact	Concern Impacts CN but is beyond CN's ability to effect change
<ul style="list-style-type: none"> Materials recovery rate and diversion of waste from landfill through physical infrastructure such as sorting and reprocessing Management of services – collection frequency, bin systems and fees Management of commercial waste through CN collections and material received at CN's facility Procurement of goods and services including requirement for goods to contain recyclable content 	<ul style="list-style-type: none"> Behaviour change through education and communication Advocacy for waste diversion Incidence of illegal dumping through the implementation of penalties and education campaigns Participation rate in the use of services and programs 	<ul style="list-style-type: none"> Global market shifts State Government waste levy Other council decisions on waste management Product design Product purchase/consumption

Figure 1: Waste Hierarchy



Recycling **1 tonne of paper and cardboard saves 12 trees** from being harvested.

In 2017-18 Newcastle households recycled 7,401 tonnes of paper and cardboard, saving 96,200 trees.

It takes 5 tonnes of bauxite to make 1 tonne of aluminium cans. In 2017-18 **Newcastle households recycled 95 tonnes of aluminium**, saving 475 tonnes of bauxite from being mined.

Circular Economy

In Australia, and across the globe, we are using resources at an ever-increasing and unsustainable rate.

We are using the resources that future generations will rely on. Without a shift in the way we consume, use and manage resources, future generations will struggle to meet their needs.

A circular economy helps answer the challenge of meeting our own needs without compromising future generations' ability to meet their needs.

Looking beyond the current take-make-waste extractive industrial model, a circular economy aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources, and designing waste and pollution out of the system.

Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It is based on three principles: design out waste and pollution; keep products and materials in use (ideally at their highest and best value); and regenerate natural systems.

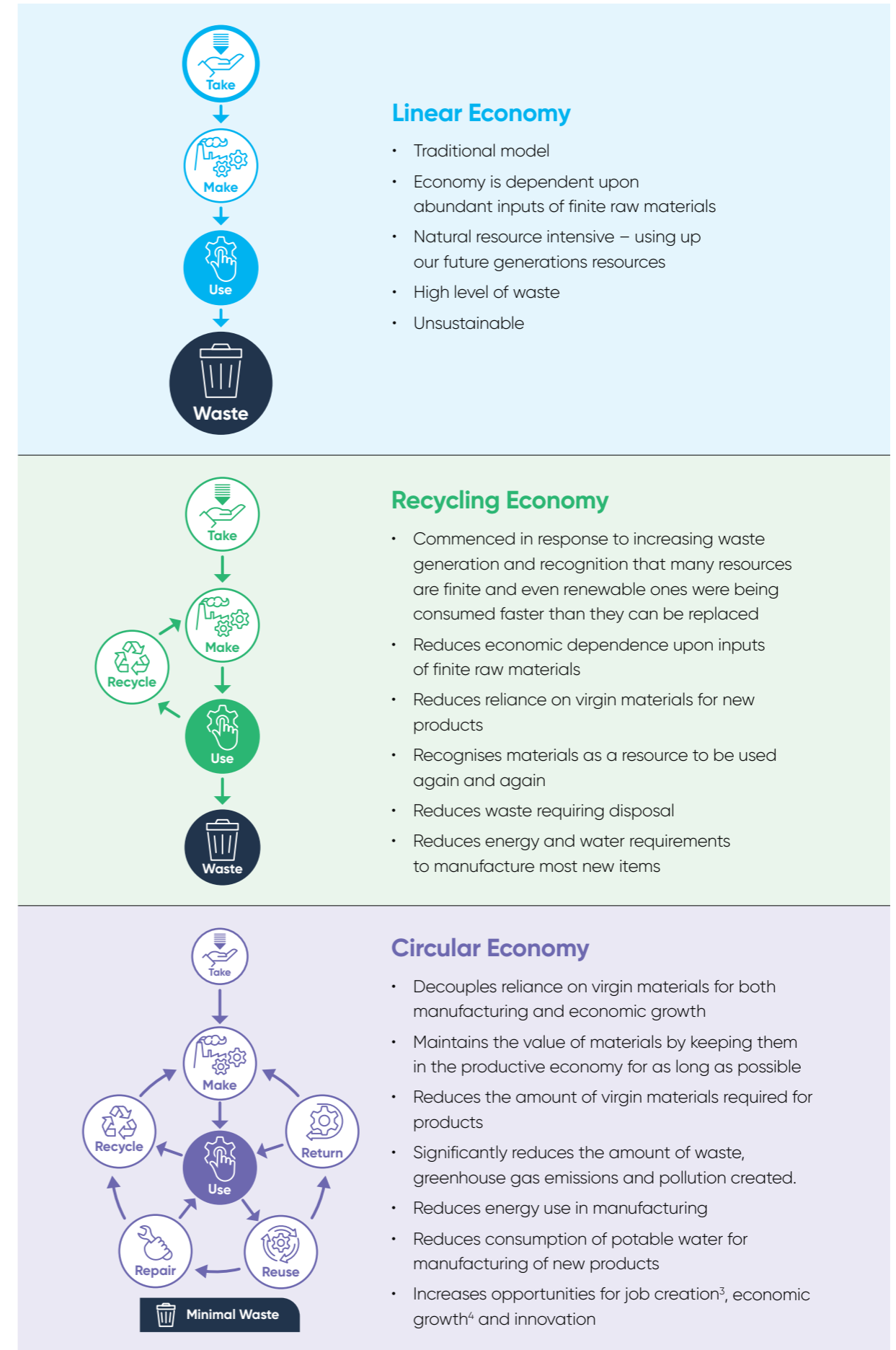
Blue Environment (2021) Australian standard for waste and resource recovery data and reporting <https://www.awe.gov.au/sites/default/files/documents/standard-wrr-data-and-reporting-final-issued-v2.pdf>

We are currently in a state of transition from a linear economy to a circular economy

CN has adopted the NSW Government's principles of a circular economy² for the development of our Strategy:

1. Sustainable management of resources
2. Valuing resource productivity
3. Design out waste and pollution
4. Maintain the value of products and materials
5. Innovate new solutions for resource efficiency
6. Create new circular economy jobs
7. Foster behaviour change through education and engagement

Figure 2: From linear economy to circular economy



³ The recycling sector in Australia currently generates 9.2 jobs per 10,000 tonnes of waste compared to only 2.8 jobs for the same amount of waste sent to landfill (Access Economics, 2009)

⁴ KPMG, 2020, Potential economic pay-off of a circular economy for Australia, <https://assets.kpmg/content/dam/kpmg/au/pdf/2020/potential-economic-pay-off-circular-economy-australia-2020.pdf>

² NSW Government (2019) NSW Circular Economy Policy Statement





1 Market Drivers

Recyclable and waste materials are part of a global and local commodity market and disruptions in these markets impact how services are delivered.

City of Newcastle is committed towards long-term security around its red, yellow, green-lid bin services:

Red: **Residual waste**

Yellow: **Recyclables**

Green: **Organics**

Understanding these drivers and planning for the future will ensure long-term local resilience to market changes.

Overview

The following drivers in this section are the catalyst for change in the waste management and resource recovery industry, globally and locally. These changes provide CN with opportunities to diversify, enhance or innovate our services to ensure long-term local resilience to market changes.

At CN, we have a key strategic asset in Summerhill Waste Management Centre (SWMC), with ample space to develop a Resource Recovery Hub that can provide local solutions for not just CN's waste but also for the region, and for many decades to come.

In addition, CN's Economic Development Strategy identified SWMC as a site in the Newcastle Innovation Arc, with the potential to drive new job creation in growth areas including circular economy, energy innovation, advanced manufacturing and reprocessing, and development of secondary material and by-product markets.

These opportunities place CN in the position of becoming a leader within the waste and resource recovery industry and a catalyst for the region's circular economy.

CN is committed to long-term security around its red, yellow, and green-lid bin services:



This section will highlight associated market drivers with these services.



Residual Waste

In NSW, 4.6 million tonnes of residual waste (from municipal solid waste and commercial and industrial waste) was disposed to landfill in 2018–19⁵. Landfilling should be the last option of disposal when considering the waste hierarchy, however, this is often not the case.

Compositional waste audits conducted by the NSW EPA revealed:

- Over two-thirds of the material in our red bins could be diverted from landfill with 45% comprised of food and organics and 22% of dry recyclables⁶.
- Over two-thirds of material arriving at a landfill from commercial and industrial waste was a mixed waste load and 51% of this material was considered degradable organic⁷.

There is a significant opportunity to divert or avoid more material ending up in the landfill. Some factors that will contribute to this include:

- Access to infrastructure (reuse, recycling and recovery),
- Product design and Extended Producer Responsibility, and
- Ongoing education.

However, a key consideration is the cost to dispose of the material. Ensuring the cost for landfilling is higher than other diversion activities will incentivise and drive resource recovery outcomes as well as ensuring our resources are kept in circulation and their value is maximised.

The continual population growth in Sydney Metropolitan Area is placing significant pressure on the few existing disposal options - Veolia's Woodlawn and Suez's Lucas Heights. Inert landfill capacity will be exceeded in 2028 and putrescible by 2036⁸. Landfills are a depleting and essential infrastructure for the foreseeable future.

The development of new landfills is challenging due to:

- High cost of land in NSW metropolitan areas;
- Challenges in securing suitable properties close to transport infrastructure;
- The reluctance of some councils or communities to have waste related infrastructure located in their vicinity;
- Lack of timely data on waste flows and holistic information on the location and volume of waste generated;
- Transportation challenges, such as poor road networks, congestion; time restrictions; long travel times and lack of convenient aggregation points⁹.

An improved diversion rate will help extend the life of existing infrastructure, however alternative disposal technology options such as Energy from Waste are currently being explored nationally and internationally.

Our changing consumption habits has led to new and complex waste streams

Product design and advanced manufacturing have contributed to the development of products that are much more complex to re-process often leading to new waste streams that need to be managed. This includes trends such as:

- Complex packaging (e.g food packaging and product/transport packaging)
- Growth in e-waste (e.g. mobile phones, portable electronic devices, laptops; televisions, lighting equipment, and other electronic equipment);
- Increased adoption of solar panels and battery systems; and
- Shifts away from fibres and metals to complex plastics.



⁵ DPIE (2021) NSW Waste and Sustainable Materials Strategy: A guide to future infrastructure

⁶ EPA (2011 and 2017) MSW Waste Audits

⁷ EPA (2014) Candi Waste Audits

⁸ DPIE (2021) NSW Waste and Sustainable Materials Strategy: A guide to future infrastructure

⁹ NSW EPA (2019) NSW Waste Sector Volume I: Key Findings



Recyclables

Recyclable materials are a tradable commodity much like oil, steel and gold. The sale of recyclable materials on the global market helps offset the costs of collecting, sorting and processing these materials, allowing us to provide a cost-effective recycling service to our residents. As with any commodity on the global market, changes in market conditions have the potential to significantly impact the recycling industry.

Global Market Drivers

2018 China National Sword Policy

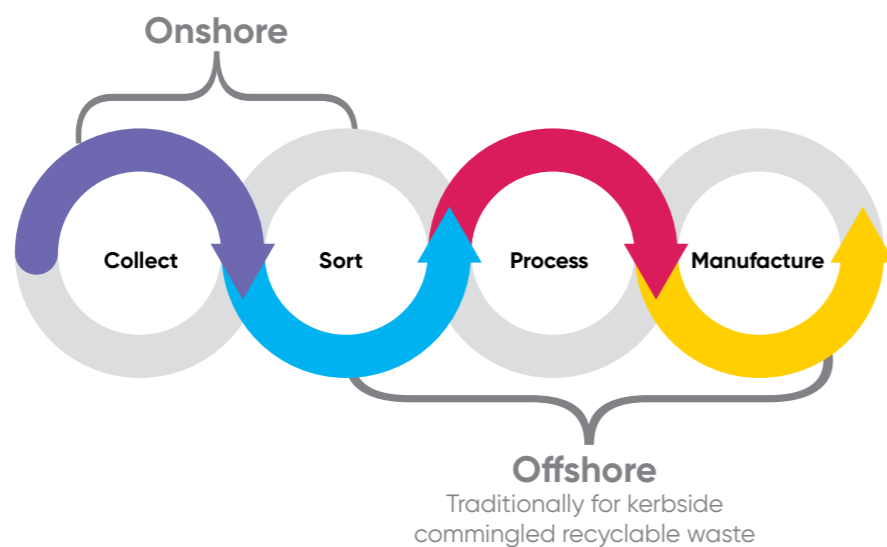
- China was one of the world's main markets for recycled paper and plastics, processing nearly half of the world's exported recyclables.
- The policy placed stringent limits on acceptable contamination of recyclable materials to 0.5%.
- Australia was then reliant on processing the majority of recycling offshore.
- The value of these commodities declined, leading to a glut of low-valued materials in Australia, and other countries, with no end market to on-sell.
- The oversupply of material with no market meant stockpiling and/or landfilling of the material and increased costs to handle the material.

National Market Drivers

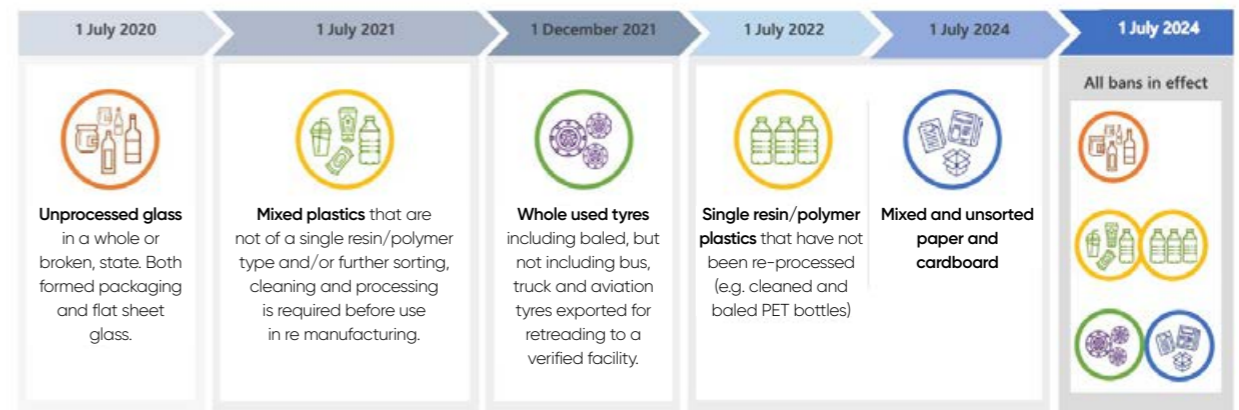
2020 COAG Waste Export Ban

- The Council of Australian Governments (COAG) introduced a Waste Export Ban, which set out a timeline to phase out exports of glass, plastic, paper, cardboard and tyres from Australia.
- This was legislated via the *Recycling and Waste Reduction Act 2020* and all bans will be in effect by 2024.
- The intent is to stabilise the Australian recycling industry, increase the quality of recycled materials and develop domestic markets for the processing and use of recycled material.

Recycling =



COAG Waste Export Ban Timeline



Local Market Drivers

2020 Hunter Materials Recycling Facility Closure

The Hunter region faced the closure of its only Materials Recycling Facility (MRF) in Gateshead¹⁰, which was processing yellow bin recyclable materials. Fortunately, CN was able to secure processing capacity at the iQ Renew Somersby facility in Central Coast, while a longer-term option for a facility to be developed at Summerhill Waste Management Centre is delivered.

