



Government of **Western Australia**  
Department of **Water and Environmental Regulation**

# State waste infrastructure plan

## Western Australia

May 2024



Department of Water and Environmental Regulation  
Prime House, 8 Davidson Terrace  
Joondalup Western Australia 6027  
Locked Bag 10 Joondalup DC WA 6919

Phone: 08 6364 7000

Fax: 08 6364 7001

National Relay Service 13 36 77

[wa.gov.au/dwer](http://wa.gov.au/dwer)

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### **Acknowledgements**

Prepared for the Department of Water and Environmental Regulation by:

MRA Consulting Group (MRA) Registered as Mike Ritchie & Associates Pty Ltd ABN 13 143 273 812  
Suite 408 Henry Lawson Building 19 Roseby Street Drummoyne NSW 2047  
+61 2 8541 6169 [info@mraconsulting.com.au](mailto:info@mraconsulting.com.au)  
[mraconsulting.com.au](http://mraconsulting.com.au)

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## Summary

This *State waste infrastructure plan: Western Australia* (infrastructure plan) is a key deliverable of the *Waste Avoidance and Resource Recovery Strategy 2030* (waste strategy), which provides a comprehensive approach to meet the waste and recycling challenges of today and transition toward a more circular economy.

This plan is the first step in providing a high-level analysis of infrastructure needs for the state, using the available data to project future needs, risks and priority areas. This is not intended to provide detailed information on facilities, location, processes, actual capacities, or potential future available capacities, nor as an all-encompassing framework for infrastructure development. The Government of Western Australia (State Government) recognises that multiple stakeholders play a role in the planning and development of the needed infrastructure and later in the operation and viability of it. As technology, markets, and socioeconomic factors evolve, so will the needs for waste infrastructure. So, this is conceived as a first step into a living plan which will undergo an iterative process over time and will need to be considered in combination with other regional, state and federal strategies and instruments.

The transition to a circular economy requires investment, innovation, people and infrastructure. The infrastructure plan will help guide decisions and investments by setting out current and future waste generation based on achieving the waste strategy objectives and targets and the infrastructure required to support the waste strategy vision. Priorities to address critical areas of growth and opportunity are provided to further guide how this might be achieved.

The infrastructure plan recognises waste is everybody's business and proposes five principles to provide ongoing guidance for all stakeholder planning and decision-making in line with the vision, objectives, and targets of the waste strategy.

The key objective of the infrastructure plan is to:

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**“Provide a long-term information framework and principles to guide decision-making for the planning and development of waste and resource recovery infrastructure in Western Australia.”**

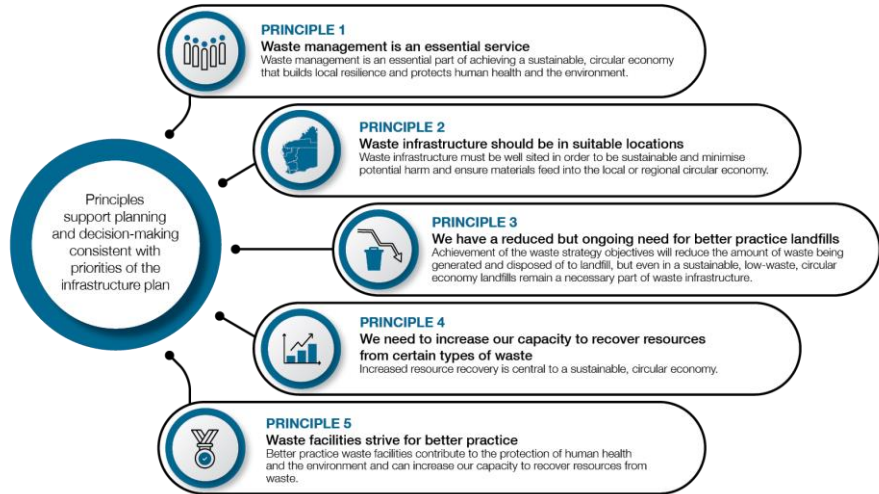
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Western Australia's [Waste Avoidance and Resource Recovery Strategy 2030](#) builds on Western Australia's previous waste strategy, *Creating the Right Environment*.



To deliver this, the infrastructure plan sets out:

- the decision-making principles for stakeholders to use when planning for, developing and approving waste facilities in line with the vision, objectives, and targets of the waste strategy
- an evidence base for stakeholders to understand and plan for the provision of waste services and investments in infrastructure needs and identified priorities across Western Australia.



## Scope

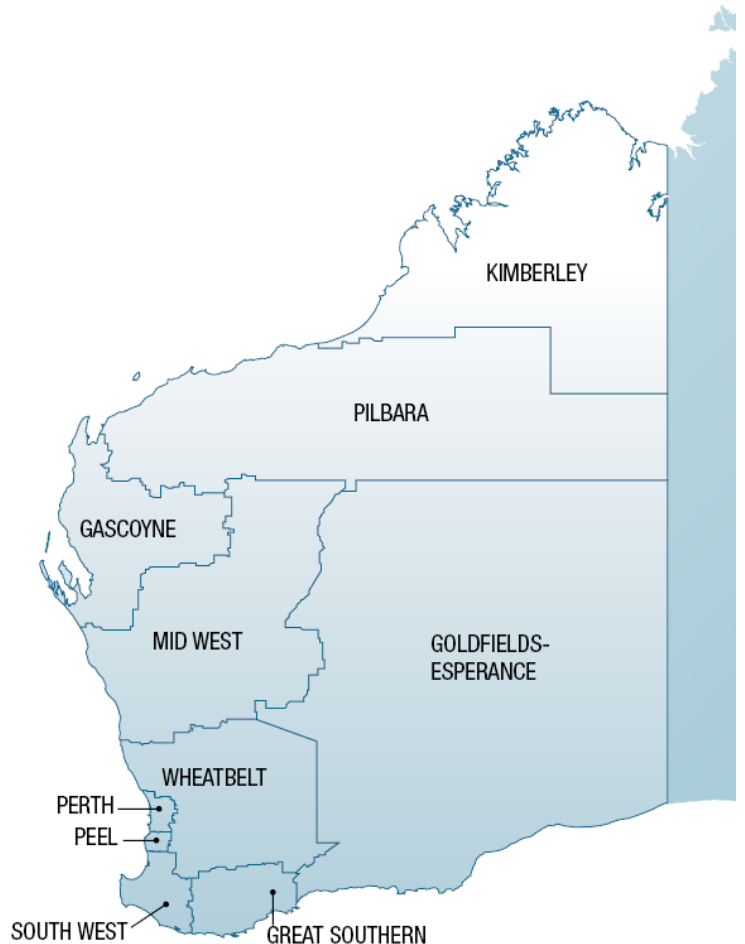
The infrastructure plan focuses on the built infrastructure (waste recovery and disposal facilities) used across the municipal solid waste, commercial and industrial waste, and construction and demolition waste streams.

The infrastructure plan includes a summary of waste generation, flows and infrastructure needs for each region of the state:

- Perth
- Peel
- Pilbara
- Kimberley
- South West
- Great Southern
- Mid West
- Gascoyne
- Wheatbelt
- Goldfields-Esperance.

Major regional centres as defined by the waste strategy are also included in assessments:

- Albany (Great Southern region)
- Bunbury (South West region)
- Busselton (South West region)
- Greater Geraldton (Mid West region)
- Kalgoorlie-Boulder (Goldfields-Esperance region).



## State of waste in 2020

In 2020, just under six million tonnes of waste was generated within Western Australia, with 55 per cent of material recovered. The annual per capita generation was 2.2 tonnes. Only a small amount of waste was transferred to or received from other states. About 171 tonnes of material waste received from other states and 720 tonnes was transferred, reflecting the movement of unprocessed medical waste.

The analysis of waste generation, management by facility type within each region and flow between regions identified:

- Perth generates the highest volume of waste, producing 73 per cent of the total for the state
- more than 85 per cent of waste in the state is generated by three regions (Perth, South West and Peel)
- most of the waste transferred from all regions goes to Perth, where it is treated; however, this represents less than 10 per cent of the volume generated in Perth
- the largest transfers to Perth are from South West and Peel, representing 67 per cent of the total transfers into Perth.

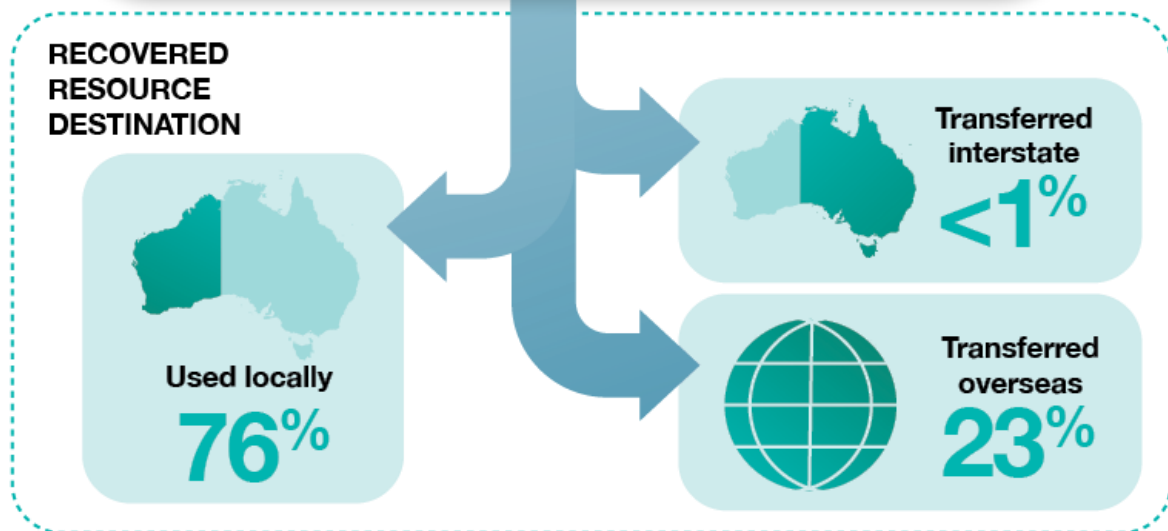
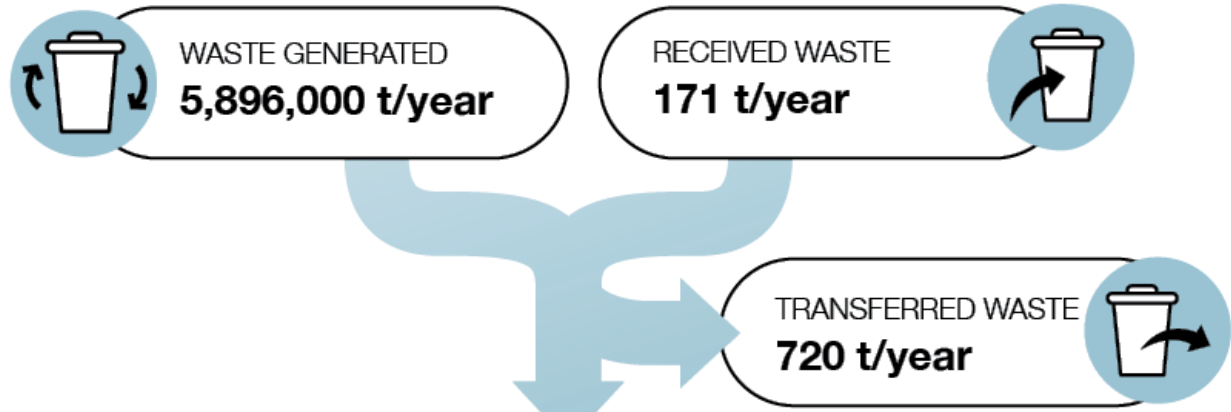
The waste generated in Western Australia was processed by 431 waste facilities including a total of:

- 225 licensed facilities (facilities with an existing prescribed premises licence)
- 96 registered facilities (Category 89 landfills)
- six unlicensed facilities (operational facilities that do not have an existing prescribed premises licence)
- 109 landfills in Aboriginal communities that are operated under the Remote Essential and Municipal Services (REMS) program.

More than three-quarters (76 per cent) of recovered resources in Western Australia are circulated back into the economy through local markets, while the remaining quarter is transported overseas (23 per cent) or interstate (1 per cent).

WASTE FLOWS 2020

# STATE OVERVIEW

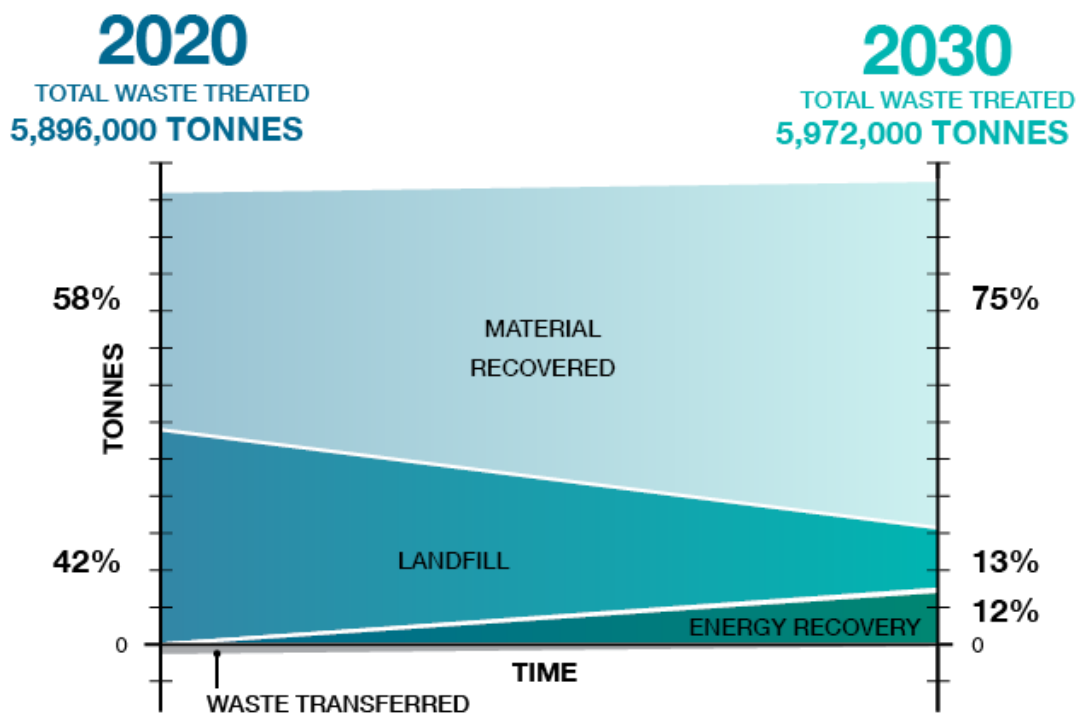


- TOP 5 MATERIAL TYPES PROCESSED IN STATE**
- 1 Mixed C&D waste
  - 2 Mixed putrescible waste – domestic (household)
  - 3 Mixed putrescible waste (commercial & industrial)
  - 4 Metals – ferrous steel – non-packaging
  - 5 Concrete

## The 2030 outlook

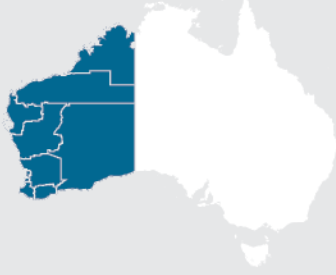
Achievement of the waste strategy targets will see the Western Australia waste generation rate decreasing to 1.88 tonnes per capita in 2030. This will result in statewide waste generation remaining consistent (~0.1 per cent variation) with total generation in 2020, despite a 16 per cent population growth. Improvements to waste infrastructure to prioritise resource recovery will increase the state resource recovery rate from 58 per cent to 87 per cent. These improvements will be supported by the introduction of waste-to-energy recovery to further decrease reliance on landfills.

The figure below depicts the shifting waste management methods of the waste treated in Western Australia in line with waste strategy targets, with the proportion recovered increasing and proportion landfilled decreasing. The amount of waste transferred interstate is modelled to decrease.



The figure below summarises the state of waste and priorities for Western Australia from 2020 to 2030.

# WESTERN AUSTRALIA STATE SUMMARY

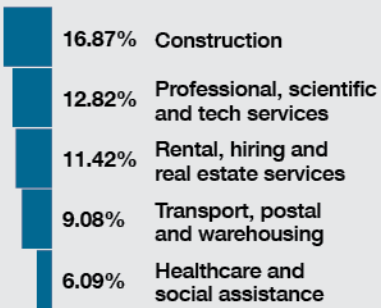


**AREA**  
2,541,049 km<sup>2</sup>

**GROSS STATE PRODUCT (2019-20)**  
\$316.32B/CAP

**NUMBER OF BUSINESSES (2019-20)**  
220,658

## TOP 5 EMPLOYMENT BY INDUSTRY

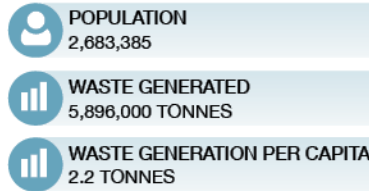


The mining industry sector makes the greatest contribution to economic output in the region, which at \$222.9B accounts for 32.87% of total output.

With 121,303 jobs representing 9.27% of total employment, it is the construction industry sector that is the state's largest employer.

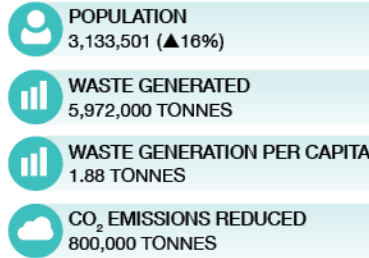
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## 2020



## 2030

PROJECTIONS TO 2030 BASED ON ACHIEVING WASTE STRATEGY TARGETS



### 2030 INFRASTRUCTURE CAPACITY NEED

1. Food organics and garden organics | 100,00
2. Material recovery facility | 153,500
3. Rubber/tyre | 8000
4. Waste-to-energy | 164,500

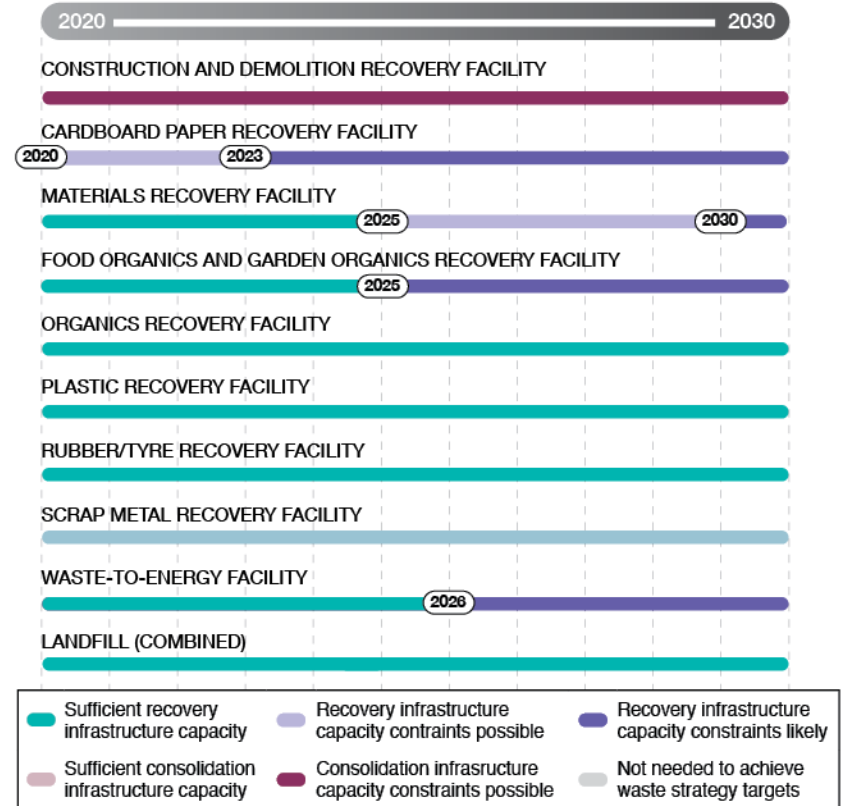


### TOP PRIORITIES

1. Investigate contingency planning arrangements for cardboard and paper in Perth.
2. Investigate designating a waste precinct in southern Perth and northern Perth to facilitate additional facilities.
3. Monitor progress of implementation of capacity expected from the Food Waste for Healthy Soils program.
4. Investigate and facilitate upgrade of existing garden organics facilities to accept food organics and garden organics in Perth and the Kimberley.
5. Facilitate appropriate guidelines and regulatory framework and specification for the recovery and treatment of bottom ash.
6. Assess opportunity for an additional waste-to-energy facility in the South West
7. Investigate alternative landfill facility contingency arrangements between Perth and the Peel region.
8. Assess waste generation and infrastructure needs in remote Aboriginal communities to ensure adequate access to services and investigate a rural landfill risk assessment of unlicensed landfill and REMS landfills.
9. Assess whether existing 67A licensed facilities can be increasingly utilised to alleviate food organics and garden organics recovery capacity need.

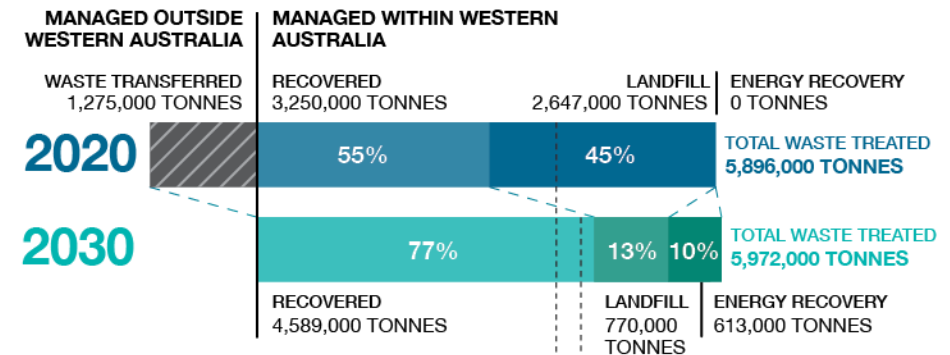
## INFRASTRUCTURE NEED BETWEEN 2020 AND 2030

Projections for capacity constraints compare current, approved and planned capacity against the infrastructure needs by 2030 to meet the waste strategy targets.



## WASTE IN WESTERN AUSTRALIA 2020 AND 2030

Waste projections to 2030 based on meeting the waste strategy targets



70% – Target waste recovery by 2025 for Western Australia according to the Waste Avoidance and Resource Recovery Strategy 2030

75% – Target waste recovery by 2030 for Western Australia according to the Waste Avoidance and Resource Recovery Strategy 2030



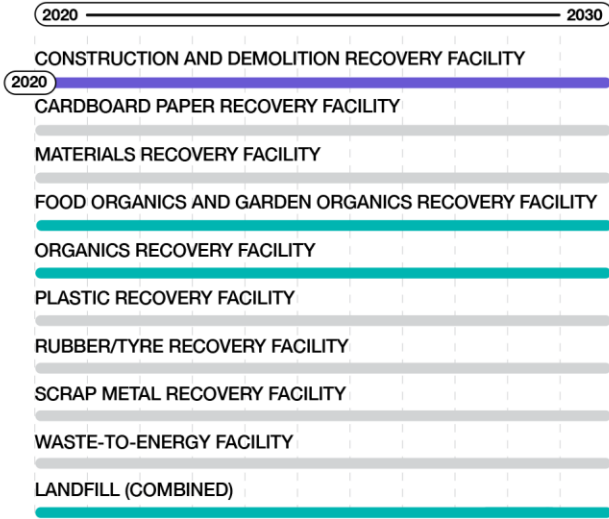
## Infrastructure needs for 2030

The current and planned waste infrastructure capacity was assessed against the projected waste to be treated within each region across the state in 2030. The assessment of required capacity considered waste generated within each region and flows of material transferring into and out of the region for treatment. An assessment was made as to whether there was sufficient or inadequate infrastructure over the planning timeframe as illustrated in the following figures for each of the ten regions across the state.

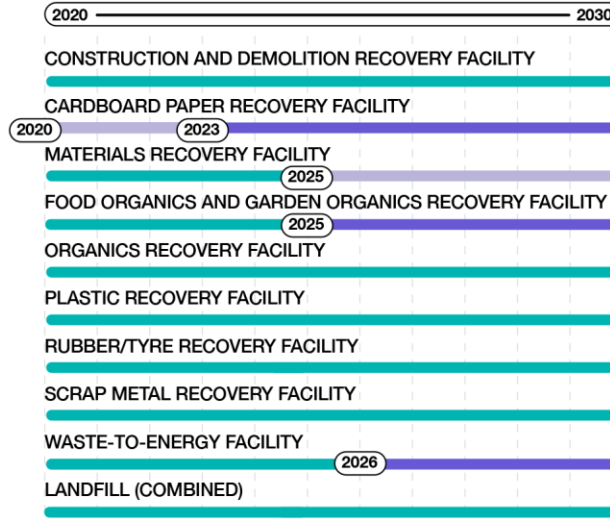
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Projections for capacity constraints compare current, approved and planned capacity against the infrastructure needs by 2030 to meet the waste strategy targets.

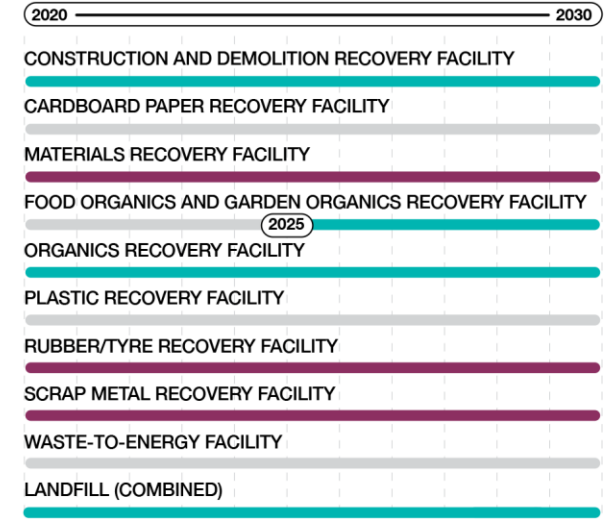
## PEEL



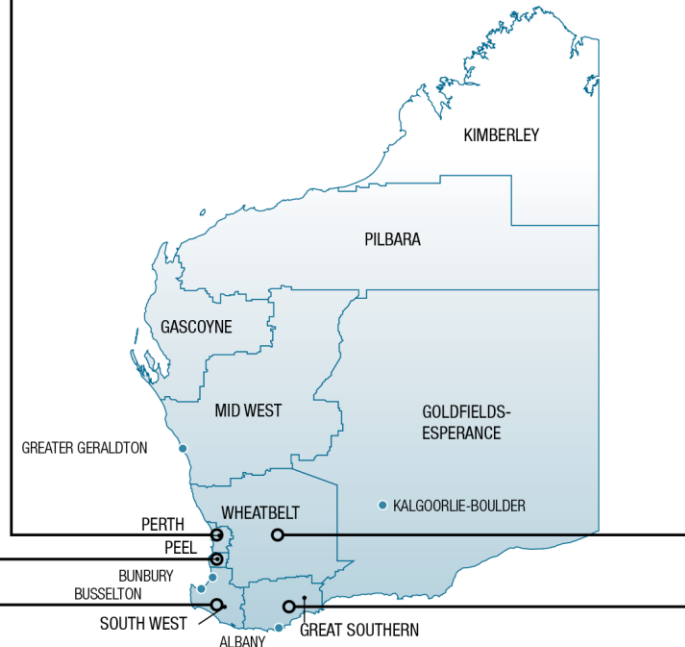
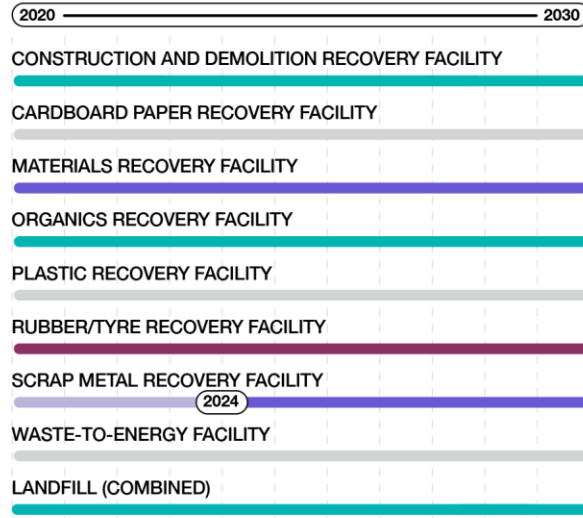
## PERTH



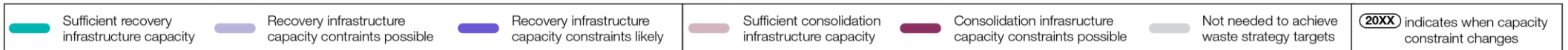
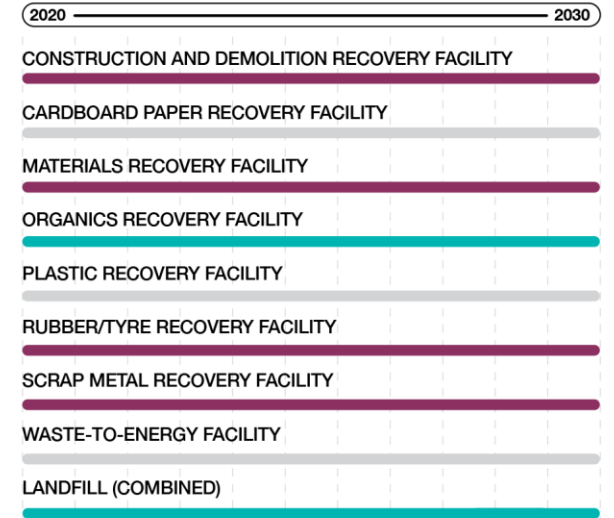
## WHEATBELT



## SOUTH WEST



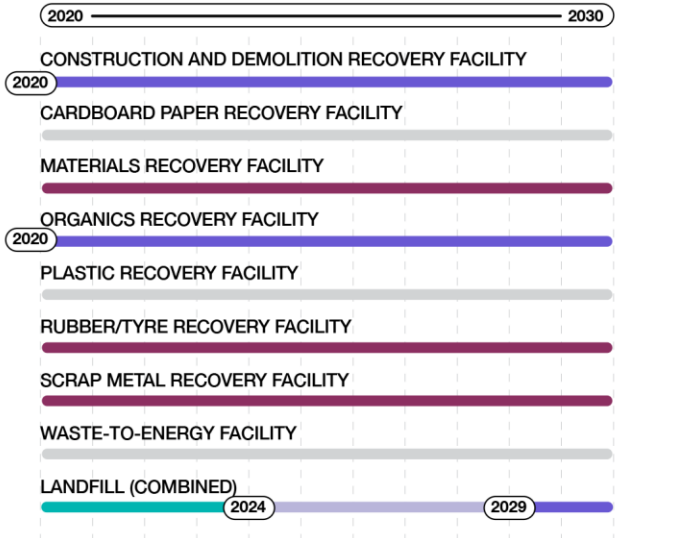
## GREAT SOUTHERN



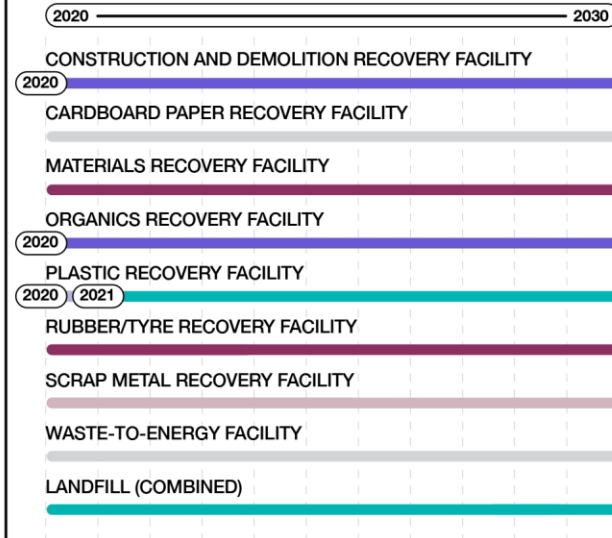
# INFRASTRUCTURE NEED BETWEEN 2020 AND 2030

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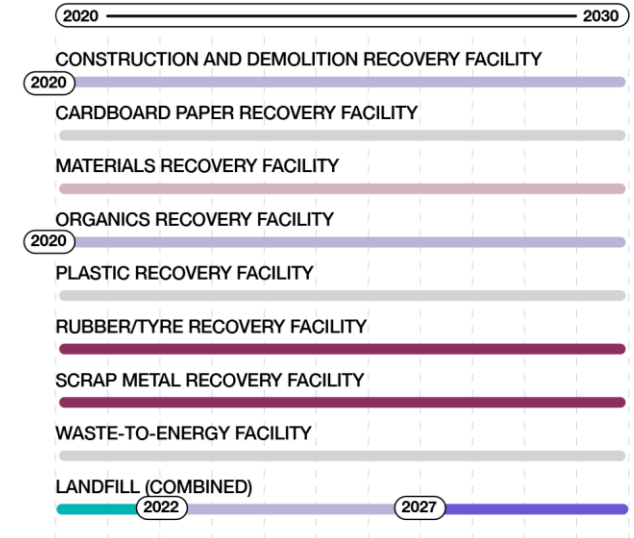
## GASCOYNE



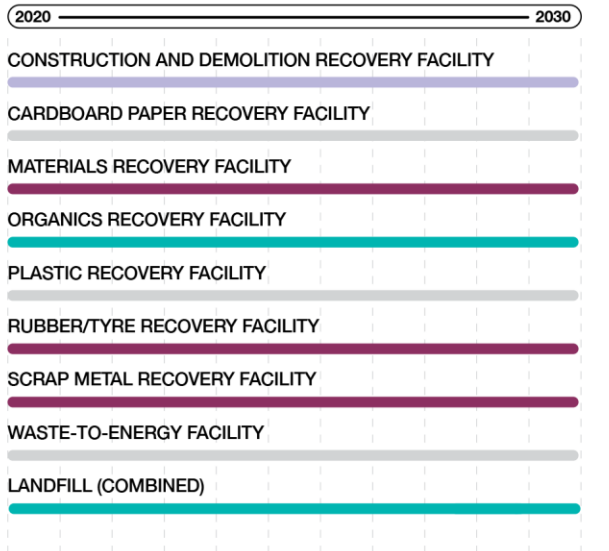
## PILBARA



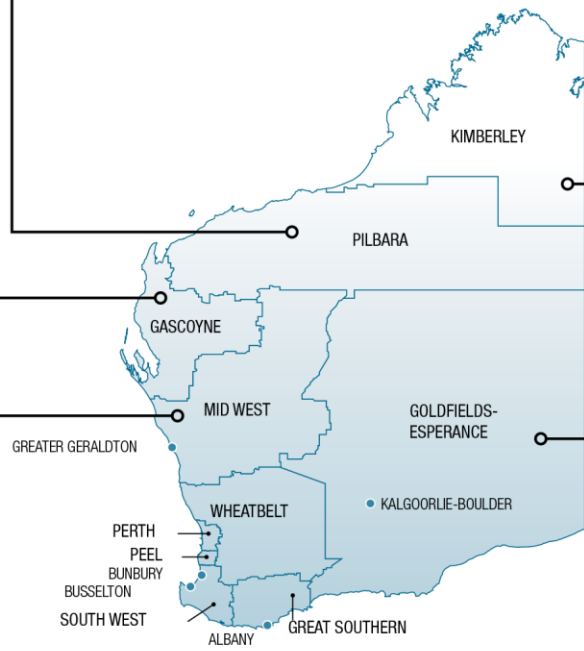
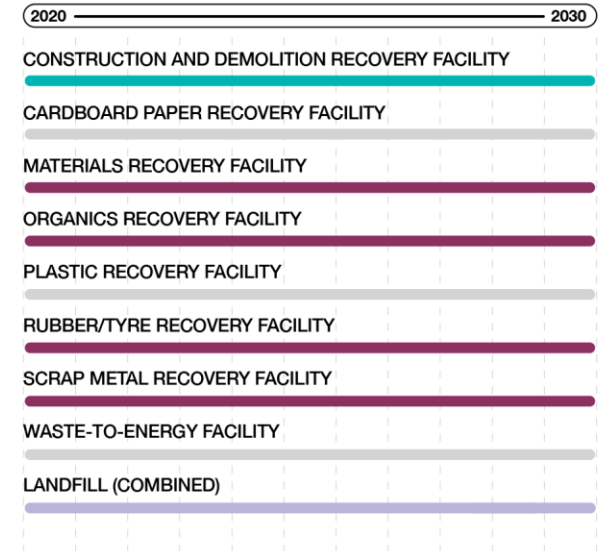
## KIMBERLEY



## MID WEST



## GOLDFIELDS-ESPERANCE



	Sufficient recovery infrastructure capacity		Recovery infrastructure capacity constraints possible		Recovery infrastructure capacity constraints likely		Sufficient consolidation infrastructure capacity		Consolidation infrastructure capacity constraints possible		Not needed to achieve waste strategy targets	<b>20XX</b>	indicates when capacity constraint changes
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## Waste and resource recovery

To determine the need for new resource recovery infrastructure within a region, the infrastructure plan considered the:

- current licensed capacity of facilities in 2020 – this may be higher than the actual annual throughput of facilities
- ability of existing facilities to expand
- estimated (or known) remaining operational life of facilities
- planned capacity of known new developments yet to be permitted, built and/or commissioned
- additional waste projected to be generated in 2030 that will require treatment.

Note: The modelling in the infrastructure plan relies on facilities being able to operate at their full licensed capacity.

Additional assumptions were applied with respect to identifying infrastructure needs:

- the time required to plan, design, seek and obtain approval for, build and commission each type of facility
- an economically minimum viable capacity for each new facility type
- facility lifetime.

Where a capacity need was identified but did not meet a certain threshold to establish a new facility, the capacity need was identified in the infrastructure plan as the need to establish consolidation centres to aggregate waste and support the development of facilities and the transfer of the material to a region with treatment capacity.

At a statewide level the total current versus planned and needed capacity across the resource recovery facility types is illustrated in the following figure.

CURRENT RECOVERY INFRASTRUCTURE PIPELINE

# STATE OVERVIEW

This overview includes a comparison of projected generation and capacities to determine the infrastructure need in 2030. It includes planned and approved facilities, as well as closures between 2020 and 2030.

**EXISTING CAPACITY IN 2020**



**EXISTING AND PLANNED CAPACITY IN 2030**

**CAPACITY NEED IN 2030**

EXISTING CAPACITY IN 2020			EXISTING AND PLANNED CAPACITY IN 2030		CAPACITY NEED IN 2030
RECOVERY	CONSOLIDATION		RECOVERY	CONSOLIDATION	2030 CAPACITY NEED
60 FACILITIES 5,104,000 TONNES PER YEAR		● CONSTRUCTION AND DEMOLITION RECOVERY FACILITY	57 FACILITIES 5,062,000 TONNES PER YEAR		107,500 TONNES
		● CARDBOARD PAPER RECOVERY FACILITY	1 FACILITY 100,000 TONNES PER YEAR		291,000 TONNES
7 FACILITIES 772,000 TONNES PER YEAR	5 FACILITIES 35,000 TONNES PER YEAR	● MATERIALS RECOVERY FACILITY	8 FACILITIES 772,000 TONNES PER YEAR	5 FACILITIES 35,000 TONNES PER YEAR	153,500 TONNES
5 FACILITIES 290,000 TONNES PER YEAR		● FOOD ORGANICS AND GARDEN ORGANICS RECOVERY FACILITY	7 FACILITIES 505,000 TONNES PER YEAR		100,000 TONNES
38 FACILITIES 1,410,800 TONNES PER YEAR		● ORGANICS RECOVERY FACILITY	36 FACILITIES 1,404,000 TONNES PER YEAR		SUFFICIENT CAPACITY
3 FACILITIES 13,500 TONNES PER YEAR		● PLASTIC RECOVERY FACILITY	7 FACILITIES 51,000 TONNES PER YEAR		SUFFICIENT CAPACITY
2 FACILITIES 45,000 TONNES PER YEAR		● RUBBER/TYRE RECOVERY FACILITY	6 FACILITIES 90,000 TONNES PER YEAR		8,000 TONNES
6 FACILITIES 755,500 TONNES PER YEAR	3 FACILITIES 112,000 TONNES PER YEAR	● SCRAP METAL RECOVERY FACILITY	6 FACILITIES 778,000 TONNES PER YEAR	6 FACILITIES 153,000 TONNES PER YEAR	99,500 TONNES
		● WASTE-TO-ENERGY FACILITY	2 FACILITIES 730,000 TONNES PER YEAR		164,500 TONNES

Sufficient recovery infrastructure capacity	Recovery infrastructure capacity constraints possible	Recovery infrastructure capacity constraints likely	indicates when capacity constraint changes
Sufficient consolidation infrastructure capacity	Consolidation infrastructure capacity constraints possible	Not needed to achieve waste strategy targets	

## Landfill capacity

The infrastructure plan identifies that there will be an ongoing need for landfill infrastructure across the state to:

- manage certain waste streams
- support contingencies such as emergency management and response plans, clean-ups from extreme weather events and/or facility shutdowns
- manage waste in locations where no other options are viable.

Landfills will continue to play a fundamental role in the management of residual, specialised and hazardous waste that remains unrecoverable.

Although there is an ongoing need for landfills, existing and new landfill facilities need to adopt better practice in landfill design and management practices, which incorporate landfill gas abatement and capture measures as a critical component in meeting the State Government's commitment to Net zero emissions by 2050.

The infrastructure plan estimates the state's landfill needs in two ways: comparing an approach based on estimated remaining capacity of landfills with an alternative 'low-risk approach', which is shown below. The low-risk approach aims to mitigate the limitations of the standard landfill lifetime projection. It does this by removing sites found to have the potential to be affected by a range of risk factors which could affect landfill longevity, including:

- uncertainty of existing sites' ability to continue to receive the projected volumes in line with their assumed capacity
- uncertainty in future landfill network capacity with potential compliance issues arising from:
  - licence conditions
  - a limited ability for landfill operations to remain viable while complying with landfill better practice design, construction and operations (which may particularly impact small-scale operations)
- proximity to groundwater and sensitive land use planning issues.

This low-risk approach means more regions are likely to face capacity constraints by 2030, with a total of 37,457,000 tonnes across 144 landfill sites identified as 'at risk'.

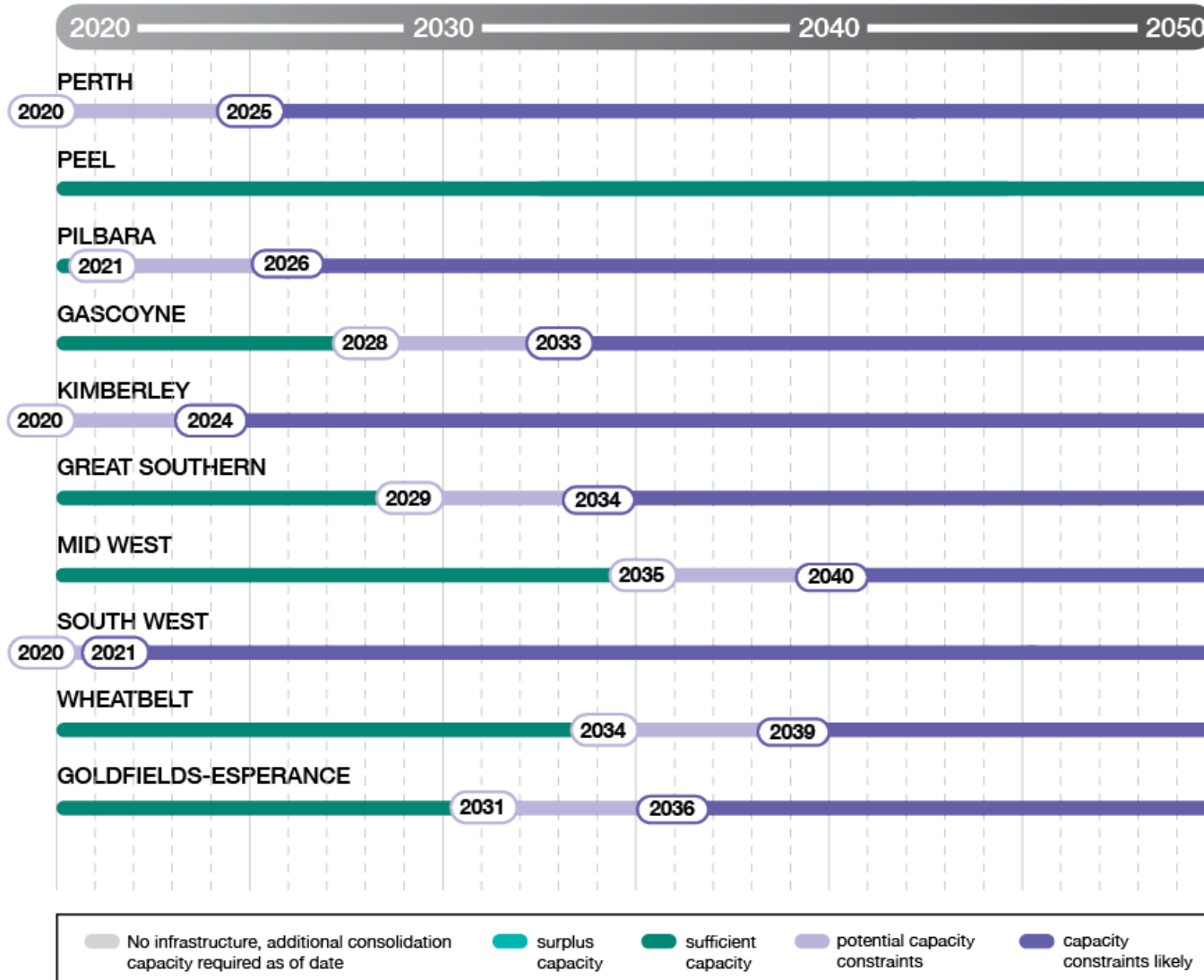
The diagram below shows the projected year that landfill capacity constraints are likely to arise in each region. This is based on current, planned and approved infrastructure under a low-risk approach. The infrastructure plan identifies that planning would be started before the projected capacity exhaustion, allowing five years for planning for expansion or closure and transporting the material to another facility, and seven or more years for the establishment of a new landfill.

This low-risk approach identifies the need for:

- contingency capacity in the Perth and South West regions, which may partly be provided in the Peel region
- the Kimberley region to develop new contingency arrangements while planning for additional landfill capacity in Broome, near the region's major source of waste generation.

# LANDFILLS

## LOW-RISK APPROACH TO CAPACITY LIFETIME FOR LANDFILL PIPELINE



## Priorities

The infrastructure capacity needs to achieve the 2030 waste strategy targets were identified and prioritised, with opportunities to support these priorities outlined for each region and infrastructure type.

Infrastructure type	Recovery facility capacity need (tonnes)	Consolidation facility capacity need (tonnes)	Priority
Cardboard and paper	291,000		High
Food organics and garden organics	100,000		High
Material recovery	29,000	124,500	Medium
Organics recovery	Sufficient		Medium
Construction and demolition	107,500		Medium
Scrap metal*	Sufficient	99,500	Low
Rubber/tyre	Sufficient	8,000	Low
Waste-to-energy	164,500		Low
Bottom ash	Sufficient		Low

\*State Waste Infrastructure Needs Analysis (Talis unpublished) modelling includes e-waste, electronics and electronic goods in the scrap metal treatment pathway.

The infrastructure plan outlines other opportunities to support the development of the infrastructure capacity need identified for 2030. The highest priority opportunities identified include:

- investigate contingency planning arrangements for cardboard and paper in Perth
- investigate waste precinct(s) in northern Perth and/or waste precincts throughout the Perth region to facilitate additional facilities
- monitor progress of implementation of expected capacity from the Food Waste for Healthy Soils and Recycling Modernisation Fund programs
- investigate and facilitate upgrade of existing organics recovery facilities to accept food organics and garden organics
- investigate transfer opportunities between Perth and adjoining regions to support capacity needs for food organics and garden organics recovery
- facilitate appropriate guidelines and regulatory framework and specification for the recovery and treatment of bottom ash
- assess opportunity for a future additional waste-to-energy facility in the South West



- investigate alternative landfill contingency arrangements between Perth and Peel
- assess waste generation and infrastructure needs in Aboriginal communities to ensure adequate access to services
- investigate a rural landfill risk assessment of unlicensed landfill and REMS landfills.

## Risks

There are risks relating to infrastructure capacity which may prevent Western Australia from meeting the waste strategy targets. They will require ongoing monitoring and management over the life of the infrastructure plan. These risks include but are not limited to:

- not achieving the waste strategy targets; in particular, not achieving the waste strategy avoidance target
- loss of infrastructure capacity from the system, including existing facilities closing early because of environmental impacts, climate change, community opposition, economic conditions, or increasing standard requirements for better practice
- failure to develop and operate planned infrastructure, particularly any delays to waste-to-energy and bottom ash facility development
- additional volumes of unreported waste being discovered as regulation and enforcement are increased
- increased volumes of waste from natural disasters requiring increased landfilling or recovery capacity
- market failures and imbalanced incentives for appropriate commercial activities to achieve the targets
- regulatory reform at national or jurisdictional levels
- management of specialised or problematic waste streams
- inadequate contingency planning.

Continuing waste generation at current rates could result in 7,465,000 tonnes of waste generated in Western Australia in 2030 – an additional 1,493,000 tonnes to what has been modelled in this infrastructure plan – resulting in increased capacity needs.

A total of 31 waste facilities are planned with approval yet to be granted, and eight facilities are scheduled to close between 2020 and 2030. This presents a risk for loss of infrastructure capacity and failure to develop infrastructure capacity.