

Regional summaries

This section provides more detail on the waste generation and infrastructure needs of each region in Western Australia. Each summary includes a snapshot of the region's industries, demographics and economy, painting a picture of how the region's activities have influenced waste generation in 2020. The 2020 waste generation and demographic data is then used to estimate 2030 waste generation.

The 2020 resource recovery infrastructure capacity is based on licensed capacity which was obtained through the *State Waste Infrastructure Register*. Gaps in existing infrastructure capacity are identified when comparing 2020 infrastructure capacity and 2030 waste generation data. Projections of needed waste infrastructure are developed using the methodology described in previous sections. Existing and planned infrastructure by region is compared to projected waste volumes to determine need, based on the concept of critical mass presented in this plan and the need for expansion of existing or development of new facilities.

Each regional summary includes waste generation by source, including MSW, C&D and C&I, to provide more insight and guide decision-making at the regional level. Each regional summary includes:

- an assessment of the social, economic and environmental indicators of the region
- a summary of waste generation, treatment and movements in 2020
- a summary of waste generation and treatment in 2030
- infrastructure capacity needs in 2030, including assessment of opportunities to provide or access capacity in neighbouring regions
- breakdown of the waste by facility type and source (MSW, C&I or C&D) in 2030
- breakdown of the material generation and recovery in 2030
- analysis of landfills by type and identified capacity risk
- an assessment of the principles and priorities for the region.

A desktop assessment of facilities' licences has been employed to understand infrastructure capacity and, as such, may not accurately reflect the specific activities conducted on site. This is one of the key limitations of with the *State Waste Infrastructure Needs Analysis* methodology for assessment, particularly in relation to FOGO recovery facility capacity needs and organics recovery facility capacity needs.

The infrastructure plan focuses on identifying infrastructure needs in alignment with meeting the waste strategy targets. Targets specifically relating to FOGO are currently limited to the Perth and Peel regions. In regions outside of Perth and Peel, FOGO waste is collectively categorised as 'organics'. Stakeholder feedback highlighted this gap in the 2030 needs assessment as several major regional centre municipalities, such as the South West and Great Southern, are considering or implementing FOGO recovery as a means to achieve their MSW recovery targets.

While there appears to be sufficient licensed capacity for organics recovery to meet regional demands until 2030, the specific availability of FOGO recovery capacity remains uncertain. In addition, there is potential for barriers to arise in regions outside of Perth and Peel depending on regional approaches on kerbside FOGO recovery. Some facilities, despite being licensed for FOGO waste, either do not accept it or handle quantities below their licensed capacity. This is discussed in more detail in the Considerations and limitations section.

Further, more detailed exploration of FOGO capacity needs outside Perth and Peel is required as an area of future work.

The infrastructure plan includes a summary for each region outlined in Figure 22:

- 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).

