



REGIONAL WASTE MANAGEMENT PLAN 2018 - 2023

Kimberley Region

Shires of Broome, Derby West Kimberley, Halls Creek
and Wyndham East Kimberley



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EXECUTIVE SUMMARY

ASK Waste Management (ASK) has been engaged by the Shire's of Broome, Derby/West Kimberley, Halls Creek and Wyndham East Kimberley to produce an update of the previous 2013 Regional Waste Management Plan (RWMP).

The purpose of the Plan is to provide strategies and actions to strengthen regional collaboration and cooperation in the delivery of waste management services and improve waste management practices across the region consistent with the State's Waste Strategy.

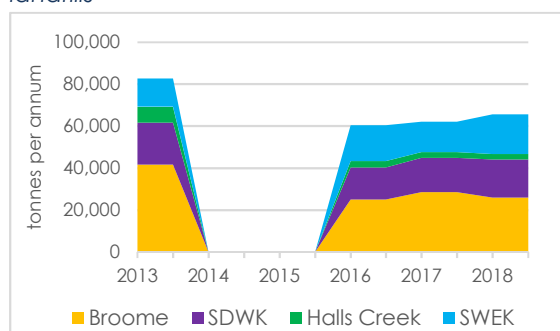
The plan discusses the relevant legislation and policy frameworks and issues that may impact on waste management within the region over the timeframe of the plan.

Waste Quantities

Between 2016 – 2018 an average of 62,700 tonnes per annum of waste was received at the Shire's landfills, excluding liquid waste, clean fill and cover material imported to the facilities. This total excludes any wastes that were managed directly by industry (e.g. mine sites and pastoral stations) or Aboriginal communities with their own landfill sites.

Figure E.1 shows the change in total waste received at the landfills in 2013 and 2016 – 2018. There was a stepped reduction in total waste received from over 80,000tpa in 2013 to 60,000tpa in 2016, possibly due to improved data collection and reduced economic activity.

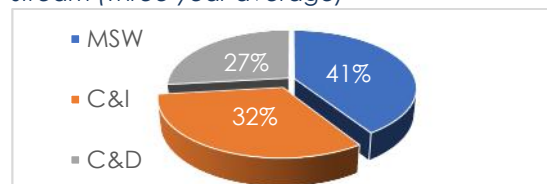
Figure E.1 – Total waste received at the Shire's landfills



Broome accounted for approximately 42% of the waste received, followed by SWEK (27%), SDWK (26%) and Halls Creek (5%). The

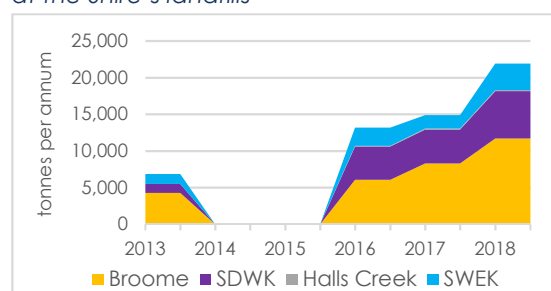
breakdown of waste into waste type is shown in Figure E.2 below.

Figure E.2 - Percentage breakdown by waste stream (Three year average)



The tonnage of waste received at the Shire's landfills that is diverted from disposal has increased by over 300% since 2013, as shown in Figure E.3. The waste diversion rate for the region was 27% in 2018, this is a significant achievement given the constraints the Shires face.

Figure E.3 – Total waste diverted from disposal at the Shire's landfills



Based on the projected population growth for the region, in 20 years the waste generated is estimated to increase by 40% to approximately 100,000tpa.

Findings

In general, implementing the 2013 RWMP has been challenging for the Shires due to insufficient organisational capacity, especially at the regional level. However, over half of the actions were completed or progressed.

Data quality has improved, however, due to the lack of weighbridges at most landfills and limited data collection it is very difficult to effectively plan future activities and operations. Instead, planning and decisions are based on estimated data generated by extrapolation and assumption.

In terms of economic understanding, Shires are effectively 'operating in the dark' as they are lacking financial data for the true cost of waste disposal and airspace. This has operational and

long term financial impacts which can lead to avoidable costs being incurred and limits the ability to assess the feasibility of potential resource recovery initiatives.

Many of the Shire's waste facilities were developed prior to modern best practice, therefore their siting and previous management were often inefficient and did not consider the requirements of site closure and rehabilitation.

The Broome landfill has less than five years of operational life and several other key facilities possibly have a remaining operational life of less than 15 years. Given the current requirements for site identification, assessment, approval and construction, any landfill with less than 10 years of operational life must immediately start the process to secure a new site.

Most Shire officers responsible for waste management are not dedicated waste officers but are also responsible for a wide range of other technical duties. Therefore, they are only able to devote a relatively small portion of their time to waste, while at the same time waste management activities increase as the expectation and need for more environmentally responsible waste management solutions increases.

Some recycling measures that have been introduced were not fully assessed for their long-term environmental and economic sustainability.

Actions for 2018- 2023

The RWMP implementation strategy is focused on the next five years, with the initial focus to develop strategies to maximise efficient collaboration with the Shires, therefore reaping the benefits as soon as possible.

Section 8 of the RWMP contains a basic implementation schedule and approximate costs per Shire, this information can be used for annual operational business planning and budget processes.

Section 9 outlines the key risks that could impact on the implementation of the 2018 RWMP, along with recommended mitigation measures and residual risks ratings. This shows that without adequate resourcing, especially for regional

coordination there is a high risk for poor implementation of the RWMP.

The key areas of action identified in this RWMP are:

Data

- J The collection of consistent and appropriate waste data across the region and introduce measures to improve its accuracy.
- J Improve the collection and interpretation of waste costs, particularly Whole of life costs and determining the value of remaining airspace.
- J This improved data will enable potential recycling measures to be effectively assessed prior to introduction and will ensure the best outcomes are achieved for the region's community.

Infrastructure planning

- J Quantify the remaining operational life of the regions waste facilities and ensure new facilities are planned for at least 10 years prior to being required.

Strategic planning

- J The implications of disaster waste generation, the municipal services upgrade program and the State Waste Strategy need to be fully understood and incorporated into each Shire's long term waste service delivery planning.

Regional collaboration

- J Regional collaboration is key to maximising the benefits for the region and the delivery of the RWMP. Dedicated regional coordination is essential, with financial support and backing from the Shire CEO's and Council.

Waste minimisation

- J There are great opportunities to build on the increased waste diversion in the region. However, they need to be thoroughly assessed to determine community support, economic viability and long term market security for the recycled materials.

The successful implementation of RWMP will provide many positive outcomes and presents an opportunity for the participating Shires to tackle the management of waste on a more regional scale and in an integrated manner.

This is an opportunity which, if actioned, could assist in reducing capital expenditure and increase the economic feasibility of recycling and recovery programs in the region.

1 INTRODUCTION

ASK Waste Management (ASK) has been engaged by the Shires of Broome, Derby/West Kimberley, Halls Creek and Wyndham East Kimberley to produce an update of the previous 2013 Regional Waste Management Plan (RWMP). The purpose of the Plan is to provide strategies and actions to strengthen regional collaboration and cooperation in the delivery of waste management services and improve waste management practices across the region consistent with the State's Waste Strategy.

This document is the third iteration of the RWMP. In 2009 the Shires of Broome, Derby/West Kimberley and Halls Creek commissioned ASK to develop their Strategic Waste Plan or RWMP in alignment with the Waste Management Board of Western Australia's Zero Waste Plan Development Scheme.

Subsequent to development of the original RWMP the Shire of Wyndham East Kimberley (SWEK) begun cooperating with the original three Shires on regional waste management initiatives. The policy environment underpinning waste management also shifted with the introduction of the Western Australian Waste Strategy (WAWA, 2012) and the annual Business Plans (WAWA, 2013) that drive it. In line with the objectives and direction of the Strategy, changes were made to the State Government funding mechanisms that support local government's waste management initiatives putting a greater emphasis on projects that involve regional cooperation and demonstrable reductions in waste to landfill. The four councils have therefore requested ASK to update the previous RWMP in order to account for the inclusion of SWEK into the regional group and the altered policy environment. A five year action plan (2013 – 2018) was subsequently developed to facilitate improved waste outcomes for the region focussing on the key findings.

In 2018, a further review and update of the plan was required. This updated RWMP places particular emphasis on assessing the progress made on the previous RWMP, identification of any barriers to its implementation, and recommending actions that can be taken to ensure progress continues into the future.

1.1 PURPOSE OF THE REGIONAL WASTE MANAGEMENT PLAN

The purpose of this Regional Waste Management Plan is to:

-)] Confirm current waste infrastructure and levels of service;
-)] Assess progress against the previous RWMP (2013);
-)] Identify priority actions to strengthen regional collaboration and cooperation in the delivery of waste management services and initiatives;
-)] Identify priority actions to improve waste management operations across the region and increase the rate of resource recovery; and
-)] Assign actions, costs and timelines for the implementation of the strategy's actions and objectives.

1.2 OBJECTIVES

The overarching objectives of the RWMP are:

-)] Facilitate cooperation and collaboration between the four Shires in the Kimberly with regards to waste management;
-)] Achieve regional outcomes and efficiencies in regard to waste management;
-)] Ensure waste is managed in a strategic, sustainable manner and regulatory compliant;
-)] Increased community awareness of the impact of waste issues on the environment;
-)] Minimise the region's direct and indirect environmental impact of waste on the environment.

This RWMP does not cover Aboriginal communities located throughout the region given Local Government generally does not fund waste management services or receive waste generated within these communities.

1.3 IMPACTS ON THE RWMP

An important role of this RWMP is to interpret and incorporate relevant legislation and policy impacting on waste management within the region. The following section discusses the relevant State and regional policy frameworks and issues that may impact on waste management within the region within the timeframe of the plan.

1.3.1 Updates to 2009 National Waste Policy

In April 2018, Australia's environment ministers agreed to update the 2009 National Waste Policy by the end of 2018. An updated policy is proposed to set a clear roadmap for collective action by businesses, governments, communities and individuals, reflecting the global shift towards a circular economy. This includes designing systems and products to avoid waste, conserve resources and maximise the value of all materials used. It also includes improving capacity for products to be better designed, reused, repaired and recycled.

A discussion paper was released in September 2018 to seek input on priority issues to be considered in future Australian waste management and resource recovery. Feedback will inform updates to the 2009 National Waste Policy for consideration by environment ministers later this year. This discussion paper reflects circular economy principles and proposes a number of targets for comment, including:

-)] Reduce total waste generated in Australia per capita by 10 per cent by 2030
-)] 80 per cent average recovery rate from all resource-recovery streams, following the waste hierarchy, by 2030
-)] 30 per cent average recycled content across all goods and infrastructure procurement by 2030
-)] Phase out problematic and unnecessary plastics by 2030
-)] Halve the volume of organic waste sent to landfill by 2030
-)] Fit-for-purpose and timely data to be available for individuals, businesses, and governments to make informed decisions

The updated policy will guide continuing collaboration between Australian governments and businesses. It will not remove the need for governments and businesses to implement tailored solutions in response to local and regional circumstances.

1.3.2 Waste Authority, Waste Strategy 2030

The draft 'Waste Strategy 2030' was released for consultation in October 2018. Building on the first Western Australian Waste Strategy: Creating the Right Environment published in 2012, this updated strategy introduces significant transformations aimed at Western Australia (WA) becoming a circular economy, with a greater focus on avoidance as well as moving towards targets for material recovery and environmental protection in addition to landfill diversion.

This strategy includes three objectives to guide the Western Australian community and enable the development of a sustainable, low-waste and circular economy. These objectives frame the priorities and strategies that will contribute to delivering on the vision and are outlined in **Figure 1.1**.

Figure 1.1 - Draft objectives and state targets (Waste Strategy 2030)

Avoid	Recover	Protect
Western Australians generate less waste.	Western Australians recover more value and resources from waste.	Western Australians protect the environment by managing waste responsibly.
2025 – 10% reduction in waste generation per capita 2030 – 20% reduction in waste generation per capita	2025 – Increase material recovery to 70% 2030 – Increase material recovery to 75% 2020 – Recover energy only from residual waste	2030 – No more than 15% of waste generated in Perth and Peel regions is landfilled 2030 – All waste is managed and/or disposed to better practice facilities

To achieve this strategy's objectives and targets, a model of shared responsibility and action is proposed to be adopted. This includes State Government working collaboratively with all stakeholders to guide and develop collective policies and solutions. For local governments and industry, the collective partnership approach will mean adopting best practice approaches to waste minimisation, resource recovery and appropriate waste management.

The strategy also identifies focus materials which will guide an emphasis on actions and measurement going forward. These materials include: construction and demolition waste, organics (food and garden organics), metals, paper and cardboard, glass, plastics, textiles, and hazardous waste.

There is currently limited clarification on the geographic application of the strategy for some objectives and targets. Some of the targets in the draft Strategy are specific to a geographic area, for example the Perth and Peel regions. Other targets are not geographically specific, such as those relating to C&I and C&D and better practice approaches to infrastructure.

If the targets apply to the whole State, it is essential that strategy descriptions are framed in such a way that the resulting initiatives accommodate the differences between the metropolitan and regional / remote areas. In particular, the targets in the draft Strategy relate to the management of all waste using better practice approaches and the adoption of resource recovery better practice by all waste facilities.

This has significant implications for regional and remote Local Governments with limited resources available to implement new approaches. These approaches need to be developed in consultation with the sector and it will be essential to provide funding assistance to transition to any new 'Better Practice' approach. However, there is only one strategy description that specifically refers to funding for areas of the State outside the definition of Perth, Peel and Regional Centres.

The draft strategy includes specific resource recovery targets for the Metropolitan and Peel region and key regional centres for municipal solid waste (MSW). A major regional centre is defined as 'Any WA local government not within the Perth metropolitan region or Peel region, with a population above 15,000 and within 600km (by road) of Perth'. This definition excludes all towns within the Kimberley zone and as such it is unlikely the region will be subject to these specific targets for MSW, but rather will contribute towards the State-wide targets.

How the Strategy will apply to Aboriginal communities and the agencies that are responsible for providing waste management activities to those communities requires further clarification.

1.3.3 Kimberley Regional Planning and Infrastructure Framework (2015)

The Western Australian Planning Commission in partnership with Regional Development Commissions, Regional Development Australia and Local Governments has prepared Regional Planning and Infrastructure Frameworks for the State's eight country planning regions. The purpose of each framework is to establish a regional vision and basis for decision-making. The frameworks also introduce a number of planning initiatives, which form the basis of an ongoing work program for the Department of Planning.

Titled 'The Kimberley Regional Planning and Infrastructure Framework' (KRPIF), this document provides an overall strategic context for land-use planning in the Kimberley region over the next 25 years. The

Framework identifies a range of strategic initiatives to help achieve comprehensive regional planning whilst having due regard to the region's natural environment, heritage and culture.

Urban places in the Kimberley are serviced by utility service networks consisting of water, power, waste water, telecommunications and waste management, and are key to the region's development. The KRPIF has investigated the current infrastructure capacity and future requirements to support economic and population growth across the region. In terms of waste, the report provides the following:

Future demand for solid waste management services

Servicing projected economic and population growth in line with the WA Tomorrow forecasts and aspirational targets will mean generation of significantly more solid waste materials. This will trigger the need for upgrading existing stations or the commissioning of new facilities.

Future capacity requirements

At present, there is a pressing need to upgrade or relocate existing landfill sites in the existing settlements of Broome, Kununurra, Derby, Halls Creek and Wyndham along with some of the Aboriginal towns and settlements. These new facilities should be strategically located so as not to impinge upon future urban expansion options but could also include the option to expand as demand dictates. One key issue that needs to be addressed is the manner by which tourism sites – camping grounds, national parks and other attractions – are provided with a rubbish removal service.

Waste minimisation is also a critical concern and will assist in increasing the life expectancy of existing landfill sites, minimising environmental damage, reducing operational costs and supporting resource recovery. However, high levels of contamination, the cost of recovery and the generally free access by households to dump trailer waste at landfills is an inhibiting factor to economically sustainable recycling operations. Green waste separation and treatment for use as mulch is not common place.

There may be opportunities for the development of a regional waste facility to improve waste management through recycling and green waste composting.

The KRPIF recognises improvements to waste management infrastructure and services as one of the key planning issues to be addressed for the Kimberley Region. The following opportunities have been identified in the framework to address future planning and provision of solid waste management services across the region. These include:

- J minimising solid waste and associated environmental impacts;
- J providing adequate collection and disposal capacity at the region's landfill sites and where necessary identify new sites;
- J identifying a suitable site for a regional/ sub-regional waste management facility as appropriate; and
- J maximising re-use and recycling of landfill materials in a sustainable manner through the use of best practice technology and waste disposal minimisation.

A specific waste management infrastructure project identified by the KRPIF is to provide new solid waste management facilities, including the ability to handle increased recycling and liquid wastes, in regional centres including Broome, Derby and Kununurra.

1.3.4 China National Sword Policy

The viability of recycling packaging materials from households and businesses in Australia has been impacted by the more stringent contamination thresholds recently introduced by China for the importing of recycled materials.

Most separated recycling material previously sent from Australia to China does meet the new contamination thresholds, and therefore this material is flowing to alternative markets and has led to a significant reduction in the value of recycled packaging materials. The reduced value of the materials is negatively impacting on the viability of recycling programs offered by local governments. This impact is

greatest in locations such as the Kimberley where these services, where they currently exist, already face higher unit costs than metropolitan areas.

This measure introduced by China has highlighted the need to develop processing capacity and markets for the packaging materials within Australia.

To avoid a repeat of the impacts of the China Sword policy, measures to increase diversion from landfill in the Kimberley should focus on reprocessing material streams that have local markets, rather than relying on the costly transport to distant markets where local governments have little or no control over the value and risk.

1.3.5 *State Government Essential and Municipal Services Upgrade Program*

The Essential and Municipal Services Upgrade Program is a major initiative of the State Government's Regional Services Reform agenda and one of 10 priority actions in the 'Resilient Families; Strong Communities' roadmap (Government of Western Australia, 2018).

Under this program the State Government will progressively upgrade infrastructure in larger remote Aboriginal communities to standards comparable to other regional towns. This will enable the delivery of improved power, water and wastewater services, and municipal services such as road maintenance and waste collection.

The program involves electricity infrastructure being handed back to and run by Horizon Power, while water infrastructure will be returned to Water Corp. A future step may include handing the balance of the municipal services back to local government to manage.

The State Government has identified the first 10 remote Aboriginal communities to participate in the Essential and Municipal Services Upgrade Program. Eight of these communities are in the Kimberley region and include Ardyaloon, Bayulu, Beagle Bay, Bidyadanga, Djarindjin, Lombadina, Mowanjum, and Warmun.

Given the waste derived from these settlements and waste infrastructure situated within these settlements has not previously been under local government care and control¹, any changes to bring this into Local Government management will have significant cost and resource implications on Shires in the region.

1.3.6 *Container Deposit Scheme*

A container deposit scheme (CDS) is due to commence in early 2020. A container deposit scheme allows consumers to take empty beverage containers covered by the scheme to a refund point to receive a refund of 10 cents which provides an incentive to return these containers. Beverage containers make up 35.2 per cent by volume of the litter stream in Western Australia based on the results from the 2015-16 National Litter Index and are manufactured from readily recyclable materials such as glass, plastic, aluminium and cardboard.

A CDS is an example of an extended producer responsibility scheme where producers take responsibility for post-consumer management of product waste. In the existing and proposed Australian schemes, the majority of small additional costs paid by consumers for the scheme can be recouped through the refund. The balance of costs pays for the container collection system that can be reasonably accessed by all users of beverage containers.

A CDS is intended to operate with kerbside recycling and complement existing services as much as possible. For communities without kerbside recycling services, it provides an opportunity to participate in recycling activities. A CDS is also likely to encourage people to collect and recycle drink containers that are consumed away from home.

Beverage containers included in the Western Australian CDS comprise beverage containers between 150 millilitres and three litres in volume and include such items as soft drink cans and bottles, bottled water

¹ The Shire of Halls Creek was the Licencee of the previous landfill at Warmun, however, they had no control of the facility's operations or compliance.

containers, flavoured milk drinks, beer and cider bottles, and sports drinks. It excludes containers generally consumed at home such as wine bottles and milk containers.

The CDS requires a network of collection points to refund ten cents for containers returned by the public. A vital part of designing the CDS and its collection network is balancing the convenience and cost of the collection network. Full time refund points are expected to reflect full time business operations.

It is expected that a minimum number of hours per week will be specified to provide consumer convenience, including at least some service outside of regular office hours. Flexible refund points are intended to meet the requirements of smaller or fluctuating populations and could be provided on a part time, seasonal, mobile, or event based (pop-up) basis.

For the Kimberley region one fulltime refund point is proposed at Broome along with 10 flexible refund points at Kalumburu, Wyndham, Kununurra, Halls Creek, Balgo, Fitzroy Crossing, Looma, Derby, Djarindjin – Lombadina, and Bidadanga.

1.3.7 Opportunities for Regional Funding

There are numerous funding sources that may become available over the life of the RWMP that could assist participating Local Governments in achieving better practice waste management outcomes for their communities and the region.

The Australian Government's Building Better Regions Fund (BBRF) supports the Government's commitment to create jobs, drive economic growth and build stronger regional communities into the future. The Government is providing \$641.6 million over 5 years from 2017-18 to 2021-22 for the program. The fund invests in projects located in or benefiting eligible areas outside the major capital cities.

Grant funding includes an infrastructure Projects Stream which supports projects that involve construction of new infrastructure, or the upgrade or extension of existing infrastructure. Round Three of the BBRF closed on 15 November 2018, however it is anticipated further rounds will become available in 2018-19.

The Western Australian Waste Authority also provide funded programs and grant schemes for local governments. These programs are limited term schemes that specifically address waste issues for the relevant target groups. They reflect priority areas of the Waste Authority and are managed by DWER on behalf of the Authority.

Many of these funded programs and grants, however, currently only have limited applicability outside the metropolitan area. With the introduction of a new Waste Strategy, it is likely that new funding streams will also be provided to assist Local Governments in meeting the requirements of the Strategy.

2 REGIONAL PROFILE

The Kimberley is the most northern of Western Australia's nine non-metropolitan regions. It occupies the western part of the Australian 'top end' and is strategically located on the southern margins of Southeast Asia. The four Shires cover a geographical area of approximately 421,440 square kilometres and are bounded by the Indian Ocean to the west, the Timor Sea to the north, the Shire of East Pilbara to the south and the State border (with the Northern Territory) to the east.

The region has a diverse regional economy. Mining, tourism, retail, agriculture and aquaculture are major contributors to the region's economic output.

Solid and liquid waste management in the region is generated from:

-)] domestic land uses;
-)] construction and demolition;
-)] council works including green waste from parks and road construction; and
-)] commercial/industrial activities.

Solid waste and liquid waste (e.g. grease trap and septage waste) facilities are located within many of the region's settlements. Each local government collects solid waste from ratepayers, including commercial and industrial customers, using external contractors or in-house services.

A number of private waste management companies also provide services for commercial organisations, including removal of waste generated from fly-in fly-out camps and mining activities. Bulk waste and greenwaste collection services are also offered during the year in major towns.

Many of the Aboriginal communities located throughout the region have only basic solid waste management facilities, with much of the community generated waste disposed of within small 'trench' landfills. This waste is generally not handled through town based municipal landfills.

2.1 SUMMARY OF WASTE MANAGEMENT ISSUES ACROSS THE REGION

The isolation of the Shires and the significant costs associated with the transport of waste and recycling materials, and the seasonal nature of the population due to the seasonality of the tourist industry, pose many challenges.

Waste management in remote settlements is especially difficult, due to a lack of opportunity to improve community awareness, language barriers, greater distance from waste facilities and recycling markets, and challenging road conditions as well as inappropriate waste management practices that have the potential to impact on the local environment.

Many of the Shire landfills across the region were developed before best practice standards were introduced and are not ideally sited to minimise the environmental impacts of waste disposal. Furthermore, several key facilities have limited disposal capacity remaining.

Given the time required to identify, gain approval and develop a landfill site, some of the Shire's are nearing a critical situation for their waste disposal capacity to ensure the delivery of this infrastructure within time and budget constraints.

This lack of landfill disposal capacity also places the region in a compromised position, as if a natural disaster impacted on these communities (e.g. flood, bush fire, cyclone, animal disease outbreak) a decade's worth of waste can be generated by a single event. This would overwhelm the current facilities, fill all the remaining airspace at the landfills and impact on longer term municipal disposal needs.

Such an event occurred with the flooding of Warmun, as the cleanup process, demolition of damaged buildings and building of new infrastructure resulted in such a large quantity of waste, that the existing landfill was filled within a 12 month period and a new landfill for the community had to be fast tracked by the DWER.

All four Shires across the region are at different stages of evolution in regard to waste management which does present some challenges in terms of consistency of waste goals and objectives across the region. The following provides further detail on the participating Shires current issues and objectives in regard to waste management.

2.2 SHIRE OF BROOME

The Shire of Broome (SOB) is located in the south-west Kimberley in the far north of Western Australia and covers approximately 56,000 square kilometres with a population of approximately 16,300 (ABS, 2016). Broome's major industries include tourism, pearling, aquaculture, pastoral and horticulture. In recent years Broome has become a high-profile tourism destination. This trend has emerged on the back of improved air access, port infrastructure and telecommunications.

The SOB supports the largest population and rate base in the region. The Shire has a dedicated waste coordinator and operational support staff. The Shire of Broome is the only Shire to have installed a weighbridge at the landfill facility. This is used for commercial loads but is not currently measuring domestic self-hauled waste.

The SOB operates one landfill and resource recovery site in Broome and provides kerbside waste collection and recycling services to residents and businesses. The current landfill site is nearing the end of its operational life. The Shire has been actively seeking a suitable new site for a regional resource recovery park (including landfill) for the last six years. To date, a suitable site has not yet been secured.

