

# CENTRAL WESTERN QUEENSLAND **REGIONAL WASTE MANAGEMENT PLAN**





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### Document Status

Rev. no.	Author	Reviewer	Date
Draft_1.0	Debra Mackeen	Anne Prince	7 November 2023
Draft_2.0	Debra Mackeen	Erin Cooney	17 November 2023
Final	Debra Mackeen	Jen Olsen	20 December 2023

December 2023

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## GLOSSARY

Acronym	Details
ABRI	Australian Battery Recycling Initiative
ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
ACM	Asbestos-containing materials
APCO	Australian Packaging Covenant Organisation
APVMA	Australian Pesticides and Veterinary Medicines Authority
BREZ	Barcaldine Renewable Energy Zone
CAPEX	Capital expenditure allocated to infrastructure works
CE	Circular economy
CCA	Copper chrome arsenate, a wood preservative used in treated power poles
CfC	Containers for Change, Queensland Government container deposit scheme (CDS)
CFL	Compact fluorescent lamps
COEX	Container Exchange, a not-for-profit organisation operating the Containers for Change program in Queensland
Commingled	Refers to mixed recyclables including plastics, aluminium, glass, paper, cardboard
Composting	Repurposing of organics wastes to produce a soil improvement material
CWQ	Central West Queensland
C&D	Construction and demolition waste generated by builders, developers and excavation
C&I	Commercial and industrial waste generated by shops, manufacturers and businesses
CCTV	Closed circuit television (or video surveillance)
CPI	Consumer price index
DES	Queensland Department of Environment and Science
DSDILGP	Queensland Department of Development, Infrastructure, Local Government and Planning
Diversion	Refers to the diversion of wastes from landfill for repurposing
EOL	End of life – products and materials at the end of their useful life
EPA	Expanded polystyrene
E-waste	Waste electrical and electronic equipment
Infrastructure	In this report, refers to plant and facilities dedicated to waste management
FEL	Front-end loader
FOGO	Food and garden organics
GHG	Greenhouse gas
HDPE	High-density polyethylene
IBC	Intermediate bulk container
LDPE	Low-density polyethylene
Leachate	Created by the decomposition of waste, the percolation of liquids in landfill
Legacy waste	Wastes kept for years and where there is no longer an opportunity to recover costs from the generator
LGA	Local Government Area
LPB	Liquid paperboard containers made of cardboard, plastic and sometimes foil
MGB	Mobile garbage bin
MRF	Material recovery facility – plant that separates and processes recyclable materials for supply to end markets as raw materials for new products
MSW	Municipal solid waste generated by households and council parks and gardens
NWQROC	North West Queensland Regional Organisation of Councils

OPEX	Operational expenditure incurred through business/facility operations
PET	Polyethylene terephthalate
PP	Polypropylene
PPP	Public Private Partnership
PS	Polystyrene
PV	Photovoltaic solar panels for the generation of renewable energy
PVC	Polyvinyl chloride
QFES	Queensland Fire and Emergency Services
QWDS	Queensland Waste Data System
RAC	Remote Administrator Control
RAPAD	Remote Area Planning and Development Board
RDF	Resource-derived fuel (a fossil fuel replacement)
Recycling	Processing of recovered packaging materials into new products
Resource recovery	Refers to waste materials that are diverted from landfill for repurposing
Reprocessing	Changing the physical structure and properties of waste to value-add and reuse
ROC	Regional Organisation of Councils
RWMP	Regional Waste Management Plan
SUP	Single-use plastic
SWQROC	South West Queensland Regional Organisation of Councils
TSA	Tyre Stewardship Australia – an industry-led program for waste tyres
ULAB	Used lead–acid batteries
WHS	Workplace health and safety

## EXECUTIVE SUMMARY

The Central Western Queensland Regional Waste Management Plan (The Plan) is a roadmap to improving waste management and resource recovery in the Central West.

The Remote Area Planning and Development Board (RAPAD) is comprised of seven central western Queensland municipalities working collaboratively to promote sustainable development in the region. The Board, established 30 years ago, is eminently capable and very effective in addressing regional opportunities and issues across this diverse and remote region. The Central West Queensland Councils are:

- Barcaldine Regional Council
- Barcoo Shire Council
- Blackall-Tambo Regional Council
- Boulia Shire Council
- Diamantina Shire Council
- Longreach Regional Council
- Winton Shire Council.

The purpose of the Plan is to support the implementation of the *Queensland Waste Management and Resource Recovery Strategy* (WMRR) and its three strategic priorities, as follows:

- Reduce the impact of waste on the environment and communities;
- Transition to a circular economy; and
- Build economic opportunity.

This Plan integrates local and regionally focused strategies for improving waste management and resource-recovery outcomes in the Central West.

The Central West Queensland region spans approximately 397,547 km<sup>2</sup> or 23% of the Queensland landmass. Approximately 10,562 people reside in 20 discrete communities within the region and represent approximately 0.3% of the state population.

The Central West region is one of the most diverse in the state, ranging from eucalypt woodlands along the Great Dividing Range through to the vast flood plains of the Channel Country and dune fields of the Simpson Desert. The landscape contains unique environmental and natural resource values including the internationally and nationally

significant Lake Eyre Basin which overlays large areas of the Great Artesian Basin, Australia's largest groundwater aquifer. Rivers and lakes within the region also interconnect with the Murray-Darling and Burdekin basins.

The municipalities within the region are diverse. Longreach Council, with one of the smaller land areas, has the largest population, generating approximately 34% of the region's waste. Conversely, Diamantina municipality covers the largest land area, at 95,000 km<sup>2</sup>, has the smallest population and generates just 3% of the region's waste.

Proportionally, three councils contribute 80% of the regions waste with Longreach (34%), Barcaldine (28%) and Blackall-Tambo (18%) generating the majority.

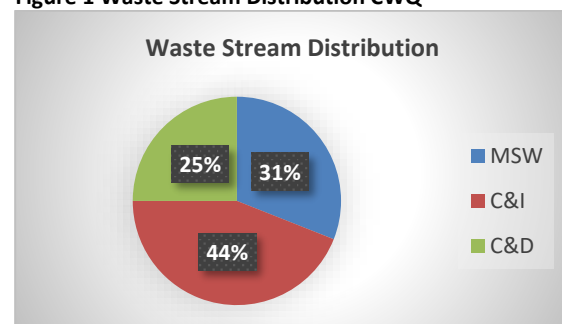
The region's population is expected to experience a small decline in numbers until moderate but positive change is expected after 2031, and most particularly between 2036 and 2041<sup>2</sup>. The population reduced by 1.31% between the period 2021 to 2022. Conversely, the commercial activity in the region grew by approximately 2.5% over the same period.

### Current waste generation

The region generates an estimated 36,000 tonnes of waste per year (t/y), including the following headline wastes materials:

- MSW: 11,000 t/y
- C&I: 16,000 t/y
- C&D: 9,000 t/y.

**Figure 1 Waste Stream Distribution CWQ**



Approximately 19,000 tonnes of general waste is generated each year, collected through kerbside services and self-haul materials and then delivered to disposal sites. Additionally, an estimated 16,000 tonnes of bulky materials are stockpiled at sites

<sup>1</sup> Queensland Government Statisticians Office, 2019

<sup>2</sup> Queensland Government Statisticians Office, 2019

annually, including green waste, C&D, steel and tyres.

There is a significant influx of visitors to the region between April and September each year. The wastes from this source are included in the MSW and C&I figures above. In future, data systems will be able to reliably isolate the quantity and type of the materials generated by the tourism sector and will enable a focus on increasing the recovery of materials from this waste stream.

Waste generation is not expected to increase substantially in the coming 10-year period.

### **Current waste management services and infrastructure**

All councils, except Barcaldine, use internal resources and equipment to service kerbside and public-place bin collection systems. Barcaldine has engaged a commercial contractor.

Kerbside general waste collections are provided across the region to both households and commercial properties. There are no existing kerbside services for recycling or organic materials.

Each community within the region has access to a disposal site which receives self-haul wastes from households, businesses and C&D projects. All sites are unsupervised and open 24/7, with the exception of Longreach Council, which outsources day-to-day management of the Longreach disposal site to contractors.

There are also commercial front-lift and skip-bin collection services operating in the larger centres.

### **Key issues and limiting factors**

Given the significant differences in size and scale of each of the municipalities, common challenges may impact to a lesser or greater degree. The geographic isolation, expensive freight services, significant distance to end markets, constrained council budgets, transient staff and declining populations all contribute to poor economies of scale.

Key issues include accumulated legacy wastes at disposal sites (tyres, concrete, green waste, steel); lack of regional processing capacity and reliable data to inform business-case development. As most sites do not have controlled access/opening times or supervision there is minimal waste diversion

occurring and, not uncommonly, significant contamination within the recovered bulk materials.

Disparate waste disposal pricing structures and poor cost-recovery mechanisms mean that the revenues to support waste management rely substantially on levied rates.

While there are some fees for waste disposal, it is somewhat inconsistent across the region. At present one council within the region applies disposal fees for commercial wastes and three councils apply disposal fees for construction and demolition wastes. There is also an opportunity to consider the equitable distribution of waste management costs between larger and smaller generators, and in this way incentivise the recovery of wastes for recycling and reprocessing.

### **Recovery, Reuse and Recycling**

The collection and processing of stockpiled materials are managed independently by councils and there is an opportunity for regional coordination of these services to encourage competitive tendering.

Efforts to stockpile wastes, including green waste, scrap metal, concrete and tyres, are highly vulnerable to contamination at sites without disposal supervision, resulting in a reduced material quality and potentially reduced interest from commercial processing companies. C&D materials may be stockpiled for a period and then covered over with earthen materials. Ferrous and non-ferrous metals are more likely to be recycled depending on commercial value.

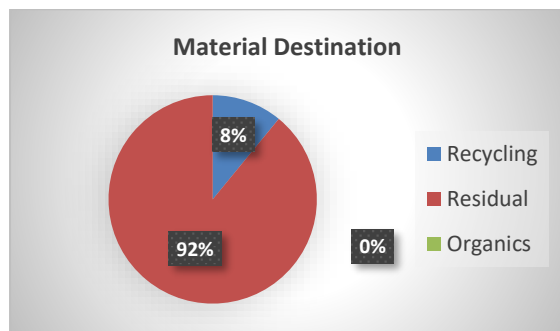
Used motor oil and lead-acid batteries (ULABs) are often stored at council depots and are primary regulated waste that are recovered from the waste stream.

Packaging waste recycling is limited to the Container for Change (CfC) program and is dependent on the delivery of eligible beverage containers to depots operated by private businesses or community organisations in six communities within the region.

A recent audit conducted of Longreach household and commercial properties found a potential weekly generation of recyclables (both CfC eligible and other) represent 27% (3 kg) by weight in the household bins and 33% (28 kg) in commercial bins.



The following graph provides the material destination pathways currently in place, which significantly favour disposal.



The estimated capital costs associated with resource-recovery activities are shared with residual waste/disposal sites (below) and are incorporated into the overall site upgrades and transition to waste transfer stations. Recovery works include the installation of drained, hardstand areas for managing bulk recovered materials and purpose-built regulated waste facilities.

As resource recovery improves, additional infrastructure may be required in the future. Expenses related to the installation of reuse centres, permanent recycling facilities and public-place recycling bins for example, have not been included in the Plan budget. Instead, robust data will be collected in the short to medium term of the Plan which will be used to model future services and infrastructure needs. The establishment of a Regional Resource Recovery Working Group (RRWG) will conduct thorough investigations into appropriate technologies, infrastructure, and Public Private Partnership (PPP) or private sector arrangements for these initiatives during the life of the Plan. The working group will be best auspiced through RAPAD given its demonstrated success in managing regional programs such as the Outback Regional Roads and Transport Group, Water and Sewerage Alliance and the Regional Pest Management Group. Similarly, the RRWG would be funded through a state and local government partnership.

Given the relatively low volume of recyclables and until initial resource-recovery initiatives are embedded, services such as kerbside recycling and MRF operations are not anticipated to be viable. Nonetheless, investigations into these options are a focus during the long-term phase of the Plan, when robust data has been collected. These costs have not

been allocated to the Plan budget as they are unknown at this point.

### Organics

The recovery of organic materials is currently limited to green wastes (via self-haul and Council). This material is generally stockpiled and burned or chipped/shredded and remains unused on site. Contamination in the stockpiles will continue to limit the processing and reuse opportunities, especially where there is open access to sites and disposal behaviours go unchecked.

A recent waste audit in Longreach found a weekly generation of food and garden wastes in household bins of 37% (4.1 kg) and 54% (47 kg) in the commercial bins which is disposed to landfill. It is likely that rural and semi-rural households recover organics via home composting or using food scraps as animal feed. However, in urban areas this may be less so.

The short to medium term focus within the Plan is for shredding and windrow composting at the disposal sites to produce a mulch product and the supply of home composting bins to support home and business organics management at the source.

The estimated capital costs associated with recovery of organics is included in the waste site upgrades, as well as **\$0.3 million** allocated to the provision of home and business composting bins. Future infrastructure for the collection and processing of organic materials will require investigations into appropriate technologies, PPP or private-sector opportunities. These costs have not been allocated to the Plan budget as they are unknown at this point.

### Legacy waste

Scrap metal, tyres, green waste, concrete, and in some cases, treated power poles are stockpiled in substantial quantities and deemed to be legacy wastes owing to the scale of the stockpile. Such stockpiles are now beyond the financial capacity of the individual councils to address. Green waste and tyres in particular form a significant fire risk at sites.

Contamination issues may become a processing risk and will need to be addressed. A volumetric survey will provide more accurate estimations of the quantities held at the sites to inform regional processing tenders and contracts for the clearance of these materials.

Based on current estimates, a total indicative cost for activities associated with legacy waste clearance across all waste facilities is **\$5.3 million**.

The ongoing annual or biannual collection of these materials will eventually need to be covered by councils, ideally under regional contract arrangements. Cost recovery mechanisms for the disposal of bulky wastes will be needed and this action forms a focus within the short term of the Plan. The plan seeks funding over the initial three-year period to allow councils time to implement mechanisms capable of financially supporting the resource recovery of these materials.

#### **Residual waste management/disposal sites**

Existing waste infrastructure throughout the region comprises:

- 20 unlined disposal pits and one engineered landfill, which is yet to be commissioned;
- One operational waste transfer station and another which is yet to be commissioned.

New and as yet non-commissioned infrastructure is located in the Barcaldine Regional Council area. The landfill was constructed some years ago and the clay liner is now in need of repair for which capital costs have been estimated in the Plan. Barcaldine plans to transition to a hub-and-spoke system, transferring materials from waste transfer stations located in satellite communities to the new central landfill.

Several municipalities engage earthmoving and agricultural contractors to periodically manage the pushing up of materials in disposal cells and site clean-up. Councils are responsible for monitoring these activities.

Three sites in the Longreach and Diamantina municipalities will reach their end of life (EOL) within three and seven years. Councils report other sites have between a 10- and 30-year remaining life.

The Plan seeks to upgrade the current sites, control access and apply supervision as the first step toward improving resource recovery and disposal behaviours. Smaller, more remote sites where supervision may not be practical, may utilise remote access systems to control entry and provide an opportunity to measure disposal quantities.

The conversion of 10 sites to waste transfer stations (WTS) is a focus of the early phase of the Plan, with another site converted potentially within 10 years. The upgrades to the sites include hardstand areas, purpose-built regulated waste storage facilities, fencing, signage, roadworks and repositioning of drop-off points ahead of disposal.

The total indicative capital cost for activities associated with waste disposal is **\$11.8 million**, noting that some infrastructure in the upgrades is also dedicated recovery facilities.

A further **\$0.8 million** is required in annual operational costs to enable supervision of the sites.

#### **Education**

The role of education programs is critical for the introduction of new programs and initiatives. These programs will be topic-specific, e.g. resource recovery, organics management and so on. Programs will need support over a period of time, at least until new systems are embedded. These programs must be multi-faceted in order to reach a broad coverage of the community. Through the RRWG, councils will take a collaborative approach in the development of programs to ensure a consistent regional message and approach are delivered. A budget of **\$.3 million** for program development and roll-out has been allocated with the Plan budget for the initial education program only. Subsequent programs related to specific and new activities will require further funding of an estimated **\$.2 million** annually.

#### **Resources**

There is strong regional collaboration across many areas of council programs through the RAPAD organisation, however none to date for waste management. This is possibly due to the complex nature and diversity of the region. Opportunities for councils to work together toward regional solutions include the management of legacy and recurrent stockpiled materials, waste collection services, waste disposal site operations, community education, feasibility and business case development, advocacy activities and preparing funding applications.

There is a recurrent annual budget of **\$0.35 million** for the recruitment of the Regional Coordinator role and for commissioning of external technical support and experts for feasibility studies, business

case development, capacity building and advocacy for the region.

The establishment of the Regional Resource Recovery Working Group (RRWG) and appointment of a Regional Coordination Resource, is essential for change to occur and is an early action of the Plan. Combined with oversight and governance by the RAPAD Board, the region is well placed to achieve planned outcomes.

The sharing of information and resources and the ability for councils to engage with community on programs that align at a regional level will contribute to achieving the state government targets.

### Conclusion

Given the challenges in achieving sufficient economies of scale, this Plan delivers a cautious approach to change. The Plan provides a framework to effectively address a range of priorities that include, but are not limited to the:

- State government focus on improving the environmental management of landfills;
- Regional focus on creating sustainable economic development opportunity, and
- Community focus on expanding access recycling and resource recovery activities.

Controlled access to landfill facilities and supervision of waste disposal activities are the cornerstone of the Plan.

Site supervision will build capacity to improve the environmental management of landfill sites, improve the quality and potential revenue for recovered materials such as steel, green wastes and C&D, create employment and business opportunities and ultimately enable the region to participate in the transition to a circular economy.

Controlling site access and providing supervision will enable the collection of data on the quantities and types of wastes entering disposal sites. This information will be fundamental to understanding

the materials that can be made available to small business initiatives and broader, longer term economic opportunities within the region.

Data will underpin the design of future resource recovery and recycling systems, better able to meet community expectations, and that are sustainable in the longer term.

This Plan, in effect, is about establishing policy settings and laying the foundations for carefully constructed waste management and resource-recovery systems. The implementation of the Plan will also consider lessons learned from initiatives undertaken in more populated regions to reduce risk and achieve greater certainty in executing the Plan.

The implementation of the Plan will need financial assistance in its commencement and through the first seven-year period. A total capital investment assistance of **\$17.8 million** is needed, with recurring annual operational funding totalling **\$14.3 million** over the coming seven-year period. Operational funding assistance is necessary to strengthen stand-alone capacity for waste management and resource recovery into the future.

The RAPAD Board and participating councils have a demonstrated capacity to collaboratively and effectively address regional matters and challenges. RAPAD as the auspice organisation for the Plan, will deliver good governance and due diligence in its implementation.

The Plan is designed to achieve sustainable waste management and resource-recovery outcomes and improved environmental management for the region.

## 1. BACKGROUND

The Queensland Waste Management and Resource Recovery Strategy (WMRR Strategy) aims to transition Queensland to a new paradigm of circular economy in which wastes are retained and circulated at the highest values for as long as possible. It also encourages collaborative actions between governments, business and industry. From a local government perspective, the strategy aims to promote greater sharing of resources, knowledge and experience while encouraging new regional opportunities previously beyond the capabilities of a single council. The priorities of the WMRR Strategy are to:

- Reduce the impact of waste on the environment and communities;
- Transition to a circular economy; and
- Build economic opportunity.

The WMRR Strategy establishes waste management and resource recovery in a much broader framework, targeting outcomes to measure waste avoidance, reuse and recycling performance while also supporting new opportunities for economic growth, job creation, local, regional and social capacity building and environmental sustainability.