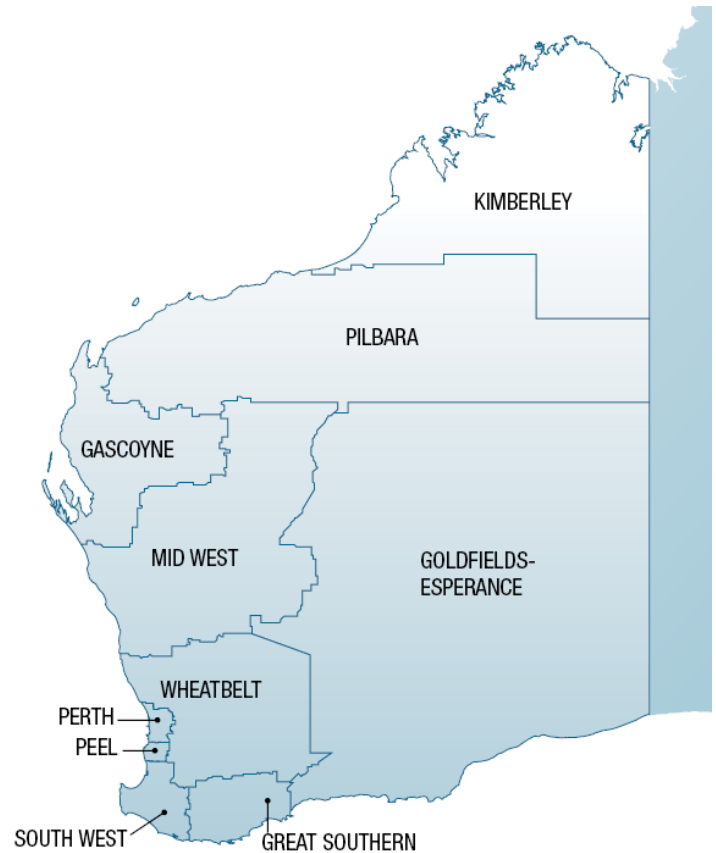


Figure 22 Regions used for the infrastructure plan

Gascoyne region

Waste profile in 2020

The Gascoyne has the smallest population of Western Australia's regions, with sparsely distributed communities connected by limited road networks. The region generated 25,000 tonnes of waste in 2020, made up of MSW (52 per cent), C&I (34 per cent) and C&D (14 per cent). The Gascoyne treated 23,000 tonnes in 2020, with 1,500 tonnes (6 per cent) being recovered and 21,500 (94 per cent) being landfilled. Geographic and capacity constraints means the Gascoyne has the lowest material recovery rate compared with other regions. Key waste profile data for the Gascoyne region waste and resource recovery in 2020 is presented below.

Residents in the Gascoyne

Less than 1 per cent of Western Australia's population resides in the Gascoyne region.

Population density of 0.1 people per km².

Residents are mostly concentrated to the Carnarvon major regional centre.

Local governments in the region

Shire of Carnarvon, Shire of Exmouth, Shire of Shark Bay, and Shire of Upper Gascoyne.

Generating waste

The Gascoyne region generates less than 1 per cent of the waste generated in Western Australia.

Transporting waste

Only one major road connecting the region with the Pilbara in the north and more populous southern regions such as Perth.

Treating waste

The Gascoyne treats less than 1 per cent of the waste treated in Western Australia.

The Gascoyne recovers less than 1 per cent of the waste recovered in Western Australia.

The Gascoyne landfills less than 1 per cent of the waste landfilled in Western Australia.

GASCOYNE REGIONAL SUMMARY

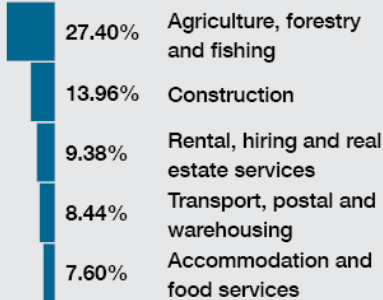


AREA
135,000 km²

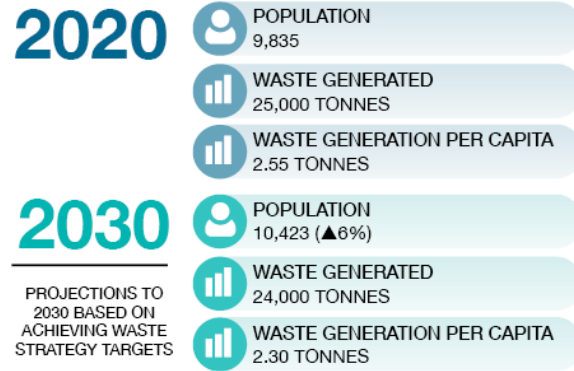
GROSS REGIONAL PRODUCT (2019-20)
\$1.29B/CAP

NUMBER OF BUSINESSES (2019-20)
927

TOP 5 EMPLOYMENT BY INDUSTRY



The mining industry sector makes the greatest contribution to economic output in the region, which at \$395.3M accounts for 20.05% of total output. With 435 jobs representing 9.13% of total employment, it is the retail trade industry sector that is the region's largest employer.