Based on current waste input volumes the remaining lifespan of the facility is anticipated to be four years. The most pressing challenge for the Shire is in managing the impacts of reducing landfill airspace availability against timeframes required to identify and construct a new landfill site. There is a significant risk a new landfill will not be constructed before the existing landfill is full.

The Shire also previously provided a liquid waste treatment facility for grease trap waste at the landfill site. This was recently decommissioned to provide an increased footprint for waste disposal. A solution for grease waste and septage waste is now required as this waste is currently being transported to Port Hedland for treatment. This incurs high transport and disposal costs for producers and is unsustainable as a long-term solution.

The Shire of Broome - Strategic Community Plan 2017 – 2027 recognises waste as a priority issue for the Shire listing the following with the Plan: *Strategy (3.1.1): Ensure the construction of a Regional Resource Recovery Park and investigate associated business opportunities*. Actions listed to achieve this strategy are listed as follows:

-)] Implementation of the Buckley's Road Landfill Closure Management Plan;
-)] Actively seek external funding to deliver waste management initiatives to reduce waste to landfill;
-)] Identify suitable site and obtain approval for a Regional Resource Recovery Park;
-)] Construct Regional Resource Recovery Park; and
-)] Identify opportunities to improve liquid waste disposal in the region.

2.3 SHIRE OF DERBY / WEST KIMBERLEY

The Shire of Derby/West Kimberley (SDWK) covers an area of 118,560 square kilometres and contains numerous Aboriginal communities and two main towns – Derby and Fitzroy Crossing being the main population centres. The Shire supports approximately 21% of the total population within the region, with approximately 18% of that population living in the main towns.

Derby is located on the King Sound near the mouth of the Fitzroy River, 2366 kilometres by road from Perth. It is the major centre of the Shire and services the pastoral, mining and tourism industries and Aboriginal Communities with a permanent population of around 3,325 (ABS, 2016). Derby remains a supply point for an important part of the Kimberley's pastoral, mining, oil and tourist industries and is the

western terminus of the Gibb River Road. The port is now a key facility designed for the export of zinc and lead from the mines of nearby Fitzroy Crossing.

Fitzroy Crossing is located on the banks of the Fitzroy River 2,524 kilometres from Perth and has a permanent population of 1,297 (ABS, 2016). It is surrounded by pastoral country, with other interests being mining and tourism.

The SDWK provides waste collection services to town centres and has three landfills. These landfills are located at Derby, Fitzroy Crossing and Camballin. The 2013 SDWK Local Planning Strategy (2013) highlights waste management as a key issue. The Local Planning Strategy sets out medium to long term planning directions for the Shire of Derby/West Kimberley over the next 10 – 15 years.

The strategy states that:

'waste disposal facilities at both Derby and Fitzroy Crossing are reaching capacity. Alternate sites for waste management facilities need to be identified. The possible construction of a road to Point Torment could offer an opportunity for a borrow pit adjacent to the road to be adapted for use as a future waste management facility for the Derby area. A specific study will need to be undertaken to identify a new site for Fitzroy Crossing. The existing landfill would operate as a waste transfer station.'

In 2016/17 the Fitzroy Crossing Waste Management Facility was expanded to the neighbouring lot and provided the Shire with an additional 40 years of disposal capacity. The Derby landfill is potentially nearing capacity, the Shire will need to determine the remaining operational life at Derby and begin the process to identify potential sites for a new landfill, should less than 10 years operational life remain.

Liquid waste generated within the region (septage and grease waste) is managed through a mixture of state government and local government facilities. There is no liquid waste facility at Fitzroy Crossing. The Derby landfill provides a facility for grease waste for the region. The Shire is not planning for the development of any new septage waste facilities for the Shire.

The Shire operates on a much lower rate base than the Shire of Broome. Resourcing for waste is significantly challenged. Waste management costs absorb a substantial component of the annual budget. There are no dedicated waste management staff positions, with responsibilities incorporated into other positions.

Currently all waste services within the Shire are contracted to external parties. This includes kerbside collections and operations of the landfills at Fitzroy and Derby. The Shire does not own or lease any waste plant or equipment. Given the running of the landfills are contracted to third parties, the flexibility of the Shire to establish best practice operations to conserve landfill airspace and costs can be somewhat hindered and tied to contractual obligations.

Waste data collection within the Shire has improved since the 2009 RWMP with the introduction of automated gatehouse software to capture and report volumes presented for disposal to the landfill. However, given the Shire facilities do not have weighbridges, data is limited to volumetric estimates by gatehouse staff. This impacts on the ability of the Shire to accurately assess waste disposal volumes, the viability of resource recovery initiatives, and longer term waste service planning.

The Shire faces significant issues with illegal dumping and the associated high clean-up costs. As such it does not charge gate fees for domestic waste disposal in an effort to encourage the community to dispose of waste correctly at the landfill.

Recycling within the Shire is also challenged by a lack of available contractors and high transport costs associated with getting recyclables to markets. This limits the viability and opportunity for recycling in the Shire.

2.4 SHIRE OF HALLS CREEK

Halls Creek is a busy service town for surrounding pastoralists, Aboriginal communities and travellers exploring northern Western Australia. Situated in the heart of the Kimberley, Halls Creek is the gateway to a range of world renowned natural attractions, including the World Heritage listed Bungle Bungle

ranges of Purnululu National Park. The Shire covers 142,908 square kilometres of predominantly desert and pastoral country, supporting a permanent population of approximately 3269 (ABS, 2016). The Shire contains approximately 9% of the total population within the Kimberley region, with approximately 55% of the population of the Shire living in the town centre.

The Shire provides a landfill facility, some recycling drop off, a liquid waste facility and kerbside domestic waste collection in-house.

The Halls Creek landfill facility is located approximately four kilometres west of the town centre with access from the Great Northern Highway. This site also contains a liquid waste facility, accepting septage and grease trap waste. The landfill and liquid waste facility were established many years ago and unlined. Given the distance to groundwater there is currently no groundwater monitoring required under existing licence conditions.

The landfill is estimated at more than 10 years of operational life remaining. However, historically buried waste was recently found while excavating a new cell in a 'virgin' area of the site. This will impact on the remaining lifespan and may require the Shire to investigate new site options sooner than anticipated.

The Shire has a 20-tonne excavator for the landfill and maintains a collection truck for kerbside pickups. The Shire requires a replacement collection truck and more appropriate plant, equipment and infrastructure at the landfill. Appropriate plant is required to move and compact the waste, thus conserving airspace, reducing cost and extending the operational life.

The Shire has the smallest population within the region, and as such operates on a very low rate base. Like SDWK, resourcing for waste both financially and in terms of staffing is significantly challenged. Waste management costs absorb a substantial component of annual budget. There are no dedicated waste management staff positions aside from landfill gatehouse staff, with responsibilities incorporated into other multi tasked positions.

Outlying aboriginal settlements within the Shire each has its own separate waste system (not managed by the LGA). These settlements generally have landfills on the outskirts of the urbanised area; many are poorly maintained and reaching capacity. These sites are currently monitored by the Shire to ascertain their operational capacity and maintenance standards. The Shire assists the settlements in finding suitable locations for new landfills when old ones reach capacity and also provide advice about landfill management. This places additional resourcing challenges on the small Shire.

The most pressing challenge currently reported by the Shire is the community acceptance of the waste gatehouse fees charged and its volumetric assessment. Currently the Shire does not have a weighbridge to accurately quantify waste received at the landfill and waste is assessed volumetrically. Significant time is reportedly spent by staff dealing with customer disputes and conflicts over the visual assessment of volumes by gatehouse staff.

Waste data for the Shire is compromised by the lack of ability to accurately quantify the waste received at the landfill, and the method at which it is recorded at the gate. This in turn impacts on the degree of accuracy of annual waste data for the Shire, influencing the ability of the Shire to accurately plan and manage service delivery.

The Shire, like others in the region, faces significant issues including the availability of contractors and high transport costs to transfer recycled materials to their markets (e-waste, metals, tyres, batteries, gas cylinders) thereby limiting the opportunity for recycling in the Shire.

2.5 SHIRE OF WYNDHAM EAST KIMBERLEY

The Shire of Wyndham East Kimberley (SWEK) is WA's northern most local government area, located approximately 3,200 kilometres northeast of Perth. It covers a 121,189 square kilometre area bordering the Northern Territory to the east. Major industries in the region include agriculture, mining and tourism. The Shire has a population of approximately 7,148 (ABS, 2016) people. This accounts for approximately 16% of the permanent population in the Kimberley (excluding tourism population equivalents). The

majority of the Shire's population (approximately 85%) lives in the town centres of Kununurra (approximately 5,300 people) and Wyndham (approximately 800 people).

In terms of waste management facilities and services, SWEK operates two landfill sites which service the towns of Wyndham and Kununurra, a liquid waste treatment facility for septage and grease trap waste and provide kerbside waste collection services to residents and business within town centres of Wyndham and Kununurra.

The Shire has committed to the provision of all waste management services in a way that minimises waste and provides a range of waste management services to residents. The SWEK Community Strategic Plan 2017 – 2027 includes waste management as a key strategy to ensure environmental goals for the Shire can be met. Achievement toward this strategy is measured by the percentage of waste diverted from landfill. However, there is only limited recycling opportunities offered within the Shire due to its isolated location and distance from markets impacting on costs and viability.

Like other Shires in the region SWEK also operates on a low rate base. However, the Shire has undertaken considerable work into whole of life operational costing of the landfill and incorporated this into annual gate fees. As a result, the landfill generally operates at a profit and this is used to subsidise rates. The Shire has also established a waste reserve to cover future capping and closure costs of the landfills.

The Shire employs a dedicated landfill supervisor to operate the Kununurra landfill and gatehouse staff for both landfills. However, there is no dedicated waste manager, with responsibilities for management of the service incorporated into another multi tasked management position. This impacts on the resources available for the Shire to effectively manage its waste operations without placing other services in jeopardy.

The existing landfill sites at Kununurra and Wyndham are expected to close in 2022-23. The Shire is actively planning a new Shire landfill site near Kununurra to provide additional capacity within the Shire should it be required. Whilst the Kununurra facility has potential airspace for a further 10-15 years, concerns on environmental impact from previous operations on site have resulted in the regulator only extending the current operational licence until 2019. The Shire will look to negotiate an agreed operational life of the facility prior to expiry of the current licence. Should this be less than 10 years, the Shire will need to progress applications and approvals for a new landfill construction on its preferred site.

The landfill at Wyndham has only limited airspace with the closure plan for the facility recently revised to increase airspace. The Shire have costed the conversion of the site to a transfer station however the community prefer a landfill to a transfer station. The option to extend the current site or establish a new site is currently being assessed.

Waste data collection in the Shire is limited to volumetric estimates by gatehouse staff. The landfills in the Shire do not have a weighbridge. This impacts on the ability of the Shire to accurately report waste quantities, the viability of resource recovery initiatives, and longer term waste service planning.

3 EXISTING SERVICES AND INFRASTRUCTURE

3.1 WASTE QUANTITIES

Waste stream data has been compiled into the following categories:

- J **Municipal Solid Waste (MSW)** - Classified as household domestic waste that is set aside for kerbside collection or delivered to a waste facility through a drop-off programme. MSW also includes other types of waste such as bulky household waste (e.g. appliances, furniture and residential garden waste), household hazardous waste or local LGA generated waste (e.g. waste from street sweeping, litter bins and parks).
- J **Commercial and Industrial Waste (C&I)** - Solid waste arising from the activities within commercial and industrial sites, including but not limited to offices, retail outlets, restaurants, factories, and institutions.
- J **Construction and Demolitions Waste (C&D)** - Solid waste that is created through activities associated with the construction, repair and demolition of buildings, structures and pavements or highways. Including, but not limited to concrete, brick, rubble, metals (ferrous and nonferrous), timber, glass, asbestos, and sand.
- J **Liquid waste** - Is wastewater or any waste in a liquid state from domestic, industrial or commercial activities. Within WA all liquid waste is a controlled waste under the Environmental Protection (Controlled Waste) Regulations 2004. Liquid waste for the purposes of this report includes septage waste, greasetrap waste and used motor oil.

The region contains a range of industries, but there are no individual companies that dispose of a significant volume of waste within the Shires landfill facilities. However, there are some private waste collection companies that dispose of waste at the Shires landfill facilities.

Aboriginal settlements generally have basic standards of solid and liquid waste management facilities. Most waste disposal systems in these towns and settlements are either community managed or managed through the Department of Communities. Depending on location of the settlement, waste is generally disposed on site and not to municipal facilities. There is currently no data collected about waste types or volumes from Aboriginal communities.

3.1.1 Population data

A breakdown of population by local government area across the region is provided in **Table 3.1**.

Table 3.1 - Population data (ABS, 2016)

Shire	Estimated population		
	Permanent	Tourist (equivalent population) *	Total
Broome	16,222	4,670	20,892
Derby West Kimberley	7,730	1,570	9,300
Halls Creek	3,269	590	3,859
Wyndham East Kimberley	7,148	1,958	9,106
Regional Total	34,369	8,788	43,157

*Tourist data taken from Tourism WA, Visitors Fact Sheets April 2018 – three-year average. Visitor nights divided by 365 to allow tourism numbers to be incorporated into population statistics.

A breakdown of population by towns across the Kimberley region is provided in **Table 3.2**.

Table 3.2 - Population of town centres (ABS, 2016)

Shire	Estimated population		
	Permanent	Tourist (equivalent population) *	Total
Broome	13,984	4,670	18,654
Derby	3,325	1,570	4,895
Fitzroy Crossing	1,297		1,297
Halls Creek	1,546	590	2,136
Kununurra	5,308	1,958	7,266
Wyndham	780		780
Regional Total	26,240	8,788	35,028

The population of town centres (in addition to tourist population) is relevant as this is likely to be the most applicable in terms of data for waste generation and population projections for future infrastructure planning given waste from Aboriginal settlements, pastoral stations, national parks, camping grounds and remote roadhouse's is generally not being received at municipal landfills.

3.1.2 Data availability

There is variability and poor accuracy in much of the waste data collected across the region. The SOB, SDWK and SWEK use Mandalay gatehouse software to collect waste and recycling data on incoming and outgoing loads, whereas the Shire of Halls Creek record waste data with an MSExcel-based internal recordkeeping system. The SOB is the only Shire to utilise a weighbridge to accurately measure the weight of material for disposal. Tonnage data from the other Shires is limited to volumetric assessment of waste loads by gatehouse staff.

Volumetric estimates of waste are inherently variable depending on each operator's interpretation and estimation of load size, leading to inaccuracies in waste data.

Given the relatively small quantities of waste generated in the region, a single development, demolition or other event can result in a significant variation of disposal and/or recycling quantities in a single year. To minimise the impact of such an event the previous three years of gatehouse data has been collected to calculate an average annual tonnage value. This three year average value has been used in this report.

Due to the limitations of the waste data, all values have been rounded to the nearest 100 tonnes.

3.1.3 Total waste generation

The estimated total quantity of waste generated by each Shire in the region is shown in **Table 3.3**. The table shows that an estimated 62,700 tonnes of waste was generated in the region. This value does not however include liquid waste, clean fill/cover material accepted at the facilities or any wastes that were generated and managed directly by industry (e.g. mine sites and pastoral stations) or Aboriginal communities with their own landfill sites.

The Shire of Broome accounted for approximately 42% of the waste generated in the region with over 25,000 tonnes generated in 2017/18. This is followed by SWEK (27%), SDWK (26%) and Halls Creek (5%).

Table 3.3 - Estimated quantity of waste (by stream) generated for each shire (Three year average)

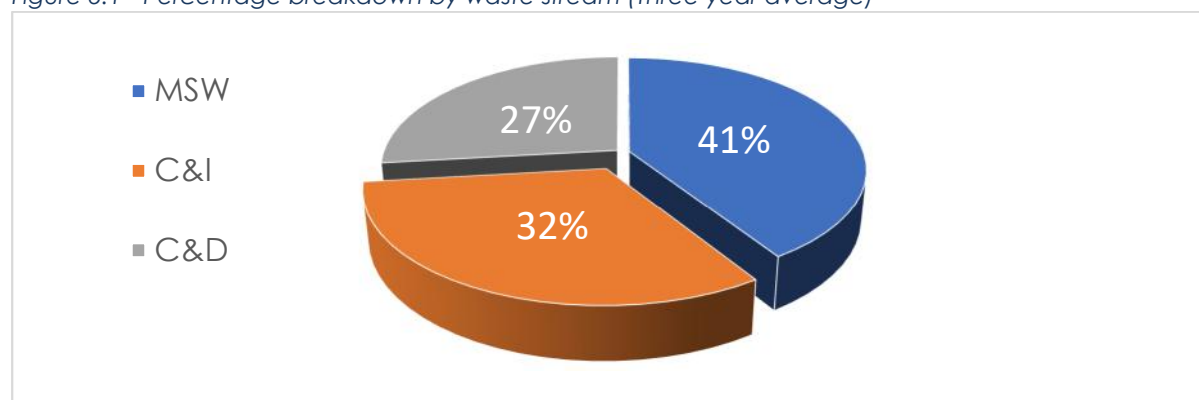
Shire	Estimated tonnes of waste generated			
	MSW	C&I	C&D	Total
Broome	13,300	7,300	5,800	26,400
Derby West Kimberley	6,500	6,000	4,100	16,600
Halls Creek	900	1,100	800	2,800
Wyndham East Kimberley	4,900	5,900	6,100	16,900
Regional Total	25,600	20,300	16,800	62,700

Table 3.4 and **Figure 3.1** displays the same data broken down into percentage contributions by Shire and waste stream. MSW, C&I and C&D waste streams comprised 41%, 32% and 27% respectively of the total waste generated in the region.

Table 3.4 - Percentage breakdown by waste stream (Three year average)

Shire	MSW	C&I	C&D
Broome	50%	28%	22%
Derby West Kimberley	39%	36%	25%
Halls Creek	32%	39%	29%
Wyndham East Kimberley	29%	35%	36%
Regional Total	41%	32%	27%

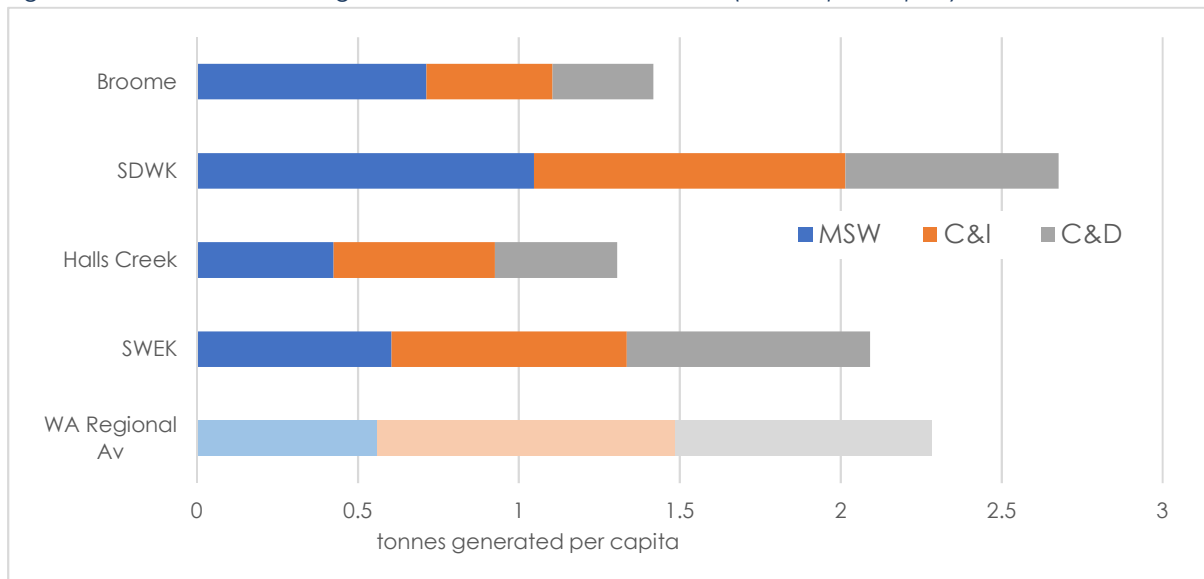
Figure 3.1 - Percentage breakdown by waste stream (Three year average)



The waste generation per capita values were calculated using the catchment populations of the Shire's landfills in the region. Therefore, the populations of the surrounding towns, rather than the total Shire populations were used (see town populations in **Table 3.2**).

As is shown in **Figure 3.2**, the waste generated per capita within each Shire was between 1.42 t/capita – 2.68t/capita, while the average waste generation for regional WA is 2.28t/capita.

Figure 3.2 - Estimated waste generation rate for waste streams (tonnes per capita)

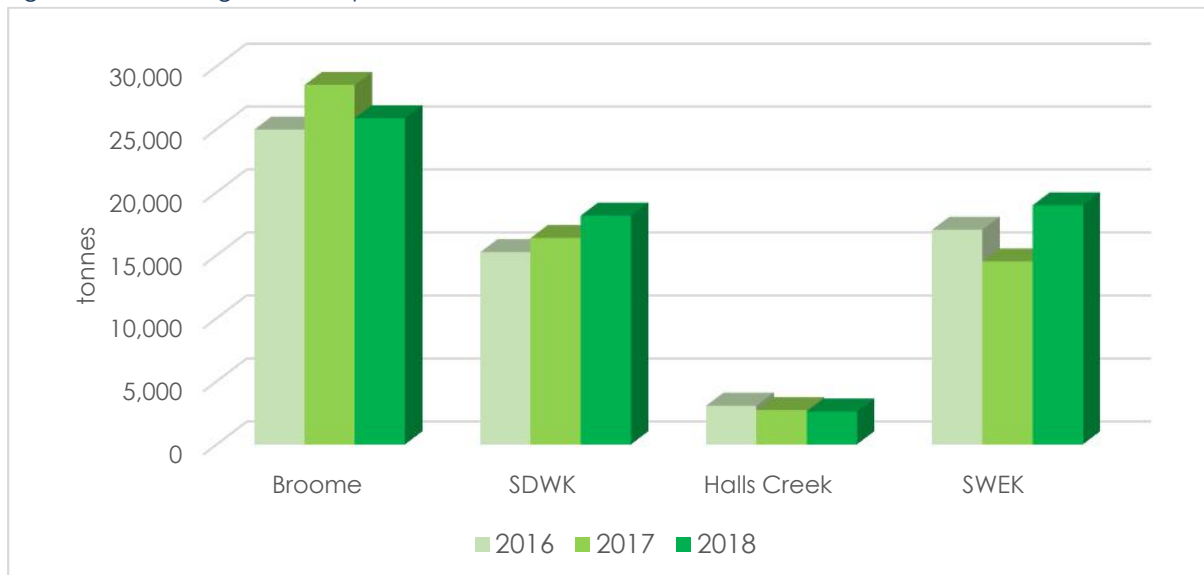


3.1.4 Waste generation trends

The project collated three years of landfill gatehouse data to calculate three year average values. The three years of data can be used to identify any trends and variations in the annual waste data collected.

The variation in the data for each Shire for total waste generation was minimal, as shown in **Figure 3.3**. The only trends are an increase for SDWK and a decrease for the Shire of Halls Creek.

Figure 3.3 - Waste generation per Shire between 2016-2018



3.1.5 Waste recycling

Table 3.5 outlines the tonnes of waste estimated to have been recycled (three year averages). The total quantity recycled in the region was estimated to be approximately 16,800 tonnes.

Table 3.5 - Estimated tonnes of waste recycled by Shire and waste stream (Three year average)

Shire	Estimated tonnes of waste recycled			
	MSW	C&I	C&D	Total
Broome	3,100	2,900	2,700	8,700
Derby West Kimberley	1,600	2,000	1,600	5,200
Halls Creek	0	100	0	100
Wyndham East Kimberley	800	1,500	500	2,800
Regional Total	5,500	6,500	4,800	16,800

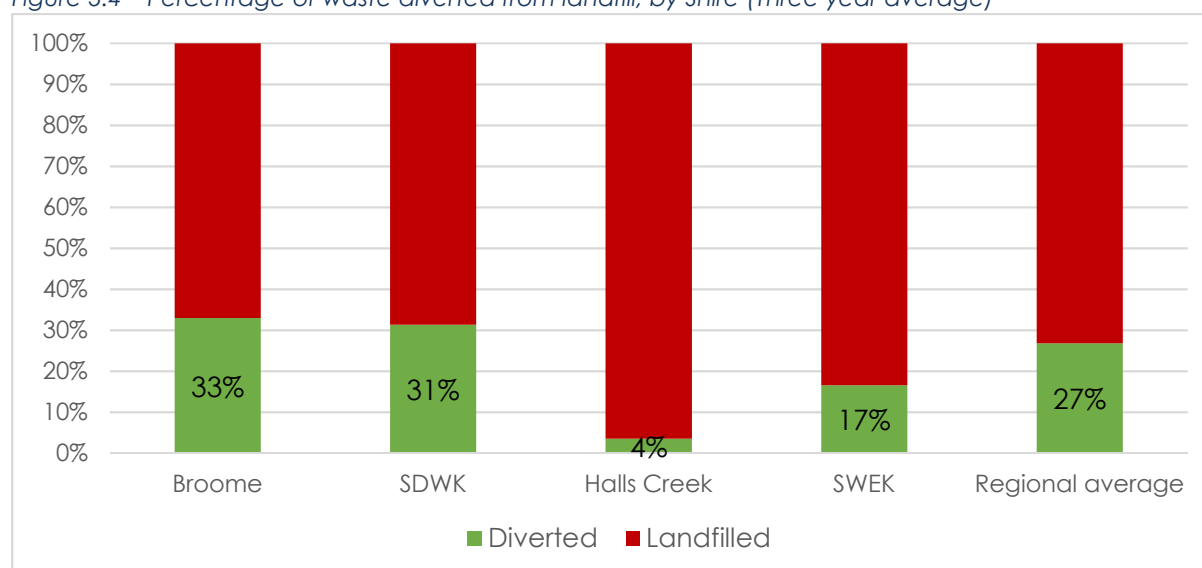
On a regional basis, the C&I waste stream has the highest rate of waste diversion at 32%; this is due to the recycling of scrap metal across the region. The C&D waste stream has the second highest rate of recycling at 29% across the region and particularly for the Shire of Broome that diverted 47% of all C&D waste received.