The Queensland Government acknowledges<sup>3</sup> the challenges faced by remote communities, which includes the CWQ municipalities: *'...whilst opportunities to improve the recovery of most streams exist, there are also significant practical and financial challenges in doing so...'; '...that such efforts are likely to be less ambitious than other regions, given the significant challenges.'*

The Queensland Government further recommends that councils focus on:

- *'Improving the environmental management of landfills;*
- *Maximising the recovery of beverage containers through the CRS systems;*
- *Identifying efficient methods of collecting and transporting recyclables and recovered materials;*
- *Community composting projects; and*
- *Exploring the potential to use backload road and rail freight opportunities for the transfer of materials.'*

The Remote Area Planning and Development (RAPAD) organisation is a recognised local government body and peak regional economic development and advocacy organisation for the Central West Queensland region.

RAPAD has seen the waste planning process as an opportunity to:

- Re-examine traditional views and work with communities by supporting their future visions;
- Identify and work collaboratively with industry stakeholders in the region to build partnerships helping deliver sustainable outcomes that will make a difference to RAPAD communities and economies;
- Enhance outcomes for local governments and the sustainability and livability of the region;
- Improve the environmental performance of waste management and resource recovery activities to protect the unique environmental values of the region;
- Grow jobs and achieve improvement in profitability through fostering future opportunities across the region.

This RAPAD Regional Waste Management Plan (the Plan) seeks to support local and regional economic opportunities, encourage capacity building and environmental sustainability, and increase access to services common to other councils and regions throughout Queensland. The long-term leadership of the RAPAD Board, its CEO and team will ensure good governance underpins the implementation of this Plan.

The implementation of the WMRR strategy is supported by a 10-year Waste and Resource Recovery funding package aimed at delivering circular-economy outcomes through improved infrastructure capacity, awareness and behaviour change in the community. Future applications for funding under the Recycling and Jobs program within the funding package will require the support of a regional waste management plan.

<sup>3</sup> Queensland Waste and Resource Recovery Infrastructure Report, 2019, Department of Environment and Science

## 1.1 Guiding principles for the Regional Waste Management Plan

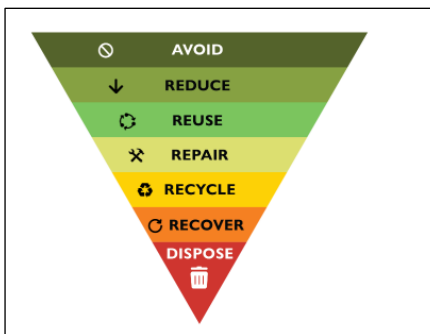
The plan provides a roadmap to deliver fit for purpose solutions that account for the unique waste management challenges of the Central West Queensland councils. The outcomes from the implementation of this Plan will represent the region's material contribution to the goals and targets of the Queensland Government's strategy and its vision for a circular economy which benefit the Central West Queensland communities and environment.

The management of wastes should not cause negative or unintended far-reaching consequences on the environment and community. Responsibility for the decisions made today must not shift to future generations to rectify. Importantly, the generator of the waste should bear the cost of its appropriate treatment and management. The guiding principles of the plan are the waste management hierarchy and the circular economy, discussed below.

## 1.2 Waste management hierarchy

The waste management hierarchy is a nationally and internationally accepted principle for prioritising and guiding efforts to manage wastes. The hierarchy has evolved over the past four decades and now includes seven steps, as summarised in the figure below.

**Figure 2: Waste management hierarchy**



The waste management hierarchy provides an order of preference for the managing of waste. The primary objective is to manage risks to human health and the environment by avoiding and reducing the generation of waste. Secondary objectives focus on the efficient use and conservation of resources, reducing the need for disposal and improving cost efficiency through reduced waste disposal and material costs.

## 1.3 Transitioning to a circular economy

The circular economy is a production and consumption model that seeks to keep resources in their highest value use for as long as possible. End-of-life materials are recovered and regenerated into new products. As such, recycling and resource recovery are core elements of a circular economy as these processes allow materials to be withdrawn from the waste stream in preparation for reprocessing into new or remanufactured products.

**Figure 3: Circular economy**



Reprocessing recovered waste materials reduces the demand on raw materials, preserves natural resources and often requires less energy compared to extraction and processing of virgin materials. The recycling and resource-recovery sectors create employment and business opportunities in association with the collection, sorting, processing, and remanufacturing of recovered materials. Job creation, in turn, contributes to local economies and creates pathways for skills development. The move to a circular economy, however, requires investment and can only happen where government, business, industry and the wider community work together.

#### 1.4 Regional Waste Management Plan objectives and targets

The Queensland Government have developed a framework for the regional plans, which have the following objectives:

- Maximise the value of waste, including but not limited to problematic waste streams;
- Deliver a financially sustainable and fit-for-purpose pathway to leverage government co-funding arrangements and industry investment or co-investment;
- Provide local governments with the data and options analysis required for them to make informed decisions about policy, infrastructure and non-infrastructure options;
- Support improved waste management, resource recovery and recycling practices towards the achievement of agreed targets;
- Encourage and support job creation, economic and market development opportunities and embed circular economy principles into BAU practices;
- Improve environmental outcomes for the community;
- Identify non-infrastructure and social and community benefits, including investment in social capital and place-based opportunities;
- Establish and maintain collaborative relationship with key stakeholders.

The plan contains transformative actions designed to support the following state government targets to be achieved by 2050:

- Reduce household waste by 25%;
- Achieve 75% recovery across all waste streams;
- Achieve a 90% landfill diversion for all wastes.

## 2. POLICY AND REGULATORY INSTRUMENTS

Australia's national policy and laws implement our multilateral environmental commitments, including to the United Nations (UN) Sustainability Development Goals (SDG). The Commonwealth, states and territories are working collectively through the Council of Australian Governments and through agreements made at Australia's Meeting of Environment Ministers forums to achieve common targets related to:

- Banning the export of unprocessed packaging wastes;
- Phasing out problematic plastic wastes;
- Increasing use of recycled content by governments and industry;
- Reducing greenhouse gas emissions;
- Increasing organics diversion;
- Reducing waste generation;
- Increasing landfill diversion;
- Increasing resource recovery rates across all waste streams.

### 2.1 National policy and regulatory instruments

The national framework for waste management and resource recovery is largely administered by the Department of Climate Change, Energy, the Environment and Water. The regulatory framework comprises:

**The National Waste Policy, 2018** implements Australia's commitment to the United Nations (UN) 2030 SDG and our obligations under the UN Framework Convention on Climate Change to reduce greenhouse gas emissions through the diversion of organics, including food wastes from landfill. The policy commits circular economy principles to a whole-of-waste management system and targets the halving of organic waste to landfill by 2030.

**The National Food Waste Strategy, 2017** focuses activities to reduce Australia's food waste by 50% by 2030 by establishing four priority areas, which are: policy, market development, business improvement and behavior change.

**National Soil Strategy, 2021** is Australia's first national policy on soil which sets out how Australia will value, manage and improve its soil for the next 20 years, including increasing and maintaining soil organic carbon.

**National Plastics Plan, 2021** establishes targets to address Australia's plastics problem through multiple interventions across the entire plastics lifecycle, including the waste export ban on unsorted mixed plastics. The plan supports the Australian Packaging Covenant Organisation (APCO) industry-led product stewardship scheme to meet the agreement to make 100% of packaging in Australia reusable, recyclable or compostable by 2025 or earlier through the following targets:

- 70% of plastic packaging will be recycled or composted;
- 30% average recycled content will be included across all packaging;
- Problematic and unnecessary single-use plastic packaging will be phased out through redesign, innovation or alternative delivery methods.

**Recycling and Waste Reduction Act 2020** provides for the licensing of waste exports, and specifications for materials for export, by rules under which regulated waste materials may be exported. Materials include:

- Waste glass exports have been regulated since 1 January 2021;
- Waste plastics exports have been regulated since 1 July 2021;
- End-of-life tyre exports have been regulated since 1 December 2021;
- Paper and cardboard exports will be regulated from 1 July 2024.



## 2.2 Queensland Government policy and regulatory instruments

Queensland's strategic direction for waste management and resource recovery has been developed by the Department of Environment and Science (DES), and the Department of State Development, Infrastructure and Local Government and Planning (DSDILGP). There is a significant number of strategies and plans either developed or under development that are designed to support the nationally agreed targets. These are discussed below.

**Waste Reduction and Recycling Act 2011** contains a suite of measures to reduce waste generation and landfill disposal and encourage recycling. It establishes a framework for waste management and resource recovery in Queensland and promotes waste avoidance, reduction, resource recovery and efficiency in alignment with the Waste Hierarchy. The Act requires government agencies and local government to prepare waste management plans, introduce product stewardship arrangements, and strengthen littering and illegal dumping offences. Additional mechanisms within the Act include the landfill disposal levy, the management of priority products and waste, a ban on plastic shopping bags, the container deposit scheme and reporting on waste management.

The waste disposal levy commenced 1 July 2019 in 39 LGAs and currently excludes all councils within the CWQ region. The levy rate varies depending on the nature of the waste within different amounts for metropolitan and regional areas. Waste covered by this levy is waste disposed of in a levy zone, or waste that originates in the levy zone or interstate.

**Waste Reduction and Recycling (Waste Levy) Amendment Act 2019** introduces the waste levy throughout Queensland, noting more remote, less urbanised regions are not included in the levy area and all seven Central West Queensland councils are exempt from the levy.

**Waste Reduction and Recycling (Plastic Items) Amendment Act 2021** enabled a series of single-use plastic bans to be implemented. The legislation bans the supply and sale of single-use plastic items including straws and stirrers, plates, bowls and cutlery, expanded polystyrene (EPS) packaging, cotton buds with plastic stems, plastic microbeads in personal care and cleaning products.

**Waste Reduction and Recycling Regulation, 2011** implements the new framework for the management of used packaging materials; planning and reporting on waste management responsibilities; and requirements associated with implementation the waste levy.

**Waste Reduction and Recycling (Container Refund Scheme) Amendment Regulation, 2018** introduces the Containers for Change container deposit scheme. It provides for the administration of the scheme and applies a refund amount of 10 cents per empty beverage container at a container refund point. The scheme defines the eligible containers, which as from 1 November 2023 will include glass wine and spirit bottles.

**Environmental Protection Act 1994** provides for a licensing system for environmentally relevant activities through to response tools such as environmental protection orders. The Act defines when a product becomes waste (excluding end-of-life waste resources) and refers to the *Waste Reduction and Recycling Act 2011*.

**Environmental Protection Regulation, 2019** defines prescribed activities for licensing, categorisation of domestic, commercial, industrial, recyclable and regulated wastes and establishes a waste-tracking system for regulated wastes. Schedule 9 of the regulation defines regulated, non-regulated, trackable wastes and waste codes.

**Waste Management and Resource Recovery Strategy, 2019** establishes a framework for state and local governments and industry to move toward a circular economy and support the reuse, recycling and remanufacture of recovered waste materials. The strategy seeks to find solutions and collaboration across regions.



Action plans are required for state and local governments and the waste industry to meet the following targets by 2050:

- 25% reduction in household waste;
- 90% of waste is recovered and does not go to landfill;
- 75% recycling rates across all waste types.

**Queensland Resource and Recovery Industry 10-year Roadmap and Action Plan, 2019** is a key action under the strategy to support industry growth and job creation in resource recovery. The Resource Recovery Industry Development Program is designed to fund the acceleration of waste diversion projects. Resources have been provided to support the acceleration of initiatives under the plan and include a range of funding interventions. These are discussed further in **Section 10**.

**Queensland Waste and Resource Recovery Infrastructure Report, 2019** maps the existing and potential future infrastructure in the state. Although relatively high level, the report identifies opportunities and types of infrastructure that will be needed over the coming 30-year period.

**Respecting Country: A Sustainable Waste Strategy for First Nations Communities, 2021** provides a clear pathway for indigenous communities to achieve improved waste management and resource-recovery outcomes. Regional waste management planning will underpin this strategy to deliver appropriate infrastructure and contribute to achieving the objectives and targets of the Queensland waste strategy.

**Queensland Climate Transition Strategy** targets reducing emissions by at least 30% below 2005 levels by 2030 and achieving zero net emissions by 2050.

**Queensland Organics Strategy 2022–2032** is designed to implement actions that will strengthen and transform the organics supply chain, accelerate job growth and invest resources in the circular economy.

**Queensland Plastic Pollution Reduction Plan** aligns with the National Plastics Plan and provides strategic initiatives to achieve a ban on sale or supply of single-use plastics and other problematic plastics.

**Queensland Single-Use Plastic Bans**, refer **Waste Reduction and Recycling (Plastic Items) Amendment Act 2021** above.

**Queensland Energy from Waste Policy, 2021** sets a framework for the role of EfW, including key performance and compliance indicators.

**Keeping Queensland Clean – Litter and Illegal Dumping Plan 2021** sets a clear direction and provides actions for sustainable, long-term change using a combination of compliance, enforcement, community engagement, education, partnership-building and program development to reduce litter and illegal dumping in Queensland.

**Recycling Enterprise Precinct Location Strategy, 2022** identifies potential locations as preparatory and transformation precincts whose activities involve the need for input material and end markets for products that have been prepared, altered, reused, remanufactured or recycled. The Strategy provides a framework to support the establishment of precincts in locations that minimise impact to the community and maximise opportunity to generate jobs and new enterprise.

While there are no precincts identified within the CWQ region, potential transformation precincts have been identified for Gracemere (near Rockhampton), Mt Isa, Gladstone and Mackay. A guideline has been developed which provides information designed to assist proponents establish a precinct.

Other government strategies under development, which may impact the regional waste management plan, include:

- **Landfill Disposal Bans** is under consideration for certain types of waste to landfill, which may include emerging wastes such as solar panels.

- **Queensland E-Products Action Plan 2023–2033** is developed in conjunction with the E-waste Watch Institute and provides detailed solution-oriented strategies for waste avoidance, reduction, reuse, repair and recycling of e-products.
- **Queensland Textile Waste Action Plan** will align with the National Clothing Product Stewardship Scheme, both of which are currently under development.

### 2.3 Technical standards

The following are examples of standards developed by the industry sector:

- The Institute of Scrap Recyclers Industry (ISRI) Scrap Specifications Circular<sup>4</sup> is a widely well-regarded publication providing product quality guidelines across a range of recovered waste materials including glass, paper, plastics, tyres, etc.
- The Australian Council of Recycling provides specifications for a range of recycled materials including:
  - Used beverage containers (aluminium);
  - Beneficiated and un-beneficiated cullet (glass);
  - Steel cans;
  - Post-consumer PVC bottle bales;
  - PET containers;
  - Australian recovered paper;
  - LLDPE and LDPE film recyclate feedstock;
  - HDPE bottle recyclate feedstock.

Collaboration between the private sector, government authorities and research institutions continue to develop standards for the use of recycled and reprocessed materials in various applications. State governments adopt specifications for the use of the recycled materials in roads, pavements and other civil works, for example:

- VicRoads for the use of recycled content in road and pavement construction<sup>5</sup>
- Queensland Transport and Main Roads Specifications, MRTS36 Recycled Glass Aggregate<sup>6</sup>

The Queensland Government End of Waste Codes (EOW), under section 159 of the *Waste Reduction and Recycling Act 2011*, deliver a framework on which to determine when a waste becomes a resource and to prescribe requirements and/or conditions for its use.

The registered resource producer and the resource user must comply with the prescribed responsibilities associated with selling, giving away or condition of use of resources. The follow EOW (updated 2023) may be relevant to future processing of stockpiled materials or recycling in the region:

- Glass fines (EOWC010001051);
- End-of-life tyres (ENEW07503018);
- Used vegetable oil (ENEW07611019);
- Recycled aggregates (ENEW07604819);
- Chemically treated solid timber (ENEW07503218);
- Returned concrete (ENEW07278517).

Prior to operating, the producer must register with the DES Chief Executive by giving notice using the prescribed form to become a registered resource producer for each specific code.

<sup>4</sup> <https://www.isri.org/recycled-commodities/scrap-specifications-circular>

<sup>5</sup> Use of Recycled Materials in Road Pavements, Technical Note 107, 2019, VicRoads, Victoria State Government

<sup>6</sup> Transport and Main Roads Specifications, MRTS36 Recycled Glass Aggregate, Queensland Government

## 2.4 Regional strategy

The Plan will align with the key priorities of the RAPAD Strategic Plan 2022–25, which are:

- Economic development;
- Infrastructure and built environment;
- Innovation and capability development;
- Community services and the environment.

RAPAD will ensure good governance underpins the implementation of this Plan and waste management infrastructure and services are maintained for the benefit of their communities and the environment into the future.

RAPAD maintains a close association with the Northwest Queensland Regional Organisation of Councils (NWQROC) and the South-West Queensland Regional Organisation of Councils (SWQROC) through the Western Queensland Alliance of Councils. Given the synergies on common issues across these regions there may be future potential for collaboration and sharing of information regarding the efficient use of resources.

## 2.5 Local strategy

Three councils have undertaken planning for waste management, including:

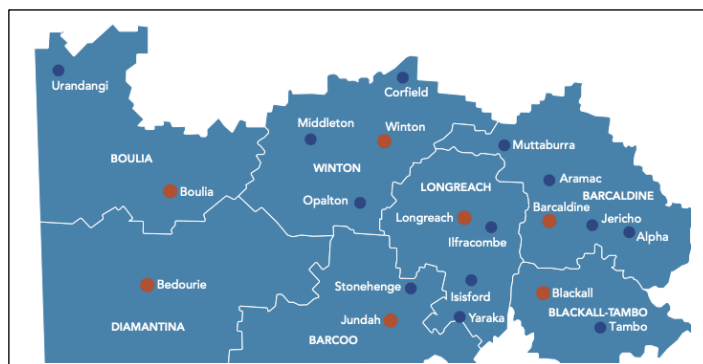
- Barcoo Shire Council: The Waste Reduction and Recycling Plan, 2015–2024 targets the environmental compliance for waste services in the municipality;
- Boulia Shire Council: Explores waste minimisation strategies and methodologies for the improved management of regulated (hazardous) wastes;
- Longreach Regional Council: Waste Management Strategy, 2020 investigates the benefit of replacing the outer-lying landfills with waste transfer station infrastructure and regionalising material flows. The strategy also targets opportunities for regional collaboration in respect to waste management.

## 2.6 The region

The Central Western Queensland councils are:

- Barcaldine Regional Council
- Barcoo Shire Council
- Blackall-Tambo Regional Council
- Boulia Shire Council
- Diamantina Shire Council
- Longreach Regional Council
- Winton Shire Council

Figure 4: Central Western Queensland Councils



Together, the CWQ councils span an area of **397,547 km<sup>2</sup>** or approximately 21.5% of the Queensland landmass and is the largest region in the state. The region borders the Northern Territory to the west, the Mt Isa, Cloncurry, McKinley, Richmond, Flinders municipalities (NWROC) and Charter Towers Regional Council (NQROC) to the north, Isaac and Central Highlands Councils (CQROC) to the east and Bulloo, Quilpie and Murweh council areas (SWQROC) to the south.

Jointly, the councils serve a population of approximately 10,562<sup>7</sup> within 20 discrete communities. Councils deliver regular kerbside waste collection, public-place bin and street cleansing services, also managing waste generated

<sup>7</sup> ABS Quick Stats, 2021

by the significant number of visitors between April and September each year across the region. The population of each council and its contribution to the region is provided in **Table 1** below.

**Table 1: Councils' contribution to regional population**

LGA	Area m <sup>2</sup>	Population	Households	Regional population percentage	Population changes since 2021
Barcaldine Regional Council	53,000	2,849	1,878	27	-1.21%
Barcoo Shire Council	61,974	308	260	3	-2.01%
Blackall-Tambo Regional Council	30,000	1,905	1,135	18	-0.53%
Boulia Shire Council	63,000	458	284	4	-0.66%
Diamantina Shire Council	95,000	266	217	3	-0.19%
Longreach Regional Council	40,638	3,647	2,158	34	-1.68%
Winton Shire Council	53,935	1,129	863	11	-2.91%
<b>Total</b>	<b>397,547</b>	<b>10,562</b>	<b>6,795</b>		

The region is experiencing a population decline, which the Queensland Government forecasts to continue until around 2036<sup>8</sup>. It is expected generated wastes and recoverable materials will be reasonably static throughout that period. Somewhat of an anomaly, the period 2021 to 2022 saw a reduction in population while business activity during the same period increased (refer **Table 2** below).