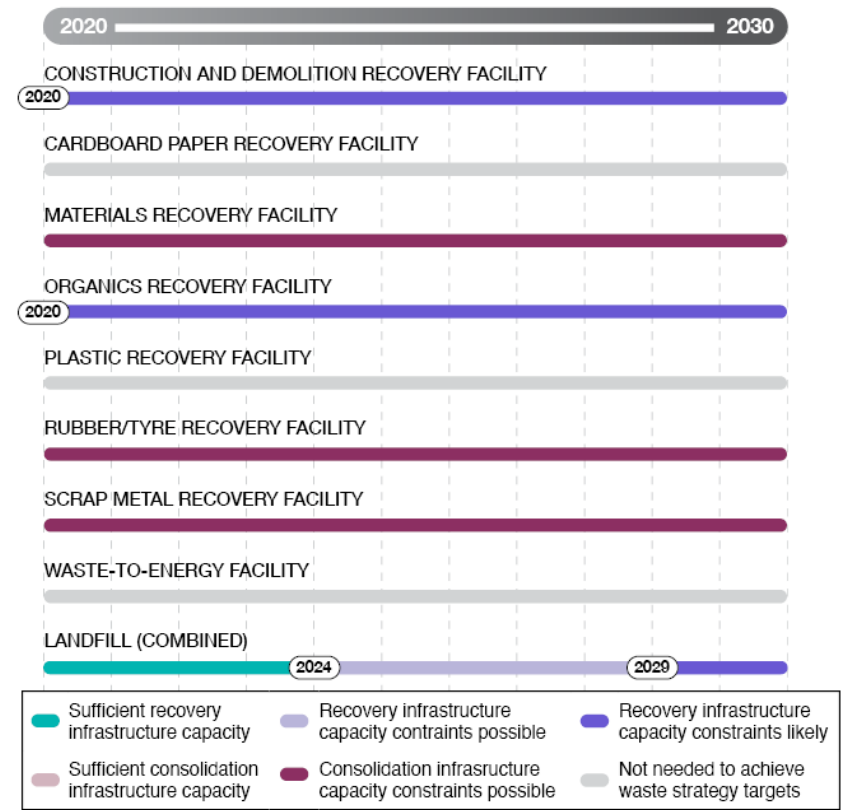
PROJECTIONS TO 2030 BASED ON ACHIEVING WASTE STRATEGY TARGETS

- ### 2030 INFRASTRUCTURE CAPACITY NEED
1. Construction and demolition | 500 tonnes
 2. Material recovery facility | 1,000 tonnes
 3. Organics | 6,000 tonnes
 4. Scrap metal | 500 tonnes

- ### TOP PRIORITIES
1. Investigate designated strategic industrial area in Carnarvon to facilitate additional facilities.
 2. Assess whether existing 67A licensed facilities in neighbouring regions 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 GASCOYNE 2020 AND 2030

