



2030

WASTE AND RESOURCE RECOVERY STRATEGY







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Acknowledgement of Country

City of Darwin acknowledges the Larrakia people as the Traditional Owners of all the land and waters of the Greater Darwin region.

To the Larrakia, Darwin is known as Garramilla. The original language of the Larrakia is Gulumirgin (pronounced Goo-loo-midgin).

Often referred to as “Saltwater People”, the Larrakia lived, loved, birthed, hunted and survived a life on pristine coastal and inland areas. Established ‘song lines’ connecting Larrakia people to Country penetrate throughout their land and sea, allowing stories and histories to be told and retold for future generations. Scientific evidence dates Aboriginal presence in northern Australia to 60,000 years.

The Larrakia culture and identity is rich and vibrant. In the footsteps of the Larrakia people, City of Darwin will continue to foster this culture and identity by creating a vibrant community together.

PHOTO COURTESY OF LARRAKIA NATION





Lord Mayor's Message

City of Darwin has made a commitment to be recognised as a clean and environmentally responsible city. One of the ways in which we can achieve this is by reducing the waste we create as a community.

By reducing, reusing and recycling our resources, we can achieve better environmental outcomes such as reducing waste disposed of to landfill and the associated greenhouse gas emissions, and help achieve a circular economy. This will also aid Council's commitment to its climate change emergency response in helping reduce the growing costs of managing waste.

To achieve this, we need a long-term, integrated strategy to substantially reduce waste disposed to landfill, modernise our collection systems and re-invigorate our recycling sector.

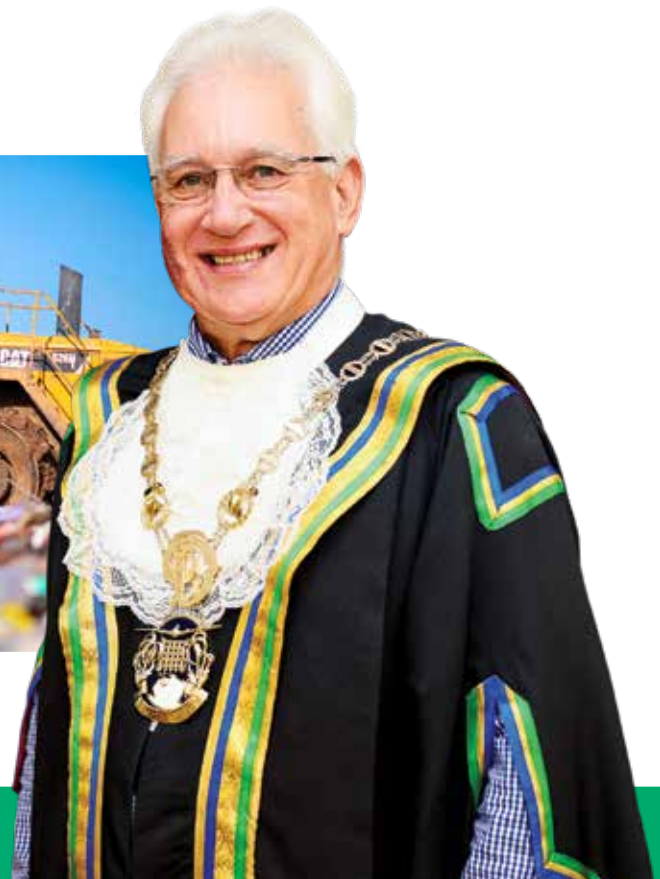
Over the next ten years, this Strategy aims to reduce kerbside waste into landfill by 50%, reduce contamination of kerbside comingled recycling and build our capacity and capability to deliver high quality resilient resource recovery services.

As a community, we have come a long way in accepting the need to reduce, re-use and recycle more of our resources, but there is much more we need to do.

City of Darwin will advocate and collaborate with all levels of government, businesses and organisations for the development of a resilient and sustainable resource recovery sector to attract and support greater reuse, recycling, resource recovery and re-manufacturing throughout the greater Darwin area.

This Strategy will assist Council to achieve its long-term vision of a more sustainable resource recovery sector for the greater Darwin area.

THE HON. LORD MAYOR KON VATSKALIS



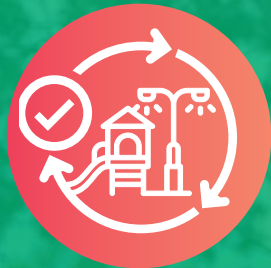
City of Darwin's Strategic Planning Framework

City of Darwin's strategic planning framework provides the basis for the setting and delivery of Council's priorities. The 2030 Waste and Resource Recovery Strategy (Strategy) informs the delivery of programs within this strategic planning framework.





Darwin 2030 *City for People. City of Colour.*



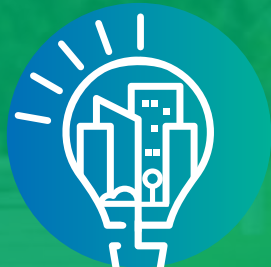
A capital city with best practice and sustainable infrastructure



A safe, liveable and healthy city



A cool, clean and green city



A smart and prosperous city



A vibrant and creative city

Underpinned by City of Darwin's Governance Framework

Vision and Culture

Roles and Relationships

Decision Making and Management

Accountability

Our Strategic Direction – A Cool, Clean and Green City

TARGET: BY 2030,
DARWIN WILL BE
RECOGNISED AS A CLEAN
AND ENVIRONMENTALLY
RESPONSIBILITY CITY.





SD3 – A cool, clean and green city



Council has put in place three key strategies that will guide the actions and targets Council aims to achieve by 2030 as it strives for a cool, clean and green city. The strategies are outlined below and through their implementation will deliver on strategic direction 3 as outlined in the *Darwin 2030 City for People. City of Colour. Strategic Plan*.



**CLIMATE
EMERGENCY
STRATEGY**



**Greening
Darwin
Strategy**



**Waste and
Resource
Recovery
Strategy**

Environmental Management System
Innovate Reconciliation Action Plan
Darwin City Centre Master Plan
Movement Strategy

About the Waste and Resource Recovery Strategy

STRATEGY PURPOSE

The Waste & Resource Recovery Strategy (Strategy) has been developed to guide the City of Darwin towards better practice resource recovery, recycling and waste management. It sets a clear path for the investigations required and infrastructure and service improvements to be considered. This includes targets for increasing landfill diversion and contamination reduction.





Strategy development

The development of the Strategy included:

- Consultation with the waste, recycling and resource recovery industry in the Greater Darwin Area (GDA), the City of Palmerston, Litchfield Council and Northern Territory Government
- Consultation with Council staff and elected members, including presentations and surveys
- A Recycling Survey project to understand the waste and recycling services, facilities and performance in the GDA for the 2019/20 FY, to assess possible future demand by local government and business for landfill void space at Shoal Bay, and/or opportunities for expanded waste processing and/or re-manufacturing within a collaborative or recycling hub concept
- Review of relevant strategies, policies, plans, reports, policies, legislation and regulations
- Workshopping of the draft Strategy with elected members.

Strategy targets, initiatives and actions will be reviewed at the mid-point of the Strategy in 2026.



About Darwin





Industry and geographic location

Darwin's two largest economic sectors are currently mining and tourism. The city is also strategically located as Australia's gateway to Asia and its growing economy.

Darwin's remoteness and associated high transport costs to Australia's major cities poses a significant challenge for the development of many industries. This includes the local recycling and resource recovery sector. This means that some recyclables are currently landfilled until the value of the material makes transport viable to overseas or interstate markets, or local markets are developed or other industry incentives are applied.

Climate

Darwin has a tropical climate and two distinct seasons. The Wet season spans from November to April and the Dry season spans from May to August. August to November is characterised by a 'build-up' period of high humidity.

The average annual rainfall is 1,800 mm with rainfall at its highest between December and March and humidity over this period averaging between 70-80 per cent. Rainfall during July can be as low as 1mm.

The wet and dry season rainfall disparity poses some challenges and opportunities related to waste management and resource recovery. These include:

- High-rainfall periods lead to significant plant growth, requiring large volumes of garden organics waste to be managed at certain times of the year
- Significant rainfall events can lead to an erosion of nutrients and soil carbon
- Extended low rainfall periods can decrease soil moisture, requiring dust management at waste and recycling facilities, and a reliance on irrigation in local agriculture.