Table 3.6 - Estimated percentage of waste streams diverted from landfill by Shire (Three year average)

Shire	Estimated tonnes of waste recycled			
	MSW	C&I	C&D	Total
Broome	23%	40%	47%	33%
Derby West Kimberley	25%	33%	39%	31%
Halls Creek	0%	9%	0%	4%
Wyndham East Kimberley	16%	25%	8%	17%
Regional Total	21%	32%	29%	27%

The total recycling rate achieved by each Shire, allowing for all waste types, is shown in **Figure 3.4**. The rate of diversion for wastes received at the Shire's landfills is 27%. A significant portion of this material diverted is scrap metal and greenwaste (note Greenwaste is diverted and burnt at several landfills, as this provides a better environmental outcome than landfilling when there is no local market for the mulched greenwaste).

Figure 3.4 – Percentage of waste diverted from landfill, by Shire (Three year average)



A breakdown of materials diverted from landfill is shown in **Table 3.7**. Greenwaste and metal recycling accounted for the majority of all waste diversion in the region.

Table 3.7 - Recycling by material type (2017- 2018)

Material Type	Tonnes of waste diverted from landfill				
	Broome	SDWK	Halls Creek	SWEK	Regional Total
Waste oil (includes engine oil, cooking oil)	1	1	0	10	12
Tyres	36	1	4	0	42
Greenwaste (mulched and burnt)	3,600	0	100	700	4,400
Metal (recycled)	3,100	4,400	100	600	8,200
Batteries (vehicle)	11	0	0	0	10
Co-mingled Recyclables	1,400	40	0	0	1,440
Concrete, Timber, Glass	3,400	0	0	0	3,400
E-waste	0	1	0	0	1
Total (rounded)	11,500	4,440	200	1,310	17,510

*Halls Creek collected e-waste but data was not captured on gatehouse records

3.1.6 Targeted material streams

There are a number of key material streams that lend themselves to diversion from landfill due to a range of factors, such as recovering resources, preserving landfill airspace, minimising environmental impacts and generating revenues. However, given the region's distance from material collectors and reprocessors, recycling activities in the region should focus on materials that demonstrate as well as align with the factors mentioned above, and have one or more of the following qualities:

-)] a local market demand (crushed inert waste, greenwaste)
-)] are of high value (metals) that can off-set the transportation cost
-)] are hazardous and produce significant impacts if disposed of in unlined landfills (HHW, car batteries, e-waste etc.)
-)] are problematic to dispose and consume significant quantities of airspace (tyres etc.)

Therefore, data has been collated to estimate the quantity of target material streams as shown in **Table 3.8**. While some of this data has been collected at facility gatehouses using weight or volumetric values, for many materials quantification has required extrapolation and estimation. Therefore, many of these values should be taken as an indication of the likely quantity, rather than a definitive value.

This simple analysis doesn't consider the economic sustainability of the diversion of materials, however, the information shown in **Figure 3.5** does show that by already recycling scrap metal, 12% of the total waste generated in the Kimberley is being recovered.

The largest material stream that could be recovered is organics. While approximately 4,400 tonnes of greenwaste is already diverted from landfill (7% of the total waste generated), there is nearly a further 10,000 tonnes of organics still going to landfill. If all organics could you recovered this would divert nearly a quarter of the waste generated in the region.

Hypothetically, if all the high volume material streams shown could be diverted from landfill the region could divert over 55% of the waste generated. However, this is an aspirational benchmark as 100% of any material stream is never separated and a full assessment of the economics, supply chain and end market is required to ensure any resource recovery measures that are introduced are fully costed and have long term sustainability.

Figure 3.5 - Proportion of "potentially" divertible high volume material streams

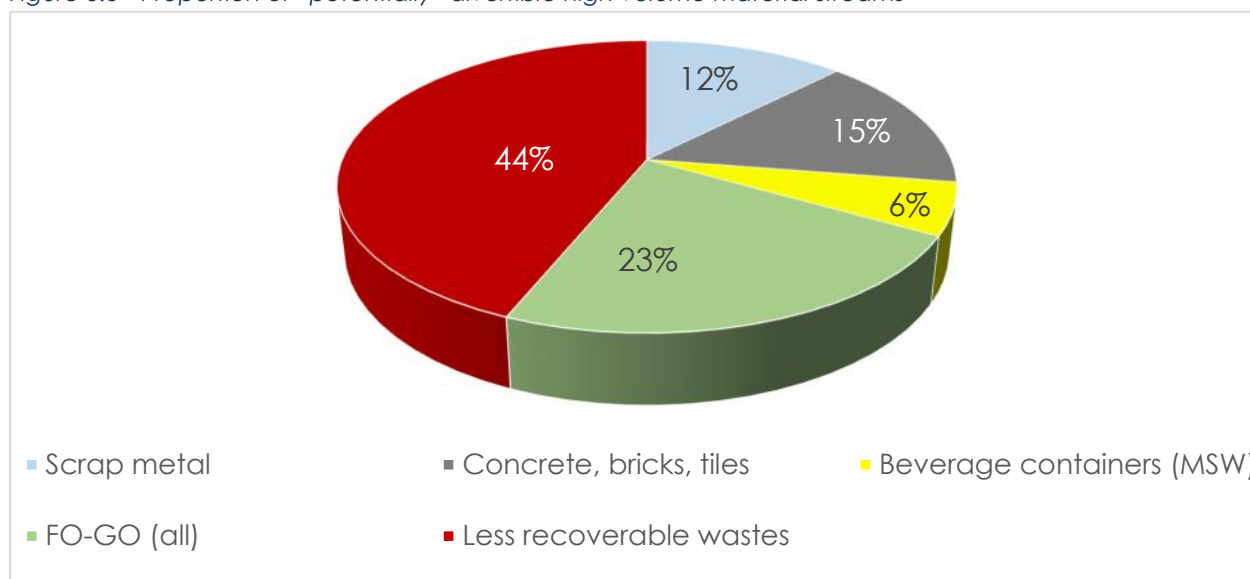


Table 3.8 - Breakdown by material type (2017-18)

Material Type (Recycled and potentially divertible materials)	Broome (tonnes)			SDWK (tonnes)			Halls Creek (tonnes)			SWEK (tonnes)			Regional Total (tonnes)		
	Generated	Currently Landfilled	Currently Diverted	Generated	Currently Landfilled	Currently Diverted	Generated	Currently Landfilled	Currently Diverted	Generated	Currently Landfilled	Currently Diverted	Generated	Currently Landfilled	Currently Diverted
Scrap metal (all waste streams)	3,100	0	3,100	4,400	0	4,400	100	0	100	600	0	600	8,200	0	8,200
Batteries	11	0	11	7	0	7	0	0	0	5	0	5	23	0	23
Concrete, bricks, tiles (C&D waste only)	3,500	400	3,100	1,300	1,300	0	400	400	0	4,400	4,400	0	9,600	6,500	3,100
Separated greenwaste (All waste streams)	3,600	0	3,600	2,400	2,400	0	100	0	100	700	0	700	6,800	2,400	4,400
Domestic FO-GO (Kerbside only)	3,100	3,100	0	1,200	1,200	0	300	300	0	1,200	1,200	0	5,800	5,800	0
Commercial FO-GO	620	620	0	510	510	0	90	90	0	500	500	0	1,720	1,720	0
TOTAL FO-GO (inc separate GW)	7,400	3,800	3,600	4,100	4,100	0	500	400	100	2,400	1,700	700	14,400	10,000	4,400
Glass (in MSW kerbside only)	2,000	1,550	450	790	790	0	180	180	0	790	790	0	3,760	3,760	0
Domestic beverage containers (kerbside only)	1,930	1,930	0	760	760	0	170	170	0	770	770	0	3,630	3,630	0
Tyres	40	0	40	97	49	49	4	0	4	100	100	0	241	149	92
e-waste (MSW kerbside only)	100	100	0	101	100	1	12	12	0	100	100	0	313	312	1
HHW (MSW kerbside only)	13	13	0	13	13	0	1	1	0	0	0	0	27	27	0
Asbestos	19	19	0	141	0	141	4	4	0	63	63	0	227	86	141

Note: All cells shaded light red contain data based on extrapolation of a typical waste composition. These values are only provided as an indication of likely material quantities.

3.1.7 Waste generation projections

Waste generation projections have been made for the next 20 years based on the population growth data provided by each Shire. In regional Western Australia the rate of waste generation per capita is increasing, while in the metropolitan area the quantity of reported waste landfilled and therefore generation per capita has decreased. For the purpose of this projection it has been assumed that over the 20 year project, waste generation per capita will on average remain constant.

The projection estimate results show approximately 100,000 tonnes per annum of waste being generated by 2038, an increase of 40% from the 2018 total waste generation of approximately 63,000 tonnes. **Figure 3.6** shows the annual waste generation projection by waste type, while **Figure 3.7** shows the increased waste generation projection by Shire. Details of the waste projection are provided in **Appendix A**.

Figure 3.6 - Waste generation projections by waste type

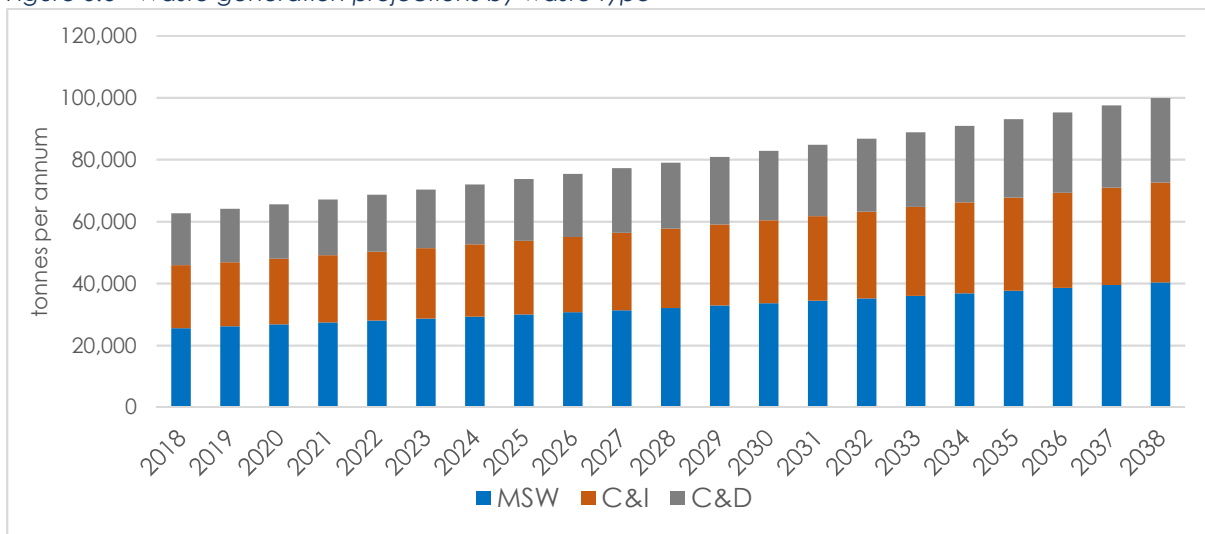
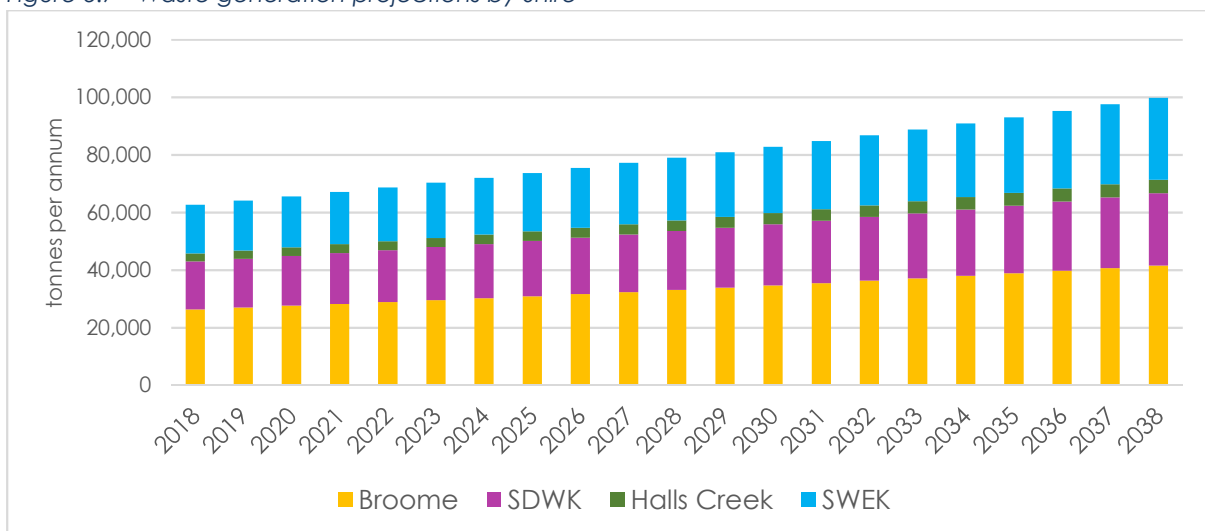


Figure 3.7 - Waste generation projections by Shire



3.1.8 Observations

- Waste data collection appears to have improved across the region since the original RWMP with three of the four Shires adopting recognised industry data software. However, issues remaining include:
 - the inconsistent waste categories used across the region

- o waste data focusing on invoicing only, while data for annual reporting and strategic assessment is often not collected
- o the inherent variability of volumetric estimates for gatehouse data
-)] The effective planning of strategies is limited by the lack of accurate and standardised waste data for the region;
-)] Implemented strategies for the region cannot be monitored / measured accurately due to lack of effective and consistent waste data collection;
-)] Recycling rates are low for all waste streams for all Shires except Broome mainly due to limited recycling options, high transport costs and limited economies of scale.
-)] Waste quantities are not expected to grow significantly for most of the Shires.
-)] The current landfill catchment for the Shires does not include outlying communities, which if included in total waste generated across the region at the 17-18 waste generation per capita rates could increase totals by approximately 15,000 tonnes, or about 25%.

3.2 COLLECTION SERVICES

Local Governments provide waste collection services for their ratepayers and some commercial properties using day labour or through the use of private contractors. LGA's also provide collection services for litterbins located in public areas and for wastes generated from their own operations.

Collection services for the Shires have been divided into the following categories:

-)] Domestic;
-)] LGA Works / Town Services; and
-)] Commercial and Industrial.

The services provided by each Shire are summarised, by service, in the following sections. **Table 3.9** provides a summary of the collection services offered by each Shire during the 2017/18 financial year.

Table 3.9 - Summary of Shire waste collection services 2017/2018

		Broome	SDWK	Halls Creek	SWEK
Towns supported		Broome	Derby, Camballin, Fitzroy Crossing	Halls Creek	Kununurra, Wyndham
Domestic	Refuse	240L MGB (weekly collection)	240MGB (twice weekly collection between 1 Nov – 1 April, otherwise once weekly collection)	240L MGB (twice weekly collection)	240L MGB (weekly collection)
	Recyclable	360L recycle bin will replace the 240L bin when the 240L bin needs replacement. 240L MGB (fortnightly collection)	None	None	None
	Bulk waste	Nil collection Biannual free disposal days for bulk waste/ preparation for the cyclone season.	Derby three collections per year Fitzroy – annual collection	Annual Collection (November bulk waste collection)	Annual Collection (pre-cyclone season)
LGA Works / Town Services	Greenwaste from LGA Works	Stockpile for mulching	Buried at landfill	Burnt in a dedicated area at the landfill.	Burnt at Kununurra Facility.
	Inert Waste from LGA Works	Concrete, steel stockpiled for recycling	To landfill	Concrete stockpiled	To landfill
	Public Litterbins	120L MGB (refuse)* as required	240L MGB, six days per week	Modified drums, five days per week	240L MGB, twice per week
Commercial & Industrial	Refuse	240L or 360L MGBs, once per week	240L MGB, as required	240L MGB, four times a week	240L MGB, as part of the domestic collection
	Recyclable	360L or 240L MGB (fortnightly collection)	None	None	None
	Bulk waste	None	None	None	None

*SOB plan to introduce recycle bins into the new developments in town, within the 18/19 year

3.2.1 Domestic services

Domestic property waste collection services are solely the responsibility of the Shires within the region, with the exception of some Aboriginal Communities that have their own waste collection services. The Shire's waste collection services are currently provided by the same private contractor for three of the Shires, while the Shire of Halls Creek has an in-house refuse collection service. Domestic waste collection

services costs are recovered via a 'bin charge' on the householder's rates notice and a waste charge for Aboriginal Communities that use the Shire's landfills.

3.2.1.1 Domestic refuse collection

Residents located in towns are provided with a minimum of one 240L MGB per household for a weekly or twice weekly kerbside collection.

A 'recyclables' collection service is provided by the Shire of Broome that provides households with a two-bin (recyclables and refuse) collection system. The two-bin system includes a 'recyclables' bin for the collection of source-separated recyclable packaging materials. The recyclables bin is collected on a fortnightly basis. The Shire is currently transitioning recycling bins from 240L to 360L MGBs, with 360L recycling MGBs to replace the 240L when the bin needs replacement.

3.2.1.2 Bulk bin collection

Town residents located in the Shires of Halls Creek and Wyndham East Kimberley are offered one annual bulk waste collection service, which also acts as the pre-cyclone season clean up collection. Residents located in the townsite of Derby (Shire of Derby / West Kimberley) are offered three bulk waste collections per annum and Fitzroy residents are offered an annual service. The Shire of Broome does not offer a bulk waste service to its residents.

As opposed to offering a bulk waste collection service, the Shire of Broome offers biannual free disposal days for bulk waste with which residents are required to self-haul waste to the facility.

3.2.1.3 Self-hauled trailer waste

Residents have access to landfills located close to most population centres and can self-haul their waste to landfill sites. This system can be used by any resident but is particularly common for residents in remote areas that do not receive kerbside collection services. The waste management practices of these residents have not been investigated as part of this project. However, it is likely that these residents may use burning or illegal dumping to dispose of some wastes generated.

3.2.1.4 Waste from Shire works

All Shires collect wastes generated from their operations on an ad-hoc basis. This may include greenwaste from street tree pruning, maintenance of parks / gardens and inert waste from road and pavement construction or maintenance. This can also include clean-up from cyclone impacts and associated flooding.

3.2.1.5 Public place litter

Councils provide public litterbins within town centres and along some highways. The frequency of the collections varies throughout the region. This service is provided by LGAs through kerbside contracts or in-house services and funded by general rates. In addition to public litterbins, Shire services also include some public place litter collection. This is disposed at the local landfills.

3.2.2 Commercial and Industrial (C&I) collection services

Generally, commercial and industrial wastes are collected by private service providers and are not the responsibility of Local Governments. However, the Shires do offer waste collection services to businesses

within light industrial areas. The frequency of collections varies throughout the region and depends on the amount of waste the businesses produce.

Recycling collection is offered to commercial customers in Broome.

3.2.3 Observations

The information about collection services provided by the Shires in the region has drawn out a number of observations:

-)] There is no collection of wastes from a number of roadhouses, pastoral stations, national parks, camping grounds and other more remote attractions in the region and waste is disposed of in onsite 'unregistered / unlicensed' landfills;
-)] There are no domestic kerbside recycling collections in the Shires of Derby / West Kimberley, Halls Creek and Wyndham East Kimberley;
-)] Very little source-separated commercial and industrial (C&I) and construction and demolition (C&D) waste is delivered to the region's waste facilities and this makes the recycling of these materials unviable.

3.3 INFRASTRUCTURE

There are seven local government municipal landfills in the region. The map shown in **Figure 3.8** indicates the location of the facilities (with orange circles providing a comparison of the estimated waste tonnages received and green circles for the estimated tonnage recycled) and a summary of each facility is provided in **Table 3.10. This**

Figure 3.8 - Map of LGA waste facilities and associated tonnages received and recycled (17-18)

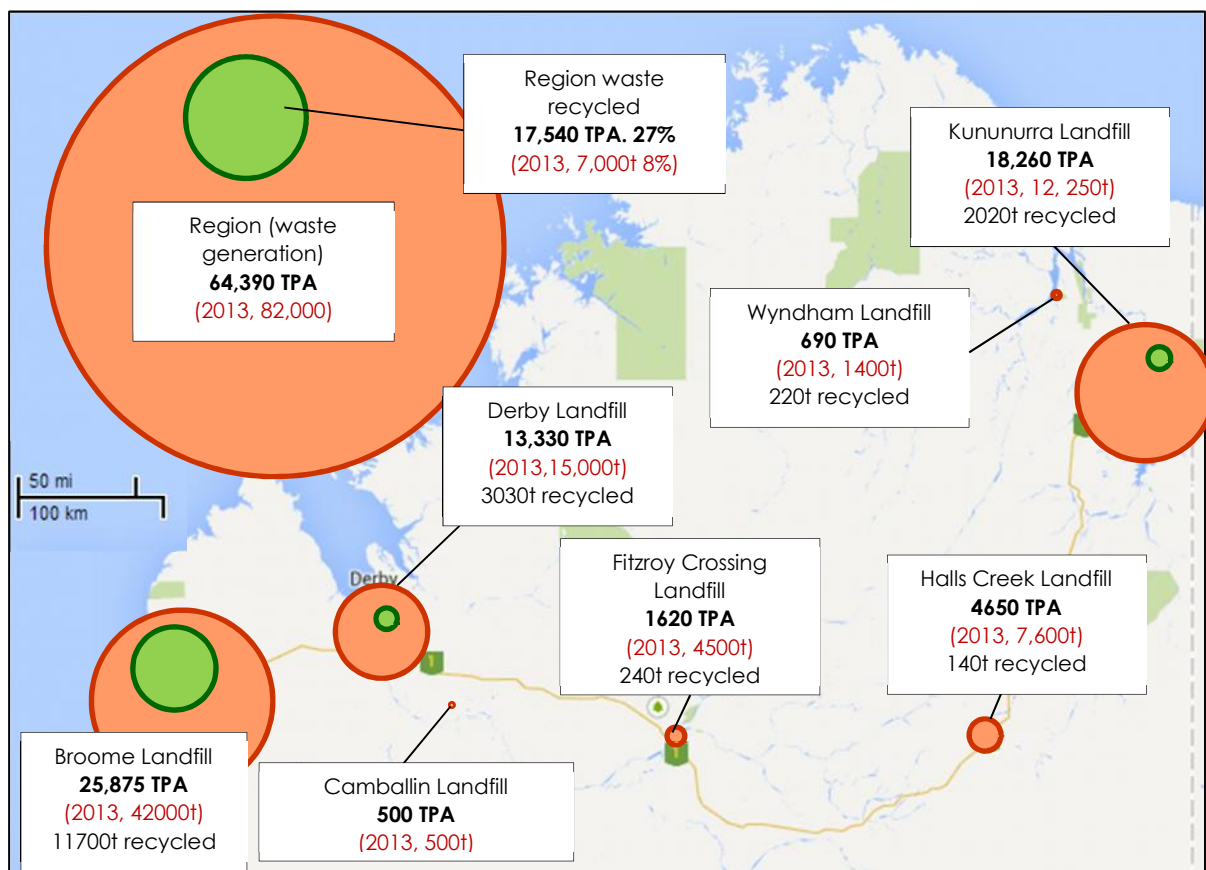


Table 3.10 - Local Government waste infrastructure in the region

Shire	Broome	SDWK			Halls Creek	SWEK	
Facility	Broome	Derby	Camballin	Fitzroy Crossing	Halls Creek	Kununurra	Wyndham
Licence #	L6912/1997/11	L8602/2011/1	Not registered	7173/5	L7142/1997/11	L7315/1998/8	1427
Facility Address	Reserve 40813, Lot 228, Buckley Rd, Broome, WA 6725	Crown Reserve 31045 Steel Street. DERBY WA 6728	Camballin, Derby / West Kimberley, WA	Reserve 41105 Lot 224 & 451 Mangkurla Rd	Lot 59 (Reserve No. 39097), Gt Northern Hwy, Halls Creek, WA. 6770	Lots 2464 & 2465, Reserve 28875, Victoria Hwy, Kununurra WA 6743	Lot 1263, Great Northern Highway, Wyndham WA 6740.
Operator	Shire of Broome	Toxfree	Looma community	Toxfree	Shire of Halls Creek	SWEK	SWEK
Key operations	Landfill disposal Resource recovery	Landfill disposal Resource recovery Liquid waste facility	Landfill disposal	Landfill disposal Resource recovery	Landfill disposal Resource recovery Liquid waste facility	Landfill disposal Resource recovery Liquid waste facility	Landfill disposal Resource recovery
Class type & approved throughput	Cat 64 – Class II putrescible landfill site (30,000 tpa) Cat 61 – Liquid waste facility (1,932 tpa)	Cat 64 - Class II putrescible landfill site (40,000 tpa). Category 62 - Solid waste depot (8000 tpa) Cat 61 – Liquid waste (320 tpa)	Not registered.	Cat 64 - Class II putrescible landfill site (10,000 tpa) Category 61A - Solid waste facility (3,200 tpa).	Cat 64 – Class II Putrescible Landfill Site (annual throughputs not specified on licence) Cat 61 – Liquid Waste facility (no annual throughputs listed) Cat 61A – Solid waste facility	Cat 64 – Class II putrescibles landfill site (30,000 tpa) Cat 61 – Liquid waste facility (1,900 tpa) Cat. 57 – Used tyre storage (500 tyres)	Rural Registered Landfill
Established	1989	Registered in 2001. Licenced in 2013.	Unknown	Licenced in 2013.	Unknown	Approximately 1987	At least 40 years.
Years remaining	Less than 5 years.	Approx. 7 years	Unknown	40 years	More than 10 years	5 years	Approx. 1 year
Site size	15ha	10.2 ha	Estimated at 6ha	8.76ha	144ha	63.2ha	10ha
Staffing	Staffed during opening hours	Staffed during opening hours	Not staffed	Staffed during opening hours	Staffed during opening hours	Staffed during opening hours	Staffed during opening hours

Shire	Broome	SDWK			Halls Creek	SWEK	
Facility	Broome	Derby	Camballin	Fitzroy Crossing	Halls Creek	Kununurra	Wyndham
Changes since 2013 RWMP	Concrete, glass, tyres, greenwaste and steel are being separated out of the waste stream. Recycling of the material to commence within 18/19 FY. No Public access to tip face- only commercial operators E-waste recycling occurring Re-use area operational	Mandalay gatehouse software implemented New clinical waste and asbestos cell		New facility established on adjacent lot (2013) New licence to allow operation of Fitzroy Crossing Category 64 Putrescible Landfill (2016) Licence amendment to increase Category 64 approved capacity, add Category 61A, and reduce the buffer distance between the fence and buried waste to 20m (2018) Amendment Notice 1 to enable use of bioremediated soil as cover material	Purchase of 20 tonne excavator Stockpiling of concrete commenced Started a waste reserve to cover closure costs (10% of gate fees)	New liquid waste facility completed. Licence amendment for storage of up to 500tyres to facilitate tyre recycling (2018) Licence amendment for the construction and operation of the Bioremediation Facility (2017) Licence amendment to increase production and design capacity (2015) Gatehouse, boom gates, electronic waste data system installed. Hydrogeological assessment of landfill completed. SOP developed for bore monitoring	Gatehouse, boom gates, electronic waste data system installed.