Waste projections to 2030 based on meeting the waste strategy targets

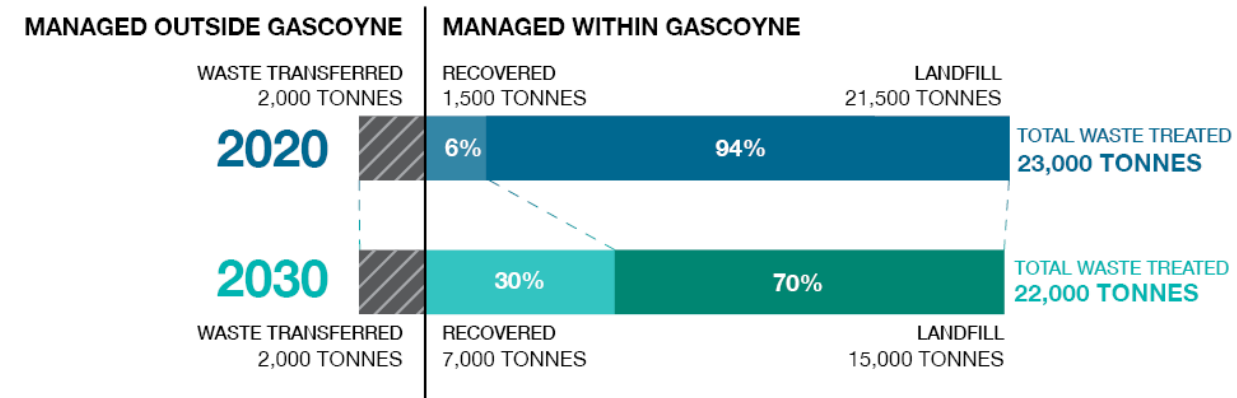


Figure 75 Waste in the Gascoyne: statistics and projections

Waste and resource recovery in 2020

Because of the small and isolated nature of many Gascoyne communities, most waste is treated through putrescible landfill disposal. The region recovers 1,500 tonnes of material per year, primarily consisting of electric and electronic goods. The top five materials processed in the region in 2020 include:

1. mixed putrescible waste – domestic (household)
2. electric and electronic goods
3. mixed C&D waste
4. metals – ferrous steel – non-packaging.

The region is serviced by five putrescible landfills, along with one REMS landfill. The only additional material recovery infrastructure are two rubber/tyre consolidation facilities. No additional infrastructure planned for the region was identified by the infrastructure plan.

The Gascoyne did not receive any waste and materials from other regions, although it transferred 2,000 tonnes per year, primarily to Perth. Transfers were predominantly to specialist waste facilities for the recovery of electric and electronic goods.

Because the region's population is concentrated in the Carnarvon area, there may be opportunities to introduce commingled recycling and FOGO collection services there, to generate feedstocks required for local infrastructure. Other recovered material can be aggregated and transported to the Pilbara or Perth for further reprocessing. These transportation networks can also be used to distribute recovered organic products to the Gascoyne's agricultural sector.

Aspects of waste and resource recovery in the Gascoyne region in 2020 that must be considered when working towards the waste strategy targets include:

- MSW formed the largest waste material source in the Gascoyne region, consisting of about 13,000 tonnes, of which 3 per cent was recovered.
- There is currently no commingled recycling or organics collection services in the region.
- All waste transfers out from the Gascoyne were to the Perth and Peel regions.
- All mixed C&D generated in the region and recovered was transferred out of region because of a lack of local recovery capacity.
- Access to transport networks means the Gascoyne could also transfer material to closer infrastructure in the Pilbara.

The location of current and planned recovery infrastructure in the Gascoyne region in 2030 is shown in Figure 78 (see Facility lists in the Appendix for a full list of facilities).