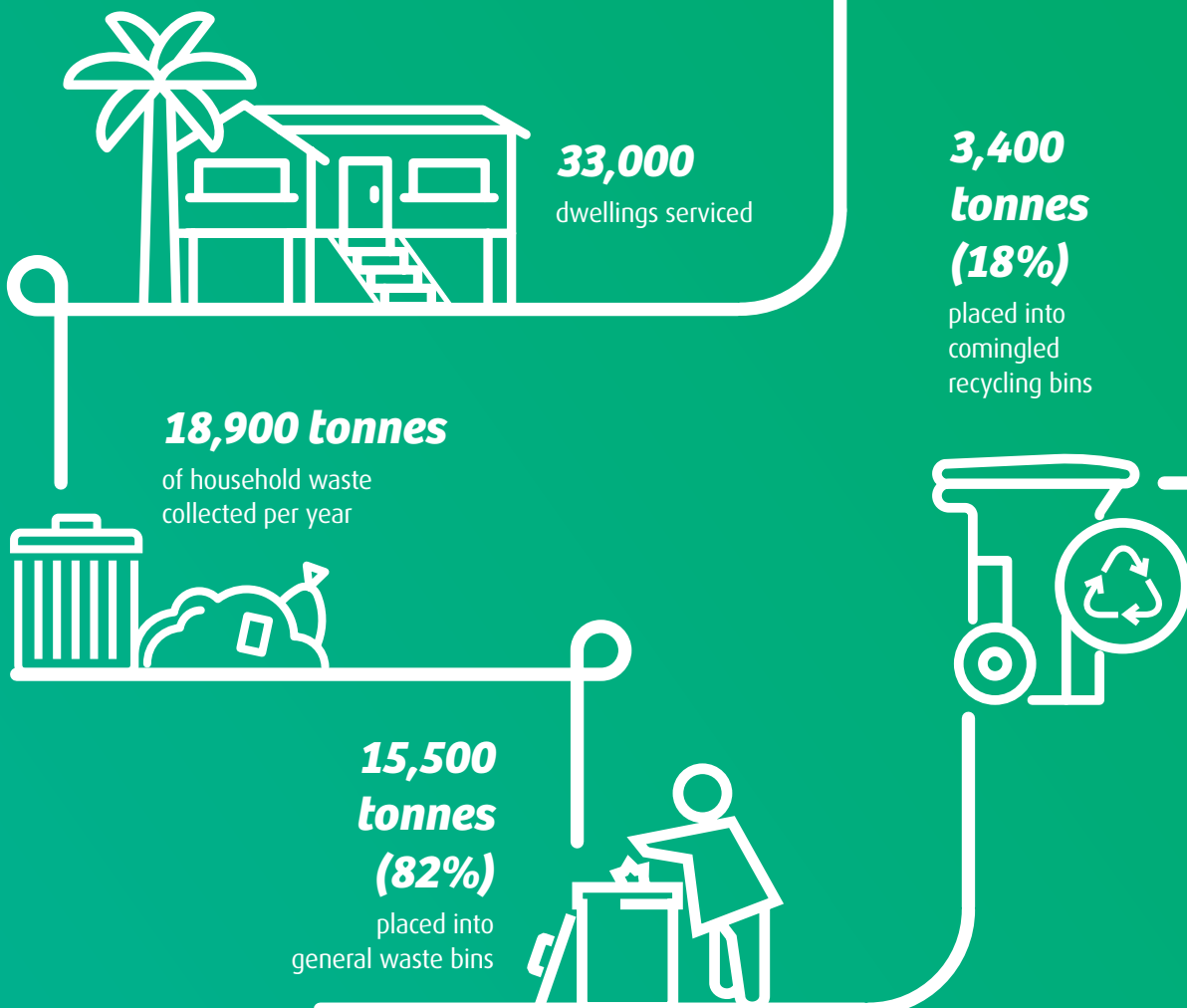
There is an opportunity for the development of local composting capacity and markets, to help retain soil moisture during the dry season and replenish soil carbon and nutrients during the wet season.

Services and facilities

Kerbside services

Council provides household kerbside general waste and recycling collection services. General waste collection services (240L red lid bins) are weekly for households and twice weekly for multi-unit dwellings (MUDs) - such as units, townhouses and apartments with four or more properties in one complex). MUDs services are typically collected manually from bin compounds.

Kerbside recycling collection services (240L yellow lid bins) are fortnightly from households and weekly from MUDs and residents are encouraged to dispose of garden organics waste at the Shoal Bay Waste Management Facility for free and compost food waste at home.





Pre-cyclone hard waste collection

Council holds an annual pre-cyclone clean-up/hard rubbish collection service in August/September for residential properties only.

Residents are asked to group their items into household waste, e-waste and scrap metals for collection by differing waste type collection teams.

Collected items are taken to the Shoal Bay Waste Management Facility (SBWMF) and either donated to charity, sent to the recycle shop, recycled, or landfilled. Scrap metals are sold for recycling.

This service has many challenges, including:

- Reliance on Council staff for the collections, diverting staffing from other projects and services; and
- Managing instances of food waste, asbestos and other hazardous wastes.

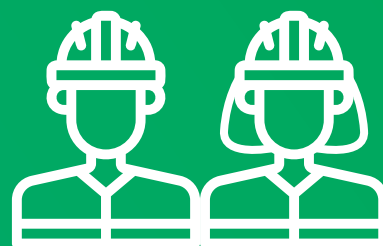


1,200 tonnes

of hard waste collected per year

8,000

staff hours per year



Shoal Bay Waste Management Facility

The Shoal bay Waste Management Facility (SBWMF) is the region's largest waste and resource recovery facility, which accepts around 204,600 tonnes of waste and recyclable material per year.

It is the only licenced facility in the GDA and includes a:

- Waste transfer station
- Recycling facility and resale shop
- Garden organics waste processing facility.

The site also includes a:

- Mulch sales facility
- Concrete crushing for on-site reuse
- Landfill gas management facility that generates renewable energy from the processing of recovered methane.

Residents access the facility by an access tag entry system. An access tag is available to residential properties that pay the waste levy in their Council rates. Residents outside of the Council area can apply for a tag for the facility.

Residents are encouraged to separate recoverable /recyclable materials at the recycling centre and waste transfer station to reduce the volume of residual waste going to landfill. Volumes of materials recycled/recovered and landfilled in the 2019/20 FY are provided in Figure 1.

The facility receives all the material landfilled in the GDA (146,100 tonnes) and 45 per cent of all material recycled/recovered in the GDA. This includes 84 per cent of all organics and 41 per cent of all masonry (mainly concrete) recovered in the region.

Landfill Stages 1 and 2 have been capped. Cells 3 and 4 are no longer operational and require capping. Stages 5 and 6 are operational. Stages will be progressively capped with post-closure monitoring and maintenance on-going for many years following stage closure.

The facility has several legacy and current issues (e.g. leachate and landfill gas capture management of existing and new cells and managing unexploded ordinances). These will need to be addressed over the short and long term. Several are covered in the Strategy Initiatives and through a separate master planning exercise for the facility.