**Table 2: Commercial business in the region<sup>9</sup>**

LGA	Number of businesses July 2021	Number of businesses June 2022	Number of businesses – change since July 2021	Percentage business change since July 2021
Barcaldine Regional Council	570	590	+20	+3.5%
Barcoo Shire Council	61	71	+10	+16.4%
Blackall-Tambo Regional Council	357	354	-3	-0.8%
Boulia Shire Council	56	55	-1	-1.8%
Diamantina Shire Council	30	29	-1	-3.3%
Longreach Regional Council	626	631	+5	+0.8%
Winton Shire Council	238	255	+17	+7.1%
<b>Total</b>	<b>1,938</b>	<b>1,985</b>	<b>47</b>	

<sup>8</sup> Qld Government Statisticians Office, 2019

<sup>9</sup> Counts of Australian Businesses, Entries and Exits, 2021-22, Australian Bureau of Statistics, December 2022; [storymaps.arcgis.com/stories/38512fd124cf4069b418e2f49df0af81](https://storymaps.arcgis.com/stories/38512fd124cf4069b418e2f49df0af81), 25 May 2023

### 3. CURRENT WASTE MANAGEMENT PROFILE

The State Government waste diversion targets are measured by quantity (weight) per headline waste stream<sup>10</sup>:

- Municipal solid waste (MSW): including putrescible wastes. A combination of domestic wastes and other wastes arising from council activities including the management of parks and gardens, the collection of litter and illegally dumped wastes;
- Commercial and Industrial waste (C&I): including putrescible wastes generated by business and commerce and includes wastes from schools, restaurants, offices, retail and wholesale businesses and manufacturing industries; and
- Construction and Demolition waste (C&D): non-putrescible wastes arising from a construction or demolition activity including road and bridge works, and include materials such as concrete, asphalt, bricks, treated timber and steel.

The Department of Environment and Science (DES) annual survey uses the web-based Queensland Waste Data System (QWDS) to collect waste management data from councils. Where weight measurements for the various waste streams are not available (as is the case in CWQ), quantities are reported by volume and converted to weight using prescribed densities with the Conversion Factors of the Guideline: Volumetric Survey, under the *Waste and Resource Recovery Act, 2011*.<sup>11</sup>

The data for the 20/21 and 21/22 years were reviewed for the purposes of this Plan. To monitor progress on the targets, the state government relies on annual data reported through the online Waste Data System.

Given there are no weighbridge facilities in the region and disposal sites are largely unsupervised, the reported data is difficult to substantiate. Therefore, two local sources of data have been used to estimate the waste profile for the region and for the individual councils, as follows:

- The reported quantities for general and hazardous wastes received at the Longreach disposal site during the period 1 July 2021 to 30 June 2022. This data is measured by visual assessment and records material type by volume/m<sup>3</sup>. This data used the conversion factors (above) and can be considered subjective; and
- Waste audit data from Longreach kerbside collection services in May 2023, which measured all material types, components and weights of sample selection of 100 household and 50 businesses within the Longreach township. This data is considered robust.

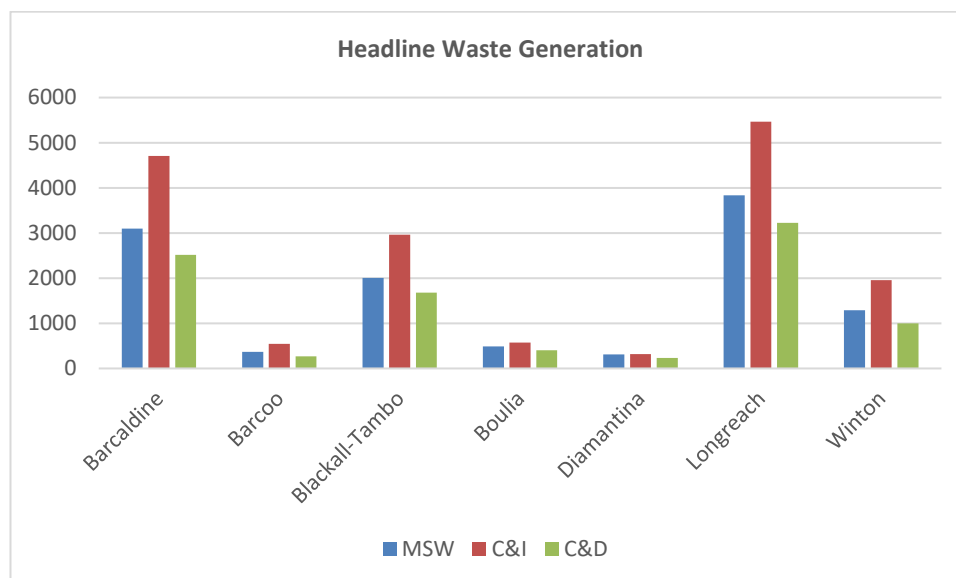
The analysed data from both sources have been extrapolated and used to estimate the waste and recovered materials across the remaining councils and their individual sites presented in this section.

#### 3.1 Waste generation

MSW, C&I and C&D waste streams in the region are estimated to be 36,413 tonnes per annum in total. This includes household, commercial and council-generated wastes received via kerbside collection and by self-haul to the disposal sites. A breakdown of the estimated regional waste by stream is provided in **Figure 5** below.

<sup>10</sup> Recycling and Waste in Queensland, 2020, Queensland Government

<sup>11</sup> CWQ Data Collection and Analysis, March 2020, Attachment 2 <https://rapad.com.au/wp-content/uploads/2022/08/CWQ-Tourism-Data-Collection-and-Analysis-Public-Version-v1-1.pdf>

**Figure 5: Headline Waste Generation per CWQ Council**

An estimated 753,100 visitors across the seven municipalities were received in the 2019 year, as follows:

- Barcaldine 145,200
- Blackall-Tambo 67,000
- Barcoo 36,300
- Boulia 37,600
- Diamantina 41,600
- Winton 119,200
- Longreach 306,200

The waste quantities attributed to visitors to the region between April and September each year<sup>12</sup> is difficult to isolate, however the contribution the tourism sector makes to the overall waste stream should not be overlooked. A recent study found visitors staying in accommodation or travelling with caravans, campers or mobile homes potentially generate up to twice the level of waste (particularly packaging wastes) than at home.

The report also suggests tourists may not always adhere to home recycling regimes while on holiday.<sup>13</sup> Nonetheless, data generated by the tourist sector will be important to this Plan and to informing future opportunities to recover materials from the waste stream.

The contribution of each council to the overall regional waste generation is provided in **Table 3** below.

**Table 3: Contribution of regional waste tonnage by percentage**

Council	Distribution
Barcaldine Regional Council	28%
Barcoo Shire Council	3%
Boulia Shire Council	3%
Blackall-Tambo Regional Council	18%
Diamantina Shire Council	2%
Longreach Regional Council	34%
Winton Shire Council	11%

<sup>12</sup> CWQ Data Collection and Analysis, March 2020 <https://rapad.com.au/wp-content/uploads/2022/08/CWQ-Tourism-Data-Collection-and-Analysis-Public-Version-v1-1.pdf>

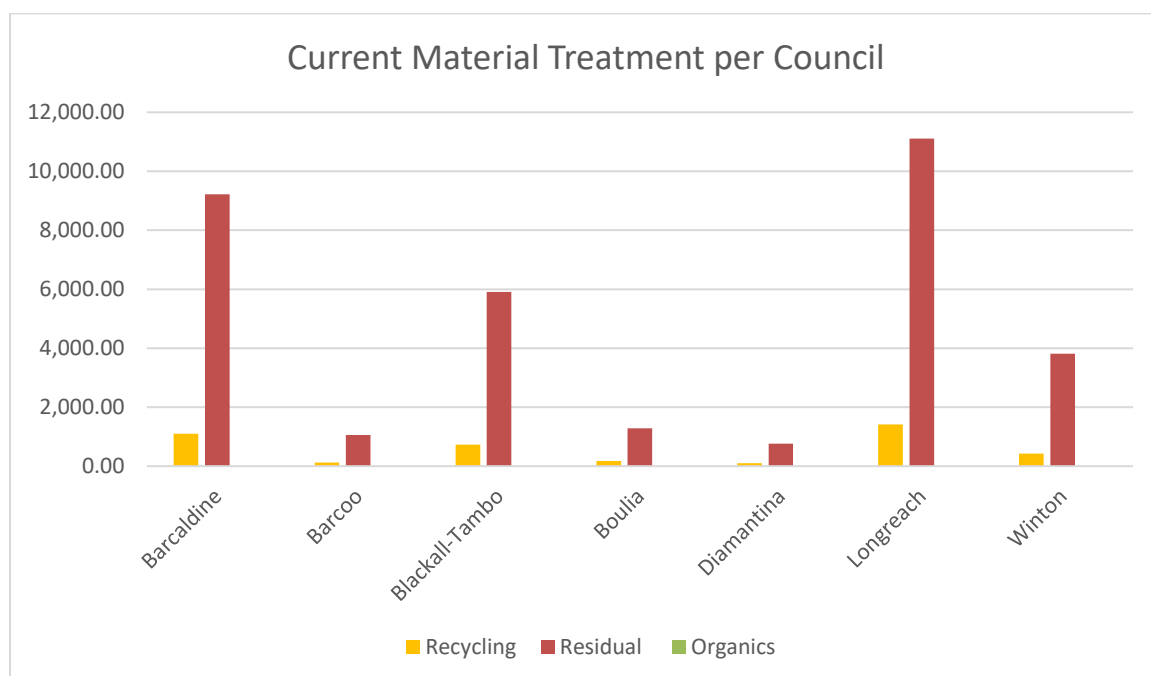
<sup>13</sup> Resource.co, 29 April 2023 <https://resource.co/article/managing-waste-tourist-cities-2023>

Resource recovery refers to materials that are diverted from landfill for repurposing, reuse, recycling, and reprocessing. Across the region, green waste and concrete materials are diverted (or recovered) from landfill, however, these materials are generally not being repurposed and largely remain in stockpiles before eventually being disposed of.

Other materials that are diverted from landfill and stockpiled include tyres and in some municipalities, treated timber power poles. Tyres in particular are stockpiled in significant quantities and are in some cases buried in single material pits. Resource recovery is predominantly limited to steel and used lead–acid batteries (ULAB), probably due to their economic value.

For the purposes of establishing a baseline recovery performance rate, we have used the recovery of scrap metal, tyres and waste oil, arriving at an estimated resource recovery rate of 5%. The reprocessing of C&D materials and green waste would substantially contribute to a recovery outcome, as would the inclusion of data for containers received through the Containers for Change program.

**Figure 6: Current Material Treatment per Council**



### 3.2 Benchmarking

RAPAD, the Northwest Queensland Regional Organisation of Councils (NWQROC) and the South West Queensland Regional Organisation of Councils (SWQROC) form the Western Queensland Alliance of Councils. There are demographic and industry-base similarities between the regions and comparisons for benchmarking purposes have been conducted to understand general management systems and trends.

**Kerbside recycling:** One council in the SWQ region provides a dual-bin system (waste and recycling) with another planning to do so. Two councils in the NWQ region plan to implement dual-bin systems in line with the construction of the Mt Isa MRF. Kerbside recycling is not currently offered within the CWQ region.

**Resource recovery at disposal sites:** It appears most sites in the regions receive separated green waste and timber, C&D and steel. Most also receive tyres and specific regulated wastes. One council in the SWQ region has installed recycling facilities at disposal sites, with one other planning to do so. Recycling is not offered in CWQ.

**Controlled site access and supervision:** Available at Longreach Council in CWQ region; Mt Isa, Cloncurry, Carpentaria and Finders Councils in NWQ region; Murweh, Maranoa, Quilpie and Balonne in the SWQ region.

**Waste transfer station infrastructure:** Present in Barcaldine in the CWQ region; Carpentaria (existing), Richmond, McKinlay, Flinders, Etheridge, Cloncurry and Burke (planned) in the NWQ region; Maranoa in the SWQ region.

A comparison of waste generation data has been made between NWQROC (DES annual survey 2021–22) and data collected at the Longreach disposal site for the same period and extrapolated across the CWQ region.

The comparison found data for tyres, C&I and MSW to be as expected given the significant contribution made to the NWQ data from Mt Isa. However, in relation to recovered materials, a higher green waste and steel quantity was found in the CWQ region and similar self-haul tonnages between the two. These are likely attributable to subjective volume assessments used for reporting or a potential non-reporting of some material quantities.

Kerbside data sets from the Longreach Regional Council audit (May 2023) were compared with data from recent audits in another Queensland location, as no known audits have been conducted in CWQ neighbour regions.

The weekly waste bin weight was higher in the comparison audit (15 kg) than in the Longreach sample (11.1 kg). Recyclable materials represented 20% (3.1 kg) of the waste bin for the comparison site, and 27% (3 kg) for the Longreach sample. Again, similar findings for the representation of organics in the waste bins at 37% for both comparison sites (3.6 kg) and Longreach (4.1 kg) per week.

### 3.3 Material flows

Household and commercial kerbside materials generally stay within the municipal boundaries where the waste is generated. However, commercial waste materials collected via private front-lift services in the Barcaldine, Longreach and Blackall-Tambo municipalities are taken to the Barcaldine landfill for disposal.

The transfer of waste materials within a municipality is occurring in Barcaldine, with the collection of a skip bin from Aramac waste transfer station for disposal at the Yellowjack landfill in Barcaldine, and in the Barcoo municipality where kerbside materials collected in Stonehenge and Windorah are transferred directly to the Jundah disposal site.

It is understood waste oil is collected from the larger centres in the region and transferred to Brisbane for processing and other regulated wastes such as used lead–acid batteries are collected for transfer to processing facilities outside of the region. Scrap steel is collected and transported to various locations, but most commonly to facilities located in Mackay or Gladstone. The more remote locations in the region are serviced by local freight companies who transfer the materials as far away as Adelaide. These arrangements are made on an individual council basis.

For recyclables, only beverage containers collected by the COEX depots are transferred to the Townsville material recovery facility (MRF), due to the cost effectiveness of this freight corridor. This facility is one of small number of MRFs contracted to COEX in the state.

### 3.4 Existing services

All councils provide weekly household and commercial kerbside collection using 240 L MGB and side-lift collection vehicles. These materials are transferred to the landfills within each municipality. In most cases, councils own the vehicle and bin assets, except Barcaldine, which contracts this service to JJ Richards.

All councils in the region regularly service a network of public-place bins within townships and on roadsides and report a low level of littering. The public bin wastes increase substantially over the visitor season between April and September each year.

Containers for Change depots are operated by local businesses or community organisations in Longreach, Barcaldine, Winton, Blackall, Boulia and Diamantina (Birdsville) municipalities. Redeemed containers are transported to the Townsville MRF for processing.



COEX depots throughout the region appear to be well supported, which shows a community appetite for recycling. A recent ABC News item (18 September 2023) delivers an insight into the success of recycling in western Queensland, claiming the container collection rate in the region is 85% compared with the Queensland average of 64%. The Longreach COEX depot receives materials from outlying stations and remote locations such as Birdsville as well as from within the township.

Further to the above, some council works depots receive waste oils, ULABs and empty, cleaned agricultural and veterinary containers under the drumMUSTER stewardship program.

### 3.5 Existing infrastructure

Communities within each municipality have access to disposal facilities. The Barcaldine Council has installed two waste transfer stations (one as a front end to the not yet commissioned engineered landfill) with a plan to convert all outlying disposal sites waste transfer stations over time.

The Winton Council Landfill Management Plan, 2016 and Longreach Council Waste Management Strategy, 2020 also intend to investigate the application of waste transfer station infrastructure either as a front-end facility (Winton) or in order to close outlying landfill infrastructure (Longreach).

**Table 4: Disposal facilities in the region**

Council	Landfill	Transfer stations
Barcaldine Regional Council	6	2
Barcoo Shire Council	3	
Blackall-Tambo Regional Council	2	
Boulia Shire Council	2	
Diamantina Shire Council	2	
Longreach Regional Council	4	
Winton Shire Council	1	
<b>Total</b>	<b>20</b>	<b>2</b>

Disposal infrastructure is unlined and without leachate collection. The disposal sites are fenced, some with farm fencing and others with either internal or external security fencing. Signage, while largely consistent between municipalities, can be limited or in poor condition at some sites. Collection facilities for regulated wastes are often rudimentary and not available for recyclables.

Longreach is the only supervised disposal site in the region and the contractor supervises the site and disposal cell, collecting data on entries during opening hours. The remaining sites either use internal resources and equipment or locally based operators with mobile plant to maintain sites.

### 3.6 Current and future capacity

The remaining life of the landfills and their potential rationalisation has been considered in light of their respective locations. Disposal facilities should be maintained in remote communities due to the potential for road closure and traffic disruption due to heavy weather events. In such circumstances, wastes could not be moved to a regional facility. Communities will be better served by maintaining disposal sites in Jundah, Boulia, Urundangi, Bedourie and Birdsville.

The Bedourie and Birdsville landfills in the Diamantina Shire have an expected seven-year of life remaining. Securing replacement sites should commence in the short term, given these processes can become protracted, involving considerable community consultation, environmental investigations, planning and licensing approvals.

The conversion of some sites to waste transfer stations should lead to greater efficiencies and compliance. Indeed, previous Longreach Regional Council planning also indicated the opportunity for the conversion of the outlying disposal sites at Ilfracombe and Isisford.

The Winton Shire Council is planning to introduce a controlled disposal point or waste transfer station at the entrance to the current site, designed to limit public access to the disposal pit and provide an opportunity for the recovery of materials. The new Barcaldine disposal site also has a front-end waste transfer station.

The rationalisation of landfills and introduction of waste transfer stations will require disposal behaviour changes by the community. Educational campaigns and on-site guidance will assist this process.

**Table 5: Capacity of disposal facilities in the region**

Council area	Landfill location	Licensed capacity (tonne p.a.)	Current est. (tonne p.a.)*	Access arrangements	Est. life remaining	Environmental Authority No.
Barcaldine	Alpha	2,000 – 5,000	717	Unrestricted	Unk.	EPPR00750513 ERA 60
	Aramac	<2,000	528	Unrestricted	Converted to WTS	
	Barcaldine (new)	Unknown		Restricted**	Est. 20 yrs	
	Yellowjack	10,000	2,038	Unrestricted	Closure 2023	
	Jericho	10,000	302	Unrestricted	Unk.	
	Muttuburra	<2,000	188	Unrestricted	Unk.	
Barcoo	Jundah	<2,000	218	Unrestricted	8 yrs in current pit 14 ha site	EPPR00230313 ERA 60
	Stonehenge	<2,000	80	Unrestricted	8 yrs in current pit 22 ha site	
	Windorah	<2,000	175	Unrestricted	8 yrs in current pit 17 ha site	
Blackall-Tambo	Blackall	<50,000	1,48	Unrestricted	Unk.	EPPR00906313 ERA 60 ERA 57
	Tambo	<2,000	522	Unrestricted	Unk.	
Boulia	Boulia Bedourie Road	>2,000 – <5,000	415	Unrestricted	15 yrs	EPPR00580313
	Boulia North Road	>50 – <2,000		Unk.	Unk.	
Diamantina	Bedourie	>50 – <2,000	152	Unrestricted	7 yrs 12 ha site	EPPR00488913
	Birdsville	>50 - <2,000	105	Unrestricted	7 yrs 12 ha site	
Longreach	Ilfracombe	>2,000 – <5,000	371	Unrestricted	3-5 17 ha site	EPPR00590313 ERA 57 ERA 61
	Isisford	>50 – <2,000	247	Unrestricted	10-15 yrs 22 ha site	
	Longreach	>5,000 – <10,000	3,464	Restricted	Est. 30 yrs*** 14 ha site	
	Yaraka	>50 – <2,000	41	Unrestricted	15+ yrs 22 ha site	
Winton	Winton	<50,000	1,661	Unrestricted	20 yrs 16 ha site	EPPR00533613 ERA 56 ERA 60

\*Excludes stockpiled materials; \*\*not yet commissioned; \*\*\*expansion of site dependent on approval

Note: ERA 60 waste disposal sites; ERA 61 incineration and thermal treatment; ERA 56 regulated waste storage; ERA 57 regulated waste transport (other than end-of-life tyres)

### 3.7 Legacy waste

Legacy wastes are those materials that have been stored over several years without sufficient budget accruals to cover processing and removal costs. Legacy wastes in the region typically comprise tyres, metals, construction wastes, timber and green waste, and in some cases power poles, which are stockpiled at most all disposal sites across the region.