3.4 RESOURCE RECOVERY

The Shires undertake a number of recycling activities ranging from kerbside collections to the re-use of Council generated wastes. **Table 3.11** summarises the current resource recovery operations for each Shire and waste facility.

3.4.1 Kerbside collection of recyclables

The Shire of Broome is the only Shire in the region that provides a kerbside collection of recyclables to its town based residents. The kerbside collection and sorting of the materials has been contracted out to a private waste management company.

3.4.2 Drop-off facilities

The Shire of Derby provides a co-mingled recycling drop-off service at the Derby landfill facility. The Shire of Broome has commenced separating and stockpiling concrete, greenwaste, glass, timber and steel. Recycling of the material is scheduled to commence within 18/19. The SHC and SWEK offer resource recovery drop off facilities for some material streams.

Other material streams collected through resource recovery drop-off facilities throughout the region include:

-)] Tyres
-)] Scrap metal recycling - Metals, particularly car bodies, are collected by all of the Shires before they are periodically collected by a metal recycling company for processing. Some fridges, other white goods and gas bottles are collected, but this varies throughout the region.
-)] Batteries - Batteries are collected at the majority of the region's facilities.
-)] Used oil is collected at Broome, Derby and Kununurra.
-)] Greenwaste is currently separated and mulched at Broome.
-)] 'Triple rinsed' chemical drums are collected as part of the Drum Muster program at Broome, and Kununurra.
-)] E-waste is being collected at Broome. Halls Creek and Derby are stockpiling e-waste.
-)] Re-use shop/areas at the Kununurra and Halls Creek facilities.

3.4.3 Community run recycling schemes

Marra Worra Worra Aboriginal Corporation was established in the late 1970s by members of the 5 tribes located in the Fitzroy Valley of Northern WA's Kimberley Region. Recently, Marra Worra Worra has developed a local recycling program for the businesses of Fitzroy Crossing. The program involves self-separation of different recyclable materials at the source and focuses on PET, HDPE, paper, cardboard, aluminium and general plastic waste. The program was developed with the intention of providing an alternative waste management service for the businesses of Fitzroy Crossing as well as creating new employment opportunities for local community members. The program has purchased an export quality baling machine and commenced operation in the early part of 2018.

3.4.4 Observations

The information about the region's resource recovery services has drawn out a number of observations:

-)] The quantity per person per annum of recyclable material collected from the kerbside is lower than some other Western Australian regions, so there is potential to increase the yields;

-)] Drop-off infrastructure at the waste facilities could be improved and the range of materials collected expanded;
-)] The economic viability of many recycling activities is limited by the region's transport logistics and small economies of scale and lack of viable end markets;
-)] Whilst numerous material streams are recovered from landfill throughout the region only metals and batteries are common to all four Shires (excluding the Camballin landfill).

Table 3.11 - Resource recovery services provided by each Shire

Shire / Facility	Broome	Derby / West Kimberley			Halls Creek	Wyndham East Kimberley	
		Derby	Camballin	Fitzroy Crossing		Kununurra	Wyndham
Co-mingled recycling	✓	✓	✗	✗	✗	✗	✗
Paper	✓	✓	✗	✗	✓ ²	✗	✗
Metal	✓	✓	✗	✓	✓	✓	✓
Glass	✓	✓	✗	✗	✗	✗	✗
Plastic	✓	✓	✗	✗	✗	✗	✗
Clothing	✗	✗	✗	✗	✗	✗	✗
Greenwaste	✓	✗	✗	✗	✗	✗	✗
Timber	✓	✗	✗	✗	✗	✗	✗
Motor Oil (L)	✓	✓	✗	✓	✗	✓	✓
Batteries	✓	✓	✗	✓	✓	✓	✓
Gas Cylinders	✓	✓	✗	✓	✓	✗	✗
Tyres	✓	✗	✗	✗	✓	✓	✓
Paint	✗	✗	✗	✗	✗	✗	✗
Reuse shop/area	✓	✗	✗	✗	✓	✓	✗
C & D	✓	✗	✗	✗	✓ ³	✗	✗
Drum muster	✓	✗	✗	✗	✗	✓	✗
E -waste	✓	✓	✗	✗	✓	✗	✗

² SHC collecting cardboard

³ SHC stockpiling concrete

4 COMPARISON TO 2013 WASTE QUANTITY DATA

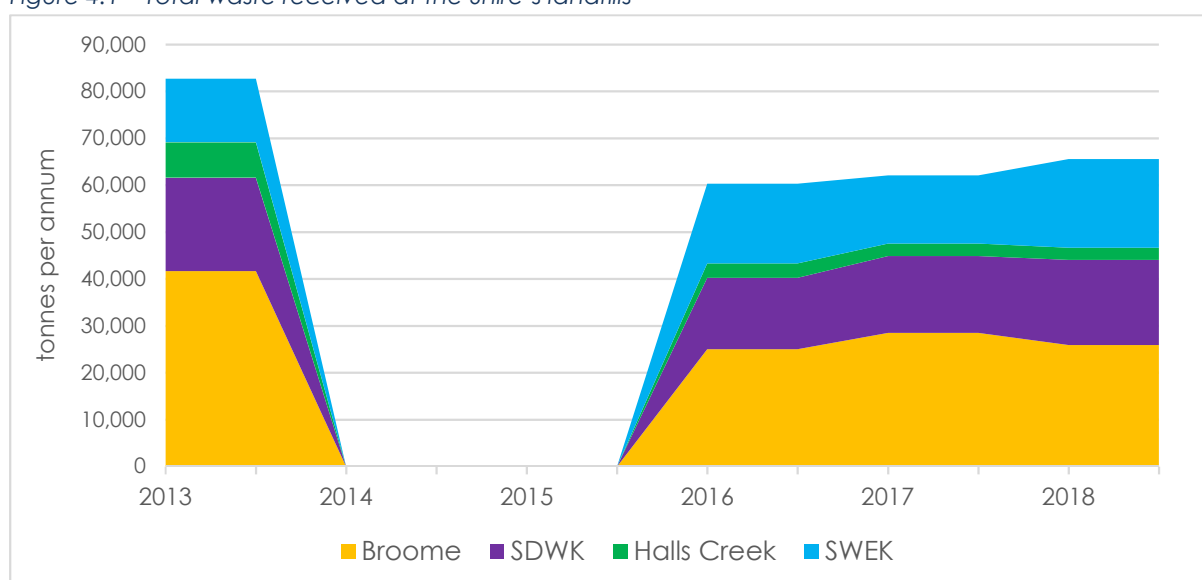
The project included collating waste data for the last three years for each Shire. This was completed to generate 'three year average' values for all waste and material categories in order to reduce the impact on the data from any significant one-off events relating to waste generation.

The collection of the additional waste data for 2016 and 2017 has also enabled the identification of any trends and provided an improved comparison with the 2013 data.

4.1 WASTE RECEIVED AT THE SHIRE'S LANDFILL (WASTE GENERATION)

The three year average waste quantity (2016-18) has shown a reduction of total waste received at the Shire's landfills of approximately 25% compared to the 2013 data. **Figure 4.1** shows the total waste received by each Shire, stacked to generate the regional total, in 2013 the total was over 80,000 tonnes, while in 2016 the total had dropped to 60,000 tonnes. The total has increase by approximately 2,500 tonnes per year since then to just over 65,000 tonnes in 2018.

Figure 4.1 – Total waste received at the Shire's landfills



However, during the same period the total population has declined by less than 5% (including tourism equivalent) and this alone would not account for this significant decrease in total waste generation. Therefore, other factors may include:

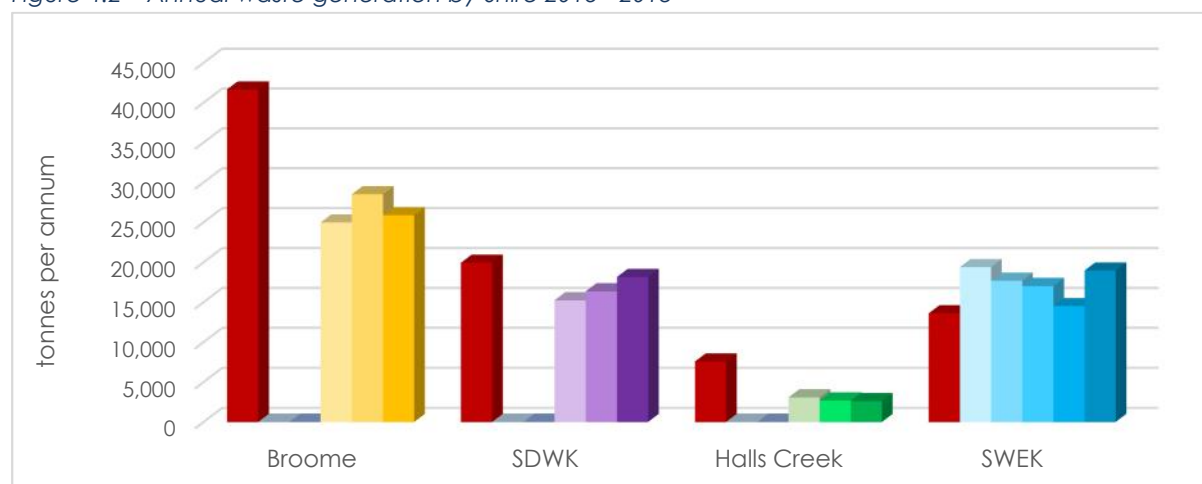
- ⌋ Reduced economic activity in the region;
- ⌋ Increased waste minimisation; and
- ⌋ Improved and more accurate waste reporting, (three of the Shires introduced electronic systems around 2014 and Broome installed a weighbridge more recently).

It is likely to be a combination of all the factors mentioned above, ASK believe there may have been a stepped decrease in waste tonnes reported following the introduction of improved gatehouse reporting systems in 2014. In support of this theory the annual total waste received at the SWEK landfills increased significantly in 2014, as shown in **Figure 4.2**, (although a portion of this increase resulted from the flood waste mentioned later). This graph shows the total waste generation in 2013 (red bar) and the following years (when data was available). As ASK have worked with SWEK over this period, a full year by year dataset was available to plot.

The information shown in **Figure 4.2** for all the Shires show that the total tonnes received at the landfills has not experienced any significant changes. The changes in total each year may include a trend in

waste generation, increasing or decreasing, however, these are easily masked by one-off events such as a large infrastructure construction project, demolition of a large facility or even a natural disaster such as the floods in Kununurra in 2014 (this resulted in large quantities of flood damaged furniture, greenwaste and soil being received at the landfill).

Figure 4.2 – Annual waste generation by Shire 2013 - 2018

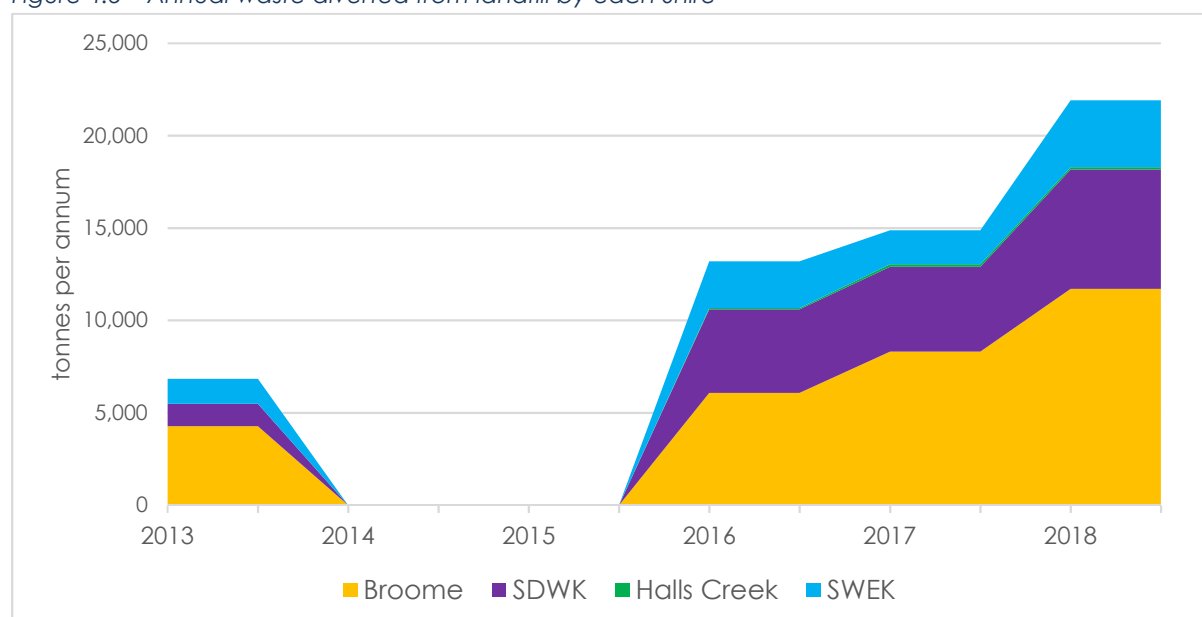


4.2 WASTE DIVERSION FROM LANDFILL

Whilst there was a decrease in total waste generation between 2013 - 2016, for waste diversion there has been a significant increase since 2013, from nearly 7,000 tonnes in 2013 to approximately 22,000 tonnes in 2018, an increase of over 300%.

Figure 4.3 shows the tonnes of material diverted from landfill by each Shire, stacked to provide the total for the region. As this shows, all the Shires have significantly increased the tonnage of material diverted from landfill, resulting in an average waste diversion rate of 33% for 2018 across the Kimberley. This is a significant achievement given the constraints faced by the Shires relating to waste diversion.

Figure 4.3 – Annual waste diverted from landfill by each Shire



5 IMPLEMENTATION OF THE 2013 RWMP

The findings, issues and recommendations from the 2013 RWMP were formulated into an action plan to improve waste management within the region. Action were divided into five categories that included:

-)] Organisational Capacity
-)] Economic Viability
-)] Waste Data
-)] Community Awareness
-)] Best Practice Operations
-)] Waste Minimisation

As part of this project, ASK has assessed the Shires' progress at implementing the recommendations outlined in the five categories. Progress was assessed from interviews with Shire staff. A full assessment of the progress against the original RWMP is provided in **Appendix B**.

5.1 SUMMARY OF PROGRESS

In general, progress on implementing the original RWMP has been challenging for the Shires with just over half of the actions either completed or progressed. **Table 5.1** shows that 27% of the actions were completed and a further 31% partially progressed.

Table 5.1 - Summary of recommendations (actions) progressed and completed

	Broome	SDWK	Halls Creek	SWEK	Regional Total
Number of Actions	28	27	28	28	111
Partial progress	10	8	8	8	34
Actions completed	9	5	6	10	30
% Progressed	36%	30%	29%	29%	31%
% Completed	32%	18%	21%	36%	27%

Actions for categories of waste data and best practice operations were generally well implemented across all four Shires, however categories of organisational capacity, economic viability, community awareness and waste minimisation were generally only partially implemented or not progressed. It was apparent from the review of progress against the 2013 RWMP that these actions were not implemented generally due to insufficient organisational capacity, especially at the regional level.

5.1.1 Organisational capacity

Organisational Capacity at the individual council and regional level must be sufficient to successfully implement new waste management initiatives within the region. The 2013 RWMP recommended four actions to improve this capacity across the region including:

-)] Regional cooperation through the formalisation and expansion of the existing regional cooperation (Waste TAG and WALGA Zone).
-)] Establishment of a mechanism to fund regional waste initiatives.
-)] Establishment and appointment of a shared Regional Waste Management Coordinator position.
-)] Implementation of systems to retain organisational knowledge and facilitate continuity of project implementation.

Of these four actions, one was partially progressed, however none have been completed. The Waste TAG teleconferences commenced however the waste coordinator position at the host Shire (Broome) was vacant for eight months affecting the frequency the meetings were held. This however has been recently rectified with the appointment of a zone coordinator and renewed commitment made by all Shires to participating in the Waste TAG. This momentum is to be maintained to provide the greatest benefit to the region.

Table 5.2 - Summary of progress of actions relating to organisational capacity

Action	Description	Broome	SDWK	Halls Creek	SWEK
4.1.1 Regional Cooperation	Formalisation and expansion of the existing regional cooperation (Waste TAG and WALGA Zone).	Partial Progress	Partial Progress	Partial Progress	Partial Progress
4.1.2 Regional Funding	Establishment and funding of a Regional Waste Management Account (potentially through the WALGA Zone) to administer funds provided by regional grants such as the Regional Investment Scheme and member contributions.	No Progress	No Progress	No Progress	No Progress
4.1.3 Regional Waste Management Coordinator	Engage a Regional Waste Management Coordinator to coordinate the implementation of this plan and other regional initiatives funded by the Regional Waste Management Account.	No Progress	No Progress	No Progress	No Progress
4.1.4 Continuity Planning	Implement management systems to retain organisational knowledge and facilitate continuity of project implementation. TAG group and regional coordinator will provide 'brains trust' to assist new staff to 'come up to speed'	No Progress	No Progress	No Progress	No Progress
Number of actions		4	4	4	4
Actions completed		0	0	0	0

5.1.2 Economic viability

The economic viability of waste management projects and services must be optimised to reduce the burden on Shires and enable new initiatives to be implemented. The 2013 RWMP identified that many of the actions to improve waste management in the region were not implemented because they were not economically viable, or Shires lacked the necessary funds to implement them.

This issue was particularly apparent in regard to the implementation (or lack thereof) of resource recovery initiatives. To ensure that advances to waste management are achieved, it is essential that the economic viability and efficiency of all waste services and projects be optimised. Five actions were developed to improve the economic viability of services provided as outlined in **Table 5.3 - Summary of progress of actions relating to economic viability**.

Of note in relation to this category, the group collaborated on the procurement of kerbside services for the region through a regional collection contract to take advantage of the economies of scale offered through regional procurement.

Good progress was also achieved in relation to action 4.2.4 (Whole of life costing and gate fee price structure). This was achieved through either implementation of the actions as occurred in SOB and SWEK or active consideration and decisions by the Shire not to progress in this manner due to internal

challenges. This is evidenced by the SDWK actively deciding not to impose full costed gate fees for its landfills due to significant issues and costs with illegal dumping in the Shire and SHC due to its challenges with regard to community acceptance of its current waste gate fees. The SWEK also have not structured prices so that mixed wastes are charged higher fees than separated recyclable wastes due to the limited viable streams currently collected and separated for recycling by the Shire.

Table 5.3 - Summary of progress of actions relating to economic viability

Action	Description	Broome	SDWK	Halls Creek	SWEK
4.2.1 Economies of Scale (Regional Procurement)	The Shires should implement actions to take advantage of the economy of scale offered by regional procurement. Regional procurement does not require a single contract to be signed by all Councils, rather it involves similar services being advertised for tender/quotation as part of the same package with a request made to tender applicants that they also provide pricing based on being awarded contracts for all Councils.	Partial progress	Partial progress	No progress	Partial progress
4.2.2 Private Sector Competition	Encourage private sector competition for all waste related goods and services by: Developing tenders to maximise economy of scales; Structuring tenders and managing the procurement process to provide a level playing field and encourage private sector competition; Where appropriate, Councils to accept reasonable risks and develop internal mitigation strategies rather than transferring all risks to the private sector (i.e. Bin ownership and maintenance).	Partial progress	Partial progress	No progress	Partial progress
4.2.3 Transport Logistics	The Shires should work collaboratively with each other and the private sector to identify potential ways of maximising transport efficiencies in the region.	No progress	No progress	No progress	No progress
4.2.4 Whole of life costing and gate fee price structure	The Shires should aim to ensure all waste management costs relating to commercial wastes are received from gate fees or any shortfall is quantified.	Complete	Complete	Partial progress	Complete
	The gate fees need to be structured to maximise the financial drivers. This means structuring prices so that mixed wastes are charged higher fees than separated recyclable wastes.	Complete	Complete	Complete	Complete
Number of actions		5	5	5	5
Actions completed		2	2	1	2

5.1.3 Waste data

The collection of waste related data, such as tonnages, landfill cell locations and site plans, is essential to effectively manage and monitor the operations of the Shire's waste facilities. The data allows the Shires to monitor progress against targets, quantify the impact of any strategies implemented and effectively plan future activities and operations.

Although there have been some significant improvements to waste data collection across the region with the introduction of gatehouse software to record incoming waste streams within three of the four Shires, the accuracy of the data is limited by the lack of a weighbridge and as such restricted to volumetric assessment by gatehouse staff. There is also a lack of standardisation in the manner in which incoming waste streams are recorded across the region. The Shire of Broome is the only Shire to have installed a weighbridge at the landfill facility. This is used for commercial loads but is not currently measuring domestic/self-hauled waste streams.

Table 5.4 - Summary of progress of actions relating to waste data

Action	Description	Broome	SDWK	Halls Creek	SWEK
4.3.1 Data Collection and Monitoring	All Shires should implement standardised recording procedures based on the classification system utilised in the Waste Data Study for the Pilbara Region (Talis, 2013).	Partial progress	Partial progress	Partial progress	Partial progress
4.3.2 Waste Tonnage Data	Complete periodic surveys of waste tonnages using mobile weigh cells. This would enable the Shire to more accurately quantify the tonnage of self-hauled waste received at the landfill sites.	Partial progress	No progress	No progress	No progress
	Shires should ensure that waste quantities can be consistently and accurately measured at larger sites and at least be measured periodically for smaller sites.	Complete	No progress	Partial progress	No progress
4.3.3 Landfill cell location and site surveys	Records must be kept of landfill cell locations for asbestos and clinical waste (a licence condition) and it is recommended that records are kept of all cell locations and waste types disposed of in each cell/area. Have all landfills in the region (excluding Camballin) surveyed on an annual basis.	Complete	Partial progress	Partial progress	Complete
Number of actions		4	4	4	4
Actions completed		2	0	0	1

5.1.4 Community awareness

Education and awareness of waste management and recycling throughout the community (i.e. residents, organisations, business, schools and industry) must be included as a 'horizontal' strategy throughout the entire implementation strategy and is integral to its success or failure. The wider community need to understand the issues and reasons why the waste management and recycling programmes are being introduced, how they will be affected, what is required from them and the benefits that the community and the Shires will gain. Four actions were developed to assist the Shires to raise community awareness across the region in terms of waste and recycling. In general, there was minimal progress in this area on a regional basis.

SWEK achieved good progress in this area in terms of communication with commercial customers and internal decision makers (Councillors). The SWEK undertook a two-pronged, face-to-face engagement campaign between August and September 2013. It held community workshops in Wyndham and Kununurra on new (whole of life) fees that would be charged for commercial waste at shire facilities. Councillors at SWEK have also been briefed on local government waste services and its drivers during the review period.

The SHC have converted the Environmental Health Officer position to a Health Promotion position to upscale waste education and communication to the community.

The SOB is currently developing a waste education strategy for implementation in 2018/19.

Table 5.5 - Summary of progress of actions relating to community awareness

Action	Description	Broome	SDWK	Halls Creek	SWEK
4.4.1 Community Attitudes	Develop and implement (on a regional basis) a market research programme to establish and monitor community attitudes about the current services they receive and how the future services and activities should be developed. Complete the survey on an annual basis to monitor any changes. Additional one-off questions can be added for topical issues.	No progress	No progress	No progress	No progress
4.4.2 Community Knowledge	To develop a communication and education programme for the Shire. Additional activities, such as radio 'sound-bites' will assist in increasing awareness, particularly for residents with lower levels of literacy. An education levy is added to all gate fees to provide a specific fund for education and awareness activities. It cannot be stressed enough, that education and awareness are crucial activities to ensure the success of the future waste strategies. The levy could be paid into a fund for regional education activities to achieve greater economies of scale. If the Shire of Wyndham / East Kimberley joined the fund, all campaigns could be 'Kimberley' branded.	Partial progress	Partial progress	Partial progress	Partial progress
4.4.3 Communication to Commercial Customers	Any significant changes to gate fees and services should be communicated to all commercial customers of the Shire's facilities at least six months prior to the change occurring. The communications should include the rationale behind the changes (e.g. meeting State guidelines and targets, etc) and the wider benefits that will be produced (e.g. increased recycling, preserving voidspace, etc). Prior communication will minimise the risk of misunderstanding or confusion at the facilities once the changes are implemented.	Partial progress	No progress	No progress	Complete

Action	Description	Broome	SDWK	Halls Creek	SWEK
4.4.4 Decision maker (Cr) understanding of the waste industry	Councillors need to understand the factors that drive the management of waste in each Shire, this includes; the whole of life economics of a landfill, environmental risk, regulatory requirements, key operational issues, Strategic plans, etc.	No progress	No progress	No progress	Complete
Number of actions		4	4	4	4
Actions completed		0	0	0	2

5.1.5 Best practice operations

The 2013 RWMP showed that waste management operations in the Shires were not to 'best practice' standards, and in some cases not compliant with licence conditions. The use of best practice for the waste management activities assists in minimising the risk of environmental damage or pollution, extending the life of the Shire's waste facilities and reducing the operational and maintenance costs associated with the facilities. Three actions were developed to increase the standards of operations in line with 'best practice' DWER requirements and are shown in **Table 5.6**.