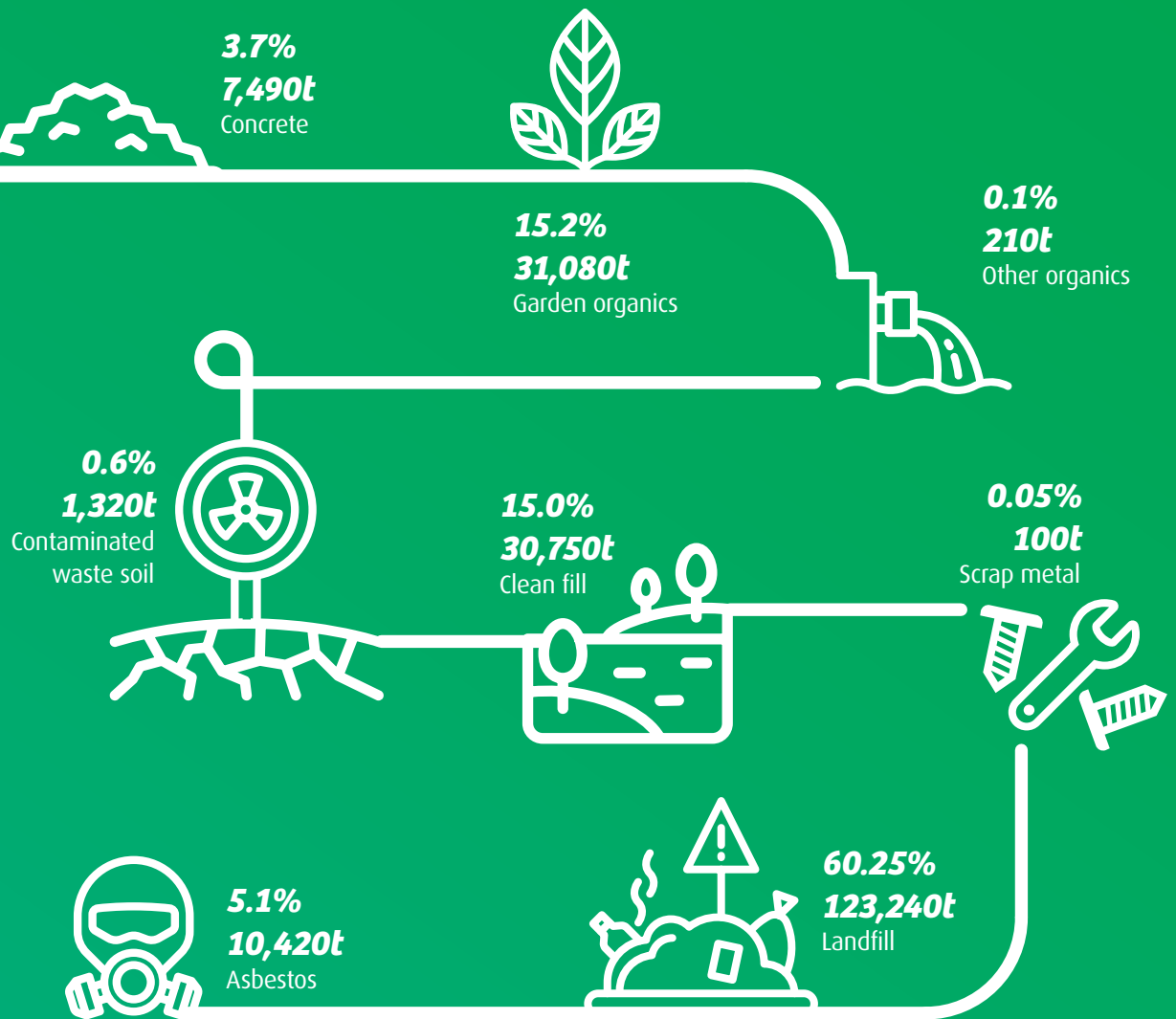


Figure 1: Incoming stream volumes at the SBWMF (2019/2020 FY)



Current Context and Future Drivers





2030 Climate Emergency Strategy

The City of Darwin declared a climate emergency in 2019.

Council has initiated a holistic, evidence-based and planned climate emergency response with a suite of three complementary resources: The 2030 Climate Emergency Strategy builds on a Discussion Paper by presenting the strategic path forward to reduce climate-related risks and embrace the emerging opportunities of the climate emergency in Darwin. This is designed to leverage the Council's influence across multiple aspects of Darwin life, including:

- Leadership and governance
- Resilience and adaptation
- Energy efficiency and renewable energy
- Sustainable transport
- Circular Economy.

The Waste & Resource Recovery Strategy is an informing body of work for the Climate Emergency Strategy. The initiatives and actions support directives by:

- Reduction of greenhouse gas emissions through the diversion of waste from landfill
- Improvement of waste and resource recovery infrastructure to manage disaster waste
- Implementing additional resource recovery of green waste from increased wet season growth and support the development of the local Circular Economy.

Waste and resource recovery

A Recycling Survey of the Greater Darwin Area (GDA), consisting of the City of Darwin, City of Palmerston and Litchfield Council areas, identified the following.

Waste and resource recovery performance (2019/20)



200,600 tonnes total waste generated

Excluding: contaminated soil/fill, clean fill and asbestos



This is equivalent to

1,469 kg per person

SOURCES OF WASTE INCLUDED:



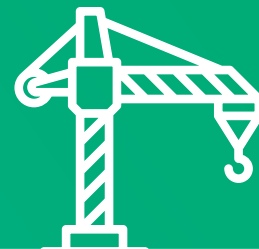
40.3%

from residential including kerbside bins & resident drop-off at transfer stations



43.9%

from the Commercial and Industrial sector



15.8%

from the construction and development sector



**68,700 tonnes (34.2%)
diverted from landfill**

THIS INCLUDED:

26.4%
Masonry & Concrete

17.2%
Metals

38.8%
Organics

11.7%
Cardboard & Paper

0.7%
Plastics

3.8%
Glass

0.3%
E-waste

1.1%
Tyres

Providing an est.

120 FTE jobs
from recycling/resource
recovery activities



**65% recycled/
recovered in the NT**
(mostly masonry
and organics recycling)



**22% recycled/
recovered
interstate**



**13% recycled/
recovered
overseas**

**46,000 dwellings
provided with a kerbside bin service**

City of Darwin & City of Palmerston residents only



83.4%
placed into
general
waste bins

16.6%
placed into
comingled
recycling
bins



Waste and resource recovery facilities

The Greater Darwin Area has many waste and resource recovery facilities (see Figure 2). This includes:

- One licenced landfill at the SBWMF
- Two Material Recovery Facilities (MRFs) for the processing of comingled recycling processing
- Five council transfer stations
- Three commercial scrap metal recycling facilities
- Several commercial mobile services for concrete crushing and mulching
- Eight Container Deposit Scheme (CDS) return locations.

It was also identified that there were:

- No significant composting facilities that accept commercial or residential food/garden waste
 - Several small composting operations were identified and related businesses (e.g. nurseries), however, these did not accept organics waste from outside the businesses
 - The SBWMF has a substantial garden waste mulching operation. Significant upgrades are required, however, to enable full composting to take place at the facility.
- No local processing options for:
 - Paper/cardboard (50 per cent was sent interstate and 50 per cent sent overseas)
 - Plastic (81 per cent sent interstate and 19 per cent sent overseas)
 - Tyres (100 per cent sent interstate for processing)
 - Glass
 - CDS glass is transported interstate for recycling
 - Mixed glass from MRFs to landfill.



Figure 2: Map of waste, recycling and resource recovery facilities in the City of Darwin and surrounding area



Waste Hierarchy and Circular Economy

Waste hierarchy

The waste hierarchy (Figure 3) is the heart of international, national and state waste legislation and policy and forms one of the main drivers of the Strategy. It sets out the preferred order of priority for managing waste and is applied from the top down.

It is based on a resource-efficient economy model that will:

- First, significantly reduce or avoid waste and encourage reuse to minimise the use of virgin resources
- Once waste reduction and reuse opportunities have been exhausted, focus on maximising the recycling of materials that are left using closed-loop recycling
- Generate low carbon energy from truly residual waste leaving very little waste going to landfill.

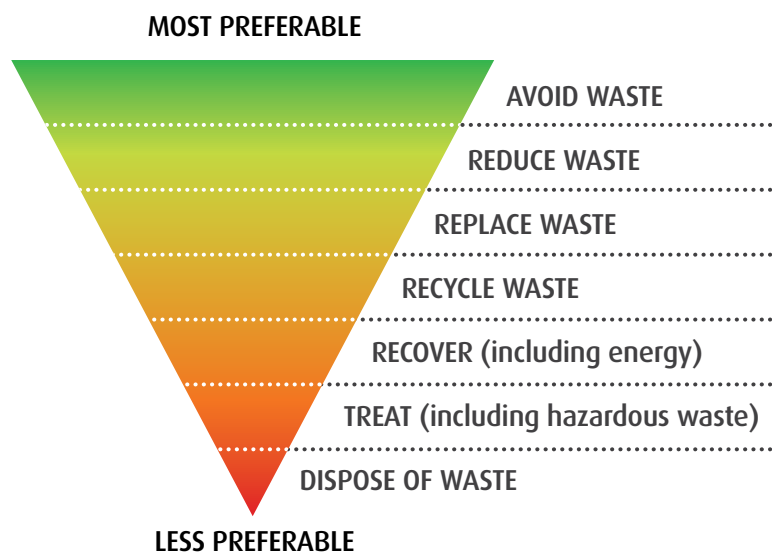


Figure 3: Waste hierarchy¹

Avoid, reuse and recycling have a variety of tangible and measurable environmental benefits compared with landfill disposal. These include energy savings, avoiding greenhouse gas emissions, water savings, avoiding waste and significant reductions in natural resource use, eutrophication of waterways and airborne pollutants.