With the closure of the only MRF in the region, other Hunter Councils including Lake Macquarie and Maitland now transport their recyclables to Sydney at additional cost to their ratepayers, and a higher overall cost paid by Newcastle ratepayers.

The ability to process recyclables is only one piece of the puzzle. Supporting end markets is just as important to ensure our materials truly get recycled and promote a circular economy. The greatest barriers to a circular economy are improved product stewardship with manufacturers considering end-of-life in design and using recycled materials to manufacture new goods. Challenges in increased recycled material use include:

- The cost of recycled materials compared to virgin materials is generally higher
- The perception that recycled material is of lower quality than virgin materials
- Virgin materials do not incorporate the costs of external environmental impacts
- The cost of recycled materials is negatively impacted by contamination and lack of scale

These challenges can be addressed by understanding what manufacturers require through material specifications and ensuring processing facilities, like a MRF, are designed to meet these requirements and are flexible enough to respond to change.

¹⁰ <https://www.newcastle.nsw.gov.au/council/news/latest-news/changes-to-city%E2%80%99s-recycling-processing-contract-1>

NSW Waste and Sustainable Materials Strategy

Recycling is expensive to transport. It is preferable to sort recycling into single component streams, and bundle ready for transport, within the region it is generated.

This will not only improve transport efficiencies, it will enable MRFs to target distribution of sorted materials to end markets, including local destinations where possible.

To achieve the targets of the NSW Waste and Sustainable Materials Strategy, MRFs will be required to enhance their existing sorting model to provide higher quality outputs with reduced contamination.

The main priority for MRFs is to improve the quality of output products, taking a whole of supply chain approach. At the MRF (if site constraints permit), the priority will be to improve quality of glass, plastic, paper/card and metals through primary sorting equipment and potentially additional processing of sorted materials to provide a higher quality product of sorted materials.





Organics

Food and Garden Organics

The NSW EPA estimated organics waste recycled in NSW is 1.6 million tonnes for certain organic sources, including:

- Garden organics (green waste) from arborist, land clearing or felling operations;
- Kerbside garden organics;
- Food organics and garden organics (FOGO);
- Commercial and industrial food waste;
- Organic outputs from municipal solid waste processing¹¹.

There is however a further opportunity for approximately 1.26 million tonnes¹² of recoverable organics that is currently sent to landfill. This presents a significant waste avoidance and recovery opportunity to divert organics going into landfill. The National Food Waste Strategy highlights:

Globally, about one billion tonnes of food produced for human consumption is wasted each year. This wastage costs the global economy around US\$940 billion, consumes nearly a quarter of all the water used in agriculture, and produces eight per cent of global greenhouse gas emissions¹³.



The organics processing and compost production industry has grown over the last 20 years in response to the desire to reduce waste to landfill and comply with government policy increasing the supply of compost. To date, the industry has been able to cope with the increase in organics and compost. The growth has been managed through government financial incentives, the entry of new players and significant expansions of operations and businesses.

Compost can be sold to a range of markets including:

- Urban amenity (residential and commercial landscaping, council playing fields and parks)
- Intensive agriculture (vegetable production, orchards, turf production, viticulture)
- Extensive agriculture (broadacre cropping, pasture establishment, forestry)
- Rehabilitation (mine rehabilitation, erosion control works, revegetation)
- Environmental remediation (contaminated sites remediation, biofiltration)¹⁴

The urban amenity market remains the key source of demand for organics, absorbing 68% of compost produced¹⁵. It demands high-quality products with low levels of contamination.

Contamination particularly within council FOGO streams is a constant challenge for the industry as it is costly to manage, and can impact workers and the quality of the compost.

Compost is generally sold into local or regional organics markets. High-quality compost, low contamination levels and differentiated products are key for ensuring markets and sustainable prices.

¹¹ NSW EPA (2019) NSW Waste Sector Volume II: Situational Analysis

¹² DPIE (2021) NSW Waste and Sustainable Materials Strategy: Future Infrastructure Needs

¹³ Australian Government (2017) National Food Waste Strategy. Department of the Environment and Energy.

¹⁴ NSW EPA (2019) NSW Waste Sector Volume II: Situational Analysis

¹⁵ NSW EPA (2020) NSW Organics Market Analysis



Challenges and Opportunities

Challenge	Opportunity
<p>Urban encroachment is an emerging problem for SWMC. This may place limitations on future waste and recycling infrastructure to meet our community's needs.</p>	<p>Develop a strategy to maintain appropriate buffers around SWMC</p> <p>Work with local and state planners to advocate for greater protection of the site for CN and the region.</p> <p>Work with surrounding developers to ensure land developed close to SWMC does not conflict with any future potential activities at SWMC.</p>
<p>No recyclables processing facilities in the region.</p>	<p>Development of a Material Recovery Facility (MRF) at SWMC</p> <p>A MRF will provide economic benefit to CN in the form of jobs and additional revenue as well as reducing CN's environmental and the financial impacts of sending recyclables long distances for processing. A MRF will also create long-term resilience for our municipal recycling stream.</p>
<p>Limited end-markets for low-quality recyclables in the region and nationally.</p> <p>Stringent requirements on output material specifications require advanced processing technology which is significantly more expensive than traditional processing.</p> <p>Waste export ban on glass, plastic, paper, cardboard and tyres by 2024.</p>	<p>Higher quality output due to advanced processing technology</p> <p>The MRF will be developed with advanced processing technology to achieve high-quality outputs, making the end product more desirable to the recycling market.</p> <p>It will also enable alignment of end products with market specifications for recycled materials and has the potential to localise supply chains and catalyse growth in local manufacturing.</p> <p>Partnering with manufacturers in the operation of the MRF.</p> <p>This could include the potential establishment of co-locating manufacturing businesses that use MRF output commodities such as glass beneficiation.</p>
<p>Lack of markets for compost.</p>	<p>Ensure high-quality compost is developed for high-value markets, such as urban amenity, through investment in education and improved source separation to minimise contamination.</p> <p>Review optimal delivery models with consideration around establishing strong purchasing networks.</p>
<p>Investment in infrastructure.</p>	<p>Strategic investment in infrastructure</p> <p>CN can invest in its own infrastructure to process its own recyclables and organics. However, with additional investment, the infrastructure can be developed to process the Hunter Region's material. This will improve the localisation of manufacturing, provide greater stability in end markets and help reduce costs to CN residents. Additional revenue may be attained by increasing facility capacity and opening up opportunities for commercial and other customers.</p>



2 Policy Drivers

Effective policy is developed through understanding global and local market drivers and responding through evidence-based research and objective-setting. This can be a significant catalyst for positive industry market transformation.

Our national and state policies have identified key targets and objectives which CN will adopt through Our Sustainable Waste Strategy and/or other CN Strategies.

There is an opportunity to secure grants from the Federal and State governments to assist to drive market transformation to benefit the environment and economy. CN and SWMC is well positioned to invest in infrastructure and access these grants.

Key Strategies and Policies

Our approach to waste management and resource recovery is guided by a framework of international, national and state goals and policies that drive decision-making. The targets and objectives of key strategies and policies are provided below.



United Nations – Sustainable Development Goal 12 focuses on substantially reducing waste generation through prevention, reduction, recycling and reuse. Sustainable consumption is about doing more and better with less. It is also about decoupling economic growth from environmental degradation, increasing resource efficiency and promoting sustainable lifestyles. Goal 12 targets:

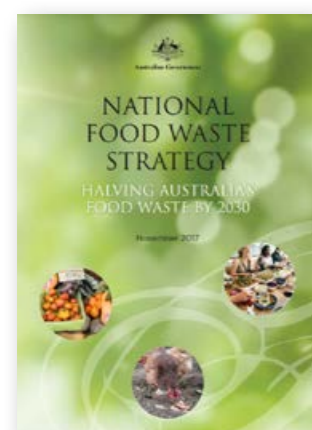
- Sustainable public procurement practices,
- Global food waste at retail and consumer levels, and
- Ensuring that people everywhere have the relevant information and awareness to minimise and managing waste sustainably.



National Waste Policy and National Waste Policy Action Plan provide the framework for waste management and resource recovery in Australia.

Targets:

- Reduce total waste generated in Australia by 10% per person by 2030
- 80% average resource recovery rate from all waste streams following the waste hierarchy by 2030
- Halve the amount of organic waste sent to landfill by 2030
- Significantly increase the use of recycled content by governments and industry
- Ban the export of waste plastic, paper, glass and tyres, commencing in the second half of 2020
- Phase out problematic and unnecessary plastics by 2025.



National Food Waste Strategy provides a framework to support collective action towards halving Australia's food waste by 2030. Four priority areas were identified:

- Policies that are supportive of food waste avoidance, reduction and repurposing
- Improvement and adoption of technologies, processes and actions to avoid and reduce food waste
- Development of markets to support the repurposing of food waste
- Practices and attitudes towards avoiding and reducing food waste are adopted and sustained.



National Plastics Plan outlines our approach to increasing plastic recycling, finding alternatives to unnecessary plastics and reducing the impact of plastic on the environment. This will be achieved through:

- Working with industry on the prevention of problematic plastics
- Greater legislation around responsibility for plastics and investing in increasing recycling capacity
- Improved consumer education for informed decision making
- Removing plastic pollution and litter
- Investment in research for plastic recycling technologies.



Product Stewardship Act 2011 refers to the 'whole of life' custodianship of products within the economy. The framework provides a way to effectively manage the environmental, health and safety impacts of products, and in particular those impacts associated with the disposal of products to landfill.

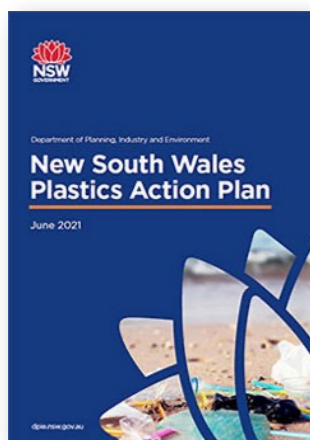
A list is published each year of products being considered for coverage by the legislation. Products currently on the National Waste Policy implementation plan for product stewardship action include televisions and computers, packaging, tyres and mercury-containing lights.



Released in June 2021, **NSW Waste and Sustainable Materials Strategy 2041**

aims to minimise what we throw away and use and reuse our resources efficiently, making them as productive as possible. We will end up with less waste, fewer emissions, minimised harm to our environment and more jobs. The move will boost innovation and help drive our economy. The targets are to:

- Reduce total waste generated by 10% per person by 2030
- Achieve an 80% average recovery rate from all waste streams by 2030
- Significantly increase the use of recycled content by governments and industry
- Phase out problematic and unnecessary plastics by 2025
- Halve the amount of organic waste sent to landfill by 2030.



NSW Plastics Action Plan focuses on four outcomes and six key actions to help meet the NSW Waste and Sustainable Materials Strategy targets around plastics. This includes:

Outcome 1: Reduced plastic waste generation

- Action 1: Introduce new legislation to reduce harmful plastics
- Action 2: Accelerate the transition to better plastic products

Outcome 2: Make the most of our plastic resources

- Action 3: Support innovation

Outcome 3: Reduced plastic leakage

- Action 4: Tackle cigarette butt litter
- Action 5: Reduce the risk of nurdles* entering the environment

Outcome 4: Improved understanding of the future of plastics

- Action 6: Support plastics research

* Nurdles are small plastic resin pellets, less than 5mm in diameter, that are used in the manufacture of plastics. Their shape and size often cause them to be mistaken as food by marine animals if they enter our waterways



NSW Circular Economy Policy Statement is designed to help guide Government decision-making as we transition to a circular economy, to deliver positive economic, social and environmental outcomes. It outlines seven key principles:

1. Sustainable management of all resources
2. Valuing resource productivity
3. Design out waste and pollution
4. Maintain the value of products and materials
5. Innovate new solutions for resource efficiency
6. Create new circular economy jobs
7. Foster behaviour change through education and engagement



Hunter/Central Coast Waste Avoidance and Resource Recovery Strategy** targets:

- Reduce waste generation per capita consistently to achieve a 4% reduction by 2021-22 from the 2011-12 baseline (Key Performance Indicator (KPI): kg/capita/year)
- Achieve a regional resource recovery rate for Municipal Solid Waste (MSW) of 70% by 2021-22 from a 2011-12 baseline (which was measured at 38%)
- Achieve a landfill diversion rate of 75% by 2021-22 from a 2011-12 baseline
- Provide facilities for core problem waste in all council areas by 2021-22
- Reduce the volume of litter by 40% by 2020

**The Hunter/Central Coast Waste Avoidance and Resource Recovery Strategy, and CN's Environmental Strategy are currently under review.



Community Strategic Plan

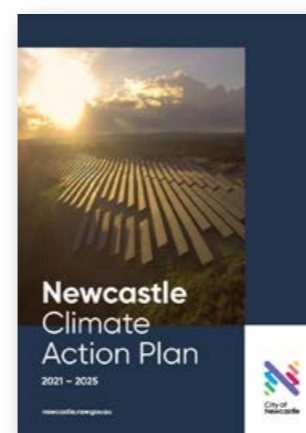
Vision: In 2040, Newcastle will be a liveable, sustainable, inclusive global city.

Theme 2

- Sustainable Newcastle: Our environment sustains our community, economy, health and wellbeing. It is at the heart of all that we do. Our city acts on climate change to achieve net zero emissions and build resilience in our community, infrastructure and natural areas. We protect, enhance and connect our green and blue networks, and we're transforming our city through circular economy solutions.

Priority 2.3 Circular Economy

- Through our transition to a circular economy, we design out waste, creating new opportunities and technologies in our local economy, promoting renewable products and sustainable infrastructure, and rethinking our use of resources as a circular flow.



Climate Action Plan Goal: *By no later than 2030, City of Newcastle will reach Net Zero Emissions for its Operations and by 2025, 50% reduction in carbon emissions from operations including SWMC.* Key actions include:

- Undertake an audit of recycled materials and identify opportunities for their utilisation within CN operations
- Establish organics processing, materials recovery and other processing facilities at SWMC to provide best practice waste diversion and recovery.
- Transition all CN heavy trucks including waste collection vehicles to electric options where available and monitor and trial improvements in technology.



The third priority of the **Economic Development Strategy** is 'City Shaping'. *Objective 3.5 relates to Circular Economy:*

- To support industry transformation leveraging economic benefits of transitions to zero-waste and net zero emissions.
- The strategy also identifies SWMC as a key innovation precinct for the City, with opportunities for industry-led circular economy investment.



Key actions that have arisen from these strategic documents are:

- Avoiding the generation of waste
- Improving resource recovery
- Recognising that waste is a valuable resource
- Taking responsibility for the waste we generate and managing it in accordance with its highest value
- Managing waste and recyclables locally, as part of a broader circular economy

Our **Sustainable Waste Strategy** is designed to incorporate these actions while balancing community expectations and financial sustainability.

Strategic Investment for our Future


The following funding streams are a summary of how the above strategies and policies are supported through strategic investments. SWMC is an operational waste and resource management facility, strategically located at the gateway to the Hunter Region and with good links to a major transportation network. It is an ideal location for additional resource management and manufacturing infrastructure, which the majority of these funding streams support.