Table 5.6 - Summary of progress of actions relating to best practice operations

Action	Description	Broome	SDWK	Halls Creek	SWEK
4.5.1 Operational Planning	All sites should have operational plans (that are less than five years old). Any site without up to date operational plans should produce these important plans. The detail required in each plan should be appropriate to the size and complexity of the site.	Partial progress	Complete	Complete	Complete
4.5.2 Knowledge and Skills	The current (and all future) staff needs to be aware of their operational duties and the site license conditions, together with the wider issues of waste management and recycling. With this in place staff should become more motivated, resulting in operational efficiencies. In addition, investment in staff through training programmes may assist in reducing staff turnover and developing the skills of current staff.	Complete	NA	Complete	Complete
4.5.3 Identification of New Sites	Accurately quantify the remaining operational life at existing facilities. If remaining operational life is less than 10 years - start the process to identify and develop a new site in accordance with BPEM landfill siting guidelines.	Complete	Complete	Complete	Complete
Number of actions		3	2	3	3
Actions completed		2	2	3	3

Good progress was achieved in this category with the majority of actions completed. All Shires have developed operational management plans for their respective sites which provide standard operating

procedures for waste related duties at the landfill. Shires have also completed landfill closure management plans which have provided estimates of operational life for each facility. Sites with remaining operational life of less than 10 years have begun the process to identify and develop a new site in accordance with BPEM landfill siting guidelines.

5.1.6 Waste minimisation

The minimisation of waste will assist in extending the operational life of the landfill facilities, maximising the recycling of resources and minimising the risk of environmental damage or pollution. The 2013 RWMP contained eight actions to assist in minimising waste within the region as shown in **Table 5.7**.

Table 5.7- Summary of progress of actions relating to waste minimisation

Action	Description	Broome	SDWK	Halls Creek	SWEK
4.6.1 Scrap Metal	The Shires work together to develop a regional solution that ensures scrap metal is collected from all facilities for recycling. This could provide an 'easy' pilot regional contract to be developed by the TAG group.	Partial progress	Partial progress	Partial progress	Partial progress
4.6.2 Source separation of C&D waste	Assess the viability of concrete and brick recycling in the region, considering:)] New C&D recycling asbestos guidelines⁴)] Volumes)] Markets)] Capital and operational costs)] Funding options)] Operational delivery options, etc.	No progress	No progress	No progress	No progress
	If the recycling of C&D waste is found to be viable, the delivery of separated C&D should be encouraged. The Shires encourage source separation by introducing Waste Management Plans (WMP) as part of building approvals, using gate fee pricing structures (low cost for separated loads) and community / industry education. The local building industry involves only a few businesses in each town, which could assist in the development / adoption of 'on-site' waste management practices that will maximise recycling. The separated "clean" concrete, bricks and tiles should be stored separately at the facilities, prior to reprocessing.	Complete	No progress	Complete	Complete

⁴ Guidelines for managing asbestos at construction and demolition waste recycling facilities (DER, 2012)

Action	Description	Broome	SDWK	Halls Creek	SWEK
4.6.3 Additional Waste Processing	That the Shires work together to identify waste streams that could be assessed for recycling / diversion. The waste streams targeted could be based on: - Problematic wastes (e.g. gas bottles) - Local markets (e.g. reuse shops) - Significant volumes (e.g. organic waste)	No progress	No progress	No progress	No progress
4.6.4 Waste Tyres	That the Shires work together to investigate possible solutions to process or recycle tyres in a cost effective manner. Some tyre repair companies are returning tyres to Perth for recycling as part of an industry scheme, this should be explored further.	Partial progress	No progress	No progress	Partial progress
4.6.5 Greenwaste Processing	That the Shires work together to develop a regional solution that: - Minimises processing costs across the region. - Provides opportunities to utilise external funding opportunities. - Assesses local markets for recycled greenwaste. - Ensures recycled greenwaste products meet the relevant product standards.	No progress	No progress	No progress	No progress
4.6.6. Packaging Materials	The Shires should not introduce a kerbside collection of recyclable materials (Recommendation from Kimberley Zone report. MRA, 2013) However, drop-off facilities could be established at manned facilities for higher value materials such as metals and plastics. Drop-off facilities avoid the cost of sorting co-mingled packaging materials and thus a lower cost alternative to introduce some recycling of these materials in the Shires. Once the materials are baled, transportation options need to be assessed to identify the most efficient system.	Complete	Complete	Complete	Complete
4.6.7 Low Volume Highly Polluting (LVHP) waste	The Shire's investigate solutions to reduce the volume of HHW and e-waste being disposed of to landfill by taking advantage of the National Television and Computer Recycling Scheme (NCRS), and the various Waste Authority initiatives.	Complete	Partial progress	Partial progress	Partial progress
Number of actions		8	8	8	8
Actions completed		3	1	2	2

The review found that generally none of the actions had been progressed on a regional basis, more so individual shires collecting and stockpiling certain waste streams (e.g. metal, concrete, tyres), often without assessment of its viability.

Resource recovery drop off facilities have been provided at all sites (except Looma) but vary in nature and size based on waste streams collected and separated for recovery and/or recycling.

Scrap metal and batteries are the only waste streams consistently collected across the Shires, however collection of this material is challenged by the isolation of the facilities, distances to markets and the lack of suppliers. Collection is being organised on an individual and adhoc basis.

Other potential recoverable material streams are handled differently across the region. This is summarised as follows.

- J Concrete: At the SOB and SHC concrete is separated on site and fee structures have been introduced to encourage recycling and separation of this material. At the SWEK a batch of concrete was reprocessed but the Shire did not have a licence condition to do so. The Shire subsequently decided the cost of compliance and monitoring required by the DWER in relation to asbestos risks negated the benefits associated with the reprocessing the material. Concrete is disposed to landfill at the SDWK.
- J Tyres: Tyres are stockpiled at SOB and SWEK and mono-filled at SDWK and SHC. The SWEK and SOB were previously working together on a solution for tyres where the SWEK were going to transport tyres to SOB for storage until suitable quantities (and therefore economies of scale) were achieved for a contractor to shred onsite at Broome. The SWEK have received a licence amendment through DWER to store increased quantities of tyres on site to support this initiative. Both Shires are still undertaking further work on this action.
- J Greenwaste: Greenwaste is stockpiled and mulched at the Shire of Broome. It is buried at the SDWK and burnt in accordance with licence conditions at SHC and SWEK.
- J E-waste: E-waste is stockpiled at all shires except SWEK. The SOB is the only Shire to have a collection agreement in place for collection on site of stockpiled e-waste. An e-waste collection was initially organised through the NTCRS for the SWEK, however the contractor then did not collect the waste. The SHC and SDWK do not have collection agreements in place and face difficulties in finding a viable market for the material.
- J There are currently no viable solutions for household hazardous waste within the region, with most being disposed to unlined landfills.

6 FINDINGS, ISSUES AND RECOMMENDATIONS (ACTION PLAN)

A number of key findings have been identified during the desktop review of the waste management plan and consultation with the Shires. The key findings aim to address the issues highlighted in the previous sections of the report.

These findings have been divided into five categories:

-)] **Data and Information:** The accurate collection of waste related data, including waste streams and tonnages is essential to effectively manage and monitor the operations of the Shire's waste facilities. The data allows the Shires to monitor progress against targets, quantify the impact of any strategies implemented and effectively plan future activities and operations. Actions include:
 - o Data consistency
 - o Data accuracy
 - o Financial data
 - o Community opinion
-)] **Infrastructure Planning:** To ensure appropriate, aligned and cost-effective forward planning in the region, the Shires must determine their future waste infrastructure needs. Given the current requirements for site identification, assessment, approval, design and construction, any Shire with less than 10 years of operational life should start the process to secure a new site to ensure continuity of service. This section provides a summary of each Shire's waste infrastructure and identifies the need for any new sites or facilities over the next decade.
-)] **Strategic Planning:** This section highlights any gaps identified in the Shire's strategic planning considerations and any external factors that could significantly impact on waste operations and planning. These recommendations will assist the Shires in preparing for and managing the associated issues and risks for both short- and long-term waste service delivery and include:
 - o Disaster or emergency waste management
 - o Municipal upgrade program (Aboriginal Communities)
 - o Alignment of RWMP with Strategic Community Plans and operational business plans
 - o Waste Strategy 2030
-)] **Regional Collaboration:** It is apparent that the key factor limiting the implementation of regional strategies is insufficient organisational capacity. While the establishment of a regional group and resources will require an initial additional effort from the Shires, the long-term benefits would include improved efficiency of procurement, collaboration and delivery of waste services. Key regional measures include:
 - o Collaboration via the Waste TAG
 - o Regional procurement
 - o Waste awareness program
-)] **Waste Minimisation:** Strategies to reduce waste generation and divert waste from landfill will assist in extending the operational life of facilities, maximising the recycling of resources and minimising the risk of environmental impact. However, each potential measure must be comprehensively assessed to ensure it is financially viable and sustainable in the long term. Potential waste minimisation activities should focus on the following:
 - o Determining the drivers for resource recovery and making informed decisions
 - o Assessing the long-term market for diverted materials and considering any transport required

- o Potential material streams to be targeted, which include:
 - High volume – low value materials to be used locally (e.g. concrete, organics and glass)
 - High volume – high value materials (e.g. scrap metal and possibly tyres)
 - Low volume – highly polluting materials (e.g. e-waste and household hazardous waste)

The key findings listed in this section are addressed in the following sections with strategies and measures that have been formulated by ASK in close consultation with the Shires of Broome, Derby / West Kimberley, Halls Creek and Wyndham East Kimberley. Each strategy is shown in the following tables and comprises of these columns:

-) Findings: A brief description of the findings discovered during the development of the report.
-) Issues: The implications that are brought about by the findings.
-) Recommendations: Formulated through innovation, imagination and/or improvisation to address issues and capitalise on opportunities.
-) Implementation: Key actions required to implement the strategy.
-) Cost: Estimated cost to implement the strategy and potential funding sources.
-) Priority: The priority of the strategy's implementation, the entity responsible and a measurable time-bound outcome for the recommendation.

6.1 DATA AND INFORMATION

Data and information provide the key foundation for effective planning and decision making. The collection of accurate and consistent waste related data and information is essential to effectively plan, manage and monitor the operations of the region's waste facilities. The information is required to assess the feasibility of any potential projects, define their specification and estimate the cost.

While data quality has improved since the 2009 RWMP was produced, it requires significant upgrades to allow the Shires to monitor progress against targets, quantify the impact of any strategies implemented and effectively plan future activities and operations. Currently, planning and decisions are based on extrapolation, assumption and estimation for much of the information required.

The information required includes waste quantity data broken into waste types and material streams, landfill operational costs (including airspace value per cubic metre), remaining airspace at landfills and, importantly, the community's views about waste management and recycling.

6.1.1 Consistent waste data collection

Findings	Issues	Recommendations	Implementation	Cost	Priority
Waste data collection is inconsistent across the region. It also does not fully meet recording and reporting requirements (such as annual Local Government Waste Census and Annual Environmental Reporting for Licenced waste facilities). Data for target material types is not consistently collected.	Inconsistent data recording makes comparison and collation of the region's data problematic and creates difficulty in analysing the data needed to underpin regional initiatives. It makes completion of reporting requirements more time consuming for Shires. With no material type data, the actual tonnage that could be diverted and processed is unknown.	All Shires should implement standardised recording procedures based on a uniform classification system that records the data required for: - Invoicing (gate fee categories, unique to each Shire) - Standard data for Annual reporting (AER, NPI, LG survey) - Standard data for strategic planning (material and waste type)	The Shire's should review current reporting requirements and develop a waste data recording/classification system for each local government that is consistent between LGs and meets minimum DWER reporting requirements. This can be undertaken by a consultant on a regional basis.	\$5k - \$10k to develop and implement uniform system. Nil cost for ongoing data collection. Cost saving for annual reporting, regional data comparison and strategic planning.	High Whom SOB, SDWK, SHC, SWEK Outcome To adopt and implement a uniform definition of wastes to be used for gatehouse waste recording by 1 July 2019.

6.1.2 Waste tonnage data

Findings	Issues	Recommendations	Implementation	Cost	Priority
Waste data for the region has a high degree of variance and accuracy as the majority of the data is based on volumetric estimates at facility gatehouses.	Volumetric estimates of waste are inherently inaccurate. Charging disposal fees based on volumetric estimates allows commercial customers to heavily compact loads and dispute gatehouse estimates to reduce gate fees payable.	Installation of weighbridges at Derby and Kununurra, provided at least 10 years of operational life remains.	Provided there is more than 10 years of operational life at the landfills, the Shire's should install weighbridges for the accurate collection of tonnage data and calculation of customer disposal fees. If a new landfill is required within 10 years, a weighbridge should be included in the facility master plan.	\$150k - \$175k installed	Medium Whom SDWK, SWEK Outcome Determine operational life by 1 July 2019, install weighbridges by 1 July 2020.
	With little accurate data about waste composition, the assessment of measures to improve recycling rates is problematic and based on assumptions.	For facilities without a weighbridge, complete periodic surveys of waste tonnages using mobile weigh cells. This would enable each Shire to more accurately quantify the tonnage of waste received at the landfill sites.	The Shires should assess the viability of purchasing a set of mobile weigh cells to be used throughout the region to complete periodic surveys of the tonnages received at each site. Once the weigh cells have been used to gather waste tonnage data, the survey and tonnage data can be combined to record the quantities disposed of in each cell. The weigh cells will enable the Shires to calibrate average weights of kerbside collection trucks, skip bins and loads from regular users of the facility. Therefore, provided the number of truckloads arriving at each site are recorded, annual tonnages can be calculated with reasonable accuracy.	The cost of the mobile weigh cells is approximately \$15k for a single axle set (i.e. two pads). Each landfill site survey would require approximately 10 staff days. This would include set up, monitoring and collating the results.	Medium Whom SDWK, SWEK, SHC Outcome Complete first audit of key sites by 1 Jan 2020.
		Determine the waste composition of kerbside bins.	Each Shire could complete a kerbside bin audit to determine the proportion of key material streams collected. This data would be assessed to determine the optimal bin collection configuration and waste processing methods. The Shire of Broome has committed to completing a kerbside bin audit.	\$15k - \$20k for a waste audit to be completed. \$10k - \$15k for the analysis of the data and development of recommendations.	Medium Whom SOB Outcome Complete kerbside waste audit by 1 Dec 2020.

6.1.3 Financial data

Findings	Issues	Recommendations	Implementation	Cost	Priority
The whole of life operational cost of the landfills (i.e. waste disposal cost per tonne) and the cost to generate airspace (construction cost per cubic metre) have not been calculated for many of the landfills.	It is difficult to assess the economic feasibility of resource recovery initiatives when the true cost of waste disposal and airspace construction is unknown. Without this information the Shire's cannot determine the impacts of any potential measures on operational costs, and therefore rates.	Each Shire should complete a whole of life ⁵ (WoL) financial assessment for each landfill to determine the true disposal cost and asset value of the airspace remaining at each landfill.	There are some WoL models available to download that have been produced by other States, however, the running of the models and interpretation of the data requires specialist waste knowledge. Therefore, this modelling could be completed in house, if specialist waste officers have available capacity. Alternatively, a waste consultant can be engaged. The model should be reviewed and updated every 3 – 4 years to reflect changing cost, regulation and waste quantities.	Process can be completed in-house, so costs relate to time required by staff, or via a consultant costing \$5k - \$10k per facility.	High Whom SOB, SDWK, SHC, SWEK Outcome All Shires determine the cost of disposal and airspace at their facilities by 1 July 2019 and review in 2022.
Operation of some waste sites is undertaken without consideration of the long-term financial impacts which can lead to significant avoidable costs being incurred.	If the whole of life costs (previously calculated for other small landfills at \$55-\$100 per tonne) are not covered by the gate fees and do not have a waste reserve fund established, it is likely that domestic rates are subsidising commercial waste disposal. Furthermore, the Shires will incur a significant financial burden when capital infrastructure (e.g. new sites, plant and machinery) and site closure and rehabilitation is required.	The Shires should aim to ensure all waste management costs relating to both domestic and commercial wastes are received from gate fees, or alternative revenue streams secured for any shortfalls quantified. Establish a waste reserve to ensure adequate capital funds for future infrastructure replacement and management.	The income from gate fees should cover the whole of life costs, however, for social or political reasons alternative funding sources (e.g. additional rates) can be used to subsidise the facilities. Landfill fees should be determined for the next five years and communicated to customers, allowing them time to adapt their waste management practices. The waste reserve fund should be established (either based on a levy per m ³ of waste disposed or flat rate as allowed in s66 of WARR Act) that will accrue sufficient funds for planned new infrastructure, site rehabilitation and to purchase strategic capital items. The fund values and future costs should be monitored regularly to ensure all future liabilities will be covered.	Process can be completed in-house, so costs relate to time required by staff to develop fee structure.	Medium Whom SOB, SDWK, SHC, SWEK Outcome All Shires gate fees are based on whole of life costing, or alternative revenue sourced for any shortfall by 1 July 2020. Waste reserve established and regularly reviewed.

⁵ Whole of life landfill calculations consider the costs across all stages of a landfill including planning and approvals, establishment, operations, and closure and post closure monitoring. When combined with the facilities capacity (airspace), this determines the true cost to waste disposal per tonne and the 'asset value' of each cubic metre of airspace. Therefore, each cubic meter of material diverted from landfill preserves the value of the airspace it would have consumed.

6.1.4 Community opinion

Findings	Issues	Recommendations	Implementation	Cost	Priority
There is little information about the communities' attitude or opinions about how they want their waste managed within the Shires.	The attitudes of the community (commercial and residential) relating to current and future waste management services need to be determined. The information should be considered for the development of waste management strategies, plans and resource recovery measures for the Shires. With regular surveys, changes in attitudes can be tracked.	Develop and implement (on a regional basis) a market research programme to establish and monitor community attitudes about the current services they receive and how the future services and activities should be developed. Complete the survey on an annual basis to monitor any changes. Additional one-off questions can be added for topical issues.	Develop a simple survey that can be completed via telephone, the Shires' websites, online, one-to-one surveys or post. Areas to be covered include satisfaction of current services, attitude to recycling, desire to increase / introduce recycling, cost of services, use of landfill, etc. Once the questions have been established, a representative cross-section of the region's community should be surveyed annually. This can be included as a section within existing or planned Shire surveys about other services. Face to face surveys could be completed by voluntary groups (e.g. Rotary) at community markets or public events, also at the Aboriginal health units to ensure all the communities' opinions are gathered.	\$15k - \$20k to develop survey and analyse the responses. Internal staff time to send and collect surveys.	Medium - High Whom SOB, SDWK, SHC, SWEK Outcome Survey completed throughout region by 1 July 2020

6.2 INFRASTRUCTURE PLANNING

To ensure appropriate, aligned and cost-effective forward planning in the region, the Shires must determine their future waste infrastructure needs. Many of the Shire's landfills and liquid waste facilities across the region were developed before best practice standards were introduced, therefore their historic management and operations were often not efficient and did not consider the requirements of site closure and rehabilitation.

The Broome landfill has less than five years of operational life and several other key facilities have a remaining operational life of less than 15 years. Given the current requirements for site identification, assessment, approval, design and construction, any Shire with less than 10 years of operational life at their landfill should immediately start the process to secure a new site. This section provides an overview of the key waste infrastructure needs for the Shires over the next decade.

6.2.1 Liquid waste infrastructure - Broome

Findings	Issues	Recommendations	Implementation	Cost	Priority
A solution required for grease waste as historic facility has been decommissioned. Septage waste being managed by Water Corp. SOB is considering the development of a new liquid waste facility at the RRRP capable of accepting material from offshore drilling projects.	High transport and disposal costs for producers of grease trap waste. Current method is unsustainable as a long-term solution. Site for a new facility has not been approved, so construction yet to start.	A new liquid waste treatment facility is required. This should be at the proposed Regional Resource Recovery Park (RRRP), however, based on the time required to secure the RRRP site, the liquid waste facility may need to be established at an alternative site. Therefore, a review of potential alternative sites for the liquid waste facility should be completed. Complete a feasibility study for development of a liquid waste facility capable of accepting material from offshore drilling projects.	Prepare for the rapid construction of a new facility as soon as a site is available. Therefore, complete the design of the facility to process the liquid waste generated and accommodate the projected increases. Identify potential companies to build the facility and prepare the procurement / tendering documentation. If there is an alternative site that could rapidly gain approvals for the liquid waste facility, complete a cost – benefit analysis for quicker establishment, but not at the RRRP site.	\$1M (source Talis, 2018)	High Whom SOB Outcome Establish facility asap

6.2.2 Liquid waste infrastructure - SDWK

Findings	Issues	Recommendations	Implementation	Cost	Priority
No septage facility in Derby. Water Corp indicate they will provide septage waste solution. Grease trap waste facility in Derby No liquid waste facility at Fitzroy Crossing	None	None	None		

6.2.3 Liquid waste infrastructure - Halls Creek

Findings	Issues	Recommendations	Implementation	Cost	Priority
A liquid waste facility at the Halls Creek landfill that accepts septage and grease trap waste. This is used by a single contractor.	The existing facility is understood to be unlined. Whilst there appears to be no groundwater impacts associated with the ponds, the Shire should upgrade the facility to include lined ponds and minimise their potential environmental impacts.	Assess potential locations for new facility, either existing site or new site. Undertake preliminary design options and costings Obtain relevant approvals for site Commence construction	This can be done internally or through a consultant.	\$200k - \$500k Dependent on treatment process and capacity of facility	Medium Whom SHC Outcome Establishment of best practice facility

6.2.4 Liquid waste infrastructure - SWEK

Findings	Issues	Recommendations	Implementation	Cost	Priority
New liquid waste ponds constructed in 2016. Old pond decommissioned and rehabilitated.	None	None	None		

6.2.5 Solid Waste - Broome

Findings	Issues	Recommendations	Implementation	Cost	Priority
Less than three years of operational life at the Buckley Road landfill. New Regional Resource Recovery Park (RRRP) including a landfill is yet to be secured. Need to establish a Community Recycling Centre (CRC) in Broome when Buckley Rd landfill closed. The RRRP is likely to include a re-use shop, hazardous household waste collection, and processing capacity for tyres, greenwaste, glass, and concrete. The Shire is considering acquiring capital items for the RRRP such as concrete crusher, glass crusher, greenwaste mulcher and posicover machine, with the	There is a significant risk a landfill at the RRRP will not be constructed before the Buckley Rd landfill is full. Therefore, the Shire may need to transfer the waste to an alternative landfill until the RRRP is operational. This would incur significant costs for the Shire and commercial organisations that generate waste. Before the Shire commit to introducing a waste diversion service at the RRRP an understanding of the drivers to divert wastes from landfill, together with the economics and markets for the diverted / reprocessed materials, is required. Then the decision can be made with an understanding of the likely impact on rates and charges.	Continue to prioritise the approval of a site for the RRRP. Ensure all actions that can be completed prior to site approval are completed to ensure the rapid establishment of a landfill cell at the RRRP (e.g. cell design, procurement preparation, etc). Construct CRC prior to RRRP opening. Identify alternative landfills for waste disposal in case RRRP is not established in time.	Continue seeking approvals for site and develop a project plan to minimise the timeline for RRRP and CRC establishment. Review alternative landfills for waste disposal and contact owners to determine capacity and cost of waste disposal. Develop agreements to receive waste, if no landfill is available in Broome.	RRRP: \$10M (source Talis, 2018) Broome CRC: \$2.26M (source Talis, 2018) Review of alternative landfills: Process can be completed in-house, so costs relate to time required by staff, or via a consultant (\$5k - \$10k).	High Whom SOB Outcome Identify and agree alternative landfills by 1 July 2019. Establish RRRP as soon as possible
		A detailed supply chain and market assessment must be completed for each potential material stream that could be diverted from landfill (e.g. concrete processed to produce recycled aggregate). See Section 6.5 (Waste Minimisation) for further specific information.	See Section 6.5 (Waste Minimisation) for further specific information regarding relevant assessments and implementation.	See Section 6.5 (Waste Minimisation) for further specific information regarding cost	See Section 6.5 (Waste Minimisation) for further specific information regarding priority

Findings	Issues	Recommendations	Implementation	Cost	Priority
possibility of these items being mobile.		Maximise the operational life of the Buckley Rd landfill by maximising waste diversion and waste compaction, minimising the use of daily cover and consider options to increase the available airspace.	Engage a consultant to work with Shire staff to review all aspects of Buckley Rd landfill operations and identify the measures that could extend the operational life, for example dynamic compaction, pre-shredding of waste, use of alternative daily cover material, waste diversion, landfill final landform and footprint, etc.	\$20k - \$30k, however, any gains in operational life would offset this cost by avoiding the transport of waste to an alternative landfill.	