¹ Source: www.planning.nsw.gov.au/Assess-and-Regulate/State-Significant-Projects/Energy-from-waste

Circular Economy

The Circular Economy is an economic principle that keeps waste materials at their highest value in the economy for as long as possible.

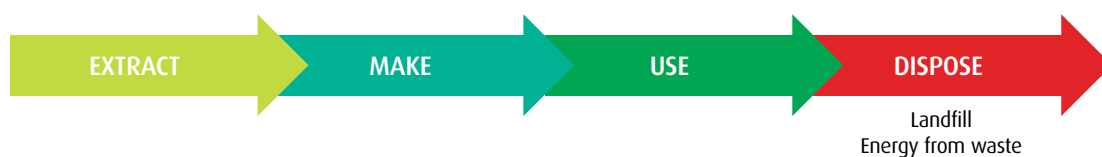
Keeping products, components and materials at their maximum utility means:

- Purchasing well-designed products that last longer and can be reused many times
- Sharing more and making repair the norm
- Recycling materials effectively and converting some waste into biofuels
- Displacing fossil fuels and derived products with bio-based materials
- Entrepreneurs and innovation in reverse logistics, services, digital technologies will be needed to facilitate these changes.

A more Circular Economy can deliver significant job creation and greenhouse gas reduction benefits. For every 10,000 tonnes of waste recycled, 9.2 direct full-time equivalent (FTE) jobs are created compared to 2.8 jobs if the same material is sent to landfill².

The transition to a Circular Economy is a long-term initiative. Undertaking many actions simultaneously to increase reuse and recycling of materials can accelerate the shift.

LINEAR ECONOMY



CIRCULAR ECONOMY

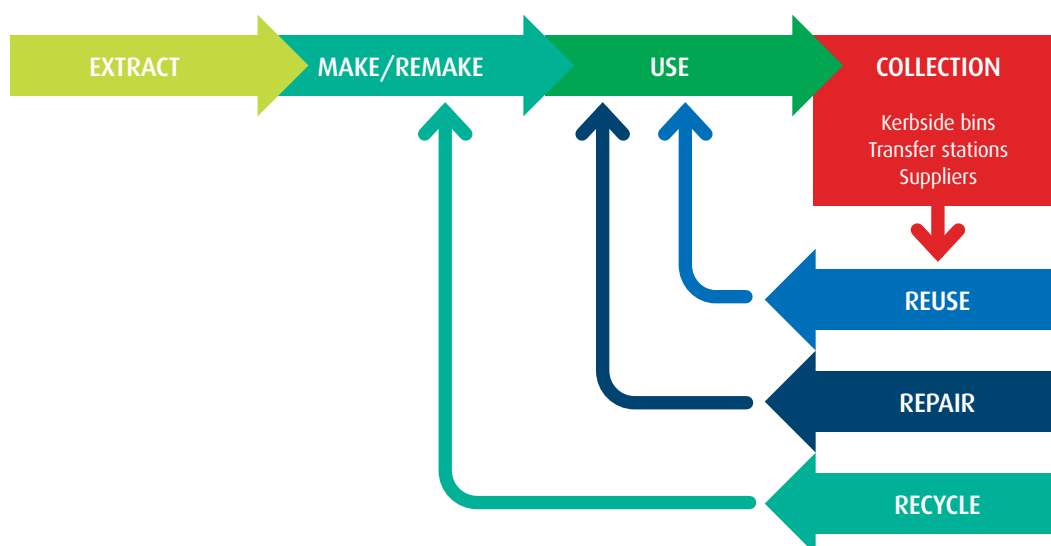


Figure 4: Circular Economy

² Access Economics 2009, *Employment in waste management and recycling*, report by Access Economics Pty Limited for The Department of the Environment, Water, Heritage and the Arts



Meeting future needs

Changes to community expectations

The priority to address waste has changed. There is growing awareness of waste issues such as marine plastic and reducing waste to landfill. This has led to increased interest from the community in the waste and recycling services provided by councils.

The community is continually seeking more knowledge of their region's waste performance and opportunities to recycle and participate in a Circular Economy. This includes expecting greater access to recycling services, from their households to the business they purchase from.

Reducing food waste

Food makes up a significant proportion of waste sent to landfills across Australia. It is estimated households throw out up to 20 per cent of the food they purchase, at an average household cost of over \$2,000 a year. This totals around a \$20 billion loss across Australia.

The Federal Government released a *National Food Waste Strategy* (2017) that aims to halve Australia's food waste by 2030. It recognises the role of local government as a key driver of this change.

Food waste is also a major contributor to greenhouse gas emissions. Alternative methods to disposing of food waste into landfill, such as composting, can have significant benefits for avoiding greenhouse gas emissions. For every tonne of food waste composted, 250kg CO₂ generated in landfills is avoided.

Economic development of the Greater Darwin Area

The Greater Darwin Area economy has weakened in recent years. This led to the development of *The Economic Development Strategy 2030*.

The focus is on building Darwin as a Smart and Prosperous City and levels of local government including service delivery, funding, regulation, partnerships and strategic alliances and advocacy efforts.

One of the targets and strategic actions to become a Smart and Prosperous City is that 'by 2030, Darwin will have attracted and retained more residents and will offer sustainable investment opportunities'.

Investment in recycling and resource recovery infrastructure and services can have significant long term benefits for attracting investment and job development.

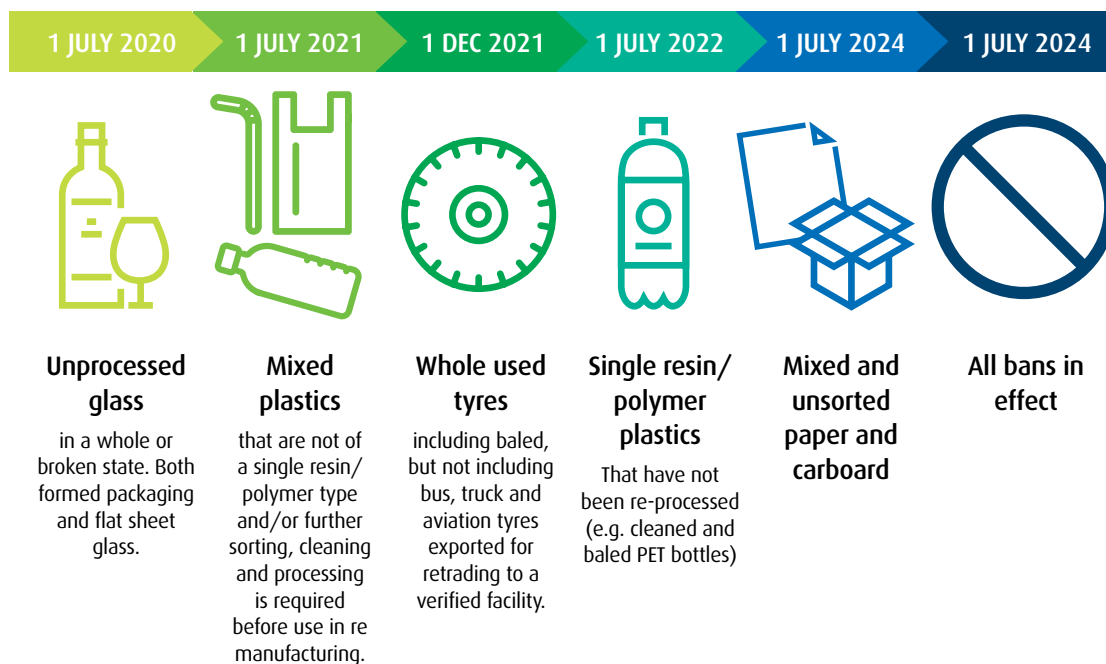
Relevant plans and policies, legislations and regulations

National Waste Policy and Action Plan

The 2018 National Waste Policy sets Australia's agenda for waste reduction to 2030 and the 2019 National Waste Policy Action plan drives implementation of our seven ambitious targets:

- Regulate waste exports
- Reduce the total waste generated by ten per cent per person by 2030
- Recover 80 per cent of all waste 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
- Provide data to support better decisions.