Funding Stream	Overview
National	
Modern Manufacturing Initiative	The program forms part of the Federal Government's JobMaker plan which seeks to rebuild the economy, create jobs and recover from the COVID-19 recession. It was announced as part of the \$1.5 billion Modern Manufacturing Strategy in the 2020-21 Federal Budget. Funding is available under the Recycling and Clean Energy priority.
Recycling Modernisation Fund	The Australian Government will invest \$190 million into this fund to leverage \$600 million of recycling infrastructure investment and drive a billion-dollar transformation of Australia's waste and recycling capacity. The fund and other measures that support Australia's National Waste Policy Action Plan, will create approximately 10,000 new jobs and divert over 10 million tonnes of waste from landfill.
Clean Energy Finance Corporation (CEFC) – Australian Recycling Investment Fund	CEFC investment commitments through the Australian Recycling Investment Fund align with the principles of the circular economy. Through the recycling fund, CEFC expects to provide either debt and/or equity finance to eligible larger-scale commercial and industrial projects. The total funding pool is \$100 million.
State	
Waste Less, Recycle More	The initiative is funded through the NSW Government's section 88 waste levy and is the largest waste and recycling funding program in Australia. Waste Less, Recycle More funding priorities 2017-21: <ul style="list-style-type: none"> Local government waste and resource recovery – \$70 million Illegal dumping prevention and waste enforcement – \$65 million Household problem wastes – \$57 million Waste and recycling infrastructure – \$48 million Organics infrastructure – \$35.5 million Litter prevention and enforcement – \$30 million Business recycling – \$22.5 million Recycling innovation – \$5 million Heads of Asbestos Co-ordinating Authorities - \$4 million.
Remanufacture NSW	Jointly funded by the Australian Government's Recycling Modernisation Fund and NSW Waste Less, Recycle More initiative. A funding pool of \$35 million to support co-investment of infrastructure projects that will address export ban materials and provide opportunities for new innovative technologies using circular economy principles.
Better Waste and Recycling Fund	The Better Waste and Recycling Fund provides funding to local councils and regional groups of councils to make it easier for their communities to recycle more and decrease the amount of waste sent to landfill. The fund supports a broad range of projects to improve recycling, engage communities, reduce waste generation, tackle littering and illegal dumping, and contribute to achieving the NSW recycling targets.


CN is monitoring and applying where eligible for funding to ensure we meet our strategic objectives most cost-effectively as well as to enable us to enhance our resource recovery and waste management programs and services. Below is a summary of co-funded initiatives:



SWMC Resource Recovery¹⁷
\$1 million funded under Waste Less, Recycle More
 Infrastructure stream for the establishment of a 2,000m² Resource Recovery Centre (RRC) at SWMC.
 The RRC enables CN staff to separate our recyclable and recoverable materials from mixed waste loads, increasing resource recovery from 3% to 20%.




\$1million
towards Resource Recovery Centre




17%
waste recovery increase from 3% to 20%

SWMC Community Recycling Centre¹⁸
\$155,000 funded under Waste Less, Recycle More
 Household problem wastes stream for the establishment of a Community Recycling Centre at SWMC to provide residents with the opportunity to safely disposed of chemicals which may cause harm to the environment or human health. This facility has collected over 350 tonnes of household problem wastes, such as paints, oils and batteries for recycling or safe disposal since opening.



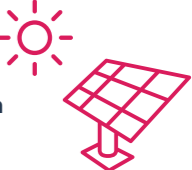
\$155,000
towards household problem waste



350
tonnes household problem waste safely disposed

SWMC Solar Farm¹⁹
\$6.5 million funded via a CEFC loan interest loan for a 5MW Solar Farm built on a rehabilitated former landfill
 The site exceeded expectations by generating twice the expected revenue²⁰, of \$420,000, in the first 6 months.

\$6.5million
to build on-site solar farm




Better Waste and Recycling Fund initiatives

\$2 million over the 10 year life of the grant funding, supporting 30 projects focused on:

- Education, information and behaviour change programs addressing waste avoidance, resource recovery and recycling, litter and marine debris, including our home composting program
- Public place waste and recycling infrastructure
- Waste audits
- Litter and illegal dumping

SWMC Materials Recovery Facility²¹
 CN secured \$5 million in funding under **Remanufacture NSW** to support the delivery of Materials Recovery Facility.

SWMC Organics Facility²²
\$1.5 million funded under Waste Less, Recycle More
 Organics stream to enable early planning for an organics processing facility at SWMC that, when fully operational, will be able to divert up to 50,000 tonnes of food and garden organics annually.



up to **50,000**
tonnes of food and garden organics can be diverted

¹⁷ <https://newcastle.nsw.gov.au/council/news/latest-news/resource-recovery-centre-diverts-over-3-100-tonnes>
¹⁸ <https://newcastle.nsw.gov.au/living/waste-and-recycling/problem-wastes/chemicals/summerhill-community-recycling-centre>
¹⁹ <https://newcastle.nsw.gov.au/council/news/latest-news/cefc-finance-to-build-newcastle-s-solar-farm>
²⁰ <https://www.newcastle.nsw.gov.au/council/news/latest-news/solar-farm-powering-city-operations-and-revenue>
²¹ <https://www.newcastle.nsw.gov.au/council/news/latest-news/city-awards-contract-for-cutting-edge>
²² <https://www.environment.nsw.gov.au/funding-and-support/nsw-environmental-trust/grants-available/remanufacture-nsw/project-summaries-2021#materialsprocessing>



Challenges and Opportunities

Challenge	Opportunity
<p>Reduce total waste generated in Australia by 10% per person by 2030.</p> <p>An ambitious target of 80% recovery rate and halving organic waste sent to landfill by 2030 has been set.</p> <p>This includes a 50% reduction in organics to landfills by 2030 and a mandate for specific businesses to divert food waste by 2025.</p> <p>Our current municipal recovery rate sits at around 40%.</p>	<p>Development of a long-term, data-driven behaviour change program</p> <p>The development of a long-term approach towards community behaviour change to ensure we have an educated community that can make informed decisions about consumption to reduce our impact on the planet. Undertaking long-term waste composition audits will allow CN to monitor progress and identify opportunities to tailor education campaigns to have the most impact on our community.</p> <p>Development of new resource recovery infrastructure at SWMC</p> <p>A 'business as usual' approach will not allow SWMC to meet these targets and a multi-pronged approach is required. A MRF at SWMC will ensure we will always have a nearby location to process our recyclables. An Organics Facility at SWMC will ensure we will always have a nearby location to process Food Organics and Garden Organics (FOGO). This will further allow CN to meet the organics reduction target and improve the overall municipal recovery rate, by approximately 10-20%. Opportunity also exists to offer this service to businesses and other councils.</p> <p>Collaboration with research institutions and industry in boutique resource recovery options will further contribute toward our 80% target. For example, MICROfactories which disassemble and recycle problematic material streams such as e-waste.</p>
<p>Waste export ban of plastic, paper, glass and tyres by 2024 has prompted policy to focus on localisation of our supply chain by significantly increasing the use of recycled content by governments and industry, especially plastics.</p>	<p>Collaboration and partnership to develop a Resource Recovery Hub at SWMC</p> <p>Cross-collaboration with research institutions and industry is required to maintain and add value to processed recycled materials. As part of the CN's Economic Development Strategy, SWMC was identified as a key innovation precinct for circular economy activities. This will be further leveraged through continual support in the localisation of industry supply chains.</p>
<p>Implementation of new initiatives, services and infrastructure requires funding.</p>	<p>Access to financial support to achieve Federal and State targets and outcomes</p> <p>The Federal Government will invest \$190 million into the Recycling Modernisation Fund. This will leverage over \$600 million of recycling infrastructure investment and drive a billion-dollar transformation of Australia's waste and recycling capacity. The Recycling Modernisation Fund will support investment in new infrastructure to sort, process and remanufacture materials such as mixed plastic, paper, tyres and glass. CN was awarded \$5M towards the construction of a MRF via Remanufacture NSW which is co-funded by the Federal and NSW governments. There are funding opportunities accessible to support a broad number of initiatives. There is also an opportunity to continually investigate and secure funding to support new initiatives, services and infrastructure.</p> <p>Hypothecation of the S88 Waste Levy back into waste and resource management infrastructure and activities rather than consolidated revenue will secure dedicated ongoing reinvestment. CN, over the past ten years, has paid \$270M in Waste Levy and has only received \$6.5M, or 2%, back in funding.</p>
<p>Waste Services operates in a highly regulated environment due to the nature of its operations.</p>	<p>Continual review of operations to prioritise people and the environment is required within the Waste Industry</p> <p>Waste business must ensure that risk management systems that are in place are fit-for-purpose and well-adopted by the organisation.</p>

Legislative Requirements

Waste Services is governed by acts and regulations to minimise harm to human health and the environment. This includes;

- *Local Government Act 1993 (NSW)*
- *Essential Services Act 1988 No. 41*
- *Work Health and Safety Act 2011 and Work Health and Safety Regulation 2017*
- *Protection of the Environment Operations Act 1997 (NSW)*
- *Protection of the Environment Operations (General) Regulation 2009*
- *Protection of the Environment Operations (Waste) Regulation 2014*
- *Privacy and Personal Information Protection Act 1998*
- *Waste Avoidance and Resource Recovery Act 2001*
- *State Environmental Planning Policy (Infrastructure) 2007*
- *Heavy Vehicle (Adoption of National Law) Act 2013 (NSW)*

UNSW SMaRT Centre MICROfactories™ are an innovation designed to transform problematic waste materials, such as glass, textiles and plastics, into new value-added materials and products such as engineered ceramic-style tiles, building panels and filament for feedstock and 3D printing, benefiting the environment and creating new economic and social opportunities.

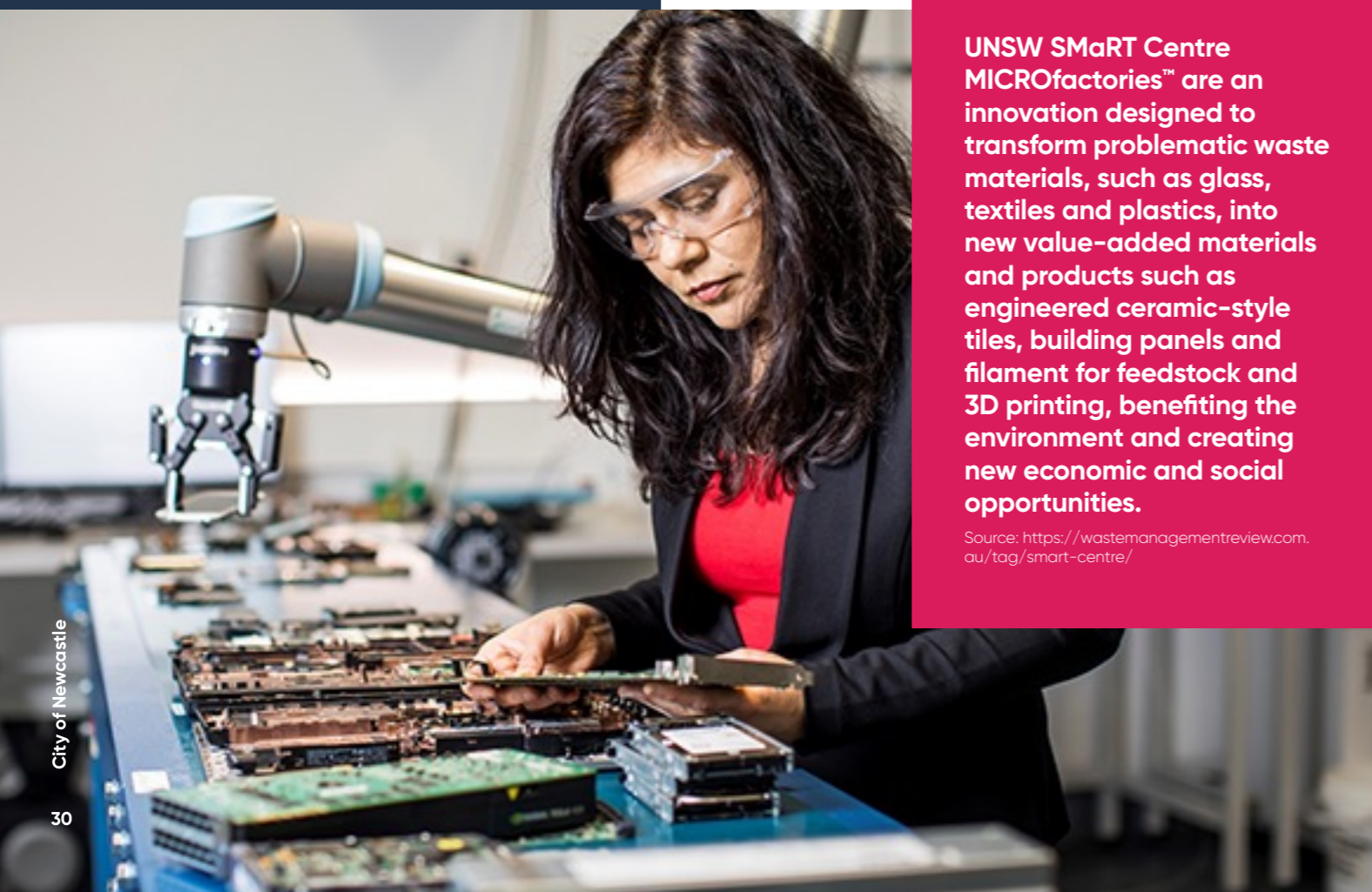
Source: <https://wastemanagementreview.com.au/tag/smart-centre/>

8,000 reusable coffee cups distributed, saving an estimated 416,000 single-use cups per annum

2,500 dog waste pouches distributed to reduce littering of pet waste

1,000 residents signing up for subsidized home composting products resulting in 9,508kg of food waste diverted from landfill

40 public place dual waste and recycling stations installed in prominent, high traffic locations such as Bathers Way, Newcastle Foreshore and Stockton Foreshore





3 CN and Regional Needs

Our community in Newcastle, and the Hunter region, are growing. It is important that we plan not just to meet our current needs and aspirations, but also to support future population growth and economic development. As a region we face common problems around waste management and resource recovery; but collectively we can meet State and Federal government targets which creates positive market transformation. This will improve the value to our environment, community, and economy.

City of Newcastle's (CN) recyclable recovery rate is 40.5%, while the Hunter's average recovery rate is 43.3%. Our region will need to find ways to improve its ability to recycle, by approximately 40%, if we are to meet the Federal and State target of 80% by 2030.

CN has gained insights auditing our waste and recycling streams to provide us with a roadmap to improve our recycling.

To meet our targets, CN will need to aggressively pursue a combination of solutions. This includes optimising our current services by reducing contamination of our recyclables, stopping recyclables leaking into our residual waste, introducing new services such as FOGO (Food Organics Garden Organics) recovery, and investigating new innovative technologies to recycle materials currently being sent to landfill.

We have listened to our community and can meet the community's aspirational goals and support the region through:

- Providing new and innovative services to increase resource recovery
- Providing local solutions to our waste
- Building future resilience
- Transitioning Summerhill Waste Management Centre to a Resource Recovery Hub.



Regional Snapshot

Between 2001 and 2017, the population of the region grew from 628,000 to just over 730,000²³. The five lower Hunter Councils are predominantly driving this growth and have the greatest influence on the population and economic growth across the region. Over the next 20 years (2021-2041)²⁴ the:

- Hunter Region population will grow by 14.8% leading to a 13.9% increase in waste generation
- Newcastle's population will grow by 15.7% leading to a 179% increase in waste generation



Population growth and a prosperous economy are intrinsically linked to waste generation. More people means more waste generated and a more prosperous economy means this waste generation is not just contained to the residential household waste streams but across all sectors; construction, commercial, retail and industrial.