6.2.6 Solid Waste - SDWK

Findings	Issues	Recommendations	Implementation	Cost	Priority
Derby landfill has a remaining operational life of approximately 10 years. Fitzroy Crossing landfill was extended to provide an estimated operational life of 40 years. Derby and Fitzroy Crossing landfill's operations are contracted to a third party. The Shire does not own or lease any waste plant or equipment. Both landfills record waste quantities based on volumetric estimates.	Given Broome's experience, at least a decade should be allowed to secure and establish a new site, to ensure the Shire has security of its waste disposal. Charging disposal fees based on volumetric estimates allows commercial customers to heavily compact loads and dispute gatehouse estimates to reduce gate fees payable (see Section 6.1.2) for recommendations relating to this issue).	The Shire should determine the remaining operational life at Derby. If the Derby landfill has less than 10 years of operational life remaining, the Shire should immediately begin the process to identify potential sites for a new landfill, complete the assessment and seek approval.	A topographic survey should be completed of the Derby landfill and compared with previous surveys to determine the rate of annual airspace utilisation and the remaining airspace at the landfill when compared with the final landform of the site. This will provide an accurate estimate of the remaining operational life based on current waste quantities and operational practices.	Site survey: \$5k Interpretation of survey can be completed in-house, so costs relate to time required by staff, or via a consultant (\$5k). New site identification, assessment and approvals: significant Shire staff input plus \$200k - \$500k consultancy and application fees.	High (for survey) Whom SDWK Outcome Define remaining operational life and, depending upon outcomes, start process for a new landfill site.

6.2.7 Solid Waste - Halls Creek

Findings	Issues	Recommendations	Implementation	Cost	Priority
Halls Creek landfill estimated at more than 10 years of operational life remaining. However, historically buried waste was recently found while excavating a new cell in a 'virgin' area of site.	The areas of unrecorded historic waste buried in what was thought to be 'virgin' ground will reduce the operational life of the site.	The Shire should determine the remaining operational life at the Halls Creek landfill. If the landfill has less than 10 years of operational life remaining, the Shire should immediately begin the process to identify potential sites for a new landfill, complete the assessment and seek approval.	Excavate test pits across 'virgin' areas to determine the extent of unrecorded historic waste burial and complete a topographic survey of the site to determine the remaining airspace at the landfill when compared with the final landform of the site in the LCMP. Review and amend the LCMP if more unrecorded waste is discovered, then recalculate the remaining operational life of the landfill. If less than 10 years of remaining operational life, start the process to establish a new site.	Test pits can be completed in-house, so costs relate to time required by staff and plant. Site survey: \$5k Review of LCMP: \$10k	High (for test pits and survey) Whom SHC Outcome Define remaining operational life and update LCMP.
Disagreements about the volumetric estimates at the gatehouse between staff and commercial customers.	Significant time spent by the Shire dealing with customer disputes and conflicts over the visual assessment of volumes. Landfill revenue and gatehouse records may be impacted due to the potential for site staff to under estimate volumes to avoid customer conflict.	The installation of equipment to weigh the loads of waste will provide a definitive value for the quantity of waste received and resulting fee.	There is a range of weighing equipment available from portable single wheel weigh cells to full weighbridges. The Shire should determine the optimal system for the site and install a weighing system.	The assessment of weighing systems can be completed in-house by Shire staff or out sourced. Weighing systems range from \$15k - \$175k.	High Whom SHC Outcome Establish waste weighing system by 1 July 2020
Limited funds are available to purchase new plant and equipment.	Lack of appropriate plant and equipment at the landfill results in inefficient operations thus increasing the long-term costs for the Shire. A waste reserve was established in 2015 for site closure. However, this does not cover equipment renewal, resulting in new plant being funded as part of the annual budget process	Appropriate plant is required to move and compact the waste, thus conserving airspace, reducing cost and extending the operational life of the landfill. The waste reserve fund should be extended to	Review the facility operational needs and assess plant options considering capital and operational costs, together with improved efficiencies. Procure the appropriate plant that is identified. Allow the waste reserve fund to be used for plant renewal. This can be either based on a levy per cubic metre of waste disposed or a flat rate on all ratepayers as allowed in s66 of WARR Act.	Review of plant needs: can be completed in-house by Shire staff or outsourced to a consultant (\$2-4k) Purchase of plant: \$350k - \$900k (new plant) depending on plant needs identified.	High Whom SHC Outcome Plant upgraded by 1 Jan 2020

Findings	Issues	Recommendations	Implementation	Cost	Priority
	and being paid for by other reserves, loans, increased rates or a waste levy.	cover future capital purchases.		Extension of waste reserve fund: Nil	

6.2.8 Solid Waste - SWEK

Findings	Issues	Recommendations	Implementation	Cost	Priority
The remaining operational life of the Kununurra landfill is limited by environmental impact rather than limited airspace, as the site is located over shallow groundwater. The landfills Licence is scheduled to expire in Oct 2019.	The Shire must demonstrate to DWER that their improved management of the landfill has reduced its environmental impacts on groundwater. By showing the reduced environmental impacts at the current landfill, the Shire can continue to use this asset and defer the significant expense of establishing a new landfill.	The Shire should produce a summary of the improved operations and environmental data for DWER to support the Licence renewal application.	Review the groundwater monitoring data, geohydrological assessment, LCMP and operational practices to produce a report that can support the Shire Licence renewal application. This will facilitate a longer licence extension. Complete the Licence renewal application and submit to DWER.	Review of data, summary production and licence application: \$10k - \$20k	High Whom SWEK Outcome Submit Licence renewal application by June 2019
The Shire has identified a potential new landfill site and is negotiating a lease. There are currently limited funds available to the Shire to finance a new landfill site.	The potential new site requires additional monitoring bores to be established as at least two years of data is required.	The Shire should seek permission to establish additional monitoring bores at the site and avoid this delay once a lease is agreed.	Gain permission to establish bores, determine the appropriate location and install bores, while recording the soil strata etc.	Establishment of bores: \$15k - \$50k depending upon depth and number of bores	Outcome Establish bores during 2019 dry season

Findings	Issues	Recommendations	Implementation	Cost	Priority
Limited airspace availability at Wyndham landfill. Wyndham community would prefer a new landfill rather than a transfer station, which is in conflict with DWER policy.	The Wyndham landfill's LMCP was recently amended to increase the operational life until 2024-26. A new landfill or transfer station must be constructed before the landfill is full. If it is decided that a new landfill is required, the process of identification, assessment, approval and establishment must start immediately.	The Shire need to ensure the current feedback is representative of the Wyndham community. Review the impacts of each option to provide an assessment of impacts. Determine and establish the preferred option.	Additional community consultation in Wyndham should be completed to explain the options and impact on service, followed by a representative survey. Assess the financial, environmental, social and political impacts of each option, so that an informed decision can be made. Establish the agreed option to provide waste service for the Wyndham community.	Community consultation and survey: can be completed in-house or outsourced to a consultant (\$20 - \$30k) Assessment of options: can be completed in-house or outsourced to a consultant (\$10k - \$20k) Establishment of infrastructure: cost determined in assessment, est. \$200k - \$1M	High Whom SWEK Outcome Determine preferred option by Oct 2019, as if a new landfill is required, there is little time for this process to be completed.

6.3 STRATEGIC PLANNING

This section highlights any gaps identified in the Shire's strategic planning considerations and any external factors that could significantly impact on waste operations and planning. These recommendations will assist the Shires in preparing for and managing the associated issues and risks for both short and long term waste service delivery.

6.3.1 Emergency waste management planning

Findings	Issues	Recommendations	Implementation	Cost	Priority
Several key facilities have limited disposal capacity remaining. The Shires have no documented emergency recovery plans for waste disposal in the event of an emergency or disaster. The level of preparedness for emergencies/disasters	A lack of landfill disposal capacity places the region in a compromised position if a natural disaster impacts on these communities (e.g. flood, bush fire, cyclone, animal disease outbreak) where significant quantities of waste are generated by a single event. Disposal of this waste could overwhelm the operational capabilities of current facilities, fill all the remaining airspace at the landfills and impact on longer term	As part of emergency and recovery planning, local and regional emergency waste management sub-plans should be developed, including consideration of the type and risk of likely emergencies, estimates of types and amounts of waste, and detailing locally and regionally available disposal and storage capacity. If capacity is compromised, there is a need to develop contingency plans for storage and/or disposal of emergency waste. This includes the pre-selection of multiple locations for temporary debris management sites that can be used to sort, store, and process debris during a disaster response and whilst approvals for	There is no State Emergency Waste Management Plan to guide the Shires in developing relevant support plans within existing emergency waste arrangements. WALGA is finalising a template to assist local governments to plan for emergency waste. This will allow local	The emergency waste management plan can be completed in-house by Shire staff or outsourced to a consultant (\$15k - \$20K).	High (Broome, Kununurra and Derby) Whom SOB, SDWK, SHC, SWEK Outcome Increased level of Shire and community preparedness for emergency

Findings	Issues	Recommendations	Implementation	Cost	Priority
is challenged through a lack of documented plans for waste disposal in the event of an emergency or disaster.	waste disposal needs for the community. Following a disaster or emergency, there is little time for assessment and planning. The lack of planning can lead to costly and slow recovery and increase health and safety risks.	longer term emergency disposal options are being progressed, i.e. new site or transport to other facility. If specific sites cannot be identified prior to a disaster, the Shires should develop guidelines that can be used to designate temporary storage sites during an incident. Emergency waste management planning will assist in determining the capacity for emergency waste management and ensure that issues are identified and solutions found prior to an incident.	governments to undertake development of plans in-house using internal resources. Alternatively, a consultant can be used to develop a more customised plan in close liaison with the Shires.		waste management.

6.3.2 Essential and Municipal Services Upgrade Program

Findings	Issues	Recommendations	Implementation	Cost	Priority
The State Government's Essential and Municipal Services Upgrade Program may include handing the balance of the municipal services back to Local Government to manage. Draft Guidelines have been prepared by the Regional Services Reform Unit (RSRU) for municipal services in Aboriginal Communities titled 'Guidelines for municipal services to remote settlements in Western Australia volume 1 – regulatory framework and service level guidelines' (WSP 2018). These guidelines suggest best practice waste services that are not currently able to be provided at most rural towns/settlements. There is also no costing associated with the recommendations.	Given the waste derived from these settlements, waste infrastructure situated within these settlements has not previously been under Local Government care and control. Any changes to bring this into Local Government management will have significant cost and resource implications on Shires in the region. Without an accurate assessment of viable service options, an understanding of the drivers for effective waste management in remote regions and accurate costing, the Shires could be committed to provide a service that has not been economically quantified.	In order to effectively plan, manage and mitigate potential impacts of increased service delivery for Aboriginal Communities, further assessment is required for potential waste quantities and types to be handled, infrastructure availability and capacity (i.e. landfill), WOL costing of proposed services to be delivered and existing staff capacity. This will provide baseline information that will provide an accurate assessment of potential costs for new waste service delivery models and infrastructure.	Relevant baseline data is required for each Shire to enable appropriate and considered decision making. This includes the following: - Quantity of waste volumes, generators and streams from individual communities; - Extrapolation of volumes to be managed over the next 10 – 20 years to inform service delivery options; - Assess existing infrastructure locations, geographic distribution of communities and options for servicing these communities (e.g. regional landfill and transfer stations, or regional landfill and truck direct, no new landfill and transport to existing municipal landfill etc.); - Cost service delivery options including both capital costs and ongoing management costs; - Quantify closure costs of existing landfills; - Identify responsibility and liability for managing any post closure requirements and potential longer term environmental impacts; and - Define how costs between SG and LG will be shared.	External consultant \$20K – \$60K depending on scope of project and number of communities	High Whom SOB, SDWK, SHC, SWEK Outcome An accurate assessment of likely ongoing management costs of waste services to be delivered and new waste infrastructure to be managed by the Shires to support effective decision making and long term financial planning.

6.3.3 Aligning strategic goals, financial planning and operational activities

Findings	Issues	Recommendations	Implementation	Cost	Priority
The 2013 RWMP actions and recommendations did not appear to be linked to Shire Strategic Community Plans and annual Corporate / Operational business plans.	There is a risk that without inclusion, actions required within the plan will not be progressed, funded or have resources allocated to achieve the outcomes required. This was apparent from the review of actions in the 2013 RWMP where many actions were not achieved due to financial or resource constraints.	That the 2018 RWMP is endorsed by respective Councils to inform relevant Shire strategic community planning goals and annual corporate and operational plans.	The 2018 RWMP is presented to Council for adoption and includes likely risks and constraints for achieving the recommended actions and allocates appropriate resources/funding to assist officers in implementing the plan. Upon adoption by Council it should be linked to Shire strategic community planning goals and included in annual corporate and operational plans.	Internal staff time in preparing Council report	High Whom SOB, SDWK, SHC, SWEK Outcome Vertical alignment of operational activities, financial planning and strategic goals within the Shire in relation to waste services.

6.3.4 Waste Strategy 2030

Findings	Issues	Recommendations	Implementation	Cost	Priority
The draft 'Waste Strategy 2030' was released for consultation in October 2018. It is as yet to be finalised. The 2018 RWMP currently supports the objectives and targets within the draft strategy.	This strategy will inform local government waste service planning and delivery. Given the strategy is yet to be finalised, the 2018 RWMP may not capture issues and objectives from the final Strategy relevant to the Shires within the Kimberley region.	Upon adoption and endorsement of the Waste Strategy 2030, the 2018 RWMP is reviewed for alignment with the strategy.	This review maybe undertaken by the Waste TAG. Should major changes occur, and the document does not align, an update of the Plan to incorporate the new strategy will be required.	Internal staff time in reviewing document against strategy. Should amendments be required this maybe taking in house or external consultant. Cost will depend on scope of changes required.	High Whom SOB, SDWK, SHC, SWEK Outcome Alignment of 2018 RWMP with WA, Waste Strategy 2030.

6.3.1 Broome Waste Management Strategy

Findings	Issues	Recommendations	Implementation	Cost	Priority
The Shire of Broome are facing many changes to their waste infrastructure and community services over the next five years. Shire specific strategic planning is required.	The strategy will inform the Shire of Broome's waste service planning and delivery.	A Waste Management Strategy is developed and produced for the Shire of Broome.	The Shire of Broome should define its future objectives and engage a consultant to develop a strategic plan to meet them.	External consultant (\$25k - \$35k)	High Whom: SOB Outcome SOB Waste Strategy produced by July 2020

6.4 REGIONAL COLLABORATION

It is apparent from the review of progress against the 2009 and 2013 RWMP that many actions were not implemented due to insufficient organisational capacity, both internally in terms of day to day resourcing for waste strategy implementation and externally in terms of progressing regional initiatives. Organisational capacity was found to be lacking in regard to progress of internal actions, regional cooperation, funding for regional projects, and the ability (time available) for staff to implement regional initiatives over and above the day to day operations within individual shires.

6.4.1 Regional cooperation – Waste TAG

Findings	Issues	Recommendations	Implementation	Cost	Priority
The key factor that restricted the implementation of regional initiatives from both the 2009 and 2013 RWMP was the lack of support for a formal system for regional communication, cooperation and collaboration.	The Waste TAG has been historically challenged by a lack of commitment and resourcing by the Shires. Recently a renewed commitment has been made by all the Shires to participating in the Waste TAG. This momentum must be maintained to enable many of the regional recommendations to be made, resulting in the opportunities for the region being realised. Currently the Waste TAG meetings are scheduled bi-monthly, to align with the Zone meetings, however, some Shires felt this was too onerous on staff in terms of conflicting resource demands.	Waste TAG meetings to be scheduled and held regularly. The Zone to organise the meetings and facilitate support to the Waste TAG. Hold an annual face to face Waste TAG meeting and include a tour of a different landfill in the region. At the next meet, discuss and agree the preferred frequency of meeting.	Waste TAG teleconferences to be undertaken regularly with a set schedule and with agendas particularly focussing on the following issues:] Progressing the RWMP recommendations (both regionally and Council specific)] Share experiences and solutions of environmental compliance issues with waste sites] Planned waste management goods and services procurement] Funding applications for identified projects] Identification of additional opportunities for regional cooperation. The frequency of TAG meetings should be discussed and agreed at the next meeting (i.e. bi-monthly or quarterly).	The costs relate to internal Shire resources and the additional time spent preparing, disseminating information and holding additional meetings. The Kimberley Regional Group (KRG) will support the preparation and running of these meeting.	High Whom All Shires Outcome To maintain regular meetings.

6.4.2 Regional waste coordination

Findings	Issues	Recommendations	Implementation	Cost	Priority
Most Shire officers responsible for waste management are not dedicated waste professionals but are also responsible for a wide range of other duties. Existing Shire staff are very busy and attracting staff can be problematic in some areas of the region. Few regional actions from the 2009 and 2013 RWMPs were implemented as Shire staff needed to prioritise their other responsibilities over the regional initiatives within the limited resources available (time and personnel).	Most of the officers are only able to devote a relatively small portion of their time to waste. This is problematic considering the industry's tightening environmental regulation and increasing community expectations for waste management. Demands on staff time for waste management activities will continue to grow as the expectation and need to provide more environmentally responsible waste management solutions increases. The 2013 RWMP highlighted the risk that recommendations may not be implemented without dedicated staff; this risk eventuated as many of the regional measures are uncompleted. Many of the recommendations will be more efficiently and effectively implemented with regional coordination.	Facilitate the implementation of this plan and other regional waste and recycling initiatives that are identified. Activities through the Waste TAG and KRG could involve:] Project management of regional initiatives and the RWMP] Coordination of procurement of regional waste and recycling services (e.g. metal, tyres, oil etc)] Regional waste education and survey (Section 6.1.4)] Providing regional initiative updates to each Council] Maintaining agendas and minutes for Waste TAG] Provide a Waste TAG report for Zone meetings] Undertaking and project managing funding applications] Development of project plans (and associated MOUs)] Data collection and analysis] Supporting coordinated groundwater monitoring and annual reporting for Licenced facilities.	Formalise funding for projects through KRG.	The cost will depend on each project's scope. To engage an independent waste specialist providing their own transport, IT system, and office would be a cost of \$100 - \$150 per hour.	High Whom All Shires Outcome To have the projects identified and funded for the annual KRG budget.

6.4.3 Regional procurement

Findings	Issues	Recommendations	Implementation	Cost	Priority
The small population size and remoteness of communities throughout the region make the unit cost of many initiatives prohibitive.	Individual councils lack the economy of scale necessary to make many waste management initiatives viable. More remote facilities struggle to have recyclable materials (e.g. scrap metal) collected by recycling companies.	The Shires should implement actions to take advantage of the economy of scale offered by regional procurement. Regional procurement does not require a single contract to be signed by all Councils, rather it involves similar services being advertised as part of the same package with a request made to tender applicants that they also provide pricing based on being awarded contracts for all Councils. Services that can potentially be procured on a regional basis include: ✓ Kerbside collections ✓ Waste site infrastructure, plant and equipment ✓ Landfill management ✓ Groundwater monitoring and reporting ✓ Scrap metal collection ✓ Concrete reprocessing/greenwaste processing ✓ Tyre collection ✓ Training and professional development ✓ Technical and specialist advice	Implementation of an ongoing regional procurement process should include the following: ✓ Waste TAG agendas focussing on regional waste management procurement opportunities. ✓ Advertising for the collection of recyclable material (e.g. scrap metal) on a regional basis, as this will allow for more cost-effective collection and ensure materials are collected from all facilities in the region. ✓ Aligning contract commencement and completion dates across the region (this should commence by developing a document that lists the start and completion dates of all waste management related contracts across the region). ✓ Utilising the Waste TAG to support the procurement process.	The majority of the initial costs would relate to internal administration and liaison via the TAG group. However, the on-going savings relating to cost and efficiency from procuring services and materials at a regional level will be significant.	Medium - High Whom All Shires Outcome Waste TAG group support via agendas and regional procurement focus immediate.

6.4.4 Regional waste awareness

Education and awareness of waste management and recycling throughout the community (i.e. residents, organisations, business, schools and industry) must be included as a 'horizontal' strategy throughout the entire implementation strategy and is integral to its success or failure. The wider community need to understand the issues and reasons why the waste management and recycling programmes are being introduced, how they will be affected, what is required from them and the benefits that the community and the Shires will gain.

The diversity of languages spoken across the region, literacy challenges and impacts of tourism present challenges. There are several examples of education and awareness programs that have been developed that minimise or overcome these factors. For example, Waste Aid Australia (<https://wasteaid.org.au/>) is a charitable organisation that has developed and introduced many education programs in remote areas of South Australia and NSW.

Findings	Issues	Recommendations	Implementation	Cost	Priority
There appears to be a varied range of knowledge about waste management and recycling issues and activities throughout the region. There are no specific funds for community education and awareness programmes. Sometimes community education is not prioritised or funded by LGAs.	There is a need to educate and involve the community (residential and commercial) throughout the region about the waste management issues and programmes. The Shires should focus on effectively communicating why it is important to act in more sustainable ways and this must be supported with measures of success. Unless the community understand the reasons for their actions, and can see genuine and attainable results, there is little motivation for changes in behaviour. Without community involvement and participation (residents, businesses and tourists) the success of this plan will be limited.	To develop a communication and education programme for the region. Additional activities, such as radio 'sound-bites' will assist in increasing awareness throughout the community. An education levy added to all gate fees to provide a specific fund for education and awareness activities. It cannot be stressed enough that education and awareness are crucial activities to ensure the success of the future waste strategies. The education levy can be used for regional education activities. To achieve greater economies of scale and a consistent message, all campaigns should be 'Kimberley' branded. The draft State Waste Strategy mentions community education measures such as "Develop education and engagement resources to communicate the benefits of resource recovery and the use of recycled products, and to minimise contamination in collection systems". Some of these measures could be used in the region. The diversity of languages spoken across the region, literacy and numeracy challenges and impacts of tourism will need to be considered in development and implementation of the programme.	There are many waste education and awareness programmes already being run by local government, these will provide a useful starting point. WMAA has a Waste Education group in WA that meets regularly to discuss programs and opportunities. The programme should be implemented regionally by the regional co-ordinator (Section 6.4.2) A method of funding (such as an additional \$1 per m³ added to all gate fees) should be agreed and paid into the regional account. This will provide a source of funding for waste and recycling education that is directly linked to the waste generated by each Shire.	Waste generators would fund the education program, with possible support from State programs. Regional education may suit a full time role depending on the scope and needs of the position. Thus, should a new position be required; the task could cost \$100k - \$200k per year. There could be potential to draw down Waste Authority funding to support waste education, but it would be unlikely that Waste Authority would fund an education officer, unless linked to a specific project.	Medium – high-low Whom All Shires Outcome Implementation of a waste education program started by 1 Jan 2020.
		If a regional communication and education programme is not developed, each Shire should continue and build on their existing community education and communication programmes to promote waste minimisation, recycling and safe disposal. Ultimately, each Shire could develop a waste education strategy.	Individual Shire community education and communication programmes would continue to be delivered with in-house resources.	Internal staff time and resources.	Continue delivery of existing programmes, and possibly produce individual waste education strategies.

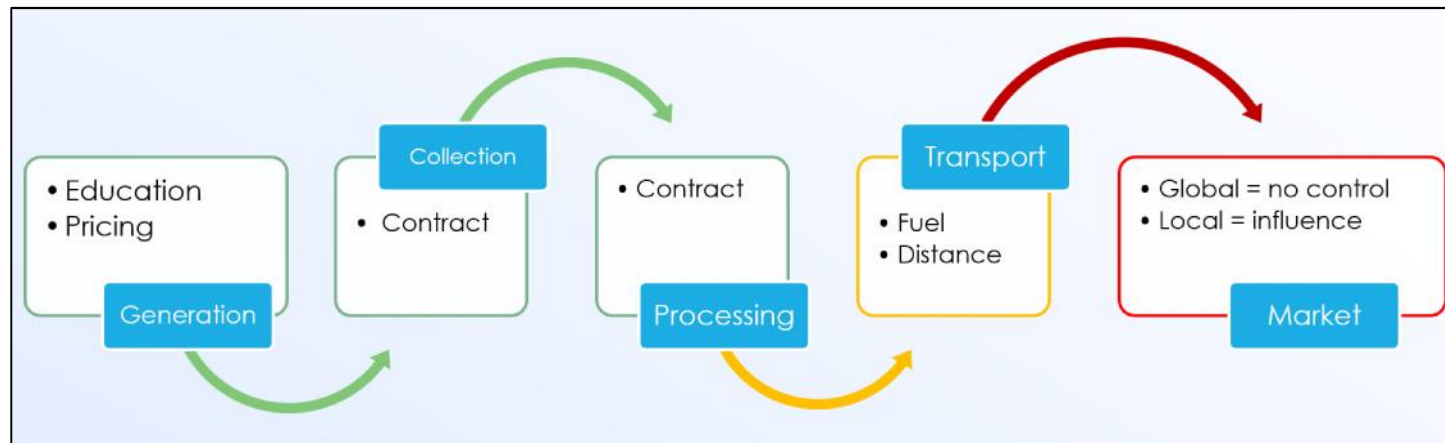
6.5 WASTE MINIMISATION

The minimisation of waste disposal provides a number of benefits to the Shires and the community. Reducing the quantity of waste landfilled preserves available airspace and increases the operational life of the landfills. It also reduces the pollution risk from the facilities, while the recycling of materials preserves resources and is aligned with targets in the State's draft Waste Strategy⁶. However, given the region's distance from material collectors and reproducers, recycling activities in the region should focus on materials that demonstrate one or more of the various qualities:

-)] have a local market demand (crushed inert waste, greenwaste)
-)] are of high value (metals) that can off-set the transportation cost
-)] are hazardous and produce significant impacts if disposed of in unlined landfills (HHW, car batteries, e-waste etc.)
-)] are problematic to dispose and consume significant quantities of airspace (tyres etc.)

Many factors must be considered before a program is introduced to divert materials from landfill to ensure the program has long term viability. The factors to assess include a materials full supply chain, including the end market for the material. **Figure 6.1** shows a summary of a material supply chain, while the colours indicate the degree of 'control and influence' a local government typically has on each stage. Reduced control and influence leads to higher risk for a program, for example, the China Sword policy has significantly reduced the market for packaging materials and thus the economic viability of this recycling service.