The materials below will not be exportable from the following indicated dates:



Further details can be found at www.environment.gov.au/protection/waste/how-we-manage-waste



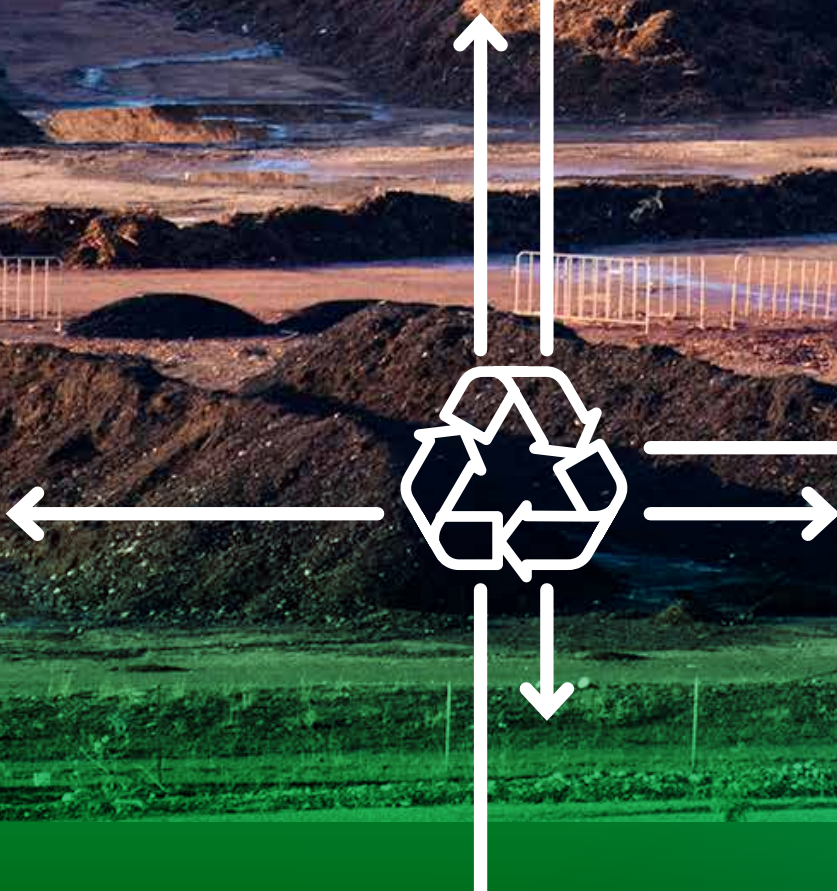
Other relevant plans and policies, legislations and regulations

Other plans and policies, legislation and regulations reviewed or considered as part of the development of the Strategy that is relevant for increasing resource recovery and transition to the Circular Economy in the GDA included:

- NT EPA [Waste Management Strategy For The Northern Territory 2015-2022](#)
- NT EPA [Strategic Plan 2018-2020](#)
- [Recycling and Waste Reduction Act 2020](#)
- [Recycling and Waste Reduction \(Product Stewardship – Accreditation of Voluntary Arrangements\) Rules 2020.](#)

The NT Government is currently developing a waste strategy, which will be released for public comment in 2021.

Vision and Guiding Principles





Vision

“Zero waste to landfill through leading the transition to a Circular Economy in the Darwin region”

Circular Economy

The City of Darwin will support and partner with its community, local businesses and industry to collaborate on activities and services aimed at increasing the Circular Economy in the region.

Landfill diversion

The City of Darwin will provide its community with best practice landfill diversion:

- Education and systems for recovery of good quality resources
- Facilities for recovery of recyclable materials
- Policies and procedures.

Cost-effectiveness

The City of Darwin will provide its community with affordable and financially sustainable waste and recycling collection, processing and disposal services and facilities with the aim of:

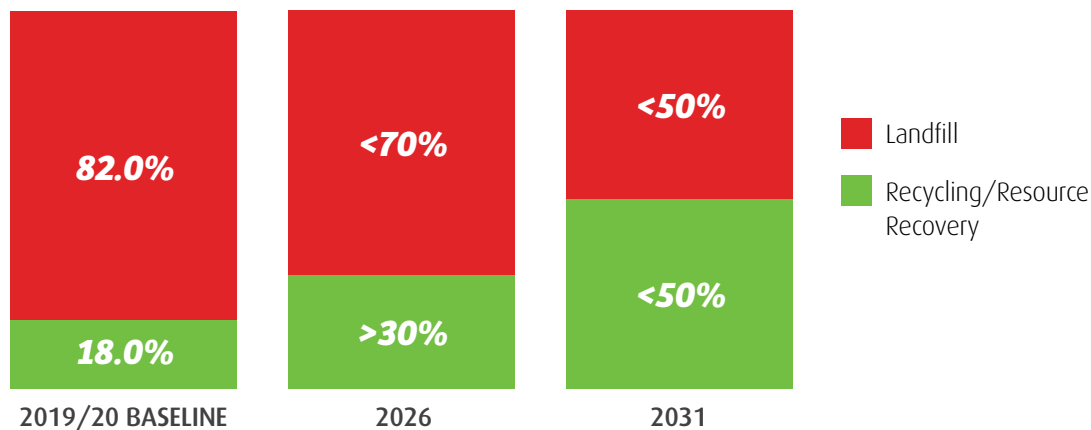
- Extracting the maximum value out of discarded products and materials
- Achieving economies of scale and long term operation viability
- Servicing legitimate and sustainable end-markets for recovered materials.

Objectives & Targets

We have set the following objectives. We will measure our success in reaching these objectives using the following performance indicators.

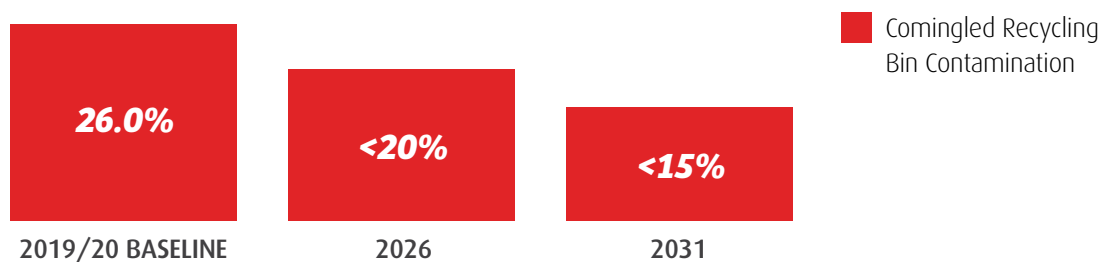
OBJECTIVE 1: INCREASE DIVERSION FROM LANDFILL FOR KERBSIDE BIN SERVICES

This includes increasing the landfill diversion of kerbside bin services provided to households and apartments.



OBJECTIVE 2: REDUCE CONTAMINATION OF KERBSIDE COMINGLED RECYCLING BINS

This includes reducing contamination of kerbside comingled recycling bin services provided to households and apartments.





OBJECTIVE 3 BUILD CAPACITY AND CAPABILITY TO DELIVER QUALITY AND RESILIENT WASTE AND RESOURCE RECOVERY SERVICES

This includes:

- Increasing waste processing capacity of the Shoal Bay Waste Management Facility, with a focus on:
 - Construction and demolition waste
 - Food and garden organics composting
- Collaborating with GDA councils, businesses and organisations to attract and support greater reuse, recycling, resource recovery and re-manufacturing in the GDA
- Procurement of items or materials made with part or whole recycled content, with a preference to locally processed and re-manufactured suppliers.

Summary of Initiatives





Summary

Table 1 below summarises the Strategy initiatives. The initiatives are not ranked in order of priority and have been organised into relevant sections.

The sections below provide details on:

- The outcomes from pursuing each initiative
- Action items required to undertake each initiative
- Indicative timelines for when the action should be investigated or implemented.