Combining the legacy materials across the region for tendering purposes will be attractive to private-sector processing contractors. The annual or biannual volumes generated will be significantly less and a joint service agreement will also be more attractive to processors, considering the dispersed nature of the sites.

A critical consideration for the contractor will be the management of contamination levels, as the risks associated with equipment damage or failure and the transport of poor-quality material is high. Materials including tyres and copper chrome arsenate (CCA) treated power poles are regulated wastes and will require specific handling, transport, processing and disposal arrangements.

The table below provides informal volume estimates of the stockpiles held at disposal sites across the region. The Plan requires volumetric surveys to be completed in order to inform a regional tendering process.

**Table 6: Current legacy waste stockpile**

Council	Site	Power poles	Tyres	Green waste & timber	C&D	Steel	Waste oil
Barcaldine	Alpha	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.
	Aramac	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.
	Jericho	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.
	Muttuburra	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.
	Yellowjack	40	4,500	1,350	15,000	1,200	Unk.
Barcoo	Jundah	Unk.	270	2	20,000	21,000	13,000
	Stonehenge	Unk.	.5	585	2,500	0.5	Unk.
	Windorah	Unk.	3	0	20,000	1	Unk.
Blackall-Tambo	Blackall	240	1,600	540	330	900	Unk.
	Tambo	Unk.	720	270		480	Unk.
Boulia	Boulia	Unk.	1,800	75	75	75	Unk.
Diamantina	Bedourie	Unk.	1,440	Unk.	Unk.	900	Unk.
	Birdsville	Unk.	1,440	200	160	300	Unk.
Longreach	Ilfracombe	Unk.	18	200	1,875	225	Unk.
	Isisford	Unk.	2,700	3,600	1,250	450	10,500
	Longreach	50	7,650	2,750	25,125	4,000	10,500
	Yaraka	Unk.	30	24	0	100	2,500
Winton	Winton	50	4,500	900	1,500	900	Unk.

### 3.8 Uncontrolled dumping

Illegal dumping of tyres near roadsides has been reported as occurring more often in recent times and thought to be possibly coming from areas where the waste levy is in place.

A considerable issue for councils is the dumping of commercial and government project wastes at the disposal sites without prior notification to councils. This is particularly relevant to C&D wastes and power poles. These materials are left to council to manage in the absence of fees and charges.

All sites other than Longreach disposal site are unsupervised and access is allowable 24 hours, seven days a week. As a result, there is little opportunity to prevent illegal dumping. The Plan includes an action for the RRWG to assist councils to consider and develop suitable cost-recovery mechanisms in the **short to medium** term.

### 3.9 Emerging wastes

As consumer habits change, so too does the composition of waste generated. Therefore, the Plan must consider future waste streams, which are becoming increasingly complex and composite in structure. There are already trends indicating a significant shift in waste owing to the rise of technology and the increasing move into the renewable energy sector.

Outlined below are the key products currently being used and consumed that have not yet become a waste burden in Central West Queensland. It is expected these materials will become more prevalent at waste sites over the coming 10-year period, given the relatively short life of some of the products.

### **3.10 Solar panels**

Australians are estimated to generate one million tonnes of solar panel waste by the 2040s. In Queensland, more than 722,000 homes already have solar panels, which have a life expectancy of between 10 and 15 years. These will likely be disposed of by individuals/households.

At present, solar recycling is in the early stages in Australia with limited options nationally for recovery at this time. Panel recycling requires a separation of the materials, a complex procedure usually undertaken manually or via mechanical processes. The landfilling of solar photovoltaic modules has already been banned in Victoria, South Australian and the ACT. The Queensland and Western Australian governments have stated their intent to follow suit.

### **3.11 Wind turbines**

Wind turbines are expected to have a lifespan of at least 20 years. There are no known commercial wind farms as such in the region, however it is understood that larger stations are increasingly using the technology. While disposal options for wind turbines in Australia are currently limited, the industry expects that reuse and recycling of the key components, such as the nacelle and blades, will be commercially viable over the next few years.

### **3.12 Lithium-ion batteries**

Lithium-ion battery waste is growing by around 20% each year in Australia and the recycling rate is currently less than 10%. Demand for reliable recycling systems is expected to increase over the next decade. Where batteries from the development of renewable energy projects are coming to EOL (expected in 10 to 15 years), councils will need to consider the commercial consequences of accepting batteries at their facilities or whether commercial operators will be required to transport batteries direct to recycling facilities.

Small lithium-ion batteries are also known to cause fires in garbage trucks and at recycling and landfill facilities. This is becoming an increasing and vexing issue, with insurance premiums at recycling facilities tending to reflect the increase in claims attributed to battery fires.

## 4. ISSUES AND OPPORTUNITIES

The Queensland Waste and Resource Recovery Infrastructure Report, 2019, identifies future infrastructure needs and opportunities across the 32 LGAs in remote Queensland.

The report recommends the following in relation to Queensland's remote councils:

- Focus on improving the environmental management of rural landfills;
- Maximise the recovery of beverage containers through the CRS and leverage the subsidised logistics networks to potentially support other recycling initiatives;
- For other recycling, focus on high-value materials, efficient methods of collecting and transporting by investment in equipment such as balers and compactors;
- In the towns, consider development of community-composting projects attached to community gardens or schools, or on-farm compost schemes;
- In areas where there are potential back-loading opportunities, work with mining companies to explore the potential to bale recyclables and transport them to a regional hub.

### 4.1 Issues

The region faces several common challenges in relation to waste management. The planning process recognises some options cannot be a one-size-fits-all approach and purpose-built solutions will be necessary. This planning process has provided an opportunity to examine existing methodologies and identify collaborative approaches to waste management that are capable of benefiting small remote communities and the more populated municipalities within the region.

### 4.2 Achieving economies of scale for material processing

The challenges to implementing recovery-focused management systems are widely acknowledged, including:

- Small populations generating low volumes of recoverable materials that must be transferred long distances combined, with an often low value and volatile pricing regime, translates to poor economies of scale for councils when acting independently.

### 4.3 Limited revenues for waste management

The small rate base generates limited revenues, which are insufficient to support improved waste management operations such as:

- Supervised disposal sites to monitor resource recovery and disposal activities, collect data and potentially site entry fees;
- Improve the management of environmental protection, protocols and licensing conditions;
- Construction of landfill sites and disposal cells to meet state government design principles;
- The implementation of recycling and organics collection services and other community expectations.

### 4.4 Retaining expertise in the region

Councils experience difficulties in recruiting and retaining staff with expertise in waste management and resource recovery. Historical knowledge that is specific to a municipality's waste management systems and infrastructure is lost and the efforts and time taken for new recruits to gather this information may inadvertently result in a loss of progress and/or unnecessary expenditure.

To address this, the RRWG forum will assist to share knowledge and experience, as will the engagement of a Regional Support Resource Coordinator with significant experience in the industry sector. Making certified training specific to waste management available within the region is also expected to encourage technical knowledge to be retained within the region.

## 4.5 Legacy waste

Legacy waste is a significant issue facing all councils. There are typically no financial reserves accrued to pay for the removal or onsite treatment of these materials.

While there are traditional offtake markets for metal wastes, the management of tyres and construction wastes in particular are at cost to councils. Given the length of time between disposal and collection for off-site transport, there is no opportunity for councils to seek user-pays revenue to assist in covering the costs. Currently, these materials are stored across the region in such quantities as to become a safety, compliance and financial risk.

The processing and/or collection of stockpiled materials has been organised on an individual council level in the past. A joint approach to managing these recoverable materials will provide an opportunity to reduce duplication of effort and achieve cost and operational efficiencies.

## 4.6 Opportunities

### 4.6.1 Regional collaboration

Intra-regional access to disposal facilities is already occurring to a degree for C&I wastes collected by the private sector. Councils may consider in future that regional landfilling, recycling or composting assets may be beneficial and these may be tendered as a PPP with private operators, or as build, own and operate options.

There are many aspects in which regional collaboration has the potential to deliver more economic and efficient approaches to waste management, which are discussed throughout the Plan. Joint tendering for disposal site management or collection services may reduce costs for each council and increase diversion from landfill. Waste management contractors will potentially have the resources and assets (e.g. vehicles and bins) that can be shared across multiple sites and this is likely to be reflected in competitive bids.

This approach would shift the day-to-day management of sites from councils to the private sector, which may prove more economically efficient where incentivised contracts can target an increased rate of material recovery to make these materials available for reuse, recycling and reprocessing. Commercial contractors are also more likely to have established relationships with processors and offtake markets that may increase the potential profitability of recoverable materials.

Regional collaboration to make feedstocks available to local business initiatives has the ability to underpin better business case outcomes and provide investment security for the proponent. Examples include green waste shredding and composting, cardboard recycling, or reprocessing of specific materials, such as timbers.

The establishment of a regional RRWG is recommended within the **short term** of this Plan. This group will contribute significantly to collaborative business and community initiatives and outcomes for the region. Refer to **Section 11.1**.

### 4.6.2 Community awareness and behaviours

Information regarding waste management services is generally published on council websites. Some councils provide additional information in regard to the materials that can and can't be placed in kerbside bins and at disposal sites, together with arrangements for pre-paid disposal of certain material types.

Through this medium, there is an opportunity to provide educational information designed to encourage:

- Waste avoidance and reduction, home-based composting, recycling, initial and ongoing guidance in the use of new services;
- Appropriate disposal behaviours and access to services for the management of problematic wastes, e.g. waste mineral and cooking oils, healthcare wastes and chemical wastes prohibited from collection and disposal points;
- Better management of product quality in the stockpiled materials (e.g. reduced contamination).

Community education programs need to be considered throughout the longer term of the Plan and are best approached from a regional perspective, where the messaging, look, feel and potentially branding is similar and easily recognisable. This approach will likely reduce costs to individual councils.

Introducing change in waste management practices will require the community (household and business) to understand why the changes are necessary and how best to prepare. Consultation and educational programs are an important tool to providing initial and ongoing guidance in the use of new or changed systems and services.

It is understood the Queensland Government has announced funding for the delivery of a behavioural change roadmap, which includes for the delivery of education campaigns, to improve waste sorting and support the rollout of organics recycling in the region. This opportunity will be further investigated as community consultation and awareness programs are recommended ahead of implementation of significant programs in the Plan. Refer to **Section 13**.

#### 4.7 Economic development and jobs creation

It is estimated that for every 10,000 tonnes of waste going to landfills in Australia fewer than three jobs are created. A higher job rate applies to resource recovery and recycling, where it is estimated that an equivalent nine jobs are created due to the labour-intensive nature of the industry sector, involving sorting, transporting and processing<sup>14</sup>.

In order to encourage entrepreneurial approaches for recovery and downstream processing of waste materials in the region, there is a need to better understand the level and type of feedstocks that may be available and indeed how these materials may be accessed. This could be achieved in the short term through supervision of the disposal sites with data-collection responsibilities.

Supervision of disposal sites would deliver employment and/or local business creation opportunities in itself. Under formal contract or employment conditions, this approach could also deliver councils multiple benefits, including improved:

- Compliance with EA conditions;
- Safety and risk management;
- Environmental management on site, e.g. regular litter collections, surface water diversion;
- Quality of processed stockpile materials, including green waste, timber and C&D waste for reuse;
- Landfill asset management and daily use;
- Ability to recover materials from the waste stream for recycling and reuse;
- Data collection;
- Cost recovery.

Collection of better data will allow councils to evaluate a potential feedstock supply to local/regional businesses and entrepreneurs and may include scrap steel operations, reuse centres, recycling collections (e.g. cardboard, steel and aluminium cans) and composting. There is further discussion on reuse centres in **Section 5.1**, as these facilities can provide materials to small businesses, including bikes, furniture, lawnmower repairs and others. Supervision of sites and control of opening hours is ultimately a policy decision for councils and is scheduled for consideration in the **short to medium term** of the Plan. Funding assistance related to the site supervision resource costs during the initial seven-year term of the Plan have been included in the Plan budget, refer **Section 10**.

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<sup>14</sup> Employment in waste management and recycling, Access Economics, 2009

#### 4.8 Cost recovery

To assist in recovering the costs of waste management, councils are encouraged to consider pricing structures for the disposal of materials, particularly those that require further processing, for example green waste, tyres and construction wastes. Some councils already have pre-payment systems for the disposal of certain materials at the sites. However, these systems can only be considered robust where pre-paid receipts are submitted on arrival at the disposal site, and this is the case in Longreach only. In all other circumstances, there is no supervision at the disposal point.

The collection of fees should certainly be considered for construction wastes. Disposal fees based on the type and quantity of material could form part of a project pre-approval for waste that is generated by civil works. Commercial disposal fees may be collected by supervisors on entry to the sites, which would equitably distribute the real costs of managing waste between commercial and household waste generators. Cost recovery is ultimately a policy decision for councils and is scheduled for consideration in the **short to medium term** of the Plan.

#### 4.9 Transport costs

In future, and particularly where waste transfer stations are established, the benefits of using a hub-and-spoke approach to moving materials between local sites to regional facilities or to processing facilities located outside the region should be considered. There are a number of approaches that can be used to optimise transport efficiency and reduce costs associated with the management of low-value materials.

Packaging recyclable materials will likely be transferred to the identified precinct hub in Gracemere, Rockhampton, or to end markets in Brisbane. Consolidation of these materials using baling equipment or on-board compaction systems such as front-lift vehicles will increase freight efficiency and should be considered for suitable material types.

Similarly, regulated wastes will likely be transported to Brisbane and the use of consolidation points within the region would increase the quantity at one location e.g. Longreach or Barcaldine and help to offset transport costs. Materials from smaller, more remote communities could be sent to larger sites to increase quantities and share freight costs. Single or larger load collections at one location will be appealing to freight hauliers which should be reflected in the freight costs.

The CWQ region also has the benefit of a rail system between Winton, Longreach, Barcaldine, Rockhampton and Brisbane. Rail freight charges investigated for this Plan are comparable with road transport rates and consideration for the use of this freight mode is recommended.

Business or council transport costs may initially require grant-funded assistance via the Queensland Government Regional Recycling Transport Assistance Package, accessible for the freight of recyclable materials. However, in the longer term, these costs will need to be sustained within the ongoing business case, through strategies that may include the use of back-loaded/reverse logistic freight services and/or rail services.

#### 4.10 Data management

Good data is critical to good planning and provides a sound basis on which to consider investment in future assets and services. Data supports efficient site operations and allows councils to better understand the real costs of managing wastes. Currently, councils record wastes generated through household and commercial bin services measured by the square-metre capacity (m<sup>3</sup>) of the vehicle. As disposal sites are unsupervised and without weighbridges (with the exception of Longreach), the self-hauled material and quantities are not recorded. Reporting is by volume estimate, which produces data that is subjective and difficult to validate.

There is a need for consistent data to be captured at all sites in order to progress the implementation of this Plan. For example, where site re-design or waste transfer infrastructure is planned, reliable data will be needed to accurately predict the capacity requirements for equipment, storage, infrastructure, and transport clearances.



Data will provide councils with greater confidence and an ability to accurately scope tender or procurement works and services designed to test the market or engage contractor services for kerbside collections and waste transfer station bin collections. The advantage is that many collection vehicles have onboard scales and contractors can provide data through automated software which interfaces direct to councils.

Weighbridges will not be required at all sites and a standard methodology for regional data collection (density conversion in m<sup>3</sup>) will be agreed between all councils. The procurement, installation and back-up problem-solving could be regionally shared where software-based systems are used.

The Plan recommends a weighbridge be installed at the Longreach disposal site as this is an already supervised site. The data captured at a Longreach weighbridge can be used to help validate the volume estimations for other councils and improve annual reporting to DES. Should Barcaldine become a regional facility in the future, consideration should be given to a weighbridge at that facility also. The development and implementation of data-collection and management systems are recommended for inclusion in the **short-term phase** of the Plan.

#### 4.11 Capacity building

It is recommended that capacity-building programs be developed to help prepare the local workforce, including staff and contractors, to deliver consistent and best-practice waste management practices across the region. This approach will support the development of waste management expertise in the region.

Accredited waste management training for council employees, council contractors and local business operations is an effective way to build capacity throughout the region and potentially drive innovation and entrepreneurial approaches to resource recovery and the circular economy.

RAPAD Skilling, an Australian Skills Quality Authority Registered Training Organisation, may be best positioned to deliver accredited programs in this sector and investigations are included within the **short-term phase** of this Plan.

## 5. RESOURCE RECOVERY

The transition to a circular economy is predominantly driven by Commonwealth and state government targets for waste reduction, recovery and diversion from landfill, and community expectation. Regionally, resource recovery is also supported through RAPAD's commitment to:

- Increasing and improving local employment, business opportunities and economic benefits;
- Enhancing innovation, creativity and entrepreneurship;
- Providing training and development, increasing expertise and capacity within the region;
- Supporting a sustainable resources sector/net zero and minimising negative impacts on the region's natural environment;
- Improving local government services to the community.

Resource recovery diverts useful waste materials away from landfill and retains value for reuse or manufacturing to become new products. It is the most prominent pillar of the circular economy. While the circular economy includes activities along the entire supply chain, it is the collection, transfer and sorting systems that provide the community with a direct opportunity to participate.

Recovery systems include kerbside recycling services, bulky waste collection services and disposal site recycling facilities. These services make materials available to entrepreneurial and business opportunities. Resource recovery is not solely reliant on local government and can be suitable for business to business, or industrial ecology approaches, where the wastes from one industry become feedstock for another.

The Queensland Government has established Recycling Enterprise Precincts<sup>15</sup> to increase economic opportunities and help facilitate industrial land growth in the state. Essentially there are two precinct types:

- Prepare precincts, which focus on preparatory activities and can leverage off local government resource-recovery infrastructure and services. These precincts are scalable dependent on the catchment population and industry mix and consolidate materials for supply to end markets or to transform precincts. Prepare precincts can also undertake preliminary processing, including shredding and crushing, where this assists transport and where the material in that form can be used locally;
- Transform precincts are generally larger and are ideally suited to industrially zoned areas, potentially where existing infrastructure is planned or has already been made. These precincts may co-locate with research and development organisations and undertake high-value processing activities, for example remanufacturing of plastics into new product.

The Barcaldine Renewable Energy Zone (BREZ) may provide a suitable location for such a precinct in time but would require significant pre-planning, market research, cost-benefit and financial feasibility investigations, as well as broad consultation. These precincts are designed to act within a network and can be developed by various entities including local government or the private sector. Guidelines are developed for their establishment and operation.<sup>16</sup>

### 5.1 Reuse shops or reuse areas

Reuse shops are outlets that on-sell goods and materials that have been recovered from the waste stream. These materials are of a quality and type that make them of some value for reuse, recycling or repurposing, for example building timbers, windows, doors, furniture and household goods. These outlets are scalable to suit the size of the community they serve and are a retail choice for people who prefer to buy secondhand and/or may need specific items, materials or parts in order to repair existing goods or undertake property renovations.

<sup>15</sup> Recycling Enterprise Precinct Location Strategy, 2022, QLD Dept State Development, Infrastructure, Local Government and Planning

<sup>16</sup> Recycling Enterprise Precinct Guideline, 2022, QLD Dept State Development, Infrastructure, Local Government and Planning

These facilities can divert a considerable quantity of material from disposal if supported by the community, who both donate and reuse items. Furthermore, reuse shops allow the community to provide feedstock to support the development of small local businesses such as bike repair, lawnmower repair and artistic/artisan-based activities. Reuse shops often become an important community asset and can also coordinate with other initiatives such as reuse and upcycling workshops, mechanical workshops, repair cafes, schools and education programs.