When it comes to municipal waste and resource recovery, the two key indicators to consider are the total amount of waste that is being generated and how much of it is being recovered. The following table show waste generation and recovery rates across the Hunter Region. There are several things to note from this information:

- Newcastle is the sixth-highest waste generator, by household, in the Hunter (out of 10 councils) and has the fourth lowest recycling rate
- The council with the highest recovery rate, Lake Macquarie, is the only council to have a FOGO service
- The councils with the lowest recovery rate do not have a green-bin garden organics collection service.

²³ ABS.Stat, ERP by LGA, Age and Sex, 2001 to 2017

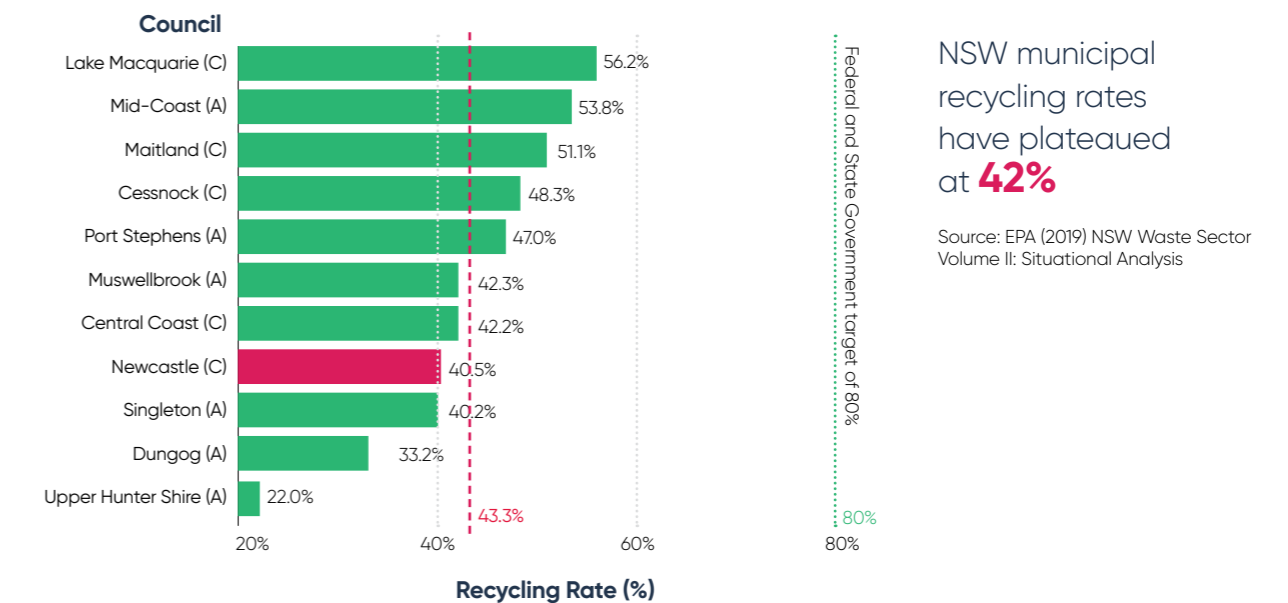
²⁴ DPIE (2019) Population, Household and Implied Dwelling Projections; <https://www.planning.nsw.gov.au/Research-and-Demography/Population-projections/Projections>

Table 3: Regional Local Government Area performance

LGA	Kg per HH/wk	Kg per Capita /wk	Recycling Rate
Greater Newcastle			
Cessnock (C)	19.94	9.32	48.3%
Lake Macquarie (C)	25.31	9.9	56.2%
Maitland (C)	26.25	10.45	51.1%
Newcastle (C)	23.12	9.39	40.5%
Port Stephens (A)	24.71	12.28	47.0%
Greater Newcastle	23.87	10.27	48.6%
Upper Hunter and MidCoast			
Dungog (A)	19.7	10.97	33.2%
Mid-Coast (A)	23.25	13.25	53.8%
Muswellbrook (A)	19.79	9.68	42.3%
Singleton (A)	20.48	9.75	40.2%
Upper Hunter Shire (A)	11.14	6.17	22.0%
Upper Hunter and MidCoast	18.87	9.96	38.3%
Hunter Region	21.37	10.12	43.5%
Central Coast and Hunter Region			
Central Coast (C) (NSW)	34.26	13.31	42.2%
Central Coast and Hunter Region	22.54	10.41	43.3%

Source: EPA Waste Data Survey 2018-19

Figure 2: Regional LGA performance



An important point to note from Figure 2 is that all councils need to make significant changes to their current recycling services to meet the Federal Government target of 80% resource recovery across all waste streams by 2030. To work towards achieving this, as a minimum, councils will need to introduce FOGO or other food waste recycling services, however this alone won't be enough to achieve the targets.

CN has developed a high-level road map of the steps required for CN to meet the targets set out in Federal and State government strategies.



Roadmap to 80% resource recovery

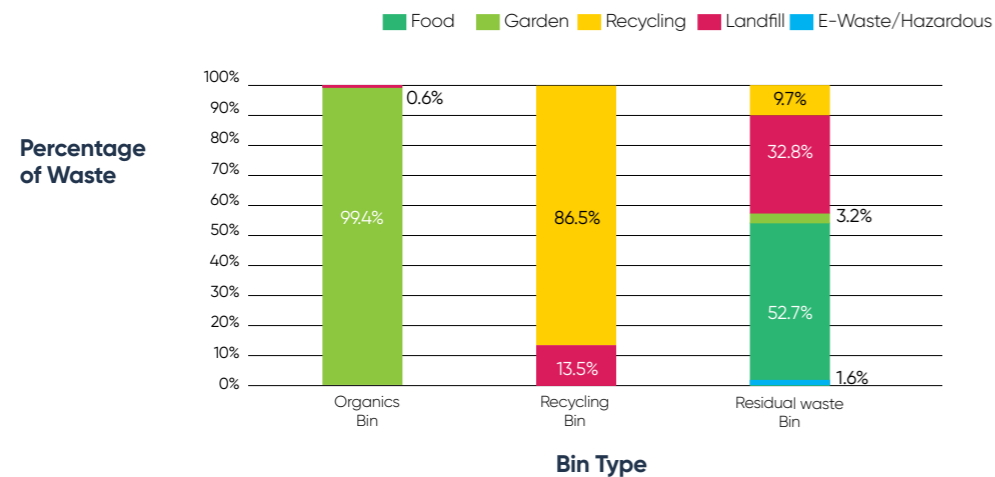
City of Newcastle (CN) periodically carries out audits of our bins to gain a better understanding of what our community is throwing away and how we can educate and improve our recycling practices and services. Figure 3 below summarises the results of our most recent kerbside waste audit in 2022.

The state-wide averages for contamination, or rejects, in the kerbside recycling and organics bins, are 10.6% and 1.8% respectively²⁵. According to the audit data, CN's recycling contamination is higher than average, at 13%, while our organics contamination rate is significantly lower than the state average at 0.6%.

The audit data shows that over half of our waste in our general (red lid) waste bin has the potential to be recovered in a Food Organics and Garden Organics processing facility.

²⁵ EPA (2018-19) Local Government WaRR Data Report <https://www.epa.nsw.gov.au/your-environment/waste/local-council-operations/local-council-waste-and-resource-recovery>

Figure 3: Audit waste composition



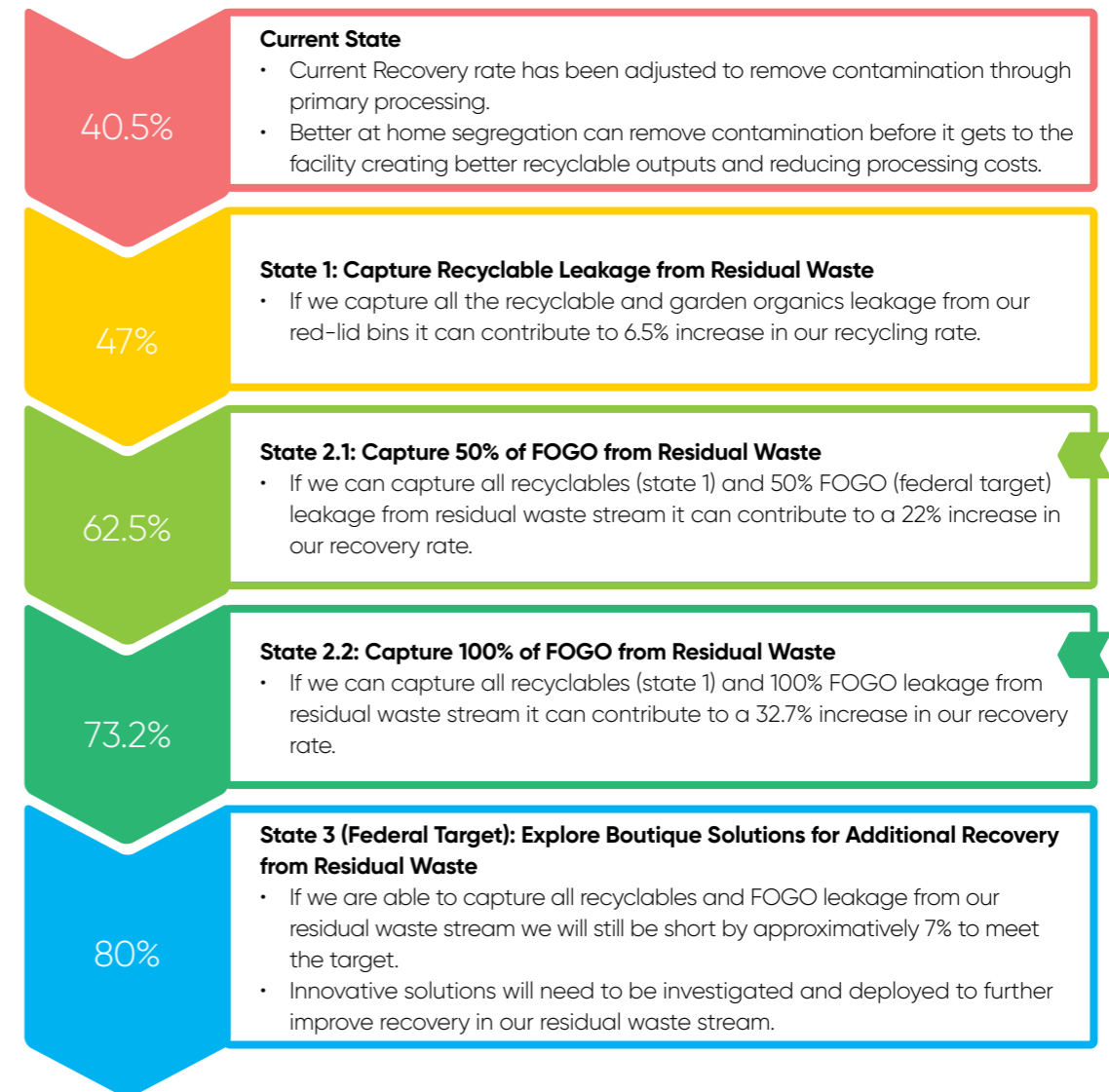
Recognising that the Federal recycling target is 80%, our audit data, combined with our waste and recycling generation data, provides us with an indicative roadmap towards achieving this target, as shown on page 37.

While each state has been stepped out consecutively, we will need to pursue a range of solutions, simultaneously, to achieve the Federal target by 2030.

Impacts of COVID

While COVID-19 has reduced waste generation from offices and retail, this has been offset by increased residential waste generation. This is considered to be a short-term trend, although the possibility of sustained work from home may see a more permanent but marginal change from the previous long-term trends.

Regular waste audits will enable CN to identify and monitor trends in waste generation and recycling as we move towards a 'new normal' and to transition services and infrastructure as needed in response.



The solutions CN will use need to be a combination of:

- Infrastructure and services:** Ensuring the availability of infrastructure and services to allow for resource recovery and processing of high-value outputs
- Education and behaviour change:** An ongoing program to promote uptake and responsible use of the services available

Table 4: High-level improvement roadmap

	Infrastructure and Services	Behaviour Change Campaigns
Current State	Access to advanced MRF that can process yellow-lid bin material to 99% purity.	Reduce contamination from yellow-lid bin
State 1: Capture Recyclable Leakage from Residual waste		Reduce recyclables and garden organic leakage in the red-lid bin
State 2.1: Capture 50% of FOGO from Residual waste	Access to organics facility that can process Food Organics and Garden Organics.	Introduce Food Organics recovery (FOGO service) to residents
State 2.2: Capture 100% of FOGO from Residual waste*		Improve uptake and reduce leakage of Food Organics recovery
State 3: [Federal Target] Explore Boutique Solutions for Additional Recovery from Residual waste	Co-location and partnerships with boutique recovery services and investigation and understanding of the role of Waste to Energy.	Waste reduction campaigns. Access to boutique recovery services.

* This is an aspirational target. Studies by VIC EPA state that 20% of residents will never adopt this service.



Infrastructure Needs

Research has been conducted by the NSW Government²⁶ and our region to understand our waste and recycling infrastructure needs. The following key infrastructure has been identified to ensure our core kerbside waste and recycling services are secure for the future.

Material Stream	Hunter Region Capacity Gap and Infrastructure Need	Reason
Mixed Recycling	<p>Current Infrastructure requirements. Either:</p> <ul style="list-style-type: none"> • CN only MRF, or Transfer Station, to process ~20,000 tpa. • Hunter region MRF to process 60,000 tpa to 70,000 tpa. 	<ul style="list-style-type: none"> • China National Sword Policy and COAG Export Ban. • Closure of Gateshead MRF. Currently, there are no MRFs in the Hunter region. All Hunter councils transport their materials to the Central Coast or to Sydney.
Organics	<p>Infrastructure requirements by 2030 for the Hunter as identified in the <i>NSW Waste and Sustainable Materials Strategy A guide to infrastructure needs</i>:</p> <ul style="list-style-type: none"> • 1 x small In Vessel Composter (IVC) (20,000 tpa) or 1 x medium outdoor aerated compost (FOGO, minor FO) (10,000 tpa to 50,000 tpa). • 2 x medium IVC (20,000 tpa to 70,000 tpa per site) or 2 x large outdoor aerated compost (FOGO, minor FO) (>50,000 tpa per site). • 2 x medium AD (FO) (30,000 tpa per site). 	<ul style="list-style-type: none"> • Federal and State governments target of 80% recycling and 50% food waste diverted from landfill. • The NSW EPA, in October 2018, revoked the exemption for mixed waste organic outputs (MWOO) application for land. An estimated additional 176,000 tpa of processing capacity for organic material will need to be reconfigured from Alternative Waste Technology to FOGO facilities. • Councils are to provide kerbside FOGO services to all households by 2030. • Selected commercial food businesses are to implement food organics recovery by 2025. • The NSW Government estimates that 1.1 million tpa in FOGO/FO processing capacity will be required (capacity deficit) to service metropolitan areas including Greater Newcastle.
Residual waste	<p>As identified in the <i>NSW Waste and Sustainable Materials Strategy A guide to infrastructure needs</i>:</p> <p>Additional landfill capacity to accept >300ktpa or a medium-scale energy recovery facility by 2040.</p>	<ul style="list-style-type: none"> • Regional population and economic growth.

LEGEND
AD: Anaerobic Digestion
COAG: Council of Australian Governments
FO: Food Organics
tpa: tonnes per annum

²⁶ DPIE, NSW Waste and Sustainable Materials Strategy: Future Infrastructure Needs

Newcastle is the primary gateway to the Hunter, linked to the rest of the region and beyond due to our connection with major road networks including the M1 and Hunter Expressway. SWMC has adequate space and is in a strong position to provide regional solutions for waste and resource recovery for the Hunter.