Table 1: Summary of initiatives

Initiatives	Increase diversion from landfill	Reduce contamination of comingled recycling bins	Build waste/recycling capacity and capability
Residential Waste & Recycling Service Initiatives			
Residential Waste and Recycling Services Initiatives	✓	✓	
Investigate and implement best practice waste and recycling education, policies and procedures to increase landfill diversion and reduce bin contamination.	✓	✓	
Improve waste/recycling planning requirements for new multi-unit and mixed-use developments.	✓	✓	✓
Shoal Bay Waste Management Facility Initiatives			
Shoal Bay Waste Management Facility Initiatives	✓		✓
Strategic development of SBWMF to meet better practice landfill management and future needs of the GDA.			
Establish a medium-scale composting facility at the SBWMF for food waste, garden organics and timber.	✓		✓
Process separated/mixed Construction and Demolition waste received at SBWMF into civil aggregate products that meet relevant standards for reuse/resale.	✓		✓
Develop the SBWMF into a Circular Hub for waste, recycling, resource recovery processes and activities.	✓		✓
Other Initiatives			
Other Initiatives	✓	✓	✓
Investigate more cost-effective comingled recycling processing options for the GDA councils.			
Lead the increased recycled content procurement in the NT.	✓		✓
Investigate local processing opportunities for materials currently processed interstate or overseas, for example, tyres, glass, plastic and paper/cardboard.	✓		✓

Residential Waste and Recycling Services Initiatives

INITIATIVE 1: INVESTIGATE AND IMPLEMENT BEST PRACTICE WASTE AND RECYCLING EDUCATION, POLICIES AND PROCEDURES TO INCREASE LANDFILL DIVERSION AND REDUCE BIN CONTAMINATION

Contamination of recycling bins is a significant issue for Council (and all Australian councils). Interventions to improve contamination rates and increase household recycling include providing waste and recycling education and using technology and updating policies/procedures to drive behaviour change.

Outcomes		
		
Reduce comingled recycling bin contamination	Divert more waste from residential bins	Greater engagement with the community

Initiative Actions	Timing
1.1 Undertake an audit of waste and recycling bins provided to households and multi-unit dwellings/apartments Audits to understand bin composition (weight and percentage), contamination rates, material separation, efficiency etc. Audits should occur regularly (e.g. every two years) to track results over time.	2021
1.2 Undertake a review of current waste/recycling education programs To investigate current education programs/activities and provided recommendations on: <ul style="list-style-type: none"> Resourcing options (internal/external) and potential costs Collaboration and partnership opportunities Focus areas for a new program (e.g. schools, businesses) Timelines for an education program, including review periods and mechanisms (e.g. audits, surveys, bin tagging) Using/adapting education programs from across Australia to increase effectiveness (e.g. Which Bin? In South Australia) Role of collection vehicle technology to identify and track contamination at the household level to provide targeted education (e.g. first incident letters, face-to-face education for repeat offenders). 	2021 (recurs every three years)
1.3 Engage expertise (internally or externally) to develop an education program Based on the recommendations in action 1.2, this could be undertaken by either a contractor or internally.	2022 (recurs every three years)



Initiative Actions	Timing
--------------------	--------

1.4 Provide on-going resources to support the education program

2022
onwards

Example duties include engaging with external providers, developing education materials, managing advertising, undertake bin tagging, reviewing program effectiveness.

INITIATIVE 2: IMPROVE WASTE/RECYCLING PLANNING REQUIREMENTS FOR NEW MULTI-UNIT AND MIXED-USE DEVELOPMENTS

New developments in the GDA have little to no waste planning requirements. Many Australian councils require a waste management plan (WMP) from a waste consultant/engineer be submitted with new development applications. WMPs can confirm that a development's design can effectively manage waste generated, assess the ability to access Council services (i.e. eligible land uses), meet relevant government policy/regulations and accommodate future services (e.g. food waste).

Outcomes		
 Ensure access for collection vehicles	 Ensure resident access to recycling services	 Better urban planning outcomes

Initiative Actions	Timing
--------------------	--------

2.1 Develop guidance and resources for waste management planning for new developments in the Council area

2021 - 2022

Guidance should provide advice on WMP preparation and inform developers on local considerations (e.g. demographics, services).

2.2 Implement policy change(s) to require waste management plans for new developments of a certain type or size

2021 - 2022

WMPs should be submitted along with development applications. WMPs differ depending on development size/complexity, but generally include:

- Proposed waste/recycling services and estimated volumes generated
- Estimated bin sizes/no. bins and storage area size, design, location and access for tenants/occupants
- Confirmation of access for collection vehicles.

2.3 Provide on-going internal resources to assess WMPs and provide advice for new developments

2022
onwards

Key tasks would include:

- Reviewing WMPs against submitted applications and plans
- Provide feedback to the developer. during the design phase of a new development
- Approving that the constructed design meets the expectations outlined in the WMP, to obtain Council services.

INITIATIVE 3: INVESTIGATE AND IMPLEMENT BEST PRACTICE KERBSIDE SERVICES TO INCREASE LANDFILL DIVERSION AND MEET COMMUNITY NEEDS

As community expectations evolve and collection vehicle technology improves (e.g. bin/vehicle tracking, household level contamination identification), councils across Australia are improving kerbside bin services to better match services to household sizes and needs meet, meet expectations for recycling (e.g. pre-booked hard waste collection) and drive changes in waste/recycling disposal behaviour. Some councils, for example, provides several bin options, including a lower-cost sustainable-orientated service and a higher-cost service for households that generate more waste.

Outcomes		
 <p>Drive increases in landfill diversion</p>	 <p>Better match services to household needs</p>	 <p>1-tonne food waste recycled = 250kg CO2 avoided</p>

Initiative Actions	Timing
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3.1 Investigate improved kerbside bin service models

2021 - 2022

Using findings from a kerbside bin audit, investigate options to:

- Provide flexible waste and recycling bin collection services to match service needs, including different pricing options
- Understand the benefits and viability of options for providing garden organics and food recycling services to residents
- Identify more cost-effective contract options (e.g. collaborative procurement of services with other GDA councils)
- Identify any infrastructure required to support service improvements (e.g. composting facility availability and suitability).

3.2 Investigate improved pre-cyclone clean-up service models

2021 - 2022

Undertake a detailed review of current hard waste/pre-cyclone collection services practices, models, including exploring options for:

- At-call/pre-booked collection of hard waste
- Recovery before collection (e.g. surveying waste for reusable items by a not-for-profit prior to collection).

3.3 Pilot preferred kerbside service options

2022 - 2023

Any recommended service improvements should be piloted to:

- Assess community interest and participation and educate them on the importance and impacts of the service improvements
- Identify performance improvements (e.g. landfill diversion) and provide recommendations for introducing service changes.






Initiative Actions	Timing
3.4 Embed service changes into on-going and future contracts	2023
After successful piloting of the service improvements, negotiation of current waste/recycling contracts may be required. Changes to service models will also need to be embedded in future contracts.	(earlier if possible)

Shoal Bay Waste Management Facility Initiatives

INITIATIVE 4: STRATEGIC DEVELOPMENT OF SBWMF TO MEET BETTER PRACTICE LANDFILL MANAGEMENT AND FUTURE NEEDS OF THE GDA

The SBWMF has many legacy and current issues that will require risk control and mitigation over the life of the facility (and beyond). Council will be required to invest in infrastructure and resources to manage these risks, as well as to enhance service offerings that increase the longevity of approved landfill airspace. Including Initiative 7 it is expected that the capital investment to achieve this, may be in the order of \$75 million over the 10 year Strategy period. On-going investment in contractor monitoring and staff training will also be required to support good facility management and increase resource recovery outcomes.