Figure 6.1 - Local Government control of the waste and recycling supply chain



⁶ The State Waste Strategy is in draft form and in its consultation phase at the time of writing.

6.5.1 Drivers for resource recovery and decision making

Findings	Issues	Recommendations	Implementation	Cost	Priority
It is difficult to assess the feasibility of resource recovery initiatives when the true cost of waste disposal is unknown. There is little understanding of the community's attitude to waste management and recycling. The markets for the local use of materials has not be quantified. The draft State waste strategy has staged targets for a reduction in waste generation and increased material recovery across the State. There is little or no economic incentive for waste producers to bring separated loads of waste to some of the waste facilities.	Without an understanding of the drivers to divert wastes from landfill, together with the economics and markets for the diverted / reprocessed materials, informed decisions cannot be made. There is little point in separating and processing a material stream if there is no viable end market for the product.	Accurate information is required to make informed decisions that will impact on operational costs for decades. See Section 6.1.1 and 0 for waste data See Section 6.1.3 for financial data See Section 6.1.4 for community opinion A detailed supply chain and market assessment must be completed for each potential material stream that could be diverted from landfill (e.g. concrete processed to produce recycled aggregate).	Much of the data and information required would be produced from the recommendation in Section 6.1 Data and Information. However, the supply chain for each potential material to be diverted must be assessed to determine: - the method to ensure a separated uncontaminated material stream can be obtained - the processing required and associated cost to produce a marketable 'product' that meets any required specifications - the existing size and value of the market for the 'product' that will be generated, together with the potential impact on that market (and other local suppliers) - the long term security and stability of the market to accept the 'product' in the future. - The impact on local employment and job creation	Process can be completed in-house, so costs relate to time required by staff to complete the assessment and analysis. Or using a specialist consultant, \$15k - \$30k per material stream to analyse the data and complete a market assessment. Potential to attract Waste Authority funding to complete feasibility studies for program that will assist with State targets.	Medium Whom SOB, SDWK, SHC, SWEK Outcome Detailed feasibility assessment completed prior to any waste diversion program introduced to ensure economic, environmental, social and political viability.
	Without an economic incentive for separated loads of waste, the Shires will have to bear the cost of separating materials for diversion or continue to landfill them.	The gate fees need to be structured to maximise the financial drivers. This means structuring prices so that mixed wastes are charged higher fees than separated recyclable materials. Information from the recommendation in Section 6.1.3 will provide the financial data needed to calculate the gate fee structure.	Gate fee pricing structure should encourage the delivery of separated material that can be viably diverted from landfill. Ultimately, the gate fees should provide income to recover all costs associated with commercial wastes. The structure of the gate fees needs to allow for: - The free or very low cost drop-off of hazardous or recyclable material. - Full cost recovery for all disposal and recycling operations relating to commercial wastes from gate fees charged. - Higher than cost recovery fees for problematic wastes requiring specific processing prior to disposal.	Process can be completed in-house, so costs relate to time required by staff to develop fee structure.	Medium Whom SDWK, SHC, SWEK Outcome All Shire gate fee structures to be developed to maximise potential for source separation of materials that can be diverted from landfill by 1 July 2020.

6.5.2 Local markets for recovered materials

Findings	Issues	Recommendations	Implementation	Cost	Priority
Local Governments have the capacity to influence end markets for recycled product within their communities. Processing and using recycled products within the community creates local employment and economic opportunities.	When recovered materials are 'exported' from the area to distant markets the 'value' of the material is lost from the local economy. Local Government has little or no control over the value or stability of distant markets. For example, the China Sword policy has led to a collapse of the value of packaging recyclables. Low value – high volume materials such as concrete, organics and glass require local markets, as the transport cost is too high in relation to the product's value.	When viable, (see Section 6.5.2) low value – high volume materials such as recycled concrete and organics should be diverted to local markets where the Shires can control or influence the market value and demand. For example, the Shires will be a user of aggregate for their projects, so can specify the use of recycled aggregate, thus creating a stable market for the recovered materials. Each Shire is likely to also require composted organics and crushed glass in their works, so if these materials are diverted and processed, the Shires should specify their use.	Assuming the feasibility and market assessment for the processing of materials has shown long term viability and are price competitive with 'virgin' materials, the Shires should specify the use of recovered / recycled materials in their works and contracted civil projects. This will ensure a stable end market for the products and lead to waste diversion and employment creation in the local economy.	Nil, as the recycled produced would be cost competitive with 'virgin' or imported materials.	Medium Whom All Shires Outcome To adopt procurement policy for recycled content products.

6.5.1 Transport logistics

Findings	Issues	Recommendations	Implementation	Cost	Priority
The cost of transporting any wastes within the region or recyclable materials to Perth or overseas is very high due to the distances involved.	The economic viability of any resource recovery initiatives, where there is not a local market for the product, is dependent on efficient transport logistics due to the extreme distance from major centres.	The Shires should work collaboratively with each other and the private sector to identify potential ways of maximising transport efficiencies in the region. The cost of transport can be used when assessing potential recycling programs.	Host a Waste TAG meeting focussing on transport logistics with a goal of identifying solutions to maximise transport efficiencies for recyclable materials (i.e. e-waste, metals, household hazardous waste and recyclable packaging materials). Consult with transport companies to identify potential efficiencies. Determine the potential for back loading of LGA recyclables together with existing recyclables already collected from local supermarkets.	Internal cost to complete assessment of transport options. By providing a collection service in line with transport industry requirements and ultimately having agreed rates should lead to more cost effective transport for recyclables.	Medium - High Whom SOB, SDWK, SHC, SWEK Outcome To determine likely transport costs that can be used to assess viability of recycling program by 1 Mar 2019.

6.5.2 Concrete, bricks and tiles

Findings	Issues	Recommendations	Implementation	Cost	Priority
Very little source separated C&D waste is delivered to the waste facilities, therefore the majority is landfilled. No accurate data about the actual volumes of concrete, brick and tile waste disposed at each facility.	It is not economically viable to separate mixed loads of waste for recycling. Therefore, the mixed loads brought to the facilities are landfilled, when a large proportion could be recycled. Concrete may make up 70% of the C&D waste stream. This could be easily processed, however, without accurate data for the quantity, cost of disposal and markets for the product, the viability to recycle it cannot be assessed.	Assess the viability of concrete and brick recycling in the region, considering: ✓ C&D recycling asbestos guidelines⁷ ✓ Quantities (See Section 6.1.1 and 0) ✓ Economics (See Section 6.1.3) ✓ Community opinion (See Section 6.1.46.1.3) ✓ Processing options (See Section 6.5.1) ✓ Markets (See Section 6.5.1) ✓ Funding options	The available information should be reviewed in relation to local economics, regulations for managing asbestos risks and other factors to determine the viability of concrete, brick and tile crushing in the region. Given the capital cost and operational cost of a crusher it may be more efficient to engage a contractor with a mobile crusher. It is very important to accurately determine the quantities (to define the size of crusher), delivery model and costs for this potential recycling option.	Could be undertaken by through the Waste TAG/KRG or an external consultant. Viability assessment: \$15k - \$30k Concrete and brick crushing project: yet to be determined	High (especially for sites with limited voidspace) Whom All Shires Outcome Determine viability of processing by 1 Jan 2020.
		If the recycling of concrete is found to be viable, the delivery of separated concrete should be encouraged. The Shires can encourage source separation by introducing Waste Management Plans (WMP) as part of building approvals, using gate fee pricing structures (see Section 6.5.1) and community / industry education (see Section 6.4.3). The local building industry involves only a few businesses in each town, which could assist in the development / adoption of 'on-site' waste management practices that will maximise recycling. The separated "clean" concrete, bricks and tiles should be stored separately at the facilities, prior to reprocessing.	If the recycling of concrete is found to be viable, the Shires should introduce the requirement of WMPs with any building approval. This would require the builder / developer to separate waste materials for recycling. Concrete, bricks and tiles can be stored at the facilities until sufficient volumes are stored to process the materials. This can be completed on a regional basis, with a number of facilities visited during the same tour. The resulting recycled aggregates can be used for infill material, road-base or as aggregate replacement. Separated steel and metals can be recycled.	Staff time to review WMP's and liaise with local building / demolition industry	Priority dependent on outcomes of viability project Whom All Shires Outcome Implemented within six months of concrete recycling project determined as viable.

⁷ Guidelines for managing asbestos at construction and demolition waste recycling facilities (DER, 2012)

6.5.3 Greenwaste

Findings	Issues	Recommendations	Implementation	Cost	Priority
Much of the greenwaste in the region is burnt and/or buried. Markets for processed greenwaste (mulch) are not understood but are thought to be small.	Greenwaste should not be buried because as it decomposes anaerobically in a landfill it creates leachate and methane (24 times higher GHG potential than CO₂). The controlled burning of greenwaste prevents leachate generation, preserves landfill airspace and significantly reduces the GHG impacts. However, the resource is lost. Greenwaste can be shredded and composted to produce a mulch, but unless there is a market for the material, the processing cost cannot be recovered, and the excess mulch may require burning or disposal.	That the Shires collaborate to develop a regional solution that: - Assesses local markets for recycled greenwaste. - Ensures recycled greenwaste products meet the relevant product standards. - Identifies a processing system that minimises the costs across the region. - Provides opportunities to utilise external funding opportunities Greenwaste that is generated in excess of the mulch market requirements may still need to be diverted from landfill with controlled burning.	Complete an assessment of greenwaste processing that considers options such as: - Quantifying local market demand for mulch (Shire and commercially) - Consider greenwaste management options (i.e. controlled burning of excess greenwaste and mulching volumes that match local demand) - A regional greenwaste-processing contract - Purchase options for processing equipment - Operational delivery options for processing	The assessment would take 15 – 25 staff days, or if outsourced to a consultant \$20k - \$30k (depending upon availability of data and complexity of options).	Medium - Low Whom SOB, SDWK, SHC, SWEK Outcome Completed assessment by 1 Oct 2019.

6.5.4 Food organics – Garden organics (FO-GO)

Findings	Issues	Recommendations	Implementation	Cost	Priority
Approximately 45% of the waste in the domestic kerbside bins is FO-GO. FO-GO waste can be composted at relatively low cost per tonne to produce a usable product. The local compost industry and markets for compost are not understood. SOB is considering implementation of waste reduction initiatives such as dual kitchen bins and worm farms or compost bins.	As FO-GO decomposes anaerobically in a landfill it creates leachate and methane (24 times higher GHG potential than CO₂). Developing a market for the use of compost is a long term process, most LGA composting facilities 'sell' their FO-GO compost to commercial composters to blend and market the material. Without an existing market for the compost, the collection and processing of FO-GO is unlikely to be viable.	Assess the viability of FO-GO recycling in the region, considering:] DWER Composting facility guidelines] Quantities (See Section 6.1.1 and 0)] Economics (See Section 6.1.3)] Community opinion (See Section 6.1.46.1.3)] Processing options (See Section 6.5.1)] Markets (See Section 6.5.1)] Funding options	A feasibility assessment should be made for the potential collection and production of FO-GO derived compost. This is a cost effective way to divert a significant portion of the MSW waste stream. However, if there is not already a market for compost in each Shire, it would require a sustained effort to determine the potential market and then develop the market for the compost.	Could be undertaken by the Waste TAG/KRG or an external consultant Viability assessment: \$25k - \$40k	High (especially for sites with limited voidspace) Whom SOB, SDWK, SHC, SWEK Outcome Determine viability of processing by 1 Jan 2020.

6.5.5 Glass

Findings	Issues	Recommendations	Implementation	Cost	Priority
Nearly 30% of the waste in the domestic kerbside bins is glass. This currently is disposed of to landfill, except in Broome where a kerbside recycling bin is provided. Glass can be recycled to produce a sand product used in some civil works. The introduction of the Container Deposit System (CDS) in WA should divert much of this material from landfill.	Glass is an inert material and presents little environmental risk when landfilled. However, the disposal of glass is loss of resource of a recycling material.	Assess the viability of glass recycling in the region and the likely diversion of glass when CDS is introduced, considering:] Quantities (See Section 6.1.1 and 0)] Economics (See Section 6.1.3)] Community opinion (See Section 6.1.46.1.3)] Processing options (See Section 6.5.1)] Markets (See Section 6.5.1)] Funding options	A feasibility assessment should be made for the potential collection of glass to be processed into a material that has a local market demand.	Could be undertaken by the Waste TAG/KRG or an external consultant Viability assessment: \$20k - \$30k	High (especially for sites with limited voidspace) Whom SOB, SDWK, SHC, SWEK Outcome Determine viability of processing by 1 Jan 2020.

6.5.6 Metals

Findings	Issues	Recommendations	Implementation	Cost	Priority
Scrap metal values are currently high with metropolitan facilities receiving in excess of \$180 per tonne from metal recyclers. However, most of the Shires are experiencing difficulty securing a contractor to collect scrap metal from some sites (especially Halls Creek and Fitzroy Crossing).	Large stockpiles of scrap metal are at some sites, which may affect operations. Scrap metal is a valuable material for recycling and should be recovered wherever possible. Metal recycling contractors are less likely to collect scrap metal from smaller more distant facilities, due to the extra transport cost and lower tonnage of material.	The Shires work together to develop a regional solution that ensures scrap metal is collected from all facilities for recycling on a 'milk run'. This could provide an 'easy' pilot regional contract to be developed by the TAG group. By collaborating, the Shires would have a larger tonnage and allow a contractor to provide a coordinated service across the region, thus minimising the collection costs. To increase volumes of materials to be collected and improve economies of scale, collection of scrap steel (e.g. car bodies) from larger aboriginal settlements could be incorporated into the brief.	Development and awarding of a contract for the collection of scrap metal throughout the region.	While this will require staff time to organise, this process is already completed by each Shire, so organising it regionally should minimise management time, ensuring all scrap is collected and may result in a higher price per tonne of the material collected.	High Whom SOB, SDWK, SHC, SWEK Outcome All facilities receive regular collection of metals from 1 April 2019

6.5.7 Tyres

Findings	Issues	Recommendations	Implementation	Cost	Priority
Significant quantities of tyres are received at the region's waste sites. Some local tyre companies are backloading tyres for recycling under an industry scheme.	Tyres are problematic to dispose of and compact, while due to their shape can consume large volumes of airspace. Waste tyres pose a significant fire risk if not managed correctly. Tyres need to be adequately costed in gate fees to cover management costs.	Investigate possible solutions to process or recycle tyres in the most cost effective manner, (including industry funded stewardship agreements) considering:)] Quantities (See Section 6.1.1 and 0))] Economics (See Section 6.1.3))] Processing options (See Section 6.5.1))] Transport efficiency)] Funding options	Complete a detailed Feasibility Study for the processing or back loading of waste tyres via an industry scheme or by the Shires. Ensure gate fee for tyres at least equals processing costs.	10-15 days of staff time or \$15k - \$20k if outsourced to a consultant.	Medium Whom SOB, SDWK, SHC, SWEK Outcome Assessment completed by 1 Jan 2020.

6.5.8 Low volume – highly polluting wastes

Findings	Issues	Recommendations	Implementation	Cost	Priority
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The majority of e-waste and household hazardous waste (HHW) received at the region's sites is landfilled as there are not appropriate drop-off facilities provided. Techcollect collect e-waste from the Broome landfill and Better Electrical stores collect in Derby and Kununurra. None of the landfills in the region have lined cells or leachate management systems, so these materials will impact on the underlying soils and groundwater.	Low volume, highly polluting (LVHP) waste is problematic for landfills as it can have disproportionately high environmental, health and safety impacts when managed inappropriately. Such wastes include, household hazardous waste (HHW), agricultural chemicals and electronic waste (e-waste).	Assess solutions to reduce the volume of LVHP waste being disposed of to landfill. Lobby the Waste Authority to extend their funded HHW collection scheme to regional areas. Determine if the National Television and Computer Recycling Scheme (NTCRS) can provide a collection service for the region.	Research and assess the viability of the LVHP waste collection schemes available for the region. For any programs that could be utilised, establish collection points across the region. Any funded schemes may need Shire support to aggregate the wastes in a single location. e.g. collecting LVHP waste at landfills before transfer to a single location in the region ready for transport by a funded scheme to Perth. The Shires should lobby WALGA and the Waste Authority to extend the funding of the HHW collection scheme to included regional areas, where due to the lack of lined landfills, the environmental impacts are greater than in the Perth area.	Assessment of options: in-house staff time or \$15k - \$20k if outsourced to a consultant. Cost of collection / diversion options: yet to be defined but target funded schemes.	Medium - High (depending upon enviro risk at each site) Whom SOB, SDWK, SHC, SWEK Outcome Assessed options by 1 July 2019 Implement recommendations by 1 July 2020
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7 IMPACTS OF THE REGIONAL WASTE MANAGEMENT PLAN

The successful implementation of the Regional Waste Management Plan will provide the following outcomes to Shires within the Kimberley Region.

7.1 DATA AND INFORMATION

-)] Improved data collection practices and stronger understanding of waste generation characteristics;
-)] Reduced time demands on Shire staff to comply with external reporting requirements (DWER Local Government Census etc.);
-)] Improved baseline data enabling the Shires and region to more effectively plan and deliver waste services to the community;
-)] Improved economic management of council operated waste facilities and services;
-)] Improved understanding of community attitudes on waste management issues;
-)] Community support for the implementation of new initiatives.

7.2 INFRASTRUCTURE PLANNING

-)] Appropriate, aligned and cost-effective operations;
-)] Sustainable long term financial planning;
-)] Sustainable service delivery;
-)] Improved community confidence.

7.3 STRATEGIC PLANNING

-)] Vertical alignment of operational activities, financial planning and strategic goals in relation to waste services;
-)] Increased level of Shire and community preparedness for emergency waste management;
-)] Improved decision making and long term financial planning.

7.4 REGIONAL COLLABORATION

-)] Improved regional communication and cooperation on waste management initiatives;
-)] Enhanced capacity to implement regional projects;
-)] An integrated and regional approach to waste management;
-)] Reduced capital expenditure and improved operational efficiencies;
-)] Increased economic feasibility of recycling and recovery programs in the region.

7.5 WASTE MINIMISATION

-)] Reduced waste to landfill in line with State and National waste policy;
-)] Preservation of available airspace and increased operational life of the landfills;
-)] Preservation of natural resources;
-)] Reduced environmental impacts from waste disposal;
-)] Informed, robust and sustainable decision making through an understanding and assessment of key drivers for resource recovery within the region;
-)] Additional employment and economic opportunities for the region.

8 IMPLEMENTATION, MONITORING AND REVIEW

8.1 IMPLEMENTATION

The RWMP implementation strategy is focused on the next five years, with the initial focus to develop strategies to maximise efficient collaboration with the Shires, therefore reaping the benefits as soon as possible. A summary of the recommended actions is contained in **Table 8.1**. This table provides a basic implementation schedule and approximate costs per Shire to provide relevant input into annual operational business planning and budget processes.

The schedule should be expanded and modified by the Shires and the KRG, particularly as the more complex recommendations will require individual project plans.

8.2 MONITORING AND REVIEW

Ideally, progression of regional waste management initiatives should form part of the individual Shires Strategic Community Plans, with actions being incorporated into annual Corporate Business Plans and reported annually to the community. This however will require the member Shires to commit in the short term to resourcing and funding above current commitments in order to achieve the longer-term benefits provided by an integrated and regional approach to waste management in the region. This is an opportunity which, if actioned, could assist in reducing capital expenditure and increase the economic feasibility of recycling and recovery programs in the region.

In addition to monitoring of initiatives, the RWMP should be treated as a dynamic document that is reviewed and amended periodically to ensure that it remains contemporary and relevant to emerging waste management issues and legislation. The Shire's should complete updates of the RWMP on a five yearly basis, or more frequently if required.

Table 8.1 – Summary of five year actions and associated costs

Task Title	Year 1	Year 2	Year 3	Year 4	Year 5	Approximate cost per Shire
Data and Information						
Consistent waste data collection						
Waste data recording/classification system	X					\$5k - \$10k to develop and implement uniform system. Nil cost for ongoing data collection
Waste tonnage data						
Weighbridge	X					\$150,000 - \$175,000 installed
Mobile weigh cells	X					The cost of the mobile weigh cells is approximately \$15,000 for a single axle set (i.e. two pads). Each landfill site survey would require approximately 10 staff days.(set up, monitoring and collating the results)
Broome Kerbside waste audit		X				Kerbside waste audit \$15k - \$20k, analysis and recommendation report \$10k - \$15k
Financial data						
Whole of life (WoL) financial assessment	X					Completed in-house, so costs relate to time required by staff, or via a consultant costing \$5k - \$10k per facility
Gate fees structure & waste reserves	X					Process can be completed in-house, so costs relate to time required by staff to develop fee structure
Community opinion						
Community Survey	X					\$15k - \$20k to develop survey and analyse the responses. Internal staff time to send and collect surveys
Infrastructure Planning						
Liquid waste Broome (septage + greasetrap)						
Siting and construction of new facility	X	X				\$1M (Talis, 2018)
Liquid waste SHC						
Upgrading liquid waste facility Halls Creek					X	\$200k - \$500k Dependent on treatment process and capacity of facility
Solid waste Broome						
Siting and construction New Regional Resource Recovery Park (RRRP)	X	X	X			RRRP: \$10M (source Talis, 2018)
Identify alternative disposal solution for waste disposal whilst RRRP being constructed.	X					Process can be completed in-house, so costs relate to time required by staff, or via a consultant (\$5k - \$10k).
Maximise the operational life of the Buckley Rd landfill	X					Consultant \$20k - \$30k, however, any gains in operational life would offset this cost by avoiding the transport of waste to an alternative landfill.
Construction of Community Recycling Centre (CRC) in Broome when Buckley Rd landfill closed.			X	X		Broome CRC: \$2.26M (source Talis, 2018)
Solid waste SDWK						
Determine the remaining operational life at Derby	X					Site survey: \$5k Interpretation of survey can be completed in-house, so costs relate to time required by staff, or via a consultant (\$5k).
New site identification if under 10 years life		X	X	X	X	New site identification, assessment and approvals: significant Shire staff input plus \$200k - \$500k consultancy and application fees.
Solid waste SHC						
Determine the remaining operational life at the Halls Creek landfill	X					Test pits can be completed in-house, so costs relate to time required by staff and plant. Site survey: \$5k Review of LCMP: \$10k
New site identification if under 10 years life		X	X	X	X	New site identification, assessment and approvals: significant Shire staff input plus \$200k - \$500k consultancy and application fees.
Installation of equipment to weigh the loads of waste	X					The assessment of weighing systems can be completed in-house by Shire staff or out sourced. Weighing systems range from \$15k - \$175k.
Solid waste SWEK						
Summary data to support the Licence renewal application	X					Review of data, summary production and licence application: \$10k - \$20k
Establishment additional bores and monitoring at new landfill site		X	X	X	X	\$15k - \$50k depending upon depth and number of bores plus increased groundwater monitoring costs

Task Title	Year 1	Year 2	Year 3	Year 4	Year 5	Approximate cost per Shire
Determine and establish the preferred option for waste management at Wyndham	X	X				Community consultation and survey: can be completed in-house or outsourced to a consultant (\$20 - \$30k) Assessment of options: can be completed in-house or outsourced to a consultant (\$10k - \$20k) Establishment of infrastructure: cost determined in assessment, est. \$200k - \$1M
Strategic Planning						
Emergency waste management planning	X					Completed in-house by Shire staff or outsourced to a consultant (\$15k - \$20K).
Cost modelling MSUP		X				External consultant \$20K – \$60K depending on scope of project and number of communities
Strategic Community Plans	X	X	X	X	X	Internal staff time
Waste Strategy 2030		x				Internal staff time
Broome Waste Management Strategy	X					External Consultant \$25k - \$35k
Regional Collaboration						
Regional cooperation - Waste TAG meetings	X	X	X	X	X	Internal Shire resources and the additional time spent preparing, disseminating information and holding additional meetings.
Regional procurement	X	X	X	X	X	Initial costs would relate to internal administration and liaison via the TAG group.
Regional waste awareness						
Waste education program	X	X	X	X	X	Dependent on method funding and scope of program. Regional education may require a full time role and would need to produce educational material, etc. Thus, the task could cost \$100k - \$200k per year.
Individual Shire Waste Education Strategy (if required, Broome as indicated a need)		X				Internal staff time
Waste Minimisation						
Drivers for resource recovery and decision making						
Detailed supply chain and market assessment		X				Process can be completed in-house, so costs relate to time required by staff to complete the assessment and analysis. Alternatively using a specialist consultant, \$15k - \$30k per material stream to analyse the data and complete a market assessment. Potential to attract Waste Authority funding.
Gate fee pricing structure		X				Process can be completed in-house, so costs relate to time required by staff to develop fee structure.
Markets for recovered materials		X				Nil, as the recycled materials produced would be cost competitive with 'virgin' or imported materials.
Transport logistics		X				Internal cost to complete assessment of transport options.
Concrete, brick, tiles						
Assess the viability of concrete and brick recycling in the region		X				Could be undertaken by Waste TAG/KRG or an external consultant. Viability assessment: \$15k - \$30k Concrete and brick crushing project: yet to be determined
Introduction of Waste Management Plans (WMP) as part of building approvals process		X				Staff time to review WMP's and liaise with local building / demolition industry.
Greenwaste						
Assessment and development of regional solution			X			The assessment would take 15 – 25 staff days, or if outsourced to a consultant \$20k - \$30k (depending upon availability of data and complexity of options).
Food and garden organics (FO-GO)						
Assess the viability of FO-GO recycling in the region				X		Could be undertaken by Waste TAG/KRG or an external consultant. Viability assessment: \$25k - \$40k
Glass						
Assess the viability of glass recycling in the region and the likely diversion of glass when CDS is introduced	X				X	
Metals						
Establish a regional approach to scrap metal collection	X					Internal staff time
Tyres						
Investigate possible solutions to process or recycle tyres in the most cost effective manner	X					10 -15 days of staff time or \$15k - \$20k if outsourced to a consultant.
Low volume - highly polluting wastes						

Task Title	Year 1	Year 2	Year 3	Year 4	Year 5	Approximate cost per Shire
Assess solutions to reduce the volume of LVHP waste being disposed of to landfill				X		Assessment of options: in-house staff time or \$15k -\$20k if outsourced to a consultant. Cost of collection / diversion options: yet to be defined but target funded schemes.
Lobby the Waste Authority to extend their funded HHW collection scheme to regional areas.	X	X	X	X	X	Internal staff time or alternatively through the KRG.
Determine if the National Television and Computer Recycling Scheme (NCRS) can provide a collection service for the region.	X					Internal staff time or alternatively through the KRG.