Typically, reuse shops or areas are located near the entry to the waste site, allowing patrons to off-load items of potential reuse value. This is best done under supervision and it is imperative the area is undercover to protect and preserve items (for example, furniture and other materials vulnerable to the weather). Shelving and racks are also required to safely store materials until they are removed or sold.

Reuse shops or resource-recovery centres are currently operating in many rural and regional townships across Australia. There are numerous business models where councils engage local business or community groups to recover materials and operate a retail outlet at single or multiple disposal sites. Sites generally employ a minimum of two staff, dependent on the scale and range of services.

While considering the value of reuse shops or areas at disposal sites, councils should also consider the broader opportunities, such as local employment and/or small-business creation, as well as:

- Incorporating site supervision, machinery supply, disposal operations, data and user fee collection into contract arrangements;
- Operation of recycling collection facilities on site for cardboard/paper, glass, plastics, etc. This approach has the added benefit of quantifying materials for potential market testing of recycling collection systems in the future;
- Better management of the capture and diversion of regulated wastes from the disposal cell, e.g. batteries and oils;
- Improving safety and environmental management controls on site and compliance with EA conditions;
- Enhancing the presentation of the sites and reducing the need for double-handling and costly clean-ups;
- Raising community awareness through demonstrations of good recycling and disposal practices;
- Better managing the quality of stockpiled materials, e.g. tyres, green waste, construction waste, to improve reuse quality and revenues as well as meeting processors requirements;
- Reducing informal scavenging practices and better managing councils' liability and risks.

Reuse shops seem most suited to populations of greater than a thousand and may present an opportunity for the larger administrative centres in the region, such as Longreach, Barcaldine, Winton and Blackall. Reuse areas are more suited to smaller townships where drop-off areas for reusable goods at disposal can be provided, such as that already in place in Boulia. A structure to protect the quality of the goods from weather damage is necessary to avoid them eventually becoming waste. Investigations into potential reuse facilities are recommended within the **medium-term phase** of the Plan.

## 5.2 Recycling through the container deposit scheme

Six councils within the region have Containers for Change (CfC) operating in their municipalities. The Queensland Government has recommended remote councils without recycling services find ways to encourage greater use of CfC. There are several ways councils can promote CfC within their communities, including at public events, through council websites and encouraging support through the local chamber of commerce.

The recent audit of 150 household and commercial weekly kerbside bins conducted in the Longreach township found more than 1,000 eligible CfC containers. When modelled over the period of one year for the whole township amounts to a potential loss of deposit return in the vicinity of \$12,000.

The promotion of the CfC should be ongoing, and while actions are not specifically allocated in the Plan, the RRWG is considered the best pathway to developing messaging and accessing resources to support the CfC on a regional basis.

### 5.3 Public-place bin recycling

While no data is available in regard to the content of public-place waste bins in the region, it can be presumed there are recyclable materials available for recovery. At present, councils regularly clear the bins and the contents are directed to landfill.

Councils may consider providing public-place bin systems for the collection of recyclables to further support the CfC system. Arrangements may be considered where a COEX operator or local community organisation is able to service the recycling bins and retain eligible containers. Councils would need to be responsible for the residual waste fraction and maintenance of the bins, however contract agreements could effectively manage these aspects.

### 5.4 Recycling of packaging materials at disposal sites

Although the collection of packaging recyclables at the disposal sites is not currently occurring, it is possible. Materials such as cardboard and paper materials, steel food cans, plastics including HDPE milk, LDPE soft and rigid plastics and glass jars are recyclable but are not serviced through the COEX scheme and ultimately go to landfill.

Based on the Longreach waste audit findings, it is estimated the following packaging materials find their way to landfill each year through kerbside collections:

- >28 tonnes of e-waste materials;
- >1,000 tonnes of plastics (including LDPE soft and rigid plastics);
- >900 tonnes of glass containers;
- >2,000 tonnes of paper and cardboard;
- >200 tonnes of steel and aluminium cans;
- >20 tonne of liquid paperboard (LPB).

In addition to the loss of recyclables in kerbside services, packaging waste materials are also being disposed of directly to the disposal sites via self-haul and include containers that are eligible under the COEX system. These quantities are additional to the data above and have not been measured.

As a forerunner to considerations for introduction of kerbside recycling systems, councils may install bins and other contained storage facilities for the collection of these materials at disposal sites. This approach would allow data to be collected on which councils may consider the value of future kerbside service options. In regional areas it remains important that systems are designed to reduce contamination levels to improve returns. This usually means separate bins/bales for each of the materials noted above and the use of baling equipment to efficiently store and transport materials to end markets or regional processing facilities.

The quantity of materials collected may provide a viable feedstock for small businesses or community organisations across the region, but will remain dependent on the handling and transport costs. That said, the use of rail services provides a competitive option, particularly for those councils in the rail corridor, such as Winton, Longreach and Barcardine. Road transport backloading should also be investigated.

Given the significant distances across the region and the contribution of eligible CfC containers, it is recommended that discussions be held with the COEX management to determine whether the more remote Barcoo, Boulia and Diamantina councils can jointly access transport arrangements for delivery of recyclable materials to processing facilities. Data estimates that the townships within these municipalities dispose of between 20 and 100 tonnes per annum of recyclables in the waste bins. While this is not a significant amount, there may be an opportunity to focus on the recovery and baling of single recyclable material types with a higher

value, such as cardboard, aluminium and steel cans. Estimated recyclable quantities per township are identified in the respective council implementation plans provided in the **Annex** to this Plan.

Investigations for the installation of recycling facilities at disposal sites are recommended to commence in the **short to medium term** of the Plan.

### 5.5 Kerbside recycling and regional processing facility

All councils across the region provide household and commercial residual waste kerbside collection services but not recycling services. Recent audits in Longreach found the household waste bins contained an estimated 27% (3 kg) of recyclable materials, rising to 33% (28.5 kg) in the commercial bins, an estimated total of 4,000 tonnes per year. This included a percentage of COEX-eligible containers. However, the implementation of a kerbside recycling system in itself wouldn't assure the recovery of these materials as this relies on source-separation practices in households and businesses. Education and incentives would also be required.

Any future investigation into potential recycling systems and regional material recovery facilities (MRFs) might also consider materials being collected through the COEX system, which are currently transferred to Townsville MRF. COEX issues tenders for processing of recyclables collected through the CfC program on a five-yearly basis. The current processing contracts will expire in 2028, at which time COEX will once again tender the MRF services for the processing of COEX materials across multiple regions.

Councils will continue to find the implementation of conventional kerbside recycling systems economically challenging if acting independently, given the poor economies of scale. Therefore, **medium- to long-term** planning recommends a cost-benefit and feasibility analysis for kerbside recycling services and indeed a regional MRF potentially located at Barcaldine, given the township's proximity to end markets and its access to multi-transport modes. Business planning would only be considered based on a positive outcome from these investigations. Future analysis should also include market testing of regional or sub-regional private-sector collection contracts and/or MRF operations.

### 5.6 Stockpiled recyclable materials

Significant quantities of stockpiled materials are held at disposal sites across the region. These materials may continue to degrade in quality, potentially becoming an environmental and safety risk if not appropriately managed. The processing of these legacy wastes forms a **short-term** focus of this Plan. Given the significant quantity, particularly of tyres stockpiled across the region, the Plan also identifies the need for state government support to assist in the removal of these materials.

Crushed concrete and shredded/chipped garden wastes should be retained for use in site improvement/maintenance activities and in general site upgrade initiatives. Processing of heavily contaminated materials may not be desirable or possible and more appropriate uses will be required to avoid unnecessary spreading of litter and other contaminants, for example C&D containment within mounds or batters. Ongoing site clean-ups will also be necessary.

Councils should consider the appropriateness of cost-recovery mechanisms for those materials that require third-party processing and this is included as a **short-term** focus of the Plan.

Construction and demolition materials, green waste and steel will continue to be stockpiled at disposal sites as the most effective form of storage. Ideally, the stockpiles will be located on hardstand areas to confine the storage footprint, separate surface waters from the storage areas and confine the storage footprint. This will require more regular processing of the materials, inevitably meaning smaller quantities will be held at each site and this may be less attractive to processing/collection contractors. However, a cleaner product with minimal contamination, together with regional tendering, will encourage a more competitive tendering process.

Indeed, councils may also consider the engagement of local business to manage steel across the region. Local scrap-metal operators may extract non-ferrous materials, separate heavy from light gauge steel and maintain product cleanliness to attract revenues. These arrangements are already occurring with the Barcoo municipality.

Evaluation of management models for green waste, tyres and concrete materials found that joint regional tendering arrangements would provide a better option than for procurement and sharing of large, complex machinery between councils, given the servicing and maintenance requirements on an ongoing basis. Refer to **Table 6** below.

## 5.7 Emerging wastes

The Plan has considered the management of emerging wastes such as PV panels, wind turbines, lithium-ion batteries and e-wastes given their increasingly complex and composite structure. It is expected these materials will become more prevalent at waste sites over the coming 10-year period, given the relatively short life of some products.

As there is a large solar farm already located at Barcaldine, with a potential expansion under the Renewable Energy Zone development, it is recommended that the CWQ councils adopt a uniform strategy on how solar panels will be managed. It will be imperative councils do not bear the cost for EOL management of this future waste stream. The recovery and disposal requirements should be considered at the planning and approval stage to ensure consent conditions allocate responsibility to the proponent.

Councils will need to provide designated collection areas at transfer stations and landfills for storage of lithium-ion batteries (household quantities) and then rely on contractors or manufacturers to collect them. At this stage, it is recommended that a wait-and-see approach be taken. Considerations are included in the **short to medium** phase of the Plan to consider e-waste collection. Investigations into necessary responses for emerging wastes, for example PV and wind turbines, are in the **long-term phase** of the Plan. Outside of this will be necessary to have an ongoing advocacy role to communicate with both State and Commonwealth governments to ensure renewable energy and other developments do not create new legacy waste items in the region.

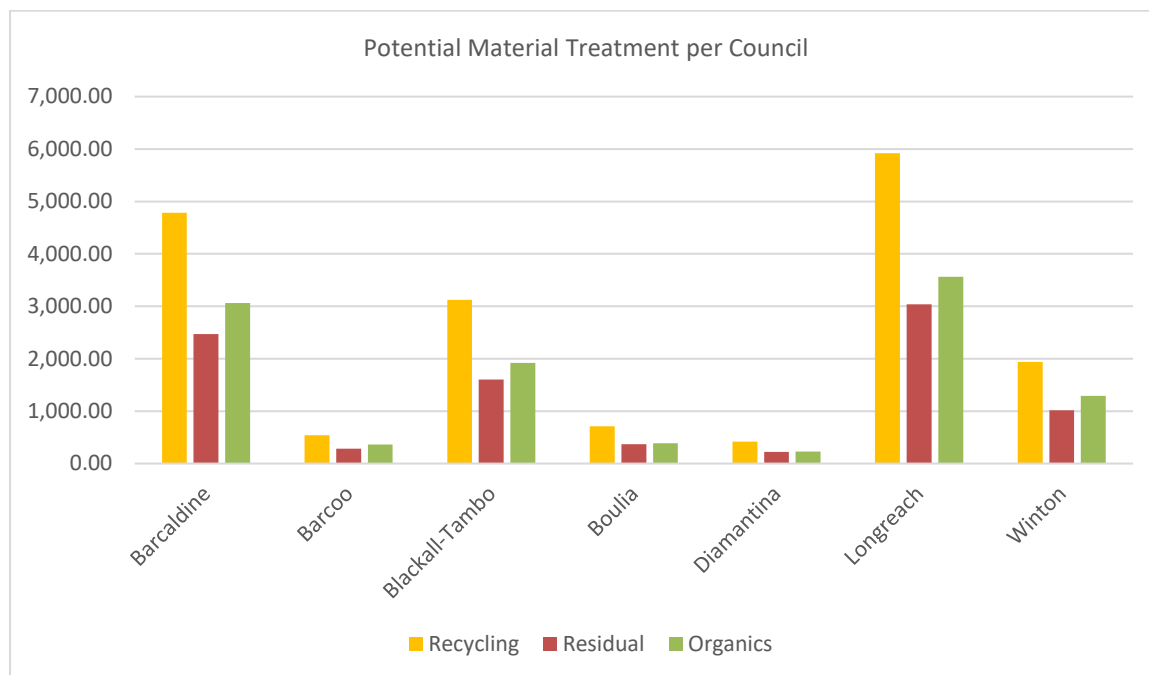
Table 7: Resource-recovery options assessment

Options for the management of recyclables and recovered materials	Multi-criteria analysis					Rationale
	Strategic & regulatory	Public interest	High-level cost	Risk management	Sustainability	
<b>C&amp;D: Target increased diversion of materials from landfill; increase recovery of materials for use in the circular economy</b>						
Option A: Business as usual	5/15	5/25	20/30	2/15	2/15	PROS: Diverts concrete materials from landfill; CONS: loss of disposal site footprint; loss of resource
Option B: Processing and removal of concrete, brick, rock aggregates from sites	10/15	15/25	10/30	10/15	8/15	PROS: Diverts concrete materials from landfill; meets circular-economy principles; community demonstration benefits; CONS: loss of processed product for use on site
Option C: Processing & the use of concrete, brick, rock aggregates for site maintenance	15/15	18/25	15/30	12/15	12/15	PROS: Diverts concrete materials from landfill; meets circular-economy principles; community demonstration benefits; processed product available for use on site
<b>Ferrous &amp; non-ferrous: Target increased diversion of materials from landfill; increase recovery of materials for use in the circular economy</b>						
Option A: Business as usual	8/15	8/25	20/30	5/15	6/15	PROS: Minimum expense associated with BAU; CONS: Materials are contaminated, potential health and safety risks with current stockpiling
Option B: Regional tender for preparation and collection of materials to end markets	12/15	20/25	20/30	10/15	10/15	PROS: Improved product quality and revenue; local business opportunity CONS: Segregated site activities, monitor stockpile cleanliness
Option C: Council staff recovery of non-ferrous and prepare materials for collection	12/15	10/25	15/30	10/15	10/15	PROS: Improved quality and revenue for product; CONS: Segregated site activities, monitoring stockpile cleanliness
<b>Organics – green waste: Target increase diversion of organics from landfill, recovery of materials for inputs to the circular economy</b>						
Option A: Business as usual	5/15	5/25	20/30	5/15	2/15	PROS: Diverts materials from landfill; minimal processing cost CONS: Lacks sustainability; non-compliant with licence conditions; loss of resource
Option B: Commercial shredding service under regional tender procurement, reuse in site upgrade and maintenance	12/15	20/25	10/30	12/15	10/15	PROS: Meets licence conditions; supports circular economy; site improvement resource; local business opportunity; cost sharing CONS: Compliance 4454-2012; Manage stockpile cleanliness; manage complexity of joint arrangements
Option C: Procurement of shredding plant asset for use across the region	12/15	20/25	8/30	8/15	10/15	PROS: As above CONS: As above; CAPEX and ongoing OPEX; not core business
<b>Recycling-packaging materials: Target is to increase diversion of materials from landfill; increase recycling rates; increase recovery of materials for use in the circular economy</b>						
Option A: Introduces kerbside recycling, establishes MRF in Barcardine & inc. CRS	10/15	20/25	10/30	10/15	10/15	PROS: Supports circular economy; addresses recycling targets; local business opportunity CONS: relies on sourcing CRS; significant investment for council/PPP; vulnerable to freight cost, market acceptance and pricing; manage complexity of joint arrangements
Option B: Introduces kerbside recycling, establishes MRF in Barcardine & exc CRS	10/15	20/25	5/30	7/15	7/15	PROS: As above CONS: As above, minimum feedstock; vulnerable to freight cost, market acceptance and pricing
Option C: Establishes recycling at disposal sites, bales materials for transport to Brisbane	10/15	20/25	15/30	7/15	8/15	PROS: Local business opportunity; demonstration of RR within the community CONS: Venture vulnerable to price point and acceptance of end markets; set up costs at each site

Highlighted: Indicates preferred model

Based on data modelling across the recoverable material and residual wastes streams, there is an opportunity to recover and make available a reasonable quantity of materials for downstream processing. Refer to **Figure 7** below which separates residual from recyclable and organic materials.

**Figure 7: Potential Material Treatment per Council**



## 6. REGULATED WASTES

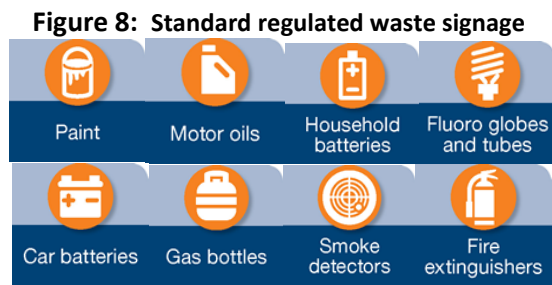
Regulated wastes are included in the resource-recovery section of the Plan as many are recyclable in their current form or have recoverable components, for example precious metals in e-wastes that are sourced for remanufacture.

### 6.1 Regulated waste materials

Households, businesses and rural properties commonly generate a range of hazardous and regulated wastes. Schedule 2 of the (QLD) Environmental Protection Regulation, 2019 prescribe what is regulated waste and what is not a regulated waste. The wastes that would be expected to be generated in the CWQ region are not limited to:

- Chemicals: including household cleaners, pesticides/herbicides, pool chemicals;
- Waste oil: engine oils, hydraulic oils;
- Engine coolants, brake fluids;
- Gas cylinders, including barbecue and camping LPGs, butanes and disposal helium cylinders;
- Fire extinguishers;
- Paints, thinners, solvents, varnishes;
- Fluorescent lamps, tubes and bulbs (CFLs);
- E-wastes (dismantled only);
- Smoke detectors;
- Flares;
- Asbestos-containing materials (ACM);
- Medical, healthcare wastes (including syringes)
- Tyres.





Disposal cells for the receipt of regulated waste are an engineered, multi-basal liner construction designed to prevent any potential discharge to the environment. There are a small number of licensed facilities for the receipt of these wastes in the state. However, landfills in the CWQ region are not licensed to dispose of these wastes and it is imperative they be handled, stored transferred to appropriate facilities in accordance with Australia's dangerous goods code and state government regulation for trackable wastes.

The eventual destination of regulated wastes will differ as materials undergo processing to recycle or extract recyclable materials; others will require treatment for stabilisation prior to licensed disposal (as above).

Disposal sites in the region use a landfill cell design that is unlined and without leachate controls. There is significant risk of release of chemicals and toxic materials to the environment, which may also directly contribute to human health impacts.

Currently most sites in the region have *ad hoc* arrangements for the receipt and storage of regulated materials. Dedicated purpose-built facilities are necessary to ensure the community can dispose of common problem wastes safely and in a manner that diverts these materials away from the disposal pit. A dedicated storage facility should be convenient and easy to use, with the correct receptacles/containers and signage in place.

The materials commonly received include waste oils, which are either stockpiled on site in smaller containers or stored at the council's works depot. Waste tyres stockpiled on site, as are treated power poles. Asbestos-containing materials (ACM) are currently managed through burial in dedicated pits at disposal sites with varying levels of signage and barrier fencing in place.

Councils will need to work collaboratively to determine solutions for these materials, such as a regional scale Household Hazardous Waste Collection program. These programs are generally run on specific days in the year with collection facilities set up at disposal sites and attended by trained staff or contractors.

Actions related to improving the management of regulated wastes are included in **short to medium term** of the Plan. An evaluation of consolidating regulated wastes in larger centres within the municipality should be considered, for example Longreach and Barcaldine, to allow for maximum loading on collection by private contractors.