Outcomes		
 Risk mitigation	 Support recycling/reuse	 Site rehabilitation
Initiative Actions		Timing
4.1 Stage 3 and Stage 4 capping This includes integration of: <ul style="list-style-type: none">Barrier system and cover soil on the top of closed landfill areasLandfill gas containment and controlled release systemSurface water management and leachate irrigation systems.		2021 - 2022
4.2 Leachate Treatment Plant This includes integrating multiple elements including: <ul style="list-style-type: none">Foam fractionation and extraction process for PFAS removalSequence batch reactor combined with a moving bed biological reactor for biological nitrogen removalTreated leachate storage pond, dissolved air floatation for solids removal constructed wetlands, irrigation, vetiver grass operation.		2021 - 2022
4.3 Stage 2 Expansion Development This includes the development of a new disposal area adjacent to the existing Stage 2 area for receipt of asbestos and other inert materials.		2021 - 2023



Initiative Actions	Timing
4.4 Upgrade Green Waste Operations	2021- 2023
This would include:	
<ul style="list-style-type: none">• Relocating the mulching operation and development of processes for higher-quality organic products to be generated• Lining barrier, leachate and surface water management systems• Specialist plant and equipment (e.g. shredding, screening)• Potential processing of additional waste streams (e.g. bioremediation of some contaminated soil waste streams).	
4.5 Disaster Waste Area	2022 - 2025
This includes development of a disposal area for the receipt, storage and processing of waste generated from disasters, (e.g. cyclones).	
4.6 Investigate options for landfill gas energy use on-site/off-site	2022

INITIATIVE 5: ESTABLISH A MEDIUM-SCALE COMPOSTING FACILITY AT THE SBWMF FOR FOOD WASTE, GARDEN ORGANICS AND TIMBER

The SBWMF recently started mulching garden waste received at the facility. With no major composting facilities identified in the region, there is the opportunity for the Council to add value to its mulching operation by processing organics received at the facility into compost. This includes composting the current garden waste, timber and other organics, and inclusions of commercial and residential food organics once processes have been established.

Outcomes		
 Produce local compost	 Composting creates 2x more jobs than landfill ³	 Enable business/resident food waste recycling
Initiative Actions		Timing
5.1 Investigate the business case for a compost operation This includes: <ul style="list-style-type: none">Determining the right operating model for the composting facility (e.g. Council owns the site/equipment and a contractor operates the facility and markets the products)Identifying and securing markets options for compost products, e.g. Council (e.g. parks/SBWMF rehabilitation activities), residents (gardens), agriculture.		2022
5.2 Obtain a licence for composting and sale of compost products at the SBWMF		2022
5.3 Establish a sustainable compost operation This includes undertaking any required upgrades to the green waste processing operation, e.g. contamination screening, Forced aeration		2022 onwards
5.4 Accept commercial food organics This includes collaborating with local waste/recycling collectors to pilot organics collection models (e.g. with local cafes, food manufacturing)		2022 onwards
5.5 Investigate options for residential food and garden organics (FOGO) collection		2023

³ Source: United States Environmental Protection Agency, 2018, Recycling Economic Information (REI) Report, <https://www.epa.gov/smm/recycling-economic-information-rei-report#findings>



INITIATIVE 6: PROCESS SEPARATED/MIXED C&D WASTE RECEIVED AT SBWMF INTO CIVIL AGGREGATE PRODUCTS THAT MEET RELEVANT STANDARDS FOR REUSE/RESALE

Between 2017/18 and 2019/20, the SBWMF received around 12,000 tonnes of C&D per year. A significant proportion of this material is either concrete or inert rubble/soil. Currently, there are limited options for the reuse of processed Construction and Demolition (C&D) in the GDA (e.g. only able to be used on the SBWMF site). Council has the opportunity to investigate options for reusing processed C&D received at the SBWMF in Council, government or commercial construction and road work projects.



Outcomes	
 <p>Divert building materials from landfill</p>	 <p>Recycling C&D waste creates 3x more jobs than landfill⁴</p>

Initiative Actions	Timing
6.1 Investigate business case for on-site C&D processing options To determine: <ul style="list-style-type: none"> • Siting and approvals • Operation model (e.g. Council owned contractor-operated) • How the material is to be received (mixed or separated bays) • The pricing structure for receiving C&D waste (e.g. price signals to encourage separation when delivered to the SBWMF) • Processing mechanisms and equipment costs • Specifications required to meet or be developed • Markets (council, other GDA councils, industry). 	2021 - 2022
6.2 Obtain a licence for C&D processing and sale of recycled C&D products at the SBWMF	2021 - 2022
6.3 Develop recycled C&D product specifications To enable the reuse of processed C&D in Council, government or commercial construction and road work developments, specifications that meet the engineering criteria for Council, NT Government or commercial developers, as well as, applicable laws, regulations and legislation will need to be developed (or adopted). Western Australia's Roads to Reuse Program, is an example of guideline specifications that have been developed to use processed C&D in road base and drainage rock.	2021 - 2022
6.4 Establish a sustainable C&D processing operation This includes undertaking any required upgrades to the C&D processing operation, e.g. crushing, testing, screening.	2022

⁴ Source: Employment in waste management and recycling, 2009, Report by Access Economics Pty Limited for The Department of the Environment, Water, Heritage and the Arts

INITIATIVE 7: DEVELOP THE SBWMF INTO A CIRCULAR HUB FOR WASTE, RECYCLING, RESOURCE RECOVERY PROCESSES AND ACTIVITIES

Although the SBWMF recently included a recycling shop for donation and resale of household goods, it has limited facilities for safe and convenient disposal of other separated recyclable items and materials (e.g. timber, bricks, concrete). The existing sawtooth drop-off should be replaced with a new front-end resource recovery facility, to target diversion of these streams from mixed/residual waste before landfill disposal.

Outcomes	
 <p>Increase resource recovery</p>	 <p>Investment in local jobs</p>
Initiative Actions	Timing
<p>7.1 Develop a front-end Material Sorting Facility at the SBWMF</p> <p>This includes infrastructure elements for the new front-end resource recovery facility such as:</p> <ul style="list-style-type: none"> • A new building including, footings, base slabs, awnings etc. • Roadways, pavements, surface water management systems • Specialist plant and equipment (e.g. baler, stillages) • Designated drop-off facilities e.g. bays, push walls, stillages • Implement price signals to encourage separation of recyclable materials (e.g. lower costs for concrete, bricks, timber). <p>The upgrades should be staged to meet site processing capacity</p>	2023 - 2025
<p>7.2 Upgrade the SBWMF to a Circular Hub</p> <p>To enable better community participation in the Circular Economy, the Material Sorting Facility development (Action 1 above) should consider in its design, a Circular Hub, which would include:</p> <ul style="list-style-type: none"> • Reuse & Repair Centre (integrated with Recycling Shop), with a: <ul style="list-style-type: none"> - A community shed (a non-profit local organisation that provides a space for craftwork and social interaction) - Makerspace – Community fabrication workshop that provides affordable access to a variety of tools/equipment (e.g. 3D printers, sewing machines, hand tools) - Tool library, where residents can borrow hand/power tools and other equipment (e.g. camping and sports gear) - Facilities for waste/recycling education displays and activities, community gatherings and café • Provisions so volunteers can recover items/materials suitable for reuse/resale from the Material Sorting Facility (e.g. allocated stillages for timber for hobby projects) • Spaces to lease out to related or compatible local business (e.g. mattress recycling, white good & lawnmower/small engine repair, upcycling (e.g. pallets into furniture), waste processing). 	2023 - 2025



Other Initiatives

INITIATIVE 8: INVESTIGATE MORE COST-EFFECTIVE COMINGLED RECYCLING PROCESSING OPTIONS FOR THE GDA COUNCILS

Currently, there are two privately owned and operated Materials Recovery Facilities (MRFs) for processing of Council comingled recycling in the GDA region. The consultations found that these facilities face challenges of limited local markets for recovered materials and therefore incur significantly higher costs for transporting materials to facilities/markets interstate or overseas. Smaller MRFs are becoming less viable as markets for recovered materials from comingled recycling streams become more volatile and less profitable. Consolidation of the two MRFs into a single facility should be investigated, as it may result in a more cost-effective and long term viable comingled recycling processing option for GDA councils.

Outcomes		
 <p>May lower recycling processing costs</p>	 <p>Joint procurement opportunity</p>	 <p>Increase in recycling processing efficiency</p>

Initiative Actions	Timing
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8.1 Undertake a detailed investigation into the viability and costs benefit of a single regional MRF	2023 - 2024
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Considering:

- Cost-benefit of a regional MRF
- Detailed design e.g. siting, infrastructure and equipment, technology, staffing
- Operation models for example:
 - Council owned and operated
 - Council owned and commercially operated
 - Commercial owned and operated
- Mitigation strategies considerations/risks including:
 - Obtaining sufficient and long term buy-in for this option is needed from all GDA councils, guaranteeing that comingled recycling from all GDA councils can be contractually consolidated into a single facility
- Sensitivities of current contractor-operated MRFs including:
 - Investment already spent by current contractors
 - Contract terms and conditions
 - Current processing of commercially collected mixed recycling by existing MRFs
- Funding opportunities (e.g. grants from the commonwealth government) to improve the viability of a regional MRF.