CN consulted with local councils and private sector waste collectors/processors²⁷, to determine the feasibility of SWMC becoming a Resource Recovery Hub that provides regional resource recovery solutions. CN found:

- Other Hunter councils want a local/regional solution for their recyclables, rather than sending material outside our region.
- There is limited processing infrastructure in the region which poses sole dependency risks, including:
 - High processing costs due to lack of competition
 - Having to find alternative solutions at a potentially much greater price should the infrastructure fail or the organisation go out of business
 - Having to send recycled material to landfill should the infrastructure fail or the organisation go out of business.
- There is significant consideration around logistics. Transporting material large distances is not economical and will necessitate the use of a transfer station for bulking of material and long-hauling. This adds significant operational expense.
- Any regional solution should be a trade-off between the volume of recyclable material and the distance it has to travel. In short, the overall volume of waste should be travelling the least distance. City of Newcastle's SWMC was considered to be consistent with this approach.

²⁷ CN (2021) Internal Unpublished Document

Regional precincts that are located on arterial transport routes have enormous potential to become circular economy precincts, where energy recovery sits at the centre of a network of complementary industries that can create jobs and drive innovation.

Source: EPA (2021), Energy from Waste Infrastructure Plan

Cleaning Up Our Act: The Future for Waste and Resource Recovery in NSW (March 2020)

The NSW Government, in its Issues Paper, notes that land for waste and resource recovery infrastructure needs to be planned, retained and managed. While these are essential services, the industry and local councils have reported it is becoming increasingly difficult to find appropriate land to build waste and resource recovery infrastructure. Even when land is identified, urban encroachment, negative public sentiment towards facilities, and competition for commercial and industrial sites make it increasingly difficult and expensive to secure land for waste and recycling facilities.

City of Newcastle has an ideal site at Summerhill Waste Management Centre that is in close proximity to our population, however it is suffering from urban encroachment as our population grows. This site needs to be protected to ensure future security of our waste and recycling services at a low cost to residents.



Listening to Our Community

Valuable feedback from our community over the last five years has told us that residents think that reducing waste, increasing recycling and moving towards a circular economy is important. The following summarises the key community feedback CN received²⁸

Our Key Projects

Percentage of residents support:



FOGO
77% of residents would be very likely to separate their food if Council introduces FOGO



Green Energy
Generate green energy (from our organics for example) to power a local recycling facility - 95%



MRF
Develop a Materials Recycling Facility (MRF) - 98%



Soft Plastics
Recovering soft plastics through yellow bins - 90%



Textiles
Recovering textiles through yellow bins - 98%



SWMC Access
Improved access at SWMC - 87%



Tip Shop
92% support Tip Shop to divert and sell re-useable items

²⁸ City of Newcastle (2020) Waste Research Report



Education and Behaviour Change



98% of residents support education programs that empower the community to produce less waste, recycle properly and reduce waste to landfill.

Our residents also suggested that we could develop new waste and recycling awareness programs about:

- Organic and food compost
- Appropriate types of waste to go in each of the three kerbside bins
- Soft plastics waste management

CN is not alone in having residents looking for more information on these types of waste. Hunter Joint Organisation also has reported that it sees a need for more information and better programs for:

- Bulky waste
- Textiles
- Soft plastics

Strategic Input

Percentage of residents support:



Research
Partnering with university to divert waste and new product uses for recyclables - 84%



Responsibility
Personally responsible for waste management - 84%



Innovation
Innovative technologies that reduce waste to landfill - 98%



Circular Economy
Circular economy at SWMC including light intensity business - 91%



Recycling
Recycling is important - 98%



Partnerships
Partner with other councils - 90%



Commercial
Recognise the value of the resource - take a more commercial approach - 88%



Summerhill
Maximise the life of SWMC - 93%



Challenges and Opportunities



Challenge	Opportunity
<p>City of Newcastle will need to improve recovery by 40% to meet the 80% resource recovery State and Federal target.</p>	<p>Multiple solutions will need to be pursued simultaneously including:</p> <ul style="list-style-type: none"> • Development of a Behaviour Change Strategy with a focus on; <ul style="list-style-type: none"> • Reducing contamination in the yellow-lid bin, • Reducing recyclable leakage in the red-lid bin • Maximising adoption of Food Organics recovery (when the facility is operational) • Waste reduction campaigns, and • Education around access to boutique recovery services. • Investigation and development of new infrastructure and services, such as; <ul style="list-style-type: none"> • An advanced MRF capable of processing material with up to 99% purity, • Food Organics capture through our green-lid bin service, • Boutique infrastructure, technology or services to recover material that would traditionally end up in a landfill.
<p>Significant need for organics solutions in Hunter region driven by state targets, that apply to councils and commercial food businesses, and the revoking of MWOO exemptions.</p>	<p>City of Newcastle is currently developing an IVC (in vessel composting) organics processing facility. Further assessments of the market should be conducted to understand the capability to cater for more feedstock.</p> <p>The community has also been supportive of generating green energy. Anaerobic Digestion, which generates green energy through the processing of organic material, should also be explored to potentially cater for commercial food diversion in the region.</p>
<p>The average recovery rate for the Hunter Region is 43%. City of Newcastle and the region face similar waste and resource recovery issues around lack of infrastructure.</p>	<p>City of Newcastle can either invest in infrastructure to meet the city's needs or further investigate opportunities for regionally designed solutions.</p> <p>A regional solution can result in reduced lifetime cost to our residents for the service, improved localisation of output feedstocks, and overall improved environmental outcomes for the region.</p>
<p>Existing waste and recycling services will not achieve the Federal and State targets. To achieve an 80% resource recovery target additional, innovative solutions will need to be developed for streams that are traditionally difficult to recover.</p>	<p>Boutique infrastructure, technology or services to recover material that would traditionally end up in landfill should be investigated and piloted. Including:</p> <ul style="list-style-type: none"> • Delivery of workshops to increase the maximum life of products, such as furniture repair • Social enterprise programs, such as a tool share program • Development of boutique resource recovery opportunities that would benefit from proximity to source materials, such as mattress recycling, e-waste recycling • Understanding the role of Energy from Waste • Innovation hub for research and collaboration with Universities • Collaboration with other Hunter Councils, State and Federal Governments, industry experts, and universities to identify solutions and promote circular innovation is important.
<p>SWMC currently only has one access road, via Minmi Rd Wallsend and Fletcher.</p>	<p>A secondary access road connecting the site to Newcastle Link Rd has been proposed and is being investigated to reduce current and future traffic impacts caused by SWMC's operation.</p> <p>Logistics planning is required to support new resource recovery infrastructure to balance customer needs, environmental impacts and community amenity impacts in the suburbs neighbouring Summerhill.</p>



4 CN Waste Services Capability

- CN currently offer our residents a three-bin waste and recycling collection service, a bulk waste service, options to safely dispose of household problem wastes and public place waste and recycling infrastructure
- Summerhill Waste Management Centre has primarily operated as a landfill, with limited resource recovery activities on-site, however steps have been taken to secure and localise our three-bin waste and recycling service at SWMC through an Organics Processing and Materials Recovery Facility
- With the changes in markets and policy, we have many opportunities open to us to reduce the amount of waste landfilled and increase resource recovery and recycling through new infrastructure and services
- The ample land and prime position of SWMC makes it the ideal location to transition away from 'just a landfill' to a Resource Recovery Hub, which will have social, environmental and economic benefit to our community and the region.



Waste and Recycling Collection Services



over 7 million collections from households and businesses per annum



16,402 tonnes of garden organics in 2020/21²⁹



15,378 tonnes of recycling in 2020/21²⁹



50,840 tonnes of residual waste in 2020/21²⁹

CN deliver a three-bin kerbside collection system for residential properties in Newcastle as part of our standard rateable entitlement, with weekly collections for residual waste and alternating fortnightly collections for recycling and green waste.

Residents can access additional bins and collections for an added cost if required.

Kerbside Collection Services



Residual Waste
Collected weekly

Taken to SWMC for landfilling



Recyclables
Collected fortnightly

Taken to SWMC where it is bulk loaded for transport to a third party MRF for processing at cost



Organics
Collected fortnightly

Taken to SWMC where it is shredded on-site before being transported to the Hunter Valley for mine site rehabilitation at cost

²⁹ EPA (2020-21) Local Government WaRR Data Report

Bulk waste service



2,800 tonnes collected per annum

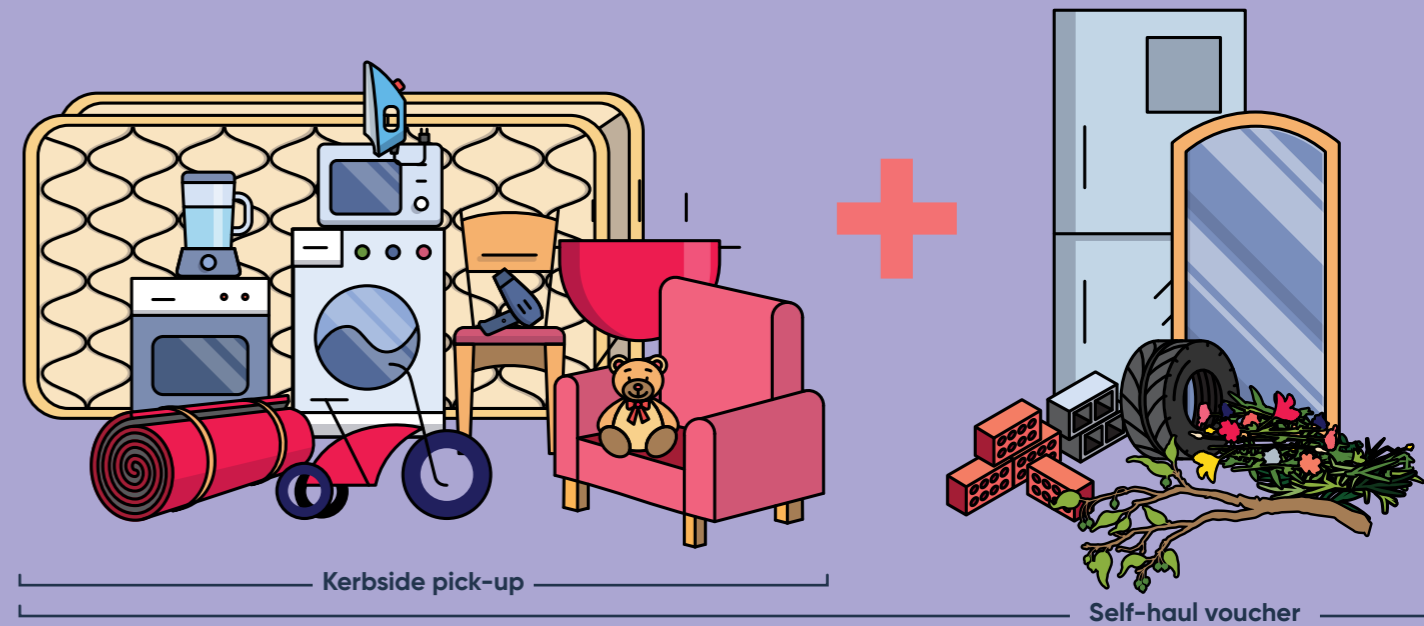
CN offers residents a free bulk waste service for those household items which are too big to dispose of through the kerbside collection service. Residents can choose between a booked kerbside collection or a self-haul voucher which enables them to bring their waste to SWMC at no charge. A self-haul voucher provides residents with the opportunity to dispose of a wider range of items than a kerbside collection, as

well as enabling residents to dispose of their items at a time convenient to them.

Residents can request two vouchers or two kerbside pick-ups in any rolling 12-month period³⁰, or one of each option, to dispose of up to two cubic metres of domestic waste per service.

³⁰ Rolling twelve-month period means if you booked a service in November 2020 and another service in April 2021, you will be entitled to your next service from November 2021

Bulk Waste Services



Household problem waste service

Household problem wastes are potentially harmful household products that should not be disposed of through our household kerbside bins. They include items such as paints and oils, cleaning products, pool chemicals, garden herbicides and pesticides, and hobby chemicals.

Many of these items can be recycled and turned into a new product or used in other ways if they are correctly disposed. We provide three services for residents to safely dispose of their household problem wastes for recycling or safe disposal

Community Recycling Centre (CRC)	Chemical CleanOut Event	Community Recycling Stations (CRS)
Located at SWMC this is a drop-off facility open year-round	An event-based service, currently offered twice per year in Newcastle.	Located at several Libraries and Council buildings. Permanent drop-off for smaller, less toxic household problem wastes
Accepts: <ul style="list-style-type: none"> • Paint • Gas bottles • Motor and other oils • Car batteries • Household batteries • Fluoro light globes and tubes • Fire extinguishers • Smoke detectors 	Accepts: <ul style="list-style-type: none"> • The same items as accepted at the Summerhill CRC • Automotive chemicals (eg, coolant) • Garden herbicides and pesticides • Pool cleaning chemicals • Hobby chemicals 	All CRS accept: <ul style="list-style-type: none"> • Household batteries • Reading glasses (no sunglasses) Depending on location accepts: <ul style="list-style-type: none"> • Fluoro globes (no tubes) • Mobile phones • Printer cartridges • X-rays
More information: Summerhill CRC	More information: Household Chemical CleanOut	More information: Community Recycling Stations



Community Recycling Centre at Summerhill Waste Management Centre

The CRC and Chemical CleanOut events are delivered in partnership with the NSW EPA and are available to all NSW residents. The Community Recycling Station service is available for Newcastle residents only.

Community Recycling Station locations

You can drop off the following household items for free, at these local facilities.

	Household batteries	Eye glasses	X-rays	Ink cartridges	Fluoro globes (no tubes)	Mobile phones
Beresfield and Stockton Library	✓	✓	✓	–	–	–
Newcastle and New Lambton Library	✓	✓	✓	–	–	–
Wallsend Library	✓	✓	✓	✓	✓	✓
Newcastle Museum	✓	✓	✓	✓	✓	✓
Summerhill Waste Management Centre	✓	✓	✓	✓	✓	✓

- **Paints** are mixed with other waste solvents and used as an alternative to fuel in cement kilns. The metal containers are recycled
- **Lead acid batteries** are sent to recyclers where the lead, acid and plastic are recovered and recycled
- **Gas bottles** have the residual gas captured for reuse. Undamaged bottles are re-tested, re-stamped and returned to the hire industry. Damaged bottles are punctured and recycled as scrap metal
- **Used oils** are processed to become a lubricant or used for waste to energy
- **Fluorescent tubes and globes containing mercury.** The mercury is removed through processing and sold for a range of industrial uses. The metals are also recycled



Chemical CleanOut event



Community Recycling Station at Wallsend Library



Community Recycling Station at Newcastle Library



Summerhill Waste Management Centre

Summerhill Waste Management Centre (SWMC) is a key asset for CN in the provision of waste services to our community and businesses. SWMC is located on a former open-cut and underground mine, which operated until 1988. The site was acquired by Council in 1990 and since 1995, the site has been operated as a waste management centre. SWMC is licensed under EPL 5897 and is permitted to dispose of 362,000 tonnes per year, with approximately

100 years of disposal life remaining. A significant part of the cost of providing waste services to the community is in transport. A key part of the value that the SWMC affords CN, and the Hunter region, is its central location via the M1 and Hunter Expressway, its proximity to the population and its capacity. This translates to reduced transport emissions and costs.