Remote sites are currently transferring regulated wastes as far afield as Mt Isa and Townsville for treatment and/or disposal, at significant cost. The larger centres in the region, Barcaldine and Longreach, may be better able to attract regular collections for regulated wastes given the larger quantities would likely provide better cost efficiencies for the collection company. Smaller councils would require licensed transporters or attain EA permits for council fleet vehicles to transfer to larger sites for consolidation.

Industry-led, voluntary or mandated stewardship programs are operating nationally to focus on a large range of materials. It is important that the CWQ region seek regular collection arrangements through the various programs to encourage the community's recovery of the materials and ensure their diversion from landfill. Examples of stewardship programs are provided in **Table 8** below. A sustained advocacy on behalf of the councils will be necessary to access these programs and this will form part of the role of the RRWG.

**Table 8: Potential recovery performance**

Stewardship program	General information
ChemClear – a national program for the collection and disposal of unwanted agricultural and veterinary chemicals	An inventory is compiled and is sent to ChemClear for collection scheduling. Chemicals are classified in two groups: <ul style="list-style-type: none"> <li>Group One: chemicals that are currently registered. Rural chemicals manufactured by participating members are collected free of charge.</li> <li>Group Two: chemicals that are de-registered, schedules are unknown, out-of-date chemicals or chemical products of non-participating manufacturers. These attract a fee ranging from 10 to 80 cents per litre, subject to the nature of the material.</li> </ul>
DrumMUSTER – for agricultural and veterinary chemical containers	Similar arrangements to the above program. Specifically built storage containers are required and drums must be assessed as having been triple-rinsed. A trained operator is required.
FluoroCycle – a voluntary partnership between govt and industry for the recovery and recycling of mercury-containing lamps	Mercury-containing lamps including fluorescent and compact fluorescent lamps (CFLs) contain small amounts of mercury and are the largest single consumer product generating mercury waste in landfill in Australia. There are options to both store and transport used lighting in purpose-built and designed cardboard or corflute boxes, weighing approximately 20 kg. The disposal rate includes a fee per box plus a recycling fee. Companies specialising in this type of recycling include Chemsal and CMA Ecocycle.
Television and computer recycling scheme – a national co-regulatory arrangement	Televisions, computers and printers are part of a national TV and Computer Recycling Scheme, where industry is required to pay for the recovery of items at the end of their useful life. Suitable storage facilities are required, usually in shipping containers or bulk bins. Many councils have operated an e-waste clean-up to attract large quantities over a short time frame.
Mobile Muster – an industry program for mobile phones and peripherals	Mobile Muster is a division of the Australian Mobile Telecommunications Association. For the collection of all brands of mobiles plus batteries, chargers and accessories. Drop-off points are provided across the country.
Cartridges 4 Planet Ark – for toner cartridges	This program was established to stop printer cartridges from ending up in landfill. It operates in partnership with Australia Post, which provides cartridge collection points. Any site can register to receive a collection box by calling 1800 24 24 73.
Battery Back Australia – for the collection of batteries	An Australian Battery Recycling Initiative set up to collect and recycle used alkaline, lithium and reusable batteries containing toxic materials that should not go to landfill nor be burned. Old, discarded batteries can be placed in containers provided at the point of sale for new batteries and at council offices. Also refer B-Cycle Battery Recycling ( <a href="http://bcycle.com.au">bcycle.com.au</a> ), an accredited product stewardship scheme providing drop-off points across Australia.

Design and installation of regulated waste storage facilities is a **short-term** focus in the Plan and included in the disposal site upgrade budget, in the **short to medium** term of the Plan.

## 6.2 E-waste or e-product

E-waste (also termed e-products) include TV and computing equipment, mobile phones, lighting equipment, large and small household appliances including fridges, freezers and air conditioners, kitchen appliances, power tools, solar PV panels and battery storage.

In 2019, Queensland generated an estimated 100,000 tonnes or 19.5 kilograms per capita of e-wastes. This number is expected to rise by 38% to 138,000 tonnes or 23.7 kilograms per capita. E-wastes are therefore a priority waste stream and councils will need to consider ways to efficiently and safely recover these materials for downstream processing.

### 6.3 Lithium-ion batteries

The importance of the correct management of end-of-life batteries cannot be overstated. The incidence of fires resulting from incorrect battery disposal is increasing across the country and is therefore one of the fastest growing risks in the waste management sector. The Queensland Fire and Emergency Services recorded 157 lithium-ion fires between 1 July 2021 and January 2023, also indicating this figure could be higher given the likely under-reporting due to difficulties associated with determining the exact cause of such fires. Further to this, the Commonwealth Government estimates a staggering 90% used handheld batteries are going to landfill<sup>17</sup>.

### 6.4 Waste oil

Waste oil collections currently operate throughout the region and are organised at an individual council level. However, there may be greater operation and financial efficiencies gained through a collaborative approach to engaging private-sector companies to collect these materials on a regular schedule.

Private companies will often utilise 32,000 litre tankers for these collections and will be able to provide better scheduling and rates where a collection run will achieve a full load. In this respect, operators would preference collection of oils from standard 5–20,000 litre tanks located at disposal sites.

### 6.5 Asbestos (ACM)

Asbestos is currently managed on an individual council basis. Materials are disposed to purpose-dug single material disposal pits and covered immediately. In several cases, councils will charge for these materials to be disposed of at site. Materials should be handled by certified operators and appropriately prepared prior to transport and disposal. Dedicated areas for ACM disposal should be mapped on site and records kept of these locations to ensure future civil works do not come into contact with these pits. Appropriate areas and signage form a component of disposal site upgrades in the **short to medium** term of the Plan.

### 6.6 Tyres

Tyres have typically been managed on an individual council basis. These materials are stockpiled to quite significant amounts. Tyres are typically processed as tyre crumb in various size fractions for different applications including:

- Crumb rubber used for tile adhesives, bituminous spray seal and asphalt;
- Buffings used in playground surfaces and artificial turf;
- Granules for equestrian arenas, mulch and walkways;
- Tyre-derived fuel used as a fuel in cement kilns and industrial boilers in overseas markets.

Stored tyres that catch fire cause an intense radiant heat that can damage property and inhibit firefighting efforts. An incomplete combustion of tyres can cause health risks through the inhalation of particulates. Tyre fires can be difficult to extinguish and the clean-up costs can be high. Storage of waste tyres should follow the Queensland End of Life Tyres (Waste Tyres) Guideline<sup>18</sup> for waste handlers and the Queensland Government Gazette No. 78 (1 April 2011) pages 539–544, which links to the *Fire and Rescue Service Act 1990* and specifies the way in which tyres should be stored on site.

<sup>17</sup> Lithium-ion batteries and consumer product safety, 2023 ACCC

<sup>18</sup> [https://environment.des.qld.gov.au/\\_\\_data/assets/pdf\\_file/0024/217059/cm-gl-ext-waste-eol-tyres.pdf](https://environment.des.qld.gov.au/__data/assets/pdf_file/0024/217059/cm-gl-ext-waste-eol-tyres.pdf)

Table 9: Regulated materials options assessment

Options for Regulated Waste Management	Multi-criteria analysis					Summary
	Strategic & regulatory	Public interest	High-level cost	Risk management	Sustainability	
<b>Tyres: Target compliance with EA conditions and NEPM controlled waste</b>						
Option A: Individual council procurement of tyre shredding and transport services	12/15	17/25	15/30	13/15	12/15	PROS: Meets EA conditions; supports circular economy; Individual council contract administration; CONS: No regional cooperation & cost sharing
Option B: Regional procurement of tyre shredding and transport services	12/15	17/25	17/30	12/15	12/15	PROS: Scheduled servicing & cost sharing; variety of potential suppliers; CONS: manage complexity of joint arrangements; manage stockpile cleanliness
Option C: Procurement of mobile tyre shredding assets by regional group	12/15	20/25	4/30	7/15	5/15	PROS: Increased employment & council business; CONS: Significant CAPEX & OPEX; manage complexity of joint arrangements; not core business
<b>Waste oil: Target compliance with EA conditions and NEPM controlled waste</b>						
Option A: Business as usual	2/15	5/25	20/30	5/15	5/15	PROS: Low-cost; CONS: High risk at unsupervised sites
Option B: Store materials at council depots in purpose-built tanks (5–20,000 L)	10/15	15/25	10/30	8/15	10/15	PROS: Secure storage; attractive to private collection companies; potential to share costs through scheduled services; CONS: Double-handling
Option C: Store materials at waste site in purpose-built tanks (5–20,000 L)	10/15	20/25	10/30	12/15	10/15	PROS: Secure storage; attractive to private collection companies; potential to share costs through scheduled services; CONS: Dependent on-site supervision costs and managed opening hours
<b>ULAB, paints, chemicals, etc.: Target compliance with EA conditions and NEPM controlled waste</b>						
Option A: Business as usual	5/15	5/25	20/30	3/15	3/15	PROS: Minimal cost; inability to meet EA conditions; CONS: High risk at unsupervised sites; clean-up costs for inappropriate disposal
Option B: Store materials in purpose-built facility at council depots	10/15	15/25	10/30	8/15	10/15	PROS: Secure storage; attractive to private collection companies; potential to share costs through scheduled services; CONS: Double-handling
Option C: Store materials in purpose-built facility at disposal sites	10/15	20/25	10/30	12/15	10/15	PROS: As above CONS: Dependent on-site supervision costs and managed opening hours

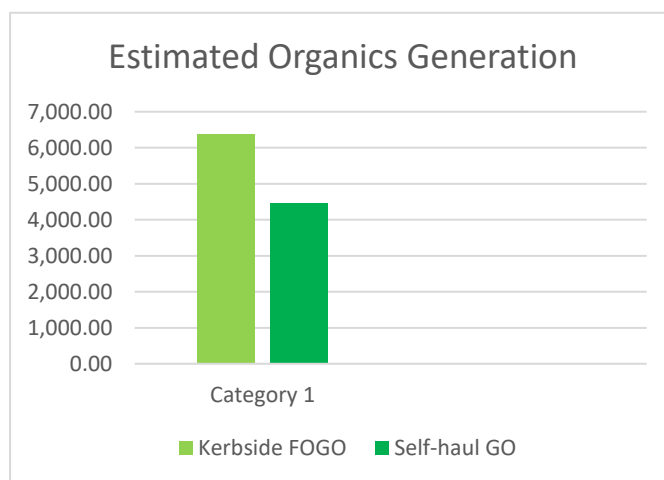
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## 7. ORGANICS MANAGEMENT

The process of organic wastes breaking down or decomposing in landfill creates primary greenhouse gases (GHG), methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>) and generates a liquid leachate. The national and state government joint focus on the minimisation GHG through the removal of organic materials from the waste stream, together with the state government focus on improving the environmental management of landfills within remote areas, requires the Plan to have management options for organics and their diversion from landfill.

Food organics (FO) and garden organics (GO) represented in the kerbside waste stream measure 37% (4.2 kg) of the household bin and almost 55% (47.6 kg) of commercial bins across the region each week. Combined with the green wastes taken to the disposal sites, there is an estimated >10,000 tonnes of organics generated across the region each year. The extent of organics generated each year is shown in **Figure 9** below.

**Figure 9: Estimated Organics Generation in the Region**



The **short-term** phase of the plan focuses on reducing organic levels in the kerbside bins via household and business composting, which must be supported by an education campaign. Councils may consider subsidising the cost of home-composting bins and/or kitchen caddies for the 'at source' separation and storage of food wastes. Similarly, schools-based composting programs or on-farm composting schemes should be considered and may attract state government funding to establish.

In the **short-term** phase of the plan, councils should also consider shredding and composting garden wastes at disposal sites to produce a mulch suitable for application on household gardens, broad-scale agricultural applications and in councils' parks and gardens works. This option would necessarily need to be supported by supervision at the disposal point in order to achieve a far reduced level of contamination than is currently present. Removal of contaminants such as plastics, glass and steel will be essential in developing a quality material suitable for spreading and use, and which also meets Australian Standard 4454-2012 parameters.

Given the volume of organic materials including green wastes and food organics generated across the region, in the **medium to long term**, there may be a suitable opportunity for a regional composting facility. Once again, business modelling will be challenged by the transport distances and quantity of feedstocks. With better data, consideration of collaborative or PPP arrangements might be investigated and, dependent on the technology, may need, for example, additional nitrogen-rich feedstocks such as manures from sale yards or collaboration with freight companies and use of untreated timbers from disposal sites.

Councils across the country are providing food organics and garden organics (FOGO) MGBs for kerbside collection with kitchen caddies and compostable bin liners to target the recovery of food wastes, garden wastes and lawn clippings. Such a collection will require a processing system to compost both the collected materials and the self-hauled garden wastes and untreated timbers from the disposal sites. Investigations into the feasibility for such systems are a focus of the **medium to long term** phase of the Plan.

Composting is a manufacturing process that follows a specific carbon to nitrogen feedstock ratio. If the recipe is out of balance, odour and liquid can be generated. Staffed operation of the process, therefore, is essential. Several proven and scalable organics-processing options are discussed below.

**Windrow compost systems:** Typically carried out in the open and can occupy a large surface-area-to-volume ratio making them more prone to drying out in hot weather and becoming flooded during rain events. Both these factors can significantly affect process control, leading to impacts on product quality, odour levels and additional production costs associated with rework of materials. The addition of food waste will likely create odour issues. The process will take 14 to 16 weeks to maturity and the windrows will require frequent turning and the addition of water. The leachates generated during this process will also require management, however this system requires the least capital of the featured options here.

**Forced aeration or aerated floor composting systems:** Use either the aerated static piles or windrow methods where oxygen is pumped into the composting process through pipes embedded or on top of a hard stand, typically to manage potential odours and maintain the maturation process. The system is common in many rural and regional areas across Australia and is capable of processing food and garden waste to minimise odour levels. This system reduces both the footprint and the production time to deliver a composted product.

A hardstand area is recommended as these costs vary greatly dependent on the location, nature of material and size of operation. A solid, impermeable base allows capture of the runoff and stormwater. Operational savings include reduced frequency of turning, lower labour costs, fuel (energy) savings and lower maintenance costs. A power supply is required as fans force air through the pile to accelerate the decomposition process and water supply will typically require 1,000 litres for each 1 m<sup>3</sup> of finished product. The maturation process takes approximately six to eight weeks.

**Tunnel and in-vessel systems:** Enable the processing of food and garden waste with effective odour and pathogen controls. Systems include modified shipping containers, small, modified bulk bins or more technical catalogue equipment. Systems may be batch or continuous flow with rotating drums both mixing and aerating, which is further enhanced via periodic air injection. Probes record temperatures so that the mix can be modified by changing air, water or temperature requirements. Air that is extracted from the system is processed through a bio-filter to remove and trap odour. Hot Rot Systems or BiobiNs are suitable for small-scale composting and can be built to various sizes subject to the feedstocks and the availability of the plant to lift, move and empty them. The energy cost is low and the system has the advantage of a small footprint.

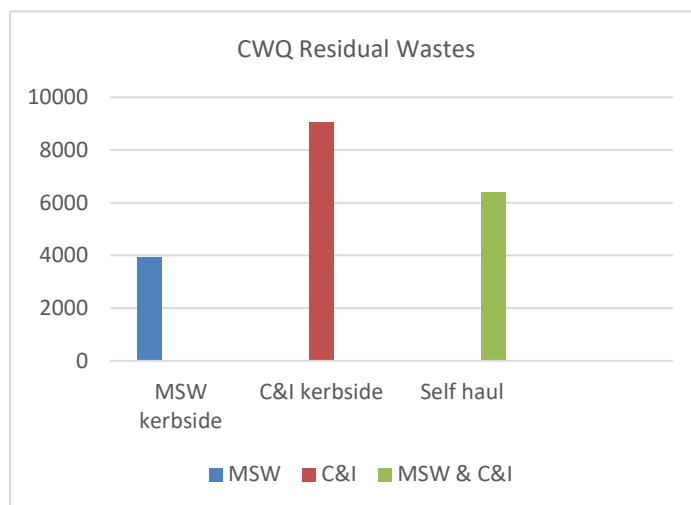
For all systems, pre-shredding of materials will be necessary and this equipment will form a critical part of the overall system. The matured product from the above systems will also require end-product screening to remove contaminants and to produce a range of sizes. The investment required in the sorting and screening will largely depend on those necessary to meet contamination levels allowable under the Australian Standard 4454-2012 composts, soil conditioners and mulches and those specified by the end markets.

## 8. RESIDUAL WASTE MANAGEMENT

Residual wastes are essentially the materials remaining after the removal of recoverable components. Not all wastes have recoverable attributes and technologies are continuing to be developed that will treat these materials as a feedstock to generate renewable energies and other products, such as resource-derived fuels (RDF) for industrial applications including as cement kiln replacement for fossil fuels.

Commonwealth and State government policies and targets for reduced greenhouse gas emissions through the diversion of organics, combined with the commitment to transition to a circular economy, provide impetus to improve residual waste management in the region. The Queensland Government's recommendation for remote councils to focus on improving the environmental management of rural landfills supports compliances with EA conditions relating to the standard of environmental protection within disposal site infrastructure and operations and aligns with GHG reduction efforts.

**Figure 10: CWQ Residual waste pathways**



There is no evident case to send residual wastes out of the region for disposal and it is recommended that this material at least in the medium term remains within each municipality. However, in time there may be better economic outcomes from regionalising the disposal of residual wastes.

### 8.1 Kerbside collection systems

All councils across the region provide residual waste kerbside collection services to households and commercial premises. These systems use 240 L mobile garbage bins (MGBs) and side-lift service vehicles. In the larger centres of Barcaldine and Longreach there are also skip-bin services provided by the private sector. Councils (outside of Barcaldine) generally own the assets and resource the collection of waste materials. Dependent on the remaining asset life of collection vehicles, councils should consider market testing to better understand the economics of regional or sub-regional kerbside collection services. The **medium-term** Plan has included the opportunity to investigate and market test for such services.

### 8.2 Disposal site improvements

The benefits of disposal site upgrades and improvements are numerous and will improve:

- Community disposal behaviours, encourage waste load preparation for resource recovery;
- Compliance and environmental protection conditions;
- On-site safety;
- Landfill diversion statistics;
- Quality and reuse potential of recovered materials;
- Collection storage and diversion of regulated waste materials;
- Improved data collection;
- Councils' approach to continual improvement practices for waste management and resource recovery.

Improved site design will be combined with educational signage and awareness programs to encourage correct usage and ultimately, engage communities in the transition to a circular economy.

The Plan includes the following budget provisions for the general upgrade of sites:

- General site lay out based on a one-way traffic flow to pass drop off points for recovered materials en-route to the disposal point
- Bunded hard stand areas for stockpiled materials
- Safety barrier systems at disposal and unloading points
- Overhead and bunded storage infrastructure for segregated regulated (hazardous) wastes
- Improvements to stormwater and operational water drainage systems
- Establish covered hardstand areas for reuse items at small sites
- Suitable accommodation for supervisory staff
- Fencing (where required)
- Signage
- General site clean up

The upgrades will also include additional separation of hazardous waste that may have unique storage, collection and disposal requirements, for example motor oil, cleaning agents, paints/lacquers lead acid batteries or e-waste. Upgraded disposal sites or new transfer stations should continue to sort waste types in the below list as a minimum.

- Tyres
- Greenwaste
- Construction and Demolition waste
- Steel
- Municipal solid waste (inc. self-haul, litter and kerbside materials)
- Commercial and non-hazardous industrial waste
- Lead acid batteries and lithium ion batteries
- E-waste
- Waste engine and cooking oils

Budget has not been allocated for mobile compaction equipment or alternative daily landfill cover systems, as these will be specific to site conditions. Alternative cover arrangements avoid the need for bulk earthen material and have the capacity to manage litter on site and also control disease vectors, odours and fires. Compaction will preserve space and extend landfill life.

Landfill cell design and construction may require basal lining and leachate collection systems in future. Consultation with the environmental regulator will be necessary to understand the full suite of engineering applications that will be required and the financial assistance to be made available to councils. The new site designs will also require councils to revise and submit a plan of operations and operating procedures to DES. There are multiple options for improved landfill cell design and consideration of disposal site improvements have been included in the **short to medium term** Plan.