INITIATIVE 9: LEAD THE INCREASED RECYCLED CONTENT PROCUREMENT IN THE NT

The consultations identified that there is minimal to no requirements from GDA councils and the NT Government for procuring products or materials that are either completely or partly made from recycled waste materials. Council has the opportunity to investigate opportunities for increasing recycled content procurement by Council. Numerous councils across Australia are currently investigating this opportunity. An example (from South Australia) includes a project where nine councils have signed an MOU to prioritise buying products made from recycled materials. Councils taking part in the pilot project, through a Memorandum of Understanding, to establish systems and processes to prioritise, track and publicly report recycled content procurement processes and volumes purchased.

Outcomes	
 <p>Increase demand for recycled content products/materials</p>	 <p>Support local recyclers/remanufacturers</p>
Initiative Actions	Timing
9.1 Investigate Council recycled content procurement opportunities This includes identifying products, items or materials made with part or whole recycled content that could be procured for Council operations and projects.	2022
9.2 Establish a recycled content procurement working group with GDA (and wider NT) councils and NT Government To investigate and develop a program identifying options for increasing recycled content procurement in Council/government construction and road work projects. This includes: <ul style="list-style-type: none"> • Prioritising recycled content through the procurement processes • Tracking recycled content purchased by weight • Publicly report the volume of recycled content products and materials purchased. 	2022 - 2024
9.3 Develop and maintain a recycled content procurement product and company directory Similar to what has been developed by Sustainability Victoria and South Australian LGA. This includes: <ul style="list-style-type: none"> • Providing information on relevant specifications • Identifying local/Australian suppliers of recycled content: <ul style="list-style-type: none"> - Fencing, piping and irrigation - Furniture and playgrounds - Paving and road base - Soils improvement products. 	2022 onwards



INITIATIVE 10: INVESTIGATE LOCAL PROCESSING OPPORTUNITIES FOR MATERIALS CURRENTLY PROCESSED INTERSTATE OR OVERSEAS, FOR EXAMPLE, TYRES, GLASS, PLASTIC AND PAPER/CARDBOARD

The Recycling Survey undertaken as part of the development of the Strategy identified that there are very limited or no local processing options for tyres, glass, plastic and paper/cardboard. These streams are either landfilled or sent interstate for further processing. Opportunities driven by impacts such as improved separation at the SBWMF, the Waste Export Bans and increased community expectations, may mean that processing of these streams may be viable in the GDA, which should be explored individually or as a group.

Outcomes	
 <p>Identify opportunities for increased local processing</p>	 <p>Identify opportunities for additional employment in the local recycling</p>

Initiative Actions	Timing
10.1 Undertake a detailed investigation into local processing opportunities for example, tyres, glass, plastic and paper/cardboard	2022 - 2023

This should include:

- Determine the viability of local pre-processing/processing or re-manufacturing
- Infrastructure/equipment and expertise needed
- Available markets or market development needed
- Linkages with recycled content procurement
- Potential for attracting additional resource recovery, re-manufacturing businesses/organisations to the GDA.

Each stream can be investigated individually or as a group.

Action Plan

Implementation Timeframes

The figure below provides a summary of the indicative timelines for the investigation of the implementation of the actions under each Strategy initiative.

Initiatives and Actions

INITIATIVE 1: INVESTIGATE AND IMPLEMENT BEST PRACTICE WASTE AND RECYCLING EDUCATION, POLICIES AND PROCEDURES TO DRIVE BEHAVIOUR CHANGE TO INCREASE LANDFILL DIVERSION AND REDUCE CONTAMINATION

- 1.1 Undertake an audit of waste and recycling bins provided to households and multi-unit dwellings/apartments
- 1.2 Undertake a review of current waste/recycling education provisions
- 1.3 Engage expertise (internally or externally) to develop an education program
- 1.4 Provide on-going resources to support the education program

INITIATIVE 2: IMPROVE WASTE/RECYCLING PLANNING REQUIREMENTS FOR NEW MULTI-UNIT AND MIXED-USE DEVELOPMENTS

- 2.1 Develop guidance and resources for waste management planning for new developments in the Council area
- 2.2 Implement policy change(s) to require waste management plans for new developments of a certain type or size
- 2.3 Provide on-going internal resources to assess WMPs and provide advice for new developments

INITIATIVE 3: INVESTIGATE AND IMPLEMENT BEST PRACTICE KERBSIDE SERVICES TO INCREASE LANDFILL DIVERSION AND MEET COMMUNITY NEEDS

- 3.1 Investigate improved kerbside bin service models
- 3.2 Investigate improved pre-cyclone clean-up service models
- 3.3 Pilot preferred kerbside service options
- 3.4 Embed service changes into on-going and future contracts

[illegible]

Initiatives and Actions

INITIATIVE 4: STRATEGIC DEVELOPMENT OF SHOAL BAY LANDFILL TO MEET BETTER PRACTICE LANDFILL MANAGEMENT AND FUTURE NEEDS OF THE GDA

- 4.1 Stage 3 and Stage 4 capping
- 4.2 Leachate Treatment Plant
- 4.3 Stage 2 Expansion Development
- 4.4 Upgrade Green Waste Operations
- 4.5 Disaster Waste Area
- 4.6 Investigate options for landfill gas energy use on-site/off-site

INITIATIVE 5: ESTABLISH A MEDIUM-SCALE COMPOSTING FACILITY AT THE SBWMF FOR FOOD WASTE, GARDEN ORGANICS AND TIMBER

- 5.1 Investigate the business case for a compost operation
- 5.2 Obtain a licence for composting and sale of compost products at the SBWMF
- 5.3 Establish a sustainable compost operation
- 5.4 Accept commercial food organics
- 5.5 Investigate options for residential Food and Garden Organics (FOGO) collection

INITIATIVE 6: PROCESS SEPARATED/MIXED C&D WASTE RECEIVED AT SBWMF INTO CIVIL AGGREGATE PRODUCTS THAT MEET RELEVANT STANDARDS FOR REUSE/RESALE

- 6.1 Investigate business case for on-site C&D processing options
- 6.2 Obtain a licence for C&D processing at the SBWMF
- 6.3 Develop recycled C&D product specifications
- 6.4 Establish a sustainable C&D processing operation



Kerbside bin diversion
from landfill >50%

Kerbside comingled recycling
bin contamination <10%

[illegible]

Initiatives and Actions

INITIATIVE 7: DEVELOP THE SBWMF INTO A CIRCULAR HUB FOR WASTE, RECYCLING, RESOURCE RECOVERY PROCESSES AND ACTIVITIES

7.1 Develop a front-end Material Sorting Facility at the SBWMF

7.2 Upgrade the SBWMF to a Circular Hub

INITIATIVE 8: INVESTIGATE MORE COST-EFFECTIVE COMINGLED RECYCLING PROCESSING OPTIONS FOR THE GDA COUNCILS

8.1 Undertake a detailed investigation into the viability and costs benefit of a single regional MRF

INITIATIVE 9: LEAD THE INCREASED RECYCLED CONTENT PROCUREMENT IN THE NT

9.1 Investigate Council recycled content procurement opportunities

9.2 Establish a recycled content procurement working group with GDA (and wider NT) councils and NT Government

9.3 Develop and maintain a recycled content procurement product and company directory

INITIATIVE 10: INVESTIGATE LOCAL PROCESSING OPPORTUNITIES FOR MATERIALS CURRENTLY PROCESSED INTERSTATE OR OVERSEAS, FOR EXAMPLE, TYRES, GLASS, PLASTIC AND PAPER/CARDBOARD

10.1 Undertake a detailed investigation into local processing opportunities for example, tyres, glass, plastic and paper/cardboard



Kerbside bin diversion from landfill >30%

Kerbside comingled recycling bin contamination <15%

Kerbside bin diversion from landfill >50%

Kerbside comingled recycling bin contamination <10%

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
			✓	✓	✓						
			✓	✓	✓						
			✓	✓							
		✓									
		✓	✓	✓							
		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓								



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