9 RISK ASSESSMENT

An assessment of the potential risks to the implementation of the plan has been undertaken in accordance with AS/NZ ISO 31000 Risk Management – Principles and Guidelines.

9.1 LIKELIHOOD

The following definitions have been used as a guide for determining the likelihood of identified risks.

Table 9.1 - Likelihood table

	Rating	Criteria
1	Rare	May only occur in exceptional circumstances
2	Unlikely	The risk event could occur at some time during the period of the Plan
3	Possible	Might happen at some time; occurrence would not be unusual
4	Likely	Will probably occur in most circumstances
5	Almost certain	Is expected to occur in most circumstances

9.2 CONSEQUENCE

The following table has been used in determining the consequence of identified risks.

Table 9.2 - Consequence table

	Rating	Criteria
1	Insignificant	Little impact
2	Minor	Inconvenient delays
3	Moderate	Material delays; marginal under-achievement of target performance
4	Major	Significant delays; performance significantly under target
5	Extreme	Non achievement of objective/ outcome; performance failure

9.3 RISK MATRIX

The following risk matrix has been used to rate risks associated with implementation of the RWMP.

Table 9.3 – Risk matrix

	CONSEQUENCE				
LIKELIHOOD	Insignificant (1)	Minor (2)	Moderate (3)	Major (4)	Extreme (5)
Rare (1)	Low	Low	Low	Low	Low
Unlikely (2)	Low	Low	Low	Medium	Medium
Possible (3)	Low	Low	Medium	Medium	Medium
Likely (4)	Low	Medium	Medium	High	High
Almost certain (5)	Low	Medium	Medium	High	Extreme

9.4 RISK ASSESSMENT TABLE

Table 9.4 outlines the key risks that have been identified as potentially impacting on the implementation of the RWMP, along with recommended mitigation measures and residual risks ratings.

Table 9.4 – Risk assessment

Identified Risk	Likelihood	Consequence	Risk Rating	Mitigation Measures	Residual likelihood	Residual Consequence	Residual Risk Rating
One of the local governments removes itself from the regional group	unlikely	moderate	low	Ongoing open communication through Waste TAG and zone meetings Consideration of needs of all LGs	unlikely	moderate	low
Inadequate resource capacity to implement actions	likely	extreme	high	Annual operational plans consider internal resourcing requirements to meet required actions	possible	major	medium
Insufficient resources to drive regional collaboration	likely	extreme	high	Every Shire commit adequate resources through the Waste TAG/KRG	possible	extreme	medium
Limited funding availability to implement actions	likely	extreme	high	Annual budgets include funding for relevant projects/actions Grant funding obtained where possible	possible	major	medium
An individual Shire Council not endorsing the Plan	unlikely	major	medium	Councillors briefed on plan and benefits outlined	unlikely	major	medium
Time delays in implementing actions	possible	major	medium	Actions incorporated in annual business plans Regular Waste TAG meetings to assess progress against targets Regular reporting on achievement of actions	unlikely	major	medium

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APPENDIX A – WASTE PROJECTION TABLES



Broome

POPULATION FORECAST	Notes	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Year	3yr Ave	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
% change (Shire of Broome data)	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%	2.30%
ABS 2011 value linked to WAPC % increase	16,222	16,595	16,977	17,367	17,767	18,175	18,593	19,021	19,459	19,906	20,364	20,832	21,311	21,802	22,303	22,816	23,341	23,878	24,427	24,989	25,563	26,151
Tourist population equivalents (Australian Tourism) & linked to WAPC % ch	4,670	4,777	4,887	5,000	5,115	5,232	5,353	5,476	5,602	5,731	5,862	5,997	6,135	6,276	6,421	6,568	6,719	6,874	7,032	7,194	7,359	7,528
Total population (inc. tourist numbers and FI-FO)	20,892	21,373	21,864	22,367	22,881	23,408	23,946	24,497	25,060	25,637	26,226	26,829	27,447	28,078	28,724	29,384	30,060	30,751	31,459	32,182	32,922	33,680
MSW (tonnes)	13300	13300	13606	13919	14239	14566	14901	15244	15595	15954	16320	16696	17080	17473	17875	18286	18706	19136	19577	20027	20487	20959
C&I (tonnes)	7300	7300	7468	7640	7815	7995	8179	8367	8560	8756	8958	9164	9375	9590	9811	10036	10267	10503	10745	10992	11245	11504
C&D (tonnes)	5800	5800	5933	6070	6209	6352	6498	6648	6801	6957	7117	7281	7448	7620	7795	7974	8158	8345	8537	8734	8934	9140
Total (tonnes)	26400	26400	27007	27628	28264	28914	29579	30259	30955	31667	32395	33141	33903	34683	35480	36296	37131	37985	38859	39753	40667	41602

Derby / West Kimberley

POPULATION FORECAST	Notes	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Year	3yr Ave	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
% change (estimate, no data provided by SDWK)	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
ABS 2016 value linked to WAPC % increase	7,730	7,885	8,042	8,203	8,367	8,535	8,705	8,879	9,057	9,238	9,423	9,611	9,804	10,000	10,200	10,404	10,612	10,824	11,040	11,261	11,486	11,716
Tourist population equivalents (Australian Tourism) & linked to WAPC % ch	1,570	1,601	1,633	1,666	1,699	1,733	1,768	1,803	1,840	1,876	1,914	1,952	1,991	2,031	2,072	2,113	2,155	2,198	2,242	2,287	2,333	2,380
Total population (inc. tourist numbers and FI-FO)	9,300	9,486	9,676	9,869	10,067	10,268	10,473	10,683	10,896	11,114	11,337	11,563	11,795	12,031	12,271	12,517	12,767	13,022	13,283	13,548	13,819	14,096
MSW (tonnes)	6500	6500	6630	6763	6898	7036	7177	7320	7466	7616	7768	7923	8082	8244	8408	8577	8748	8923	9102	9284	9469	9659
C&I (tonnes)	6000	6000	6120	6242	6367	6495	6624	6757	6892	7030	7171	7314	7460	7609	7762	7917	8075	8237	8401	8569	8741	8916
C&D (tonnes)	4100	4100	4194	4291	4389	4490	4594	4699	4807	4918	5031	5147	5265	5386	5510	5637	5767	5899	6035	6174	6316	6461
Total (tonnes)	16600	16600	16944	17296	17655	18021	18395	18776	19166	19564	19970	20384	20807	21239	21680	22130	22590	23059	23538	24027	24526	25035

Halls Creek

POPULATION FORECAST	Notes	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Year	3yr Ave	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
SoHC Local Planning Strategy (Av for Shire)	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%
ABS 2016 value linked to WAPC % increase	3,269	3,356	3,446	3,538	3,632	3,729	3,829	3,931	4,036	4,144	4,255	4,368	4,485	4,604	4,727	4,854	4,983	5,116	5,253	5,393	5,537	5,685
Tourist population equivalents (Australian Tourism) & linked to WAPC % ch	590	606	622	639	656	673	691	710	728	748	768	788	809	831	853	876	899	923	948	973	999	1,026
Total population (inc. tourist numbers and FI-FO)	3,859	3,962	4,068	4,176	4,288	4,402	4,520	4,641	4,765	4,892	5,022	5,156	5,294	5,436	5,581	5,730	5,883	6,040	6,201	6,367	6,537	6,711
MSW (tonnes)	900	900	924	949	974	1000	1027	1054	1082	1111	1141	1171	1203	1235	1268	1302	1336	1372	1409	1446	1485	1524
C&I (tonnes)	1100	1100	1129	1160	1190	1222	1255	1288	1323	1358	1394	1432	1470	1509	1549	1591	1633	1677	1722	1768	1815	1863
C&D (tonnes)	810	810	832	854	877	900	924	949	974	1000	1027	1055	1083	1112	1141	1172	1203	1235	1268	1302	1337	1372
Total (tonnes)	2810	2810	2885	2962	3041	3123	3206	3292	3380	3470	3562	3657	3755	3855	3958	4064	4173	4284	4398	4516	4636	4760

Wyndham East Kimberley

POPULATION FORECAST	Notes	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Year	3yr Ave	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
% change (Data from SWEK)	2.00%	2.00%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%	2.67%
ABS 2016 value linked to WAPC % increase	7,148	7,291	7,437	7,635	7,839	8,049	8,263	8,484	8,711	8,943	9,182	9,427	9,679	9,937	10,203	10,475	10,755	11,042	11,337	11,639	11,950	12,269
Tourist population equivalents (Australian Tourism) & linked to WAPC % ch	1,958	1,997	2,037	2,091	2,147	2,205	2,264	2,324	2,386	2,450	2,515	2,582	2,651	2,722	2,795	2,869	2,946	3,025	3,105	3,188	3,273	3,361
Total population (inc. tourist numbers and FI-FO)	9,106	9,288	9,474	9,727	9,987	10,253	10,527	10,808	11,097	11,393	11,697	12,009	12,330	12,659	12,997	13,344	13,701	14,066	14,442	14,828	15,223	15,630
MSW (tonnes)	4900	4900	4998	5131	5268	5409	5554	5702	5854	6010	6171	6336	6505	6678	6857	7040	7228	7421	7619	7822	8031	8246
C&I (tonnes)	5900	5900	6018	6179	6344	6513	6687	6865	7049	7237	7430	7629	7832	8041	8256	8477	8703	8935	9174	9419	9670	9928
C&D (tonnes)	6100	6100	6222	6388	6559	6734	6914	7098	7288	7482	7682	7887	8098	8314	8536	8764	8998	9238	9485	9738	9998	10265
Total (tonnes)	16900	16900	17238	17698	18171	18656	19154	19665	20191	20730	21283	21851	22435	23034	23649	24280	24929	25594	26277	26979	27699	28439

Regional Total

POPULATION FORECAST	Notes	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Year	3yr Ave	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
ABS 2016 value linked to WAPC % increase	34,369	35,127	35,902	36,744	37,605	38,488	39,391	40,316	41,262	42,231	43,223	44,239	45,278	46,343	47,433	48,548	49,690	50,859	52,057	53,282	54,537	55,821
Tourist population equivalents (Australian Tourism) & linked to WAPC % ch	8,788	8,982	9,180	9,396	9,617	9,843	10,075	10,313	10,556	10,804	11,059	11,320	11,587	11,860	12,140	12,427	12,720	13,020	13,328	13,643	13,965	14,295
Total population (inc. tourist numbers and FI-FO)	43,157	44,109	45,082	46,139	47,223	48,331	49,466	50,628	51,818	53,036	54,282	55,559	56,865	58,203	59,573	60,975	62,410	63,880	65,384	66,925	68,502	70,116
Annual change %		2.21%	2.21%	2.35%	2.35%	2.35%	2.35%	2.35%	2.35%	2.35%	2.35%	2.35%	2.35%	2.35%	2.35%	2.35%	2.35%	2.35%	2.36%	2.36%	2.36%	2.36%
MSW (tonnes)	25600	25600	26158	26762	27379	28011	28658	29320	29998	30691	31400	32126	32869	33629	34407	35204	36018	36852	37706	38579	39473	40387
C&I (tonnes)	20300	20300	20735	21220	21717	22225	22745	23278	23823	24382	24953	25538	26137	26750	27378	28021	28679	29352	30042	30748	31471	32211
C&D (tonnes)	16810	16810	17182	17603	18035	18477	18930	19394	19870	20358	20858	21369	21894	22432	22982	23547	24125	24718	25325	25947	26585	27238
Total (tonnes)	62710	62710	64075	65585	67131	68713	70334	71993	73691	75430	77211	79034	80900	82811	84768	86771	88822	90922	93073	95274	97529	99837

APPENDIX B – REVIEW OF 2013 RWMP ACTION PLAN

2013 REGIONAL WASTE MANAGEMENT PLAN PROGRESS REVIEW

Issue	Recommendation	Outcomes	Broome	SDWK	Halls Creek	SWEK
ORGANISATIONAL CAPACITY						
4.1.1 Regional Cooperation	Formalisation and expansion of the existing regional cooperation (Waste TAG and WALGA Zone).	To maintain at least bi-monthly meetings for the duration of the RWMP.	Partial progress Waste Coordinator (SOB) role not filled for 8 months	Partial progress Waste Coordinator (SOB) role not filled for 8 months	Partial progress Waste Coordinator (SOB) role not filled for 8 months	Partial progress Waste Coordinator (SOB) role not filled for 8 months
4.1.2 Regional Funding	Establishment and funding of a Regional Waste Management Account (potentially through the WALGA Zone) to administer funds provided by regional grants such as the Regional Investment Scheme and member contributions.	To have agreed general funding model and established account by 1 July 2014.	No progress	No progress	No progress	No progress
4.1.3 Regional WM Coordinator	Engage a Regional Waste Management Coordinator to coordinate the implementation of this plan and other regional initiatives funded by the Regional Waste Management Account.	To have developed the position description and (if required), sought funding by 1 April 2014. Start date of 1 July 2014 (to align with regional funding account).	No progress	No progress	No progress	No progress
4.1.4 Continuity Planning	Implement management systems to retain organisational knowledge and facilitate continuity of project implementation. TAG group and regional coordinator will provide 'brains trust' to assist new staff to 'come up to speed'	To have linked position descriptions by 1 July 2014. TAG group support immediate.	No progress	No progress	No progress	No progress

Issue	Recommendation	Outcomes	Broome	SDWK	Halls Creek	SWEK
ECONOMIC VIABILITY						
4.2.1 Economies of Scale (Regional Procurement)	The Shires should implement actions to take advantage of the economy of scale offered by regional procurement. Regional procurement does not require a single contract to be signed by all Councils, rather it involves similar services being advertised for tender/quotation as part of the same package with a request made to tender applicants that they also provide pricing based on being awarded contracts for all Councils.	TAG group support via agendas and regional procurement focus immediate See above for regional account and coordinator.	Partial progress Kerbside contract was a Regional contract (except Halls Creek)	Partial progress Kerbside contract was a Regional contract (except Halls Creek)	No progress Kerbside services provided inhouse	Partial progress Kerbside contract was a Regional contract (except Halls Creek)
4.2.2 Private Sector Competition	Encourage private sector competition for all waste related goods and services by: - Developing tenders to maximise economy of scales; - Structuring tenders and managing the procurement process to provide a level playing field and encourage private sector competition; Where appropriate, Councils to accept reasonable risks and develop internal mitigation strategies rather than transferring all risks to the private sector (i.e. Bin ownership and maintenance).	TAG group to discuss tenders and engage specialist advice as required.	Partial progress As above tender for kerbside services	Partial progress As above tender for kerbside services	No progress Kerbside services provided inhouse	Partial progress As above tender for kerbside services
4.2.3 Transport Logistics	The Shires should work collaboratively with each other and the private sector to identify potential ways of maximising transport efficiencies in the region.	To determine likely transport costs and optimal infrastructure & process for collection by 1 Jan 2015.	No progress	No progress	No progress	No progress

4.2.4 Whole of life costing and gate fee price structure	The Shires should aim to ensure all waste management costs relating to commercial wastes are received from gate fees or any shortfall is quantified.	All Shire gate fees are based on whole of life costing, or alternative revenue sourced for any shortfall by 1 July 2016.	Complete	Complete High costs associated with illegal dumping which would increase with the introduction of WoL gate fees	Partial progress Customers 'argue' over current fees and volume estimates at the gatehouse	Complete
	The gate fees need to be structured to maximise the financial drivers. This means structuring prices so that mixed wastes are charged higher fees than separated recyclable wastes.	All Shire gate fee structures to be developed to maximise potential for source separation of materials that can be diverted from landfill by 1 July 2016.	Complete. The majority of charges encourage people to separate. Free domestic recycling has been introduced	Complete As above	Complete Lower fee for separated C&D waste	Complete Council decided against this given financial viability of recycling in the region
WASTE DATA						
4.3.1 Data Collection and Monitoring	All Shires should implement standardised recording procedures based on the classification system utilised in the Waste Data Study for the Pilbara Region (Talis, 2013).	To adopt and implement a uniform definition of wastes to be used for gatehouse waste recording for 1 July 2014. Shire to be collecting data by excel or other electronic system by 1 Jan 2015.	Partial progress Gatehouse software introduced but not using regional uniform classifications	Partial progress Gatehouse software introduced but not using regional uniform classifications	Partial progress Excel spreadsheet for collecting gatehouse data but not using regional uniform classifications	Partial progress Gatehouse software introduced but not using regional uniform classifications
4.3.2 Waste Tonnage Data	Complete periodic surveys of waste tonnages using mobile weigh cells. This would enable the Shire to more accurately quantify the tonnage of self-hauled waste received at the landfill sites.	Complete first audit of key sites by 1 Jan 2016.	Partial progress Weighbridge installed on site but not currently measuring domestic/self-hauled waste streams	No progress	No progress	No progress
	Shires should ensure that waste quantities can be consistently and accurately measured at larger sites and at least be measured periodically for smaller sites.	Install weighing system by 1 July 2017.	Complete Weighbridge installed at landfill	No progress	Partial progress Assessing feasibility to install a weighbridge in 18/19	No progress

4.3.3 Landfill cell location and site surveys	Records must be kept of landfill cell locations for asbestos and clinical waste (a licence condition) and it is recommended that records are kept of all cell locations and waste types disposed of in each cell /area. Have all landfills in the region (excluding Camballin) surveyed on an annual basis.	Tender regional contract for the 2014-15 year.	Complete	Partial progress Records kept for cell location etc, but not surveyed on annual basis	Partial progress Records kept for cell location etc, but not surveyed on annual basis	Complete Records kept for cell location. Operational Plan inc SOP's developed for the KNX landfill. Both landfills surveyed as required to ensure final contours are correct.
COMMUNITY AWARENESS						
4.4.1 Community Attitudes	Develop and implement (on a regional basis) a market research programme to establish and monitor community attitudes about the current services they receive and how the future services and activities should be developed. Complete the survey on an annual basis to monitor any changes. Additional one-off questions can be added for topical issues.	Complete first survey by 1 April 2015.	No progress	No progress	No progress	No progress
4.4.2 Community Knowledge	To develop a communication and education programme for the Shire. Additional activities, such as radio 'sound-bites' will assist in increasing awareness, particularly for residents with lower levels of literacy. An education levy is added to all gate fees to provide a specific fund for education and awareness activities. It cannot be stressed enough, that education and awareness are crucial activities to ensure the success of the future waste strategies. The levy could be paid into a fund for regional education activities to achieve greater economies of scale. If the Shire of Wyndham / East Kimberley joined the fund, all campaigns could be 'Kimberley' branded.	Implementation of a waste education program started by 1 July 2015.	Partial progress Waste Education Strategy for SOB starting 18/19 FY	Partial progress Ad hoc advice and education at a local level provided	Partial progress Converted EHO position to Health promotion position to upscale waste education and communication	Partial progress Community workshops held relating to changes in fees and services, particularly for potential transfer station at Wyndham.

4.4.3 Communication to Commercial Customers	Any significant changes to gate fees and services should be communicated to all commercial customers of the Shire's facilities at least six months prior to the change occurring. The communications should include the rationale behind the changes (e.g. meeting State guidelines and targets, etc) and the wider benefits that will be produced (e.g. increased recycling, preserving voidspace, etc). Prior communication will minimise the risk of misunderstanding or confusion at the facilities once the changes are implemented.	Newsletter provided as required from 1 July 2015.	Partial progress.	No progress	No progress	Complete SWEK undertook a two-pronged, face-to-face engagement campaign between August and September 2013. It held a community workshops in WYN and KNX on new (WOL) fees that would be charged for commercial waste at shire facilities.
4.4.4 Decision maker (Cr) understanding of the waste industry	Councillors need to understand the factors that drive the management of waste in each Shire, this includes; the whole of life economics of a landfill, environmental risk, regulatory requirements, key operational issues, Strategic plans, etc.	First introduction by 1 Oct 2014 and then within 3 months of every LGA election.	No progress	No progress	No progress	Complete Council briefing provided where possible for new Crs on waste by Shire staff.
BEST PRACTICE OPERATIONS						
4.5.1 Operational Planning	All sites should have operational plans (that are less than five years old). Any site without up to date operational plans should produce these important plans. The detail required in each plan should be appropriate to the size and complexity of the site.	All facilities to have up to date operational plans by 1 Jan 2015.	Partial progress	Complete	Complete	Complete
4.5.2 Knowledge and Skills	The current (and all future) staff needs to be aware of their operational duties and the site license conditions, together with the wider issues of waste management and recycling. With this in place staff should become more motivated, resulting in operational efficiencies.	Training program implementation to start by 1 July 2015.	Complete Staff are provided with OMP for facilities which provide SOP of waste related duties at the landfill/s.	NA Management of sites tendered out	Complete Staff are provided with OMP for facilities which provide SOP of waste related duties at the landfill/s.	Complete Staff are provided with OMP for facilities which provide SOP of waste related duties at the landfill/s.

	In addition, investment in staff through training programmes may assist in reducing staff turnover and developing the skills of current staff.					
4.5.3 Identification of New Sites	Accurately quantify the remaining operational life at existing facilities. If remaining operational life is less than 10 years - start the process to identify and develop a new site in accordance with BPEM landfill siting guidelines.	All facilities operational life estimated by 1 Jan 2015. Site identification started 10 years before end of life, as required.	Complete LCMP complete and potential new site investigations underway.	Complete LCMP complete and further assessment of a new site for derby required	Complete LCMP complete and potentially 10+ years still available on site. No new site not identified as yet	Complete LCMP complete and new sites identified
WASTE MINIMISATION						
4.6.1 Scrap Metal	The Shires work together to develop a regional solution that ensures scrap metal is collected from all facilities for recycling. This could provide an 'easy' pilot regional contract to be developed by the TAG group.		Partial Progress Undertaking individually	Partial Progress Undertaking individually	Partial Progress Undertaking individually	Partial Progress Undertaking individually
4.6.2 Source separation of C&D waste	Assess the viability of concrete and brick recycling in the region, considering: - New C&D recycling asbestos guidelines¹ - Volumes, - Markets - Capital and operational costs - Funding options - Operational delivery options, etc.	To determine viability by 1 Oct 2014.	No progress SoB looking to crush own concrete for council works	No progress	No progress	No progress
	If the recycling of C&D waste is found to be viable, the delivery of separated C&D should be encouraged. The Shires encourage source separation by introducing Waste Management Plans (WMP) as part of building approvals, using gate fee pricing structures (low cost for separated loads) and community / industry education. The local building industry involves only a few businesses in each town, which could assist in the development / adoption of 'on-site' waste management practices that will maximise recycling. The separated "clean" concrete, bricks and tiles should be stored separately at the facilities, prior to reprocessing.	Implemented within 6 months of C&D waste recycling project determined as viable.	Complete Concrete is separated on site and fee structures encourage recycling	No progress	Complete Concrete stockpiled on site	Complete A batch of concrete was reprocessed, but Shire did not have licence condition in place. Decided the cost of compliance and monitoring was too high.

¹ Guidelines for managing asbestos at construction and demolition waste recycling facilities (DER, 2012)

4.6.3 Additional Waste Processing	That the Shires work together to identify waste streams that could be assessed for recycling / diversion. The waste streams targeted could be based on: - Problematic wastes (e.g. gas bottles) - Local markets (e.g. reuse shops) - Significant volumes (e.g. organic waste)	At least one assessment completed by 1 July 2015.	No progress	No progress	No progress	No progress
4.6.4 Waste Tyres	That the Shires work together to investigate possible solutions to process or recycle tyres in a cost effective manner. Some tyre repair companies are returning tyres to Perth for recycling as part of an industry scheme, this should be explored further.	Assessment completed by 1 Jan 2015.	Partial Progress See SWEK entry	No progress	No progress	Partial progress SWEK were going to transport tyres to SOB for storage until suitable quantities for contractor to shred onsite at Broome. Still awaiting further work on this action.
4.6.5 Greenwaste Processing	That the Shires work together to develop a regional solution that: - Minimises processing costs across the region. - Provides opportunities to utilise external funding opportunities. - Assesses local markets for recycled greenwaste. - Ensures recycled greenwaste products meet the relevant product standards.	Completed assessment by 1 July 2016.	No progress	No progress	No progress	No progress
4.6.6 Packaging Materials	The Shires should not introduce a kerbside collection of recyclable materials (Recommendation from Kimberley Zone report. MRA, 2013) However, drop-off facilities could be established at manned facilities for higher value materials such as metals and plastics. Drop-off facilities avoid the cost of sorting co-mingled packaging materials and thus a lower cost alternative to introduce some recycling of these materials in the Shires. Once the materials are baled, transportation options need to assess to identify the most efficient system.	Define viability by 1 Apr 2015. If viable, implement service by 1 July 2016.	Complete Kerbside recycling provided Drop off facilities for some recyclable materials	Complete Comingled recycling drop off facility at Derby	Complete Metal drop off provided	Complete Metal drop off provided

4.6.7 Low volume highly polluting (LVHP) waste	The Shire's investigate solutions to reduce the volume of HHW and e-waste being disposed of to landfill by taking advantage of the National Television and Computer Recycling Scheme (NTCRS), and the various Waste Authority initiatives.	Assessed options by 1 July 2015 Implement recommendations by 1 July 2016.	Complete E waste collection underway at the landfill	Partial progress E waste currently stockpiled	Partial progress E waste currently stockpiled	Partial progress E-waste collection initial organised and then collection contractor stopped
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