### 8.3 Disposal site supervision and monitoring

Supervising and monitoring the usage of disposal sites will be needed to progress landfill diversion and recovery rates. A better understanding of the types, quantities and sources of wastes will help to establish realistic recovery and diversion targets. This data can be used to better inform tendering and procurement processes.

Restricting opening hours with or without supervision will also reduce councils' risk in respect to incorrectly disposed materials and unauthorised scavenging. Essentially, site supervision and monitoring is an opportunity to consider the real costs of waste management, determine cost-recovery measures and design initiatives to increase the recovery of materials and improve disposal practices.



Site supervision and monitoring has the potential to directly improve:

- The recovery rate of materials and diversion from landfill;
- Revenues for recovered materials such as steel and timbers;
- Costs for processing stockpiled materials, as minimal contamination is less risk to plant and equipment;
- The quality of recovered materials and their reuse value;
- Councils' general duty of care and control of site access to avoid potentially dangerous site conditions arising;
- Costs and obligations associated with the eventual closure and remediation of the site.

It may also in time provide a way to apply fees and charges for disposal, particularly for commercial and industrial wastes. An operational budget item has been allocated for resourcing/site supervision over the first seven-year period of the Plan as follows:

- **Barcaldine:**  
Barcaldine waste transfer station and landfill (based on two resources budgeted, 8hr p/d - 5d/w)  
Aramac waste transfer station (based on one resource budgeted, 4hr p/d – 3 d/w)  
Alpha waste transfer station (based on one resource budgeted, 4hr p/d – 3 d/w)
- **Barcoo:**  
Jundah landfill site (based on one resource budgeted, 4hr p/d – 3 d/w)
- **Blackall-Tambo:**  
Blackall landfill site (based on one resource budgeted, 4hr p/d – 5 d/w)  
Tambo waste transfer station (based on one resource budgeted, 4hr p/d – 3 d/w)
- **Boulia:**  
Boulia landfill site (based on one resource budgeted, 4hr p/d – 3 d/w)
- **Longreach:**  
Ilfracombe waste transfer station (based on one resource budgeted, 4hr p/d – 3 d/w)  
Isisford waste transfer station (based on one resource budgeted, 4hr p/d – 3 d/w)
- **Winton**  
Winton landfill and waste transfer station (based on one resource budgeted, 4hr p/d – 5 d/w)

Councils will need to seek initial assistance from the state government to cover resource costs for a period of seven years to ensure longer term sustainability.

For councils faced with cost challenges associated with staffing the disposal sites, remote-controlled entry may be an alternative option. Several technology providers have developed auditable entry systems for unattended sites using a unique ID pin assigned to every household or business with/without number plate recognition and using 360-degree cameras to monitor movements and deliveries.

Most systems will require Councils to provide fencing, an electric gate, civil works, cabling, power (can be solar) and internet connection. The implementation Plan has allocated budget for remote monitoring at some sites based on indicative costs.

The option of remote access and monitoring has been included in disposal site improvements and Plan budget as follows:

- **Barcaldine:**  
Jericho waste transfer station  
Muttuburra waste transfer station

- Barcoo:  
Stonehenge waste transfer station  
Windorah waste transfer station
- Diamantina:  
Bedourie landfill site  
Birdsville landfill site  
Betoota waste transfer station (budget not currently allocated)

The focus on transition to controlled access and site supervision or remote entry systems is within the **short to medium** term of the Plan and the capital and operational budgets. Refer to **Table 9** and **Section 10.1**.

#### 8.4 Landfill site consolidation

The Plan continues the dependence on landfilling into the **short to medium** term. The remaining life of most disposal sites across the region allows councils time to investigate and consider future arrangements for residual waste management including regional/sub-regional landfill and waste transfer stations. Councils will need to seek financial support from the state government to assist with such infrastructure builds. Refer to **Section 10.1**.

There are three sites with short- or medium-term pressure on capacity. The Ilfracombe (Longreach municipality) has a remaining life of three to five year and replacement planning should commence in the **immediate** one-to-two-year period. The Bedourie and Birdsville (Diamantina municipality) sites have both have an estimated seven years remaining and planning for their replacement is commenced in the **short term** of the Plan.

Given the remoteness of the Diamantina and Boulia municipalities, there is a strong case to maintain their disposal facilities into the longer term due to the potential for road damage, road closures and the isolation of the townships within these municipalities. Retaining remote disposal sites is important to ensure consistent access, particularly in the event of needing to dispose of emergency or disaster wastes.

However, for other sites such as Ilfracombe, Isisford, potentially Yaraka (Longreach municipality) Aramac, Alpha, Jericho and Muttuburra (Barcaldine municipality), and Tambo (Blackall-Tambo municipality), there is an opportunity to transition to waste transfer stations, as these sites are within suitable distance of a receiving landfill and in a sub-region able to be serviced by a single contractor. Blackall may also consider transition to a waste transfer station should Barcaldine become a regional landfill facility in future.

The Stonehenge and Windorah disposal sites (Barcoo municipality) are also considered suitable as waste transfer stations with materials being transferred to the Jundah site for consolidation, processing or disposal. In the short term, it would seem beneficial to retain the disposal cells at each of the sites until the community become better used to using the new site infrastructure. A small waste transfer station for the Betoota community (Diamantina municipality) will also be required to appropriately manage wastes generated throughout the year and during the tourist season.

The Plan has budgeted for waste transfer stations designed on a disposal apron/ platform and hooklift bin operation. The allocated budgets should sufficiently cover the costs of suitable accommodation for supervising staff and areas set aside for the collection and storage of recovered materials. Note: additional budget may be required for the establishment of waste transfer infrastructure at Betoota.

In the future it may be beneficial to consider further rationalisation of landfills and the construction of transfer stations to feed into a fully engineered regional landfill, particularly in circumstances where construction and management costs for new disposal cells become cost prohibitive.

With the increasing compliance obligation, limited budget reserves and unknown closure and post closure liabilities for the current landfills, transitioning sites to transfer stations is considered the best alternative to reduce compliance and operational challenges for many locations.

If longer term reliance on residual disposal is preferred, and continued cell construction is required, the true cost of landfilling should be examined as these costs and obligations extend beyond the life of the landfill cell into a period of environmental monitoring over 20 to 25 years after closure, capping and rehabilitation of the site. This will be a significant financial obligation to councils and ideally an evaluation of future landfilling needs will be undertaken jointly by the councils.

Where a new site is considered necessary, the process should be embarked on as early as possible as the costs associated with identifying replacement sites can be significant and the time frame protracted. A cost-benefit analysis of site consolidation, regionalisation and/or conversion to waste transfer station infrastructure options is a **short to medium** term focus in the Plan.

### 8.5 Energy from Waste (EfW)

The Queensland Government Energy from Waste Policy in 2021 establishes a role for the recovery of energy from residual waste materials in future. Recovery can take the form of solid, liquid or gaseous fuels that may be combusted to generate electricity or used as a fossil fuel replacement in vehicles and machinery. While the heat may be used to generate hot water and steam for heating systems or be used to drive air-conditioning systems. Steam can also be converted to electricity using a turbine.

While EfW sits above disposal or landfilling in the waste management hierarchy. The policy is not intended to promote EfW but does provide a framework to ensure EfW proposals and subsequent facilities meet technical, environmental, regulatory and community expectations. The policy is also intended to provide certainty to EfW proponents around these matters.

The policy becomes relevant in relation to the Barcaldine Renewable Energy Zone and the potential private investment in a pyrolysis plant to be commissioned for renewable electricity generation. The Commonwealth *Renewable Energy (electricity) Act 2000* regards the energy derived from organic wastes as renewable energy. Furthermore, the Queensland Government regards the energy (bio-energy) generated from biomass-based components of municipal waste as eligible to contribute to the state renewable energy target of 50% from renewable sources by 2030.

That said, while pyrolysis may be considered a suitable technology to receive different types of biomass-based components of agricultural and municipal waste, the technology may also carry risks associated with pollution generation and detailed investigations will be necessary.

The technology operators may require wastes to be delivered as separated materials in order to manage calorific and quality parameters. It is also likely that a gate fee will be placed on receipt of the materials.

Planning and approvals for the technology are likely to be protracted and commercially sensitive information may need to be provided to potential feedstock supply organisations. Therefore, it is recommended that private sector or council proposals for the option to supply alternative EfW technologies undergo a detailed technology and compliance assessment, which is scheduled in the **long-term** phase of the Plan.

## 9. IMPLEMENTING THE PLAN

The region is as diverse as it is expansive, with varied economic, cultural and environmental attributes. Municipalities existing in rural to very remote areas means that one-size-fits-all solutions are not likely to be met with success. The Plan therefore delivers realistic opportunities for each community and the region as a whole to contribute to Queensland's waste diversion and resource-recovery targets.

The Plan provides a framework for improved waste management and resource recovery based on the issues and opportunities discussed and evaluated in the previous sections. The following section provides a roadmap for delivery of the Plan, including areas of regional collaboration and the actions required at an individual council level.

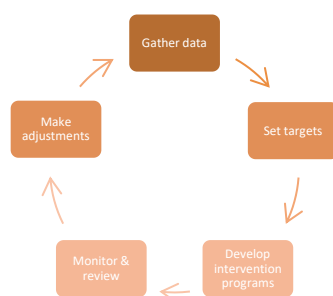
In the short term, the Plan is focused on preparing the CWQ region for transition to the circular economy while improving disposal site management. There is much to consider and the proposed establishment of a regional resource-recovery working group, and the engagement of a regional support resource, will deliver a coordinated approach to implementing the plan across the whole region, thereby reducing the costs and effort required by individual councils to meet state government targets.

By using the first phase of the Plan to gather data, engage and consult with the communities, the medium term can be focused on market testing, planning and implementation of initiatives designed to increase employment and business creation, rationalise and make better use of council assets and evaluate the benefits regionalised approaches to infrastructure.

In the longer term, councils will be well positioned to secure investment in infrastructure, new technologies and improved services on a collaborative basis and perhaps through PPP arrangements. The key actions detailed in the Implementation Plan have been grouped within six themes, as follows:

- Plan administration and the community;
- Legacy waste materials;
- Recycling, resource recovery and regulated materials management;
- Organics management;
- Residual waste management.

Each of the six pillars is also reflected in the individual implementation plans for each council in the **Annex** to this Plan. In that way the activities within the local and regional Plan are linked and able to deliver mutually beneficial outcomes. Regional approaches and initiatives are encapsulated in **Table 10** (Implementation Program) and the councils must refer to this overarching plan when delivering their own programs which do not detail the regional activities.



### 9.1 Timeframe and sequence

The implementation program is predominantly focused on the short (2-year), medium (5-year) and long (10-year) term. The Plan provides an overarching framework for the delivery of improved waste and resource recovery program and infrastructure. The full suite of initiatives are provided in **Table 9** below.

The regional implementation program is linked to the individual council implementation plans. Ensuring the responsibilities are maintained between the councils will be pivotal to the Plans success. The RRWG representing each council in the region will play a critical guidance and monitoring function throughout the delivery of the Plan. Refer to **Figure 11** below which sets out the high-level division of responsibilities for the implementation of the Plan.

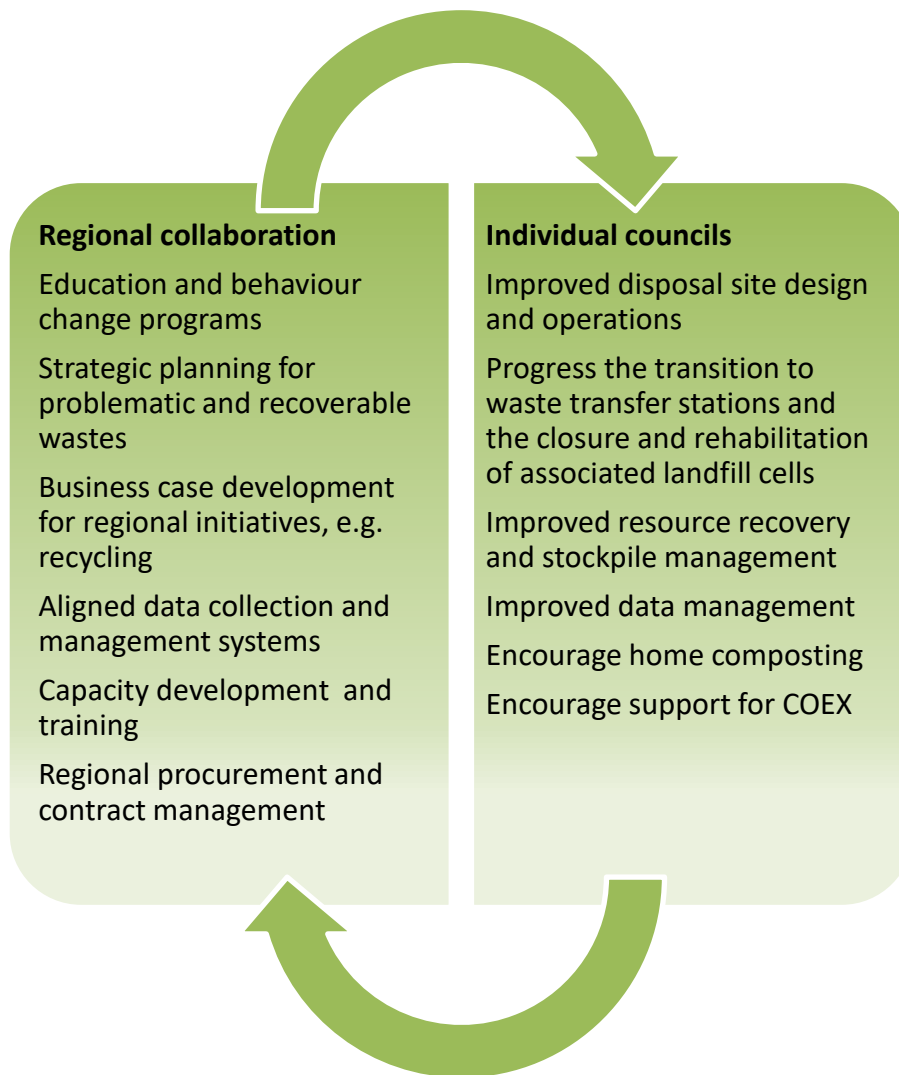
**Figure 11: Division of responsibilities for Plan implementation**

Table 10: Regional implementation program

Implementation Action	Responsibility	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2040	2050
		Within 2 years		Within 5 years			Within 10 years						
<b>Plan administration and community consultation</b>													
Establish regional waste working group & engage regional support resource	ALL Councils												
Prepare and manage forward programs including capacity building	RWWG												
Ongoing regional collaboration, advocacy and regional procurement	ALL Councils												
Development of community consultation and education programs	RWWG												
Develop suitable data management and cost-recovery mechanisms	RWWG												
<b>Legacy waste management</b>													
Confirm legacy stockpile quantities, volumetric survey	RWWG/Councils												
Manage regional tender for tyre processing and transport	RWWG												
Manage regional tenders for concrete & green-waste processing	RWWG												
Manage regional tender or assist councils with scrap metal collection	RWWG/Councils												
<b>Recycling, resource recovery and regulated material management</b>													
Establish regular regional tendering for stockpiled materials e.g. tyres etc.	RWWG												
Investigate recycling facilities (inc. e-waste) at disposal sites with community educational program; assist schools recycling programs	RWWG/Councils												
Establish and service regulated waste collection facilities at disposal sites	Councils												
Implement supervision or remote access at disposal sites	Councils												
Investigate the benefits of public-place recycling & regional systems	RWWG												
Evaluate options for reuse centres at the disposal sites	RWWG/Councils												
Evaluate the feasibility of recyclable collection and regional processing													
Review necessary responses to emerging wastes, e.g. PV, wind turbines;													
<b>Organics management</b>													
Develop home-composting initiative with community educational program	RWWG/Councils												
Assist schools to undertake school composting projects	RWWG												
Implement composting of garden wastes at disposal sites	Councils												
Investigate the viability of FOGO systems & regional composting facility	RWWG												
<b>Residual waste management</b>													
Finalise site upgrade design and equipment	RWWG/Councils												
Construction of WTS; closure and capping of landfills													
Market testing for regional or sub-regional kerbside collection services	RWWG												
Design a regional disposal site signage schedule, regional procurement	RWWG												
Evaluation of the feasibility for material supply to EFW facility	RWWG												

The extent of the implementation and the timing of actions will depend upon the availability of capital and recurrent funding. The key overarching actions have been divided into timeframes to provide a forward plan for the councils, RAPAD and the government funding agencies and have due respect for the councils currently limited financial and human resources. The actions defined in the tables below link to the implementation program and are based on priority rankings:

- Short term (high priority) within 2 years
- Short to medium term within 3 - 5 years
- Medium to long term within 6 - 10 years

**Table 11: Short term actions within 2 years**

	Activity	Est. CAPEX	Est. Annual OPEX
	<b>Plan administration and community consultation</b>	\$ 300,000.00	\$ 900,000.00
1	Establish RWWG, group charter and regional procurement entity		
2	Recruitment of Regional Support Resource Coordinator technical and administrative support		\$ 500,000.00
3	Prepare and manage forward programs, technical advice, capacity building. Investigations into suitable cost recovery mechanisms		\$ 200,000.00
4	Deliver initial & annual community consultation and education program	\$ 300,000.00	\$ 200,000.00
	<b>Legacy waste management</b>	\$ 5,372,000.00	\$
5	Coordinate volumetric surveys of stockpiled materials	\$ 100,000.00	
6	Manage regional tenders for tyre, concrete, greenwaste processing, scrap metal collection	\$ 5,272,000.00	
	<b>Recycling, resource recovery, regulated material management</b>	\$	\$ 800,000.00
7	Establish regular regional tendering for stockpiled materials	Refer item #3	
8	Implement supervision or remote access at disposal sites		\$ 800,000.00
	<b>Residual waste management</b>	\$	\$
9	Plan site upgrade designs and equipment requirements	Refer item #3	
	<b>Totals</b>	\$ 5,672,000.00	\$ 1,700,000.00

**Table 12: Short to Medium term actions 3 - 5 years**

	Activity	Est. CAPEX	Est. Annual OPEX
	<b>Plan administration and community consultation</b>	\$	\$ 1,650,000.00
1	Manage forward programs, technical advice, capacity building		\$ 300,000.00
2	Regional Support Resource Coordinator salary		\$ 750,000.00
3	Community consultation and education program		\$ 600,000.00
	<b>Recycling, resource recovery, regulated material management</b>	\$	\$ 7,440,600.00
4	Investigate recycling facilities at disposal sites and schools		Refer item #1
5	Establish regular stockpiled material processing and clearance		\$ 5,040,600.00
6	Supervision of disposal sites		\$ 2,400,000.00
	<b>Organics management</b>	\$ 300,000.00	\$
7	Develop home-composting initiative	\$ 300,000.00	
8	Assist schools to undertake school composting projects		Refer item #1
9	Implement composting of garden wastes at disposal sites		Refer item #4
	<b>Residual waste management</b>	\$ 11,875,000.00	\$
10	Finalise site upgrade designs and equipment requirements	Refer item #1	
11	Construction: site upgrade, WTS, closure landfills, and equipment procurement	\$ 11,875,000.00	
12	Market testing regional/sub-regional kerbside collection services	Refer item #1	
13	Design and procurement regional disposal site signage	Refer item #1	
	<b>Totals</b>	\$ 12,175,000.00	\$ 9,090,600.00

**Table 13: Medium to long term actions 6 - 10 years**

#	Activity	Est. CAPEX	Est. Annual OPEX
	<b>Plan administration and community consultation</b>	\$	\$ 1,100,000.00
1	Prepare, manage forward programs, technical advice, capacity building		\$ 200,000.00
2	Regional Support Resource Coordinator technical salary		\$ 500,000.00
3	Community consultation and education program		\$ 400,000.00
	<b>Recycling, resource recovery, regulated material management</b>		\$ 2,400,000.00
4	Investigate the benefits of public-place recycling		Refer item #1
5	Evaluate options for reuse centres at the disposal sites		Refer item #1
6	Review responses to emerging wastes, e.g. PV, wind turbines; Evaluate feasibility of regional recycling and processing system		Refer item #1
7	Supervision of disposal sites		\$ 2,400,000.00
	<b>Organics management</b>	\$	\$
8	Investigate the viability of FOGO systems & regional composting facility		Refer item #1
	<b>Residual waste management</b>	\$	\$
9	Evaluation of the feasibility for material supply to EfW facility		Refer item #1
	<b>Totals</b>	\$	\$ 3,500,000.00



## 10. PATHWAY TO FUNDING IMPLEMENTATION OF THE PLAN

### 10.1 Funding assistance required

This section delivers indicative costs for implementation of the actions within the Plan. A more detailed budget will be required prior to proceeding, and indeed in many cases a business case analysis will be necessary to provide investment certainty. Investment costs are shown for the region in **Table 14** below. The individual council implementation plans in the **Annex** to this Plan provides further detail in regard to capital investments that are council specific.

Significant gaps remain in relation to the data and information for current waste management infrastructure and operations. Council-published annual budgets may not always show a separation of disposal site and collection service expenditure. Therefore, the costs allocated in the budget for the processing and/or removal of legacy wastes, including C&D, tyres and steel, have been estimated at a high level given the uncertainty of quantities.

It is acknowledged that current waste management is operated on low budgets. Improvements to operating standards will require a commitment from state government for both capital and in some cases operational funds to support the implementation of the Plan. More precise costs will be available when the timing of the initiative or action is agreed and a more detailed budget will be prepared. The indicative capital investment for implementation to FY30–31 is summarised in the following tables and is estimated to be **\$17,847,000** with a seven-year operational budget of **\$14,290,600**.

**Table 14: Implementation capital investment estimates for the region**

Council and asset description		Estimated CAPEX
<b>Barcaldine Regional Council</b>		<b>\$ 3,700,000.00</b>
New transfer station at Aramac (close and cap old landfill)	\$ 600,000.00	
New transfer station at Alpha (close and cap old landfill)	\$ 600,000.00	
New transfer station at Jericho (close and cap old landfill)	\$ 600,000.00	
New transfer station at Muttuburra (close and cap old landfill)	\$ 600,000.00	
Upgrade Barcaldine landfill (new clay liner) & transfer station	\$ 500,000.00	
Hook-lift truck and skip bins for waste transfer stations (12)	\$ 650,000.00	
Remote access systems for Jericho and Mutuburra sites	\$ 150,000.00	
<b>Barcoo Shire Council</b>		<b>\$ 2,000,000.00</b>
General landfill site upgrade at Jundah	\$ 150,000.00	
New transfer station at Windorah (close and cap old landfill)	\$ 600,000.00	
New transfer station at Stonehenge (close and cap old landfill)	\$ 600,000.00	
Hook-lift truck and skip bins for waste transfer stations (6)	\$ 500,000.00	
Remote access systems for Windorah and Stonehenge sites	\$ 150,000.00	
<b>Blackall-Tambo Regional Council</b>		<b>\$ 1,500,000.00</b>
General landfill site upgrade at Blackall	\$ 150,000.00	
New transfer station at Tambo (close and cap old landfill)	\$ 600,000.00	
Future – new transfer station at Blackall (close and cap old landfill)	\$ 600,000.00	
Skip bins (6) (share Barcaldine hook-lift truck)	\$ 150,000.00	
<b>Boulia Shire Council</b>		<b>\$ 600,000.00</b>
General landfill site upgrade at Boulia	\$ 300,000.00	
General landfill site upgrade at Urandangi	\$ 300,000.00	
<b>Diamantina Shire Council</b>		<b>\$ 750,000.00</b>
General landfill site upgrade at Bedourie	\$ 300,000.00	
General landfill site upgrade at Birdsville	\$ 300,000.00	
Remote access systems for Bedourie and Birdsville sites	\$ 150,000.00	
<b>Longreach Regional Council</b>		<b>\$ 2,325,000.00</b>
General landfill site upgrade for Longreach	\$ 150,000.00	
Weighbridge at Longreach	\$ 150,000.00	
New transfer station at Ilfracombe (close and cap old landfill)	\$ 600,000.00	

New transfer station at Isisford (close and cap old landfill)	\$ 600,000.00	
New transfer station at Yaraka (close and cap old landfill)	\$ 600,000.00	
Skip bins (9) (share Barcaldine hook-lift truck)	\$ 225,000.00	
<b>Winton Shire Council</b>		<b>\$ 1,000,000.00</b>
General landfill site at Winton	\$ 150,000.00	
New transfer station at front end of Winton disposal site	\$ 600,000.00	
Bins and mobile plant	\$ 250,000.00	
<b>Legacy waste</b>		<b>\$ 5,372,000</b>
Determine legacy stockpile quantities	\$ 100,000.00	
Tender for tyre shredding and transport to end processor	\$ 3,072,000.00	
Concrete clean-up	\$ 1,000,000.00	
Steel clean-up	\$ 1,000,000.00	
Garden and wood-waste-chipping and clean-up	\$ 200,000.00	
<b>Organics</b>		<b>\$ 300,000.00</b>
Home/commercial composting support program and compost bins		
<b>Education</b>		<b>\$ 300,000.00</b>
Initial education campaign	\$ 300,000.00	
<b>Total CAPEX</b>		<b>\$ 17,847,000.00</b>

Table 15: Operational budget - annual

Activity	Estimated OPEX	Annual
<b>Operational (per annum)</b>		
<b>Resources (over 7 years)</b>	<b>\$ 8,050,000.00</b>	
Regional Support Resources to support the Regional Resource Recovery Working Group	\$ 250,000.00	
Capacity building, technical investigations, feasibilities including cost-recovery mechanisms	\$ 100,000.00	
Supervision of disposal sites	\$ 800,000.00	
<b>Education (over 6 years)</b>	<b>\$ 1,200,000.00</b>	
Community education	\$ 200,000.00	
<b>Recovered material processing (over 3 years)</b>	<b>\$ 5,040,600.00</b>	
Regular processing and clearance of recovered materials stockpiles (initial 3-year period only)	\$ 1,680,200.00	
<b>Total OPEX over 7 years</b>	<b>\$ 14,290,600.00</b>	

Table 16: Combined budget to FY30-31

Activity	Estimated Budget
Capital	\$ 17,847,000.00
Operational	\$ 14,290,600.00
<b>Total CAPEX and OPEX</b>	<b>\$ 32,137,600.00</b>

As current waste management systems are, in general, operated on very low budgets, the implementation of improved service standards will need committed capital and operational funds from the member councils, or a blend of grant-based capital and state government operational funding with council budget allocations.

When considering funding for improved waste management systems, multiple approaches should be considered, including efficiency gains within council operations, and through the development of local economic opportunities, revenue and cost-recovery mechanisms, and grant funding through state and national government.

While the Plan provides the primary vehicle for accessing funding through the Recycling and Jobs Fund (refer to **Section 10.4** below), there may also be opportunities for specific initiatives to be funded that are outside the Plan, for example a pilot at a local level to 'test' the suitability of a model or infrastructure for the region (or sub-region).

It is expected the bulk of the funding will come from state recycling and jobs funding programs, and the pathway for approvals will be made more streamlined given initiatives have already been identified in the Plan.

The Plan will be a living document, however, and where projects are identified outside the first version, discussions will be held between RAPAD and the RRWG to assess suitability for funding as part of the Plan or whether it should be considered under separate funding pathways.

Councils participating in the development of this Plan can do so in the knowledge that this of itself does not oblige individual councils to any funding commitment. Subsequent business cases developed as part of implementing the Plan would necessarily include funding arrangements for RAPAD's consideration and decision making.

## **10.2 Local government**

Local government revenues typically come from three main sources: municipal rates, user fees and charges and grants from federal and state/territory governments. In some cases, a fourth revenue source may be raised from operating public enterprises or providing road maintenance services and supplies to state and national road networks. In this category, other revenues from natural disaster relief and recovery arrangements may also be sourced.

Some councils (but not all), currently apply fees and charges for the acceptance of problematic materials and/or commercial wastes at the disposal sites, although these are not universally applied across the region.

In general, given the small population sizes across the region, local governments will have limited resources to support capital investments and the operations of improved infrastructure and other initiatives if they are reliant on revenues drawn from annual rates.

The capacity of local governments to raise revenue is critical to achieving financial sustainability over the longer term, while delivering the level of service expected by the community. Given the small populations across the region, councils may have insufficient revenue-raising capacity and will therefore be very restricted in operating upgraded infrastructure and delivering initiatives associated with this Plan.

Price signals are now commonly employed in local government to encourage household and commercial waste producers to reuse and recycle, instead of automatically disposing. The use of incentives for recycling and resource recovery are effective in reducing waste to landfill and increasing recovery, which in turn creates a feedstock to support business and employment creation.

The application of user-pays fees at disposal sites also has the capacity to equitably distribute costs between lesser and higher generators of waste while also providing a vehicle for councils to recover costs to allocate to the management of wastes.

Consideration should also be given to the cost efficiencies that may be gained through regional, sub-regional or local procurement of private-sector waste collection and/or waste disposal site management services. Tendering for these services across multiple council areas will generate greater interest by the private sector, who is then able to make better use of assets and resources for these services, for example collection vehicles, mobile equipment and staffing, leading to a competitive tendering process. A larger number of collection services or waste site operations may lead to more attractive rates and improved servicing.

## **10.3 Private sector**

The private sector may participate in several ways, including PPP arrangements with councils. This can take the form of a commercial company entering into service contracts such as kerbside collection services or disposal site operations. Contract terms have the capacity to deliver investment security and support the introduction of improved assets and services associated with recycling, resource recovery, waste collection, treatment and disposal services. Local government may also provide land and other concessions.

Build, own and operate models may also be attractive to the private sector but will necessarily require longer term service agreements/contract arrangements to secure feedstocks and/or product offtake agreements.

#### 10.4 State and Commonwealth funding

The Queensland State Government supports local governments through grants, subsidies and direct investments in projects. Access to grant funding requires the applicant and the project to meet certain criteria across a range of factors including location, benefit to the broader community, economic impacts and so on, and these requirements will be specific to the program and the program objectives. In general, grants programs will be competitive and may require 'in kind' or a cash contribution from the proponent.

Grants programs are generally run over specific periods and the programs listed below may have already been closed to new applications.

**The Queensland Recycling Modernisation Fund** is an investment of \$40 million which is co-funded equally between the State and Commonwealth governments. This program is focused on attracting private-sector investment in new infrastructure, particularly for sorting, processing and remanufacturing of waste plastics, paper, cardboard, tyres and glass. The current round of this fund is targeting solutions for plastics that are hard to recycle and is open to applications until 13 November 2023.

**The Regional and Remote Recycling Modernisation Fund** is also jointly funded by the State and Commonwealth governments and allocates grants of up to \$500,000 to local governments and industry partners for infrastructure projects that divert waste plastics, mixed paper and cardboard, unprocessed glass and whole used tyres from landfill. The program is currently closed to new applications, however future rounds may be suitable to support the implementation of activities within this regional plan.

**The Local Government Grants and Subsidies** is a competitive application-based program to support local governments to deliver key infrastructure projects that contribute to sustainable and liveable communities, align with government infrastructure priorities, support economic growth, community development, increase local job creation and training opportunities and provide efficient and cost-effective outcomes through a regional collaborative approach. Projects for new or upgraded infrastructure projects will be in the essential service areas of waste infrastructure and waste management.

**The Recycling and Jobs Fund** aims to create more opportunities for business and industry as resource-recovery infrastructure is expanded and new markets are developed. The \$1.1 million fund provides opportunities for government and industry to co-invest in the transition to a circular economy. This program may be suitable to support the implementation of activities within this regional plan.

**The Industry Partnership Program** provides \$350 million to support a range of industry sectors including resource recovery, recycling and the circular economy. The objectives of the program are to enhance and grow industry and employment by expanding the existing industry footprint and developing emerging industries or locations of strategic importance. This program may be suitable to support the implementation of activities within this regional plan.

**The Regional Recycling Transport Assistance Package**<sup>19</sup> is a market signal to incentivise the diversion of waste from landfill. This is a \$6 million competitive fund. An eligible project is a new, existing or expanded recycling activity that is unviable due to transport costs; that is, the cost to landfill is less than the costs to recycle and transport. Only the costs of transporting recyclable materials from regional Queensland to facilities where it can be recovered or processed and turned into new products are eligible for funding. Grants of up to \$250,000 are allocated to regional businesses, councils and charities.

<sup>19</sup> Regional Recycling Transport Assistance Package [https://www.qld.gov.au/\\_\\_data/assets/pdf\\_file/0013/111136/rrtap-guidelines.pdf](https://www.qld.gov.au/__data/assets/pdf_file/0013/111136/rrtap-guidelines.pdf)

The **Organic Waste Smart Schools Program** provides grants of up to \$2,500 and is open to all Queensland state schools. Projects must include the purchase of equipment that either contributes to organic waste reduction strategies in schools or directly supports activities that encourage appropriate use in the school. Equipment may include compost bins, worm farms and related equipment, waste separation bins, gardening equipment and signage.

## 11. GOVERNANCE FOR THE PLAN

### 11.1 Regional working group

The CWQ region will establish a formal RRWG to support the implementation of the actions within the Plan and contribute to the development of waste and resource recovery initiatives for the region. The CWQ councils through the RAPAD Board will be required to review and endorse such initiatives, and through this pathway, apply for potential state government grant funding.

Membership of the group will consist of key technical officers from each council and may potentially include representatives from the Queensland Government, in particular the Department of Environment and Science (DES), the Department of State Development, Infrastructure, Local Government and Planning (DSDILGP), along with the Local Government Association of Queensland.

The reporting obligations to the CWQ Councils and the RAPAD Board will be developed in line with the group's charter. A coordinator role will be necessary to provide administrative support to the group and its activities and to ensure good governance is maintained.

Funding will be sought from the Queensland Government to fund a Regional Support Resource Coordinator role. This position will manage collaboration between the group and the councils across the region, advocate for better access to services, coordinate progress of initiatives and actions within the Plan and act as a secretariat to the group. Refer to **Section 12** below. One full-time-equivalent role is anticipated.

An estimated amount of \$250,000 per year for this role has been allocated to the Plans high-level budget together with a provisional amount of \$100,000 to assist capacity building, advocacy costs, engagement of external experts and technical support as required. The establishment of the group and the Regional Support Resource Coordinator position forms a **short-term** action of the Plan.

### 11.2 Regional procurement

This Plan has discussed the potential benefits of joint procurement, which may be further considered by the regional working group. In circumstances where tendering and contracting for more than one council is considered the best approach, a regional procurement entity may be beneficial. Alternatively, one council may lead the administration of the procurement activity and also the ongoing contract management on behalf of the remaining councils.

There are several models for joint procurement that could be employed. A special-purpose entity, governed by the regional RAPAD board may manage the tendering process with each council managing their independent contracts. Alternatively, a special-purpose entity may manage the joint contract on behalf of the member councils. Any regional procurement model may need clearance through the Australian Consumer and Competition Commission (ACCC) and suitable options should be investigated through this organisation.

Joint procurement may be beneficial in regard to the following activities:

- Procurement of technical or commercial advisory services relating to research and development;
- Regional-scale procurement for waste collection and disposal site management services; material processing services e.g. green-waste shredding;

- Regional-scale contracts associated with offtake arrangements for materials such as regulated wastes, steel and other value commodities;
- Contracts to purchase goods and services, for example mobile garbage bins and skip bins;
- Development of a long-term regional waste solutions, for example regional landfill or material recovery facility.

### 11.3 Role of member councils

The success of the Plan will rely on the sustained level of ownership by member councils. The plan contains initiatives that are at both local and regional level and the buy-in of council staff and the communities they service. This will directly influence the planned outcomes.

The regional group of councils through the RAPAD Board will have overall ownership of the Plan. While the implementation will largely be the responsibility of the RRWG, the councils will maintain the role of authorising and approving projects and associated project expenditure and adopting policy.

## 12. SUPPORT FOR DELIVERY

A range of support service functions are necessary to inform decision making and delivery related to key actions within the Plan, but also importantly to underpin good governance practices of the regional working group.

A Regional Support Resource Coordinator will play a pivotal role in supporting the regional working group and the individual councils by providing technical and administrative functions that may include:

- Coordinating the development of the working group charter, administrative and financial management systems;
- Providing secretariat functions to the working group, including reporting and presentations;
- Delivering contract management and project management functions;
- Fulfilling an ongoing advocacy role;
- Supporting the preparation of funding applications to the gateway processes set up by the Queensland or Commonwealth governments;
- Providing technical support to waste management and resource-recovery systems;
- Coordinating the preparation of detailed business cases, cost-benefit analysis, feasibility studies, procurement plans, tender and contract/s development;
- Coordinating the development of regional community education programs.

In this respect, it is recommended the Regional Support Resource Coordinator be of long standing within the industry sector and have demonstrated experience in both the technical and administrative aspects for waste management and resource recovery.

## 13. MANAGING CHANGE

The states and territories through the Environment Ministers Meetings manage the alignment to and implementation of nationally driven targets. It is expected that governments will be increasingly focused on the continuing transition to the circular economy and the management of the nation's carbon footprint.

National and state governments continue to refine significant policy, operational and regulatory mechanisms that directly impact waste management and resource recovery. It is therefore expected that the coming 10-year period will see changes to the environmental, economic, social and technical basis and assumptions underpinning this Plan.

In implementing the Plan, the working group and the CWQ councils should remain aware of potential disruptors and be able to respond to these disruptors adequately, which may include:

- Policy changes imposed by the Queensland or Commonwealth governments that have a direct impact on the services provided by councils;
- Changes to the composition of waste within households and businesses associated with the Commonwealth Government actions on imported materials;
- A change in packaging materials, in particular products that contain a greater proportion of recyclable content;
- The development of new and/or small-scale fit-for-purpose technologies including energy-from-waste (EfW) and/or anaerobic digestion;
- Changes to the State Government waste levy.

### 13.1 Education and community engagement

Community education will form a critical action in supporting the implementation of the Plan, and importantly engaging and consulting with community in regard to the necessary or desired behaviour changes. As such, an education and engagement program should be multi-faceted to reach all members of the community.

The theme and presentation of all media should align throughout the region to assist with recognition of the messaging. It is essential that community education messaging and tools are easy to understand and not unnecessarily complicated to avoid misunderstanding or apathy. An education campaign will often produce early positive results which will need to be sustained over time. As such, a 'one off' program will not be sufficient and will require ongoing activities to maintain focus.

The basic tools for effective waste education commonly include:

- Easily identifiable branding;
- Clear messaging based on a principle of 'less is more';
- Consistent messaging and use of appropriate images;
- Interactive and demonstrative elements;
- Use of a dedicated website with waste page links to other sites;
- Use of social media;
- Use of radio, newsprint, television, pop-up events, posters and signage;
- Use of a 'local champion';
- Coordination with community groups events;
- School programs.

Campaigns may feature such messaging as:

- Reduce, reuse and recycle;
- Container redemption centres or other charitable community facilities;
- Organics management, at home and in workplaces, to reduce carbon impacts and improve soil health;
- Litter and illegal dumping prevention aimed at reducing exposure to safety and environmental risks.

## 14. MONITORING AND REVIEW

A formal program is required to monitor the performance of the initiatives in the Plan. The program should be used as a basis for the amendment of the Plan and where necessary to modify or add to actions. Ideally, in the short term, a set of formalised monitoring parameters and targets will be agreed by RAPAD and the RRWG, and by review process or through amendment will be incorporated into the Plan.

The responsibility for monitoring the implementation of the individual council plans will reside with member councils. The coordination of the implementation of the Plan will rest with the RRWG and the Regional Support Resource. So too should the overall analysis of its performance.

It is recommended a five-year review of the Plan be undertaken and this be coordinated by the RRWG, in communication with the individual councils and reporting to the RAPAD Board.