WASTE FLOWS 2020

GASCOYNE

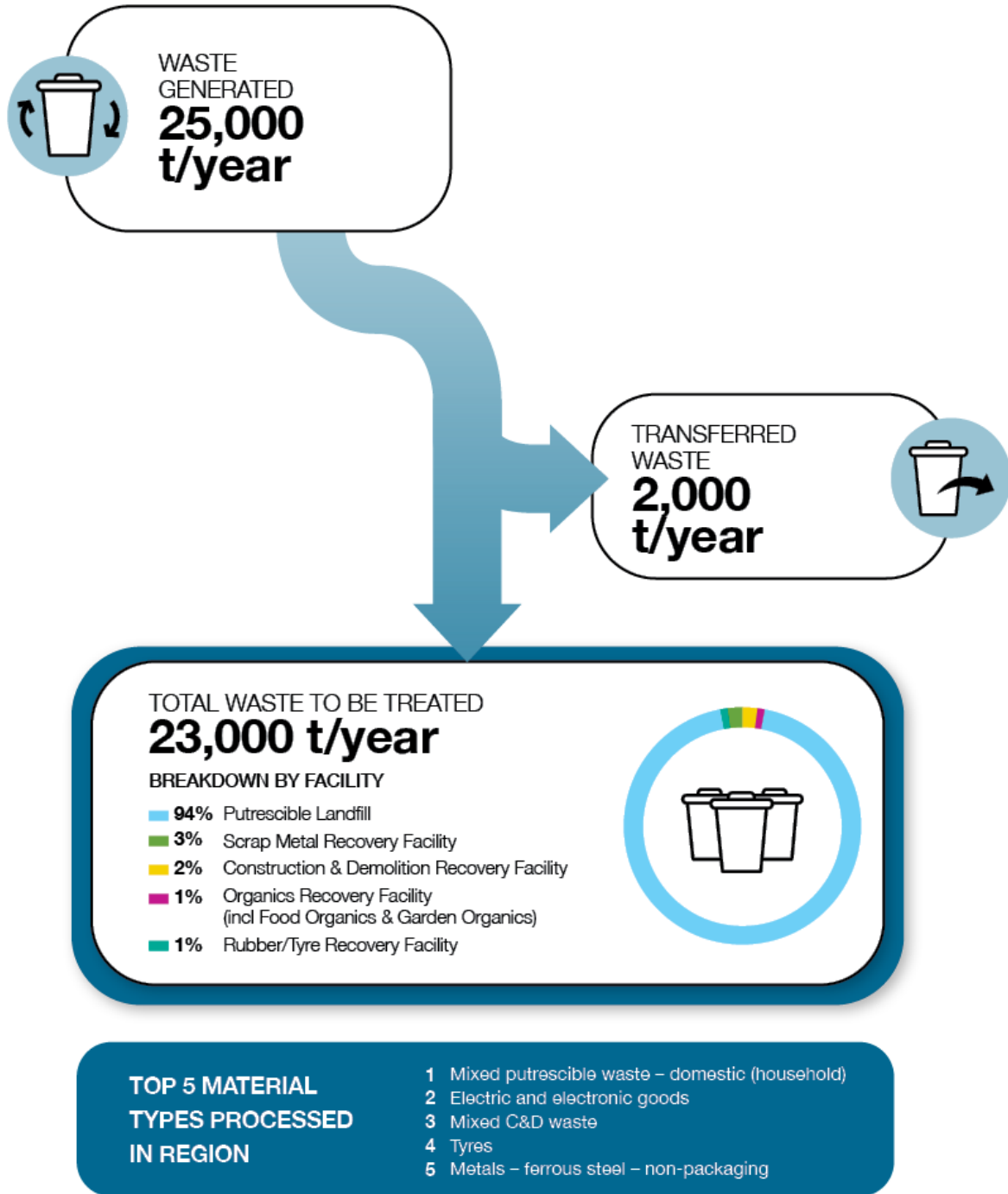


Figure 76 Waste generated, received, transferred and treated in the Gascoyne in 2020