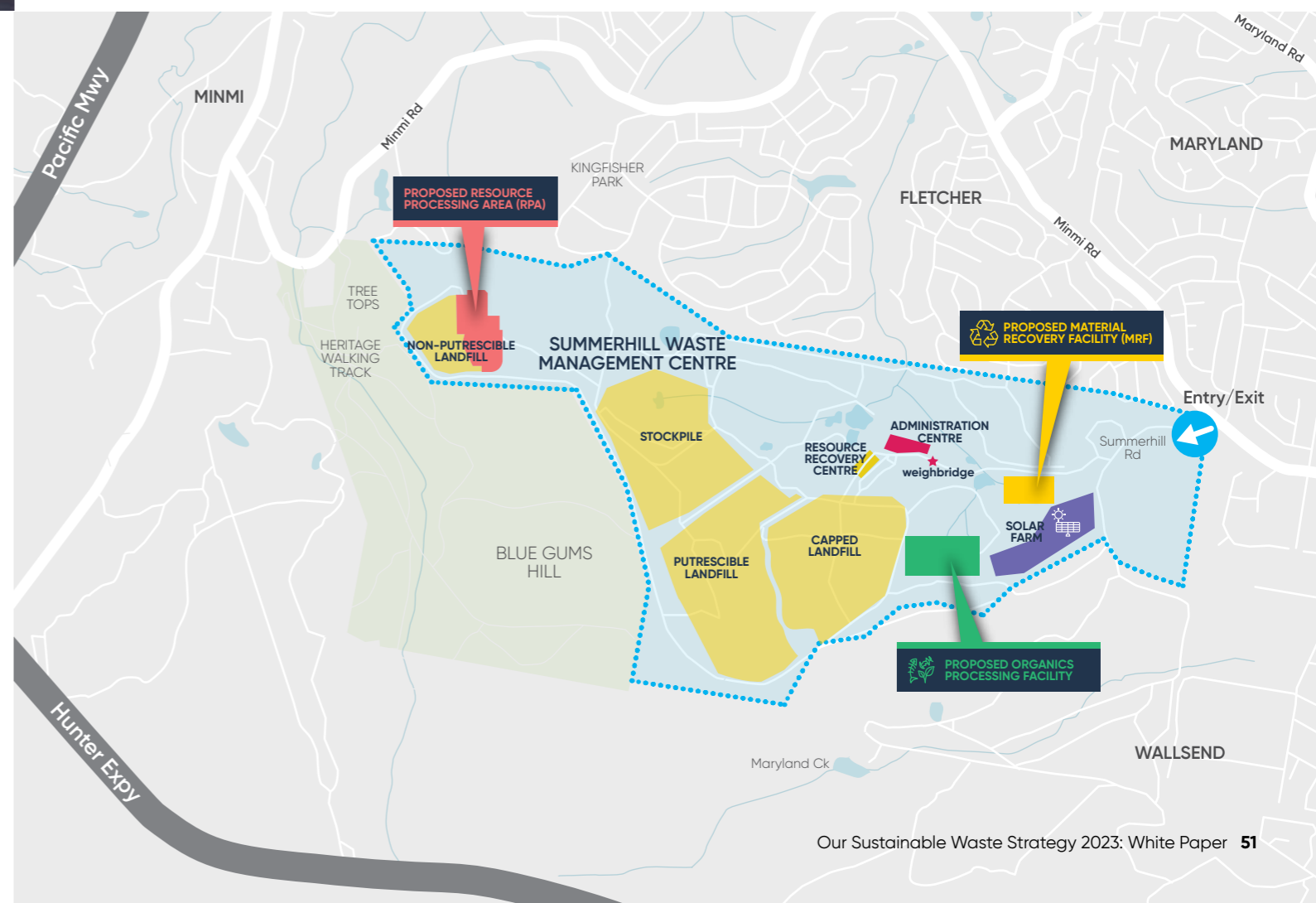
While SWMC has operated primarily as a landfill, the site will be pivoting its operations to become a Resource Recovery Hub. The aim is to ensure the long-term security of our red, yellow, and green-lid bin services and create the best and highest value outcomes for our planet and economy.

Figure 4: A summary of waste and resource recovery activities that are currently and proposed to be carried out at SWMC.

Public place services, litter and illegal dumping

CN's public place waste and recycling infrastructure plays a critical role in improving environmental amenity, as well as providing residents with the opportunity to dispose of waste and recycling away from home. Unfortunately, litter is still a widespread issue within the City. CN has operated targeted litter campaigns funded through the Better Waste and Recycling Fund; Throsby Creek Litter Management Project and the Throsby High Schools Marine Debris Program. Throsby Creek has a large catchment area situated near a large residential area. The nature of the currents means that marine debris enters the catchment and is combined with litter expelled via the stormwater

system. The issue results in a loss of amenity for the Throsby Creek residential population. It also threatens the Carrington mangrove environment. Illegal dumping relates to material that is larger than litter and most commonly, in Newcastle, includes green waste, household waste, mattresses, furniture, and whitegoods. There are limited incidences of asbestos dumping, which are typically small-scale and associated with kitchen and bathroom renovations. Illegal dumping occurs at parks, charity bins, public places and the kerbside, with several illegal dumping 'hot spots' in Black Hill, Stockton, Carrington, Cooks Hill, Carrington, Minmi and Steel River Industrial Estate.





Resource Recovery

There are currently two key components to resource recovery operations at SWMC:

- Resource Recovery Centre (RRC) and
- Resource Processing Area (RPA).

Resource Recovery Centre

The RRC opened in September 2019 and is a "one-stop shop" for residents and small commercial customers dropping off their waste. In the first year of operation, the RRC recycled 3,100 tonnes, or the weight equivalent of 74 semi-trailers, of waste destined for landfill, whilst generating income of approximately \$250,000 to offset the cost of running it. In addition, this initiative has saved over \$450,000 in waste levy fees to the NSW EPA by recovering items for recycling, rather than disposal to landfill.

There are three zones to the RRC which maximise opportunities to recover as many resources as possible.

Sort and Save Service

The Sort and Save service allows Newcastle residents to drop off pre-sorted loads of eligible items at no charge. The items accepted through this service are paper and cardboard, household recyclable containers, scrap metal, e-waste³¹, clean wood and soft plastics.

Community Recycling Centre

The CRC accepts household quantities, to a maximum of 20L or 20kg, of household problem wastes as shown on page 48.

Resource Recovery Area

Residents who have items not accepted through the Sort and Save or CRC services, or who do not wish to pre-sort their loads before arriving at the site, and small commercial customers, drop off their mixed waste loads on our sorting floor.

Staff and machinery sort out reusable and recyclable materials from the mixed waste.

CN also have a contractor on-site who recovers reusable items, such as good quality furniture, bikes, toys and books, to sell through their reuse shop.



Food Organics (planned facility)

CN is developing an Organics Processing Facility at SWMC. Once complete, the facility will be able to process up to 50,000 tonnes of Food and Garden Organics (FOGO) per annum. While the city already recovers Garden Organics, there is an opportunity to recover Food Organics from our residual waste bin. This will allow us to:

- Divert 24,000 tonnes of Food Organics from landfill
- Create a saleable compost material that can generate significant revenue over the life of the facility
- Increase our Domestic Resource Recovery Rate by 15%
- Reduce our GHG emissions by 24,000 t CO₂-e

Reprocessing Area

The reprocessing area is set aside for large and bulky recyclable items, such as scrap metal, mattresses, bricks, tiles and concrete, clean wood waste and garden organics.

- Bricks, tiles and concrete are crushed to produce aggregate for road construction on site and civil projects across the city
- Clean wood waste is shredded and sent to a local energy producer to use as a substitute for coal in the generation of electricity
- Mattresses and tyres are stockpiled until there is sufficient quantity to send to a third-party processor, who extracts the scrap metal and other recyclable components from these items
- Scrap metal is sent for recycling
- Garden organics are shredded on-site daily and then transported to the Upper Hunter Valley for use in mine site rehabilitation



Photo: Sort and Save at Summerhill Waste Management Centre (CN 2020).

³¹ Up to 10 items per residential customer per visit

Materials Recovery Facility (planned facility)

To provide certainty of service continuity, and to reduce the ongoing costs associated with transporting our recyclables outside of the region, CN is intending to construct a MRF at Summerhill Waste Management Centre. This facility will sort the recyclables collected in our yellow lid recycling bins into single material streams, which will then be sent to domestic manufacturers for processing into new products.

Some of the benefits³² include:

- A local facility would significantly reduce associated recyclables transport costs
- Process 35,000-tonnes of material per year with the ability to grow to 85,000 tonnes
- Generate significant revenue over the life of the facility.

³² CN commissioned CBA Study



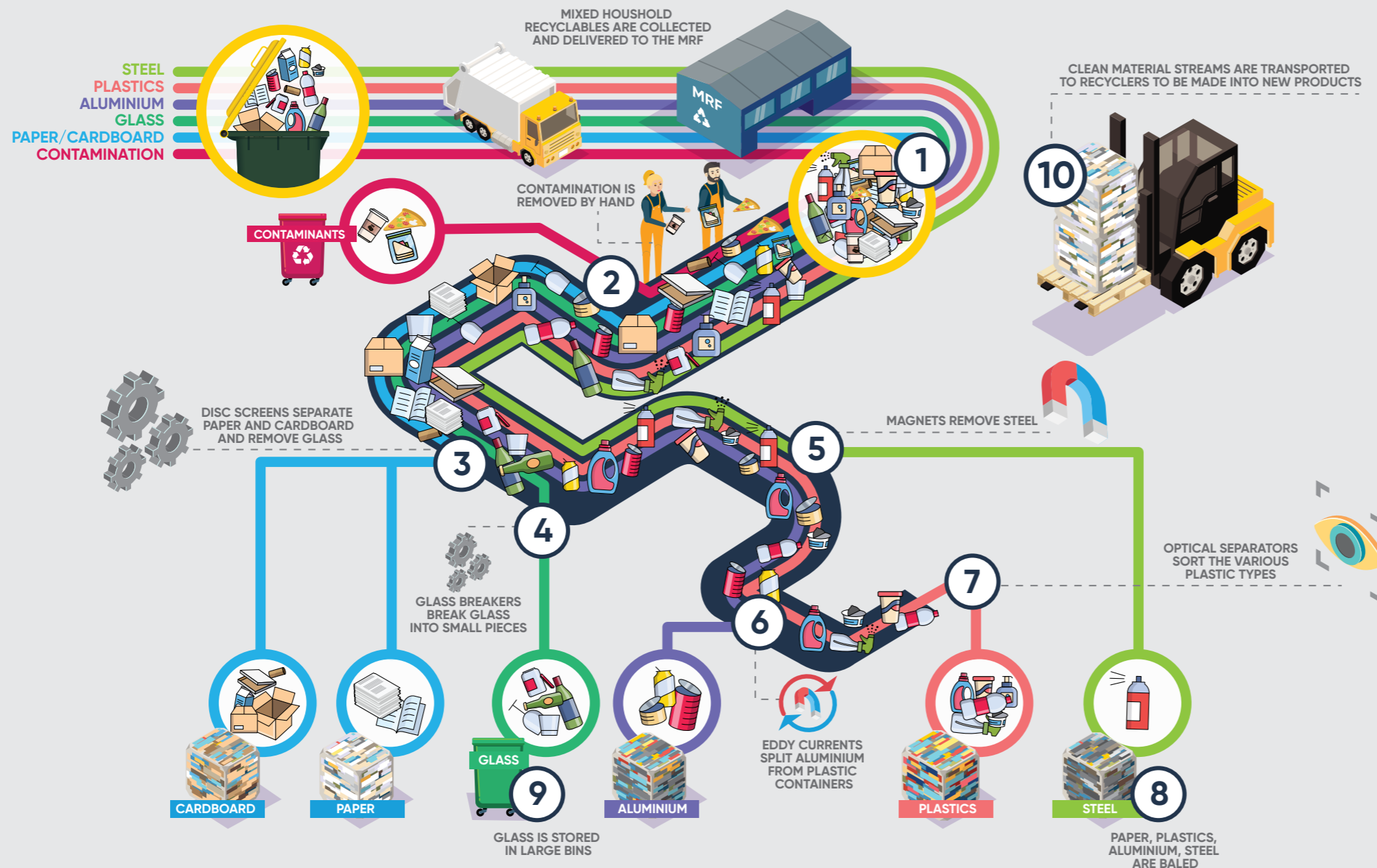
Layout of a Material Recovery Facility: A network of conveyors move the mixed recyclables through a series of equipment that sort the mixed recyclables into individual material streams.



Separated recyclables (paper, cardboard, plastics, glass, aluminium and steel) are stored in bays until they can be transported to various recyclers to be made into new products.



MRF processing



- 1 Mixed materials arrive and are loaded on to the conveyor in the receive area
- 2 Contamination is removed by hand
- 3 Disc screens separate paper and cardboard and remove glass
- 4 Glass breakers break glass into small pieces
- 5 Magnets remove steel
- 6 Eddy currents split aluminium from plastic containers
- 7 Optical separators sort the various plastic types
- 8 Paper, plastics, aluminium, steel are baled
- 9 Glass is stored in large bins
- 10 Clean and separated materials are transported to recyclers to be made into new products

Landfill

The purpose of a landfill is to provide a final destination for materials that cannot be reused, recycled or recovered.

Landfilling has historically been the primary activity at SWMC. There is a putrescible landfill and a non-putrescible landfill. Waste that includes food and organic material, such as kerbside residual waste and mixed commercial waste, is disposed of in the putrescible landfill. Dry waste streams such as construction and demolition waste are disposed of in the non-putrescible landfill.

Although CN is in a unique position to have close to 100 years of landfill capacity, it is important to ensure that sufficient capacity remains on an ongoing basis and that associated infrastructure is available to maximise the life of the landfill.

In 2021/22, the City invested \$6 million³³ to proactively manage and prevent pollution of water and leachate. An ageing site and increased incidences of unseasonable wet weather events have contributed to a review and investment in environmental improvement projects to ensure the longevity of SWMC.



³³ <https://newcastle.nsw.gov.au/about-us/news-and-updates/latest-news/environmental-upgrades-underway-at-summerhill-wast?feed=news>



Energy

While SWMC is predominately a Waste and Resource Management operation, the site is also a significant energy producer. There are plans to investigate the expansion of energy generation at SWMC and powering infrastructure behind the meter.

Solar Farm

Our five-megawatt solar farm, comprising 14,500 solar panels, is constructed on a closed, non-putrescible landfill site at SWMC. In the first six months of operation, the solar farm generated more than \$420,000 in revenue³⁴.

Landfill Gas Management

SWMC has two 1.1 MegaWatt LMS landfill gas generators on-site. Landfill gas, which comprises a mixture of carbon dioxide and methane, is generated when organic material such as food waste, paper and cardboard and vegetation decomposes in the landfill. There is a network of pipes through the landfill, which are constantly drawing this landfill gas into the two generators, where it is turned into renewable energy.



Benefits per annum³⁵

MWH Exported	17,000 MWH
Gas Extracted	11,050,000 m ³
Carbon Abated	107,800 CO ₂ -e
Homes Powered	3,000 per year
Water Saved	37,400,000 litres

³⁴ Source: <https://newcastle.nsw.gov.au/about-us/news-and-updates/latest-news/solar-farm-powering-city-operations-and-revenue>

³⁵ Source: <https://lms.com.au/projects>



Providing Value for Money

The Domestic Waste Management Charge (DWMC) is charged against residentially rated properties in Local Government Areas (LGA) to provide domestic waste management services, such as the kerbside three-bin collection service, bulk waste collection, and waste education. The amount charged is based on a cost-recovery model. CN offers the lowest DWMC in the Hunter region by optimising its waste and resource recovery infrastructure.

The highest costs to Waste Services operations include:

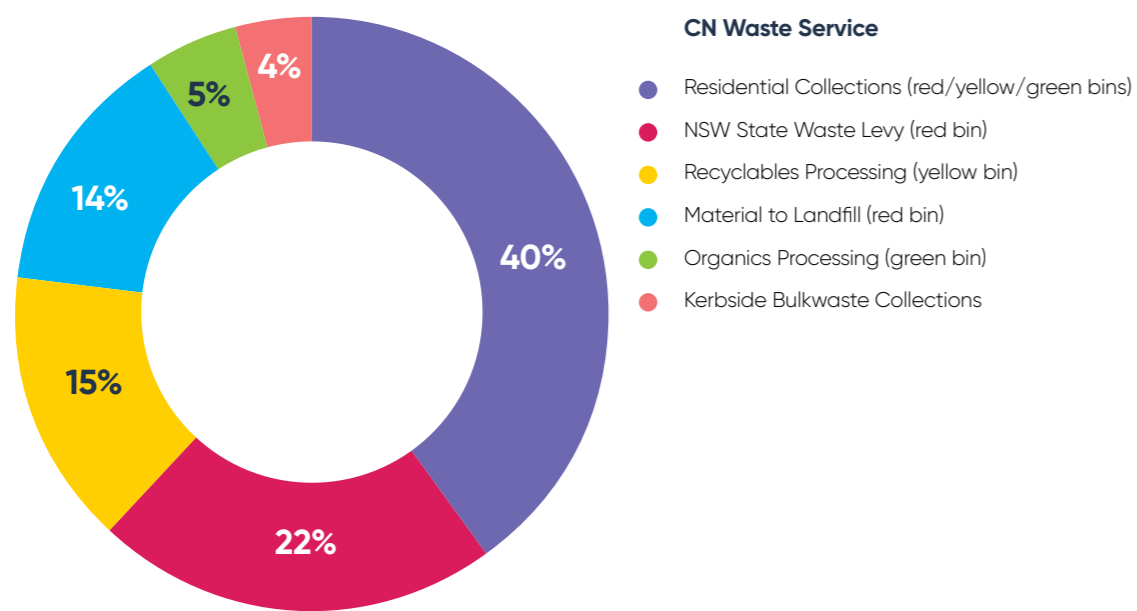
Collection services	40%
Paying the Waste Levy to EPA	22%
Processing of recyclables	15%
Landfill disposal	14%

CN is exploring opportunities to optimise the delivery of the services it provides which include:

- Operational improvement projects
- Modernisation of business systems
- Investment in new infrastructure

Any future CN service change and investment in infrastructure will always consider a balanced approach of value for money to our residents and improved services.

Figure 5: Percent breakdown of operational costs in DWMC



Customer Satisfaction and Service Levels

City of Newcastle puts customer experience at the forefront by committing³⁶ to:



A customer-led culture

Build a culture that encourages empathy, understanding and willingness to work alongside customers and colleagues



Service management capability

The growing capability to manage expectations and deliver what we promise



Digitised services and ways of working

To empower customers and staff



Co-designed innovative services

with the community that anticipates and improves customers' lives

Residents are overwhelmingly happy with CN's Waste Services, however, there are several services that some residents are unaware they can access such as the Community Recycling Centre and the Sort and Save facility. CN recognises further work is required to promote existing services to give residents the full opportunity to participate in resource recovery.

There are also several areas where CN is unaware of customer expectations, this includes expectations for CN and commercial customers coming to SWMC. CN will need to consult with the community and customers to determine acceptable service level expectations.

CN asked residents about their satisfaction across several services³⁷.

Table 6: Resident satisfaction and awareness

Service	Satisfaction Level	Awareness of Service
Kerbside red, yellow, and green lid bin	97-98%	High
Kerbside bulky waste collection	90%	Moderate
Bulk waste self-haul voucher	85%	Moderate
SWMC Community Recycling Centre	90%	Low
SWMC Sort and Save	88%	Low

Low: 0-3 out of 10 residents aware
Moderate: 4-7 out of 10 residents aware
High: 8-10 out of 10 residents aware

Customers surveyed at SWMC³⁸ expected to wait no more than:



5 minutes during **non-peak** times to enter our site



10 minutes during **peak** times to enter our site

³⁶ City of Newcastle (2021) Customer Experience Strategy

³⁷ City of Newcastle (2020) Unpublished - Community Survey Report

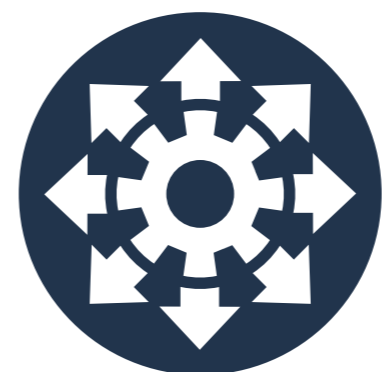
³⁸ City of Newcastle (2020) Unpublished - Weighbridge Survey



Challenges and Opportunities

Challenge	Opportunity
<p>CN has different systems for monitoring and evaluating the efficacy of its Education/ Behaviour Change projects – especially with litter and illegal dumping campaigns.</p>	<ul style="list-style-type: none"> • Improved monitoring and evaluation program for Education/ Behaviour Change projects. • Collection of data about incidences of litter and illegal dumping before and post-intervention campaigns is important to understand the intervention's level of impact.
<p>SWMC has operated primarily as a landfill, the site will be pivoting its operations to become a Resource Recovery Hub.</p>	<p>Master planning of the site to consider:</p> <ul style="list-style-type: none"> • Core infrastructure (red, yellow, and green bin services) • Potential locations for co-located infrastructure that would support SWMC's industrial ecology • Internal road network and additional weighbridges to separate heavy and light vehicles to improve safety and efficiency • Planning for future landfill cells
<p>Unrealised opportunities for resource recovery.</p>	<p>Bulk Waste Collection Service</p> <ul style="list-style-type: none"> • Investigate the feasibility of sorting kerbside bulk waste collection loads in the RRC compared to the feasibility of segregated kerbside bulk waste collection (e.g. separate scrap metal, e-waste, other recyclable or reusable items from items genuinely requiring landfill and collect via multiple vehicles or multiple passes) <p>MRF</p> <ul style="list-style-type: none"> • Investigate opportunities to increase the types of materials collected as part of our Contract Renewal (e.g., soft plastics) • Investigate opportunities to increase the types of materials collected once our MRF is operational <p>Tip Shop</p> <ul style="list-style-type: none"> • Investigate the feasibility of a tip shop located at SWMC, where items dropped off by residents and collected through our bulk waste service can be diverted for reuse and resold to the public
<p>Limited planning and resourcing for the long term have meant that environmental improvements have occurred on an ad hoc and as-needed basis. This has been exacerbated by ageing infrastructure and increased unseasonable wet weather events.</p>	<p>Investment in an Environmental Improvement Program at SWMC that meets regulatory requirements and contributes to the long-term environmental protection and enhancement of the SWMC site.</p>
<p>Unrealised opportunities for energy generation at SWMC .</p>	<ul style="list-style-type: none"> • Develop a Renewable Energy strategy to consider powering future SWMC infrastructure and collection operations (i.e. garbage truck fleet powered by renewable energy generated at SWMC). • The community has also been supportive of investigating green energy generation through the processing of organic material (i.e. Anaerobic Digestion).

Challenge	Opportunity
<p>Collections and processing/disposal operations are the largest cost to the business.</p>	<p>Review non-value-added activities in the business to optimise service delivery. A non-value-added activity can include inefficient collection routes, equipment down-time at SWMC, or high administrative activities.</p> <p>Review the business to understand where operations can be optimised through:</p> <ul style="list-style-type: none"> • Operational improvement projects • Modernisation of business systems • Investment in new infrastructure <p>Potential areas include:</p> <ul style="list-style-type: none"> • Collections route optimisation program • Fleet management system to ensure 100% uptime • SWMC operational improvements at the landfill and RRC • Reduce wait times at SWMC
<p>Current business systems limit further growth and diversification of services .</p>	<ul style="list-style-type: none"> • Implement fit-for-purpose business systems to align our people, processes and infrastructure to ensure consistent service levels, improve governance and transparency, and deliver continuous improvement and excellence. • Conduct a comprehensive asset audit and assessment • Review & improve our data management system to ensure appropriate data governance and intelligent business reporting
<p>CN have undertaken extensive consultation and improvement regarding our Customer Service Experience in resident's interactions with CN in general, however, this needs to be further developed for Waste Services due to the specific needs of our business operations and customers.</p>	<ul style="list-style-type: none"> • Establish a customer survey program. • Co-design innovative services with our community that anticipates and improves our customers' lives. • Digitise our services and ways of working to empower our customers and staff. • Grow capability to manage expectations and deliver what we promise.
<p>Lack of established service levels across programs and services. Including, but not limited to:</p> <ul style="list-style-type: none"> • Collection services • Council drop-off services • Education programs • SWMC services 	<ul style="list-style-type: none"> • Community and customer consultation on service levels across all relevant operations to establish a baseline. • Review and improve customer experience with our infrastructure at SWMC with a focus on accessibility and ease of use. • Reduce wait times at SWMC to access services (including before the weighbridge or while on site) • Review and optimisation of all our services;



5 Our opportunity

This White Paper (Appendix 1) provides an overview of:

1. Market drivers,
2. Policy drivers,
3. City of Newcastle and Hunter Region needs, and
4. Current service capabilities for waste and resource management.

This document raises numerous challenges and opportunities across each area.





City of Newcastle has prioritised 11 key challenges³⁹ that will be transformed into opportunities.

Each challenge has been linked with a Priority of the Strategy.



Challenge 1

Security around processing recyclable (yellow-lid) and organic (green-lid) materials locally



Challenge 2

Developing resilient local end-markets



Challenge 3

Funding our future



Challenge 4

Meeting ambitious waste and recycling targets



Challenge 5

Strategic direction and long-term planning



Challenge 6

Understanding customer expectations to deliver excellent customer service



Challenge 7

Engaging all residents and customers to change behaviours



Challenge 8

Managing our high-risk operation proactively, rather than reactively



Challenge 9

Fostering regional collaboration to create impacts at scale



Challenge 10

Realising the potential of renewable energy generation and usage



Challenge 11

Optimising our systems and processes to maximise value for our customers

City of Newcastle has summarised the current position of Waste Services through a SWOT⁴⁰ matrix.

The matrix will enable prioritisation of the actions within our Sustainable Waste Strategy and directly at Summerhill Waste Management Centre (SWMC) to respond to these elements and considers:

- How can we take advantage of our strengths?
- How can we moderate the impact of our weaknesses and ultimately resolve them?
- How can we capitalise on the opportunities?
- How can we address the threats?

Strengths	Weaknesses	Opportunities	Threats
<p>Landfill capacity Landfill asset has almost 100 years of capacity at current throughput</p> <p>Development potential SWMC site potential for development of additional infrastructure</p> <p>Strategic location SWMC site is at an excellent strategic location for the region in close proximity to the M1 and Hunter Express Way</p> <p>Renewable energy SWMC site generates 7MW of renewable energy which can power future infrastructure behind-the-meter</p> <p>Community support Community support for improving waste diversion and better waste management practices</p>	<p>Historical business model Business model historically focused on disposal rather than recovery</p> <p>Lack of strategic direction Historical lack of strategic direction for development and operation of site and CN waste operations</p> <p>Poor data Poor waste data and operations data management is a barrier to identifying opportunities for future improvements</p> <p>Council resource limitations SWMC operational efficiency and development opportunities limited by Council budgets and resources</p> <p>Poor recycling performance High contamination and low capture of recyclables in kerbside yellow recycling bins. Low recovery of commercial waste (C&I and C&D). High State/Federal targets of 80%</p> <p>Understanding customer expectations Limited customer service levels defined and measured. Limited ongoing engagement to understand customer expectations to achieve excellent customer service</p>	<p>Build long-term financial strength to future proof Waste Services Transition SWMC into a financially stable business, creating long-term financial security for Waste Services and CN</p> <p>Develop new business models Develop new business models to generate value beyond landfill revenue at SWMC. Leveraging its competitive advantage through growth and diversification</p> <p>Opportunity to provide localised resilience Limited processing infrastructure in region provides opportunity to build local infrastructure to provide long term regional resilience and reduce dependency on Central Coast and Sydney</p> <p>Circular economy opportunities Circular economy opportunities and colocation of facilities at SWMC</p> <p>Integrated systems Development of integrated efficient and automated systems and processes in the operation of SWMC</p> <p>State and federal funding State and federal funding to support capital investment of infrastructure</p>	<p>Urban encroachment Future urban encroachment on SWMC may constrain further development of the site</p> <p>Competition Competition from potential new facilities, including the introduction of Energy from Waste. This may divert revenue away from SWMC and block future opportunities</p> <p>Highly regulated industry Waste Services is governed by acts and regulations. Failure to comply places people, the environment, and the operation of the business at risk</p> <p>End-markets for processed recyclables Limited end-markets for processed recyclables and compost in region. Resilient, localised supply chains are a priority</p> <p>Climate change Increased frequency and intensity of extreme weather events impacts waste generated after natural disasters and operations of SWMC</p> <p>Sole dependency risks Limited processing infrastructure in region pose sole dependency risks</p>

⁴⁰ Strength, Weakness, Opportunity, and Threat Matrix

³⁹ Our Sustainable Waste Strategy: Appendix 1: Summary of Key Challenges and Opportunities



Realising our Opportunities

This document explains our current position and achievements in waste and resource management across our operations and our community. This has demonstrated a number of opportunities for the City.

To realise these opportunities, CN has developed a **Strategic Framework** that will guide the future direction of Waste Services by defining our:

- 20-year vision
- Core operating pillars and priorities
- Key outcomes and success measures
- Long-term objectives

This will be further underpinned by a **Delivery Plan**, reviewed every 4 years, providing a roadmap on how we will deliver on the Strategy.



Appendix A

Glossary of Terms

Terminology	Definition
AD	Aerobic digestion
CEFC	Clean Energy Finance Corporation
CN	City of Newcastle
COAG	Council of Australian Governments
CRC	Community Recycling Centre
CRS	Community Recycling Station
CSP	Community Strategic Plan
DPIE	Department of Planning, Industry and Environment
DWMC	Domestic Waste Management Charge
EfW	Energy from Waste
EPA	Environmental Protection Authority
EPL	Environment Protection Licence
E-waste	Electronic waste
FO	Food organics
FOGO	Food Organics, Garden Organics
FTE	Full time equivalent
HJOC	Hunter Joint Organisation of Councils
HV	Heavy vehicle
IVC	In-Vessel Composter
KPI	Key Performance Indicator
LGA	Local Government Area
MRF	Materials Recovery Facility
MSW	Municipal solid waste
MW	Mega Watt
MWh	Mega Watt hours
MWOO	Mixed Waste Organic Outputs

Terminology	Definition
Recovery rate	Recovery rate = total waste diverted to reuse & recycling/ total amount of waste generated
Residual waste	Waste which cannot be reused or recycled and is therefore destined for landfill.
Resource recovery	To remove/direct materials out of the waste stream to reuse, recycling, composting or energy generation
Reuse	Using materials more than once before recycling or disposing of them
RPA	Resource Processing Area
RRC	Resource Recovery Centre
SMA	Sydney Metropolitan Area
SWMC	Summerhill Waste Management Centre
SWOT	Strengths Weaknesses Opportunities Threats
The Strategy	Our Sustainable Waste Strategy
UNSW	University of New South Wales
Waste audit	The physical sorting and separation of waste into individual material types (e.g. aluminium) or product types (e.g. TV's) for the purpose of quantifying amounts of material or product
Waste avoidance	Not creating waste in the first place
WS	Waste Services



Appendix B

Summary of 11 Key Challenges to Opportunities



Challenge 1

Security around processing recyclable (yellow-lid) and organic (green-lid) materials locally

Challenge

Securing stable, local processing of recyclable and organic materials to:

- Meet the challenges of an unstable recycling market and closure of recycling facilities, including the only facility in the Hunter
- Ensure CN always has a location under our control to take our recyclable and organic materials to be processed
- Reduce the excessive cost and carbon emissions associated with long distance transport of recyclable materials for processing
- Support our community's stated desire to increase waste diversion and recycling, while keeping processing of recyclable materials local and developing a circular economy
- Capitalise on the investment and funding opportunities provided by State and Federal government to increase local recycling and manufacturing.

Opportunities

Development of a **MRF** with advanced processing technology at SWMC will:

- Provide CN with certainty of processing capability, reducing reliance on third party processors and the instability that comes from this
- Provide CN with economic benefit in the form of jobs and additional revenue
- Provide quality control of outputs resulting in higher quality recyclables and organics designed to meet local circular economy supply chains
- Enable CN to capitalise on the Federal Government's Recycling Modernisation Fund to invest in recycling infrastructure

Development of an **Organics Processing Facility** at SWMC that will process both food and garden organics will enable CN to:

- Keep food waste out of landfill thereby reducing the loss of this valuable resource and reducing greenhouse gas emissions
- Turn the nutrients in organic material into a nutrient rich compost material, to improve soil quality
- Increase resource recovery, potentially, by a further 20% from existing recovery rates.

Localisation of infrastructure at SWMC will:

- Eliminate the need for long-haul transport of household recyclables/organics. This will:
 - Reduce transportation costs
 - Reduce related greenhouse gas emissions
- Potentially enable localisation of manufacturing supply chains that require material as feedstock, enabling a circular economy.



Challenge 2 Developing resilient local end-markets

Challenge	There are limited end-markets for low-quality recyclables in the region and nationally.
Opportunities	Investment in processing infrastructure that creates high-quality outputs is only the first step. CN will need to work with the market to align our recycled end-product with manufacturer specifications to ensure stable supply chains and catalyse growth in local manufacturing. Partnering with manufacturers could include the potential establishment of co-locating manufacturing businesses that use MRF output commodities such as glass beneficiation.



Challenge 3 Funding our future

Challenge	Access to appropriate funding and resourcing to achieve Federal and State targets and outcomes.
Opportunities	CN will need to explore a mix of options to strategically invest in infrastructure to support targets and outcomes. This will include: <ul style="list-style-type: none"> • Applying for State and Federal government grant funding • Offsetting investment costs by leveraging economies of scale of infrastructure increasing facility capacity, opening up opportunities for commercial and other customers to increase revenue. • Exploring a variety of operating models • Advocating for hypothecation of S88 Waste Levy back into waste and resource recovery infrastructure and activities.



Challenge 4 Meeting ambitious waste and recycling targets

Challenge	Waste and resource recovery targets set out in both Federal and State Government policies include: <ul style="list-style-type: none"> • Reducing total waste generated in Australia by 10% per person by 2030 • 80% resource recovery across all streams by 2030 • 50% reduction in organic waste sent to landfill by 2030. <p>CN's current municipal recovery rate sits at around 40%. Our existing waste and recycling services will not achieve the Federal and State Government targets. To achieve an 80% resource recovery target additional innovative solutions will also need to be developed for streams that are traditionally difficult to recover.</p>
Opportunities	The solutions CN will use need to be a combination of: <ul style="list-style-type: none"> • Infrastructure and services: ensuring the availability of infrastructure and services to allow for resource recovery and processing of high-value outputs • Education and behaviour change: an ongoing program to promote uptake and responsible use of the services available <p>Expansion or consideration of new infrastructure and services include:</p> <ul style="list-style-type: none"> • Materials Recovery Facility: processing yellow-lid recyclables with future potential to expand materials captured in the kerbside recycling, such as soft plastics, textiles, etc. • Organics Processing Facility: processing green-lid bin with plans in place to capture Food Organics. • Tip Shop: creation of a 'tip shop' to divert reusable materials and items from landfill • Boutique resource recovery: development of boutique resource recovery opportunities that would benefit from proximity to source materials, such as mattress recycling, e-waste recycling • Energy from Waste: understanding the role of Energy from Waste • Bulk waste recovery: improving resource recovery through our bulk waste collection service <p>A comprehensive, data driven, targeted education and behaviour change program will need to be developed to ensure:</p> <ul style="list-style-type: none"> • A more engaged community • Greater understanding and acceptance of the value of waste as a resource within our community, region and CN • Improved recycling and resource recovery • Decrease in contamination leading to higher quality MRF outputs • Ensure effective adoption of the FOGO service when introduced • Reduction in the generation of waste in the first place. <p>Collaboration with other Hunter Councils, Local, State and Federal Governments, industry experts, and universities to identify solutions and promote circular innovation is important.</p>



Challenge 5

Strategic direction and long-term planning

Challenge	The absence of a strategic framework to inform long-term planning for Waste Services operations or the SWMC site has led to reactive delivery of services.
Opportunities	<p>CN has an opportunity to leave a lasting legacy in waste and resource management for CN and the Hunter.</p> <p>The development of key strategies and plans will provide direction and a long-term plan.</p> <ul style="list-style-type: none"> • 20-Year Strategy to set CN's waste direction • Masterplanning of SWMC to consider: <ul style="list-style-type: none"> • Core infrastructure (red, yellow, green bin services) • Future landfill cell staging delivery • Potential locations for co-located infrastructure that would support SWMC's industrial ecology • Internal road network and additional weighbridges to separate HV and light vehicles to improve safety and efficiency • Environmental Improvement Program: to ensure current and future environmental compliance of the site is met • Buffer Management Plan: SWMC is suffering from urban encroachment. This may place limitations on future waste and recycling infrastructure to meet our community's needs. • Renewable Energy Strategy for SWMC and Collections.



Challenge 6

Understanding customer expectations to deliver excellent customer service

Challenge	<p>Without a good understanding of our customers' expectations we cannot provide excellent customer service.</p> <p>CN has developed a Customer Experience Strategy for the City. However, this needs to be further developed for Waste Services due to the specific needs of our business operations and customers. Including, but not limited to:</p> <ul style="list-style-type: none"> • Collection services • Council drop-off services • Education programs • SWMC services.
Opportunities	<p>Establish a baseline and adopt a continuous improvement model for service levels for customers:</p> <ul style="list-style-type: none"> • Initial extensive consultation with our community and customers to develop an understanding of expectations which will lead to the development of service levels across all of Waste Services • Regular surveys of our community and customers to determine satisfaction and whether we are achieving our agreed service levels. • Digitise our services and ways of working to empower our customers and staff <p>Establish a Customer Survey Program:</p> <ul style="list-style-type: none"> • In addition to developing service levels and improving customer experience, the Customer Survey Program will seek out new and innovative service that anticipates and improves our customer's lives. <p>Improving customer access to, and experience at, SWMC:</p> <ul style="list-style-type: none"> • Determine feasibility and cost of improved logistics at site to reduce wait times to access services (including before the weighbridge or while on site) • Investigate opportunities to improve customer experience on-site at SWMC through better signage, changed traffic conditions and site optimisation. <p>Review current bulk waste service to improve customer experience and meet expectations:</p> <ul style="list-style-type: none"> • Investigate feasibility of multiple passes for kerbside collection for pre-sorted loads, including scrap metal, e-waste, reusable items • Investigate opportunities for, and feasibility of, reducing wait times for booked kerbside collection • Increase resource recovery from bulk waste service through separated piles on the kerbside, sorting at the RRC and inclusion of a 'tip shop' at SWMC.



Challenge 7

Engaging all residents and customers to change behaviours

Challenge	Social research shows that, as a stand-alone tool, information is not enough to change behaviours for most people. It requires a multi-pronged approach using many different intervention methods.
Opportunities	Develop a comprehensive Behaviour Change Program that will support the delivery of our Waste Strategy by focussing on: <ul style="list-style-type: none"> • increasing resource recovery • reducing contamination across all waste and recycling streams • waste avoidance • improved environmental amenity through reduced litter and illegal dumping Improved monitoring and evaluation program, such as waste composition audits, will assist in monitoring progress and identify opportunities to tailor education campaigns that have the most impact for our community.



Challenge 8

Managing our high-risk operation proactively, rather than reactively

Challenge	Waste Services operates in a highly regulated environment due to the nature of its operations. Proactive management of the risks will keep our people (staff, customers, residents) and the environment safe.
Opportunities	Develop a culture that puts people and the environment first. This can be achieved through: <ul style="list-style-type: none"> • Continual review of operations to prioritise people and the environment. • Ensuring risk management systems that are in place are fit-for-purpose and well-adopted by the organisation. • Establishment of an ongoing Environmental Improvement Program that exceeds regulatory requirements and contributes to the long-term environmental protection and enhancement of the SWMC site.



Challenge 9

Fostering regional collaboration to create impacts at scale

Challenge	The average recovery rate for the Hunter Region is 43%. City of Newcastle and the region face similar waste and resource recovery issues around lack of infrastructure.
Opportunities	City of Newcastle can either invest in infrastructure to meet the city's needs or further investigate opportunities for regionally designed solutions. A regional solution can result in reduced lifetime cost to our residents for the service, improved localisation of output feedstocks, and overall improved environmental outcomes for the region. Ongoing consultation with Hunter Councils, the Hunter Joint Organisation and regional industries is required to foster collaboration.



Challenge 10

Realising the potential of renewable energy generation and usage

Challenge	SWMC generates 7MW of energy. Further strategic planning around growth or usage of renewable energy will need to be undertaken.
Opportunities	Develop a Renewable Energy strategy to consider powering future SWMC infrastructure and collection operations (i.e. garbage truck fleet powered by renewable energy generated at SWMC). Review the feasibility of renewable energy solutions, such as Anaerobic Digestion, to complement existing and future operations, community sentiment and policy direction. Based on a community survey conducted in 2020, the community has been supportive of investigating green energy generation through the processing of organic material (i.e. AD). This supports the State mandate to reduce food organics from landfill by half and implement a FOGO solution to councils by 2030 and specific businesses by 2025.





Challenge 11

Optimising our systems and processes to maximise value for our customers

Challenge

Current systems and processes will require further investment to support growth and diversification of services in a sustainable manner.

The highest costs to Waste Services operations, against the DWMC, are:

- Collection services (40%)
- Paying the Waste Levy to EPA (22%)
- Processing of recyclables (15%), and
- Landfill disposal (14%)

This provides a valuable starting point in reviewing and optimising our operations.

Opportunities

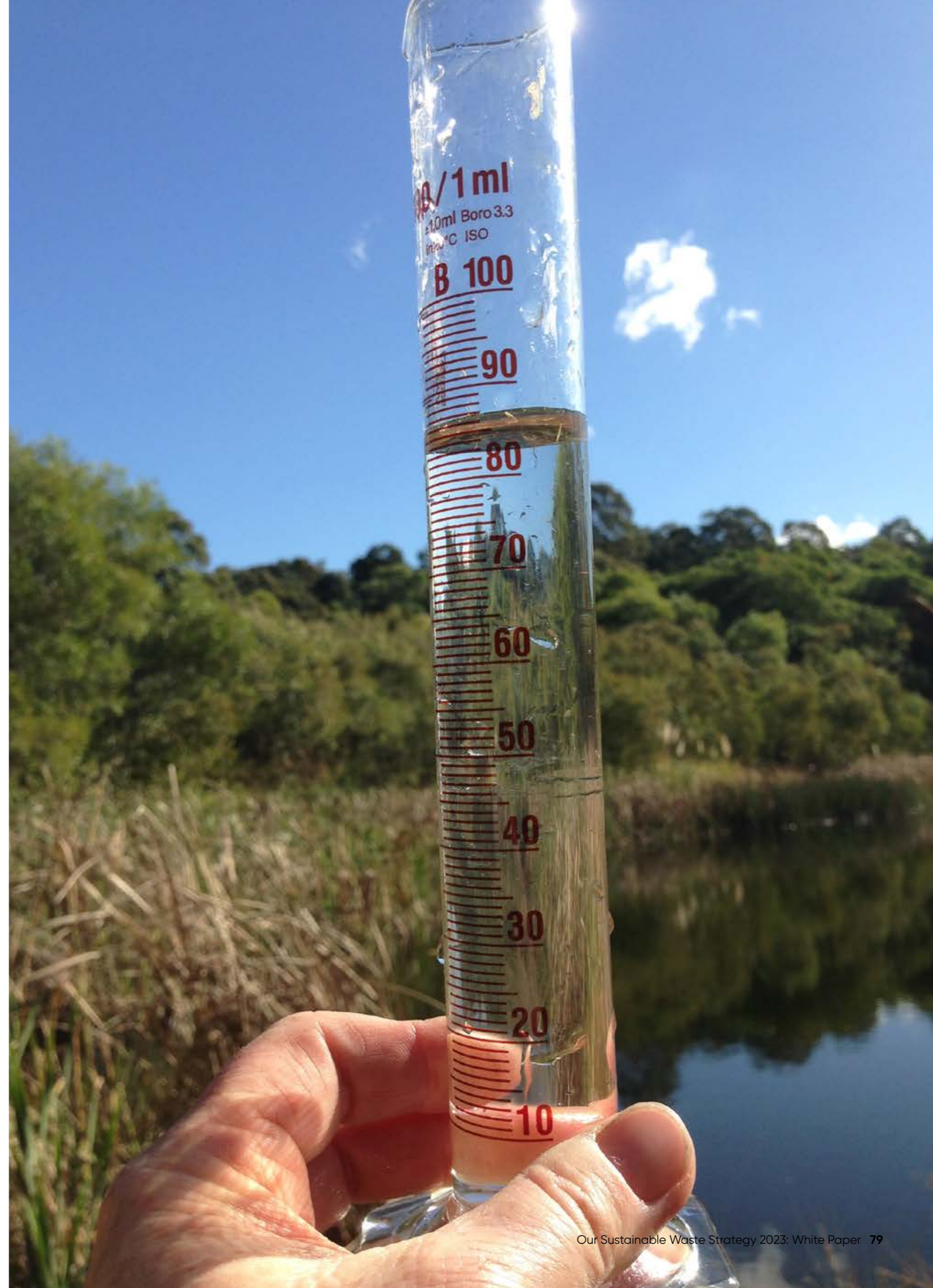
There is potential for optimisation of the delivery of our services by eliminating non-value-added activities. A non-value-added activity includes inefficient collection routes, equipment down-time at SWMC, or high administrative activities

Review the business to understand where operations can be optimised through:

- Operational improvement projects
- Modernisation of business systems
- Investment in new infrastructure

Potential areas include:

- Review and improve overall data management system within Waste Services to ensure appropriate data governance and intelligent business reporting. This includes the existing weighbridge system.
- Collections route optimisation program
- Fleet management system to ensure 100% uptime
- SWMC operational improvements at the landfill and RRC
- Reduce wait times at SWMC.



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