WASTE FLOWS 2020

GASCOYNE

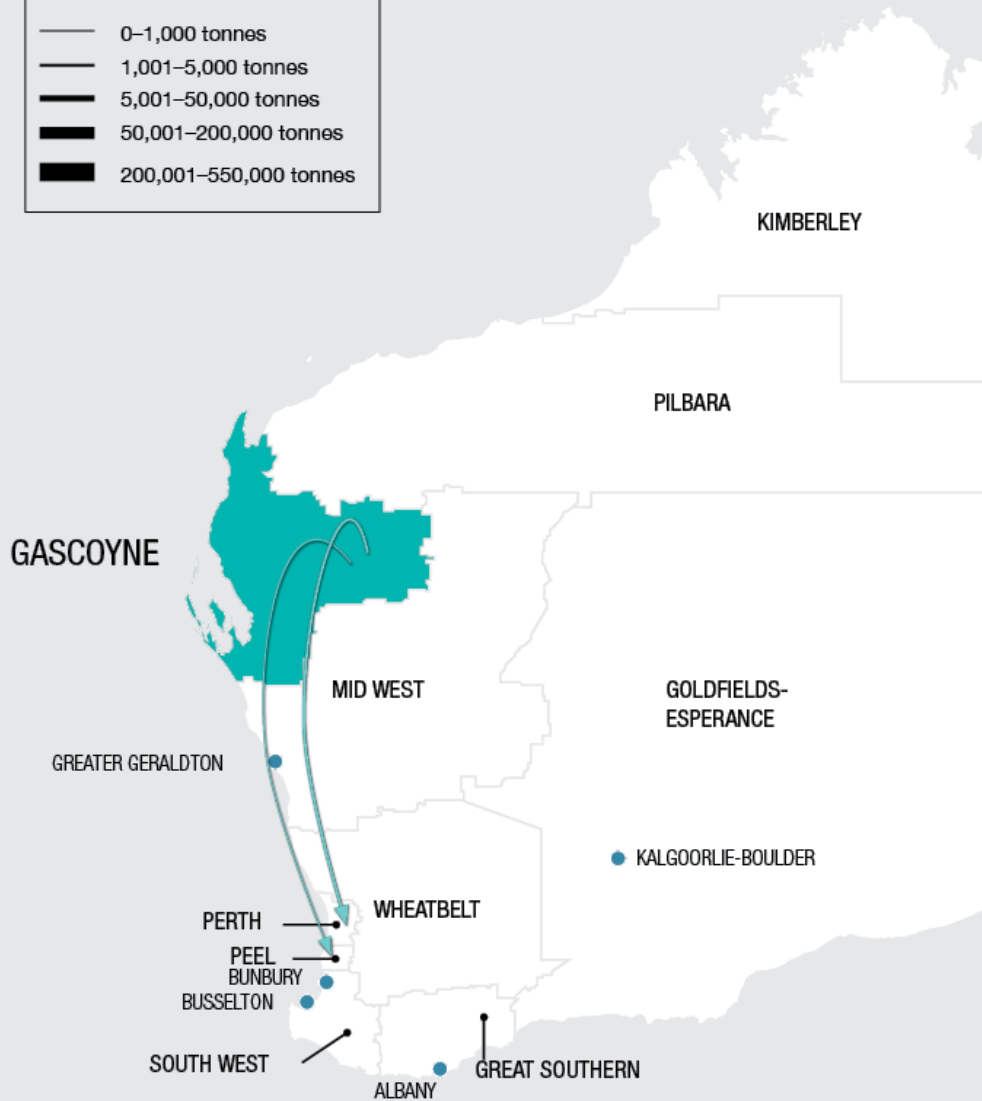
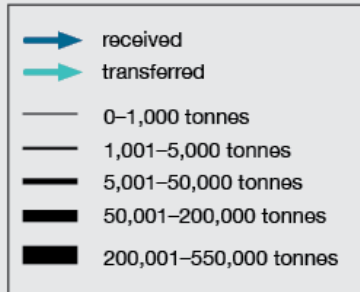


Figure 77 Waste flows in the Gascoyne in 2020

CURRENT AND PLANNED
INFRASTRUCTRE BY REGION
GASCOYNE

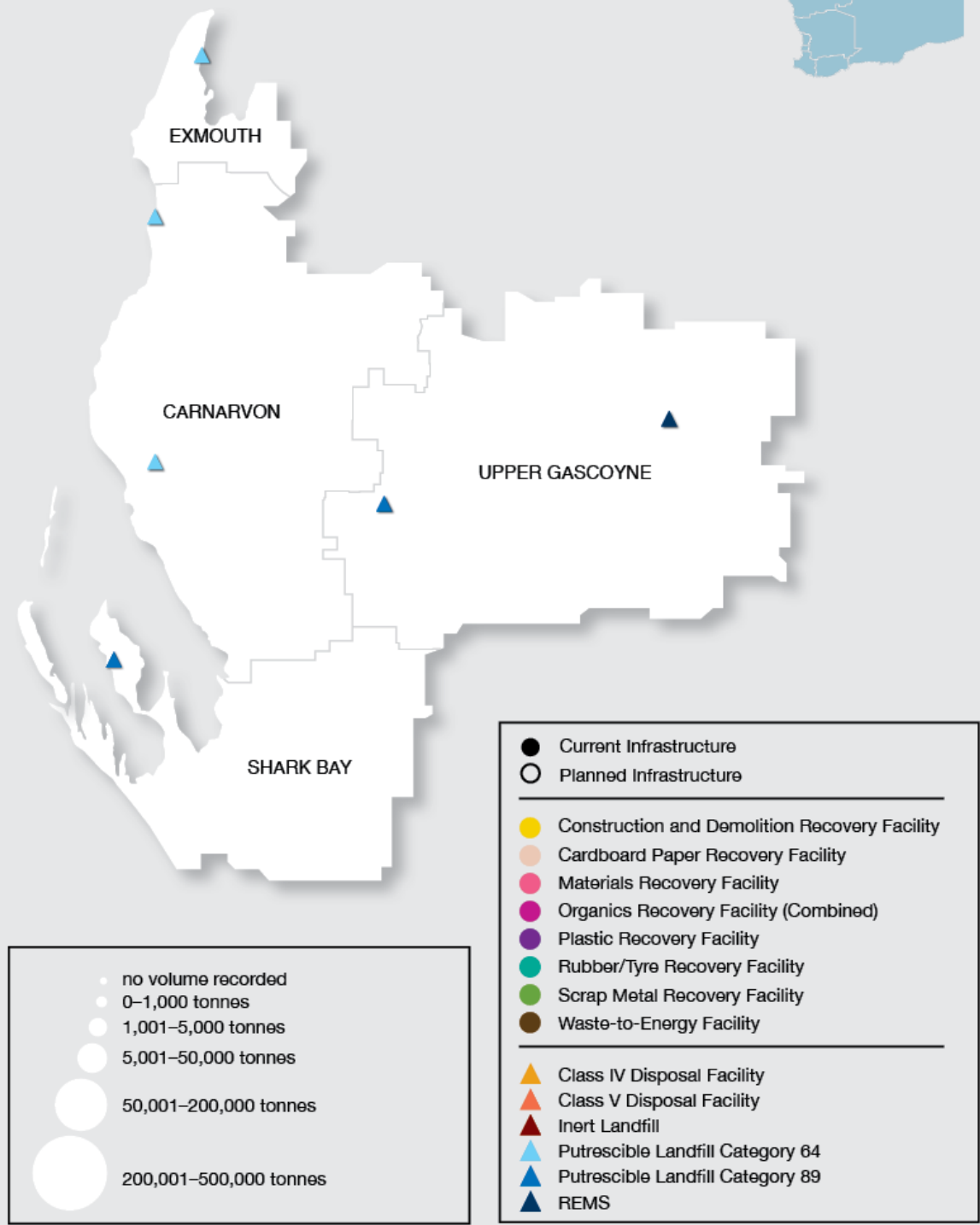
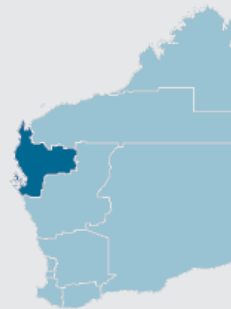


Figure 78 Current and planned infrastructure locations in the Gascoyne in 2020

Waste and resource recovery in 2030

Modelling to achieve all waste strategy targets in 2030 found the Gascoyne region would generate 24,000 tonnes and transfer 2,000 tonnes out of region, both similar to 2020 quantities.

New infrastructure will aim to change treatment methods to increase the Gascoyne materials recovery rate from 6 per cent to 30 per cent. Figure 79 shows the distribution of feedstock materials used by each facility type, indicating which waste streams are most significant and where the resource recovery efforts should be concentrated. This is also reflected in the Gascoyne region Principles and priorities section.

GASCOYNE

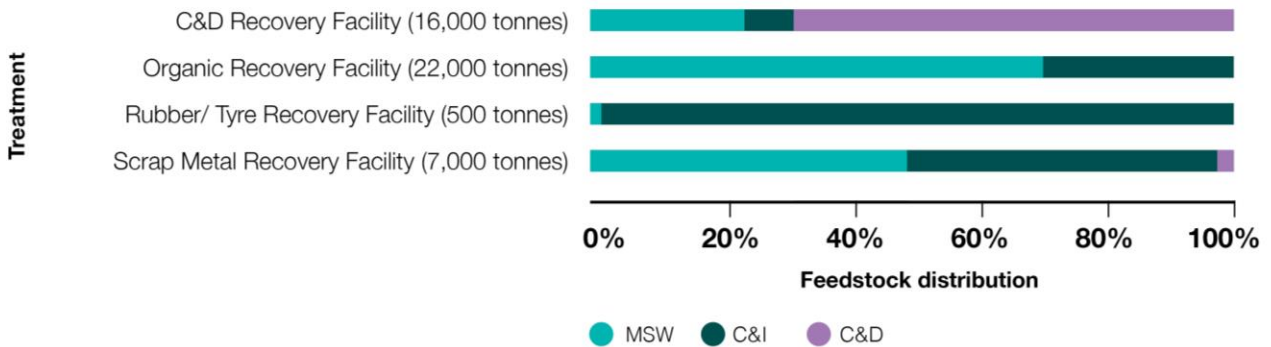


Figure 79 Feedstock distribution of treatments in the Gascoyne in 2030

Infrastructure capacity needs in 2030

Based on current, planned and approved infrastructure in 2020, the Gascoyne requires the following additional capacities to meet the waste strategy targets in 2030:

- 500 tonnes of additional recovery capacity is needed for C&D, which will require consolidation as it is not sufficient for a new facility.
- 1,000 tonnes of additional consolidation capacity is needed for MRFs.
- 6,000 tonnes of additional recovery capacity is needed for organics which is sufficient volume to allow for the development of a new organics recovery facility, but not enough for a FOGO recovery facility. As demonstrated in Figure 79, a high percentage (68 per cent) of the organics feedstock is estimated to consist of MSW, indicating that there may also be a need for a FOGO recovery in the region. This may be achieved through the extension or expansion of existing organics facilities to be able to accept FOGO.
- 500 tonnes of capacity is needed for scrap metal recovery, which will require consolidation, although is not sufficient for a new facility.

CAPACITY REMAINING BY LANDFILL TYPE

GASCOYNE

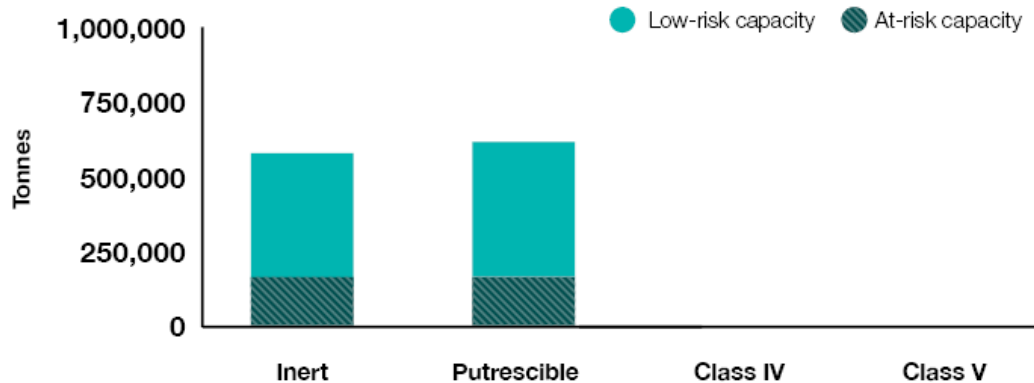


Figure 80 Capacity remaining by landfill type in the Gascoyne, including an assessment of low-risk and at-risk capacity

Total remaining capacity by landfill types is presented in . This figure also indicates the proportion of that capacity that is at risk (see section on Landfill capacity lifetime assessment to 2030 and 2050).

Under the low-risk scenario, a total of 4,000 tonnes of capacity was identified as potentially at risk, of which inert landfills make up 50 per cent and putrescible landfills 50 per cent. *State Waste Infrastructure Needs Analysis* modelling predicts 13,000 tonnes of residual waste will be disposed of in landfill each year. Feedstock lifetime remaining for landfills is shown in Figure 19 .

Details of the infrastructure needed to achieve waste strategy targets are outlined in Figure 81, including the expected facilities, capacities and capacity needs in 2030.

GASCOYNE

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.



Figure 81 Gascoyne recovery infrastructure pipeline and capacity needs in 2030

Principles and priorities

The principles outlined in this plan have been used to identify priorities.

Priority areas that are projected to go beyond capacity need, based on the completed modelling for the region, arise when applying the principles.

Based on the analysis, the top priorities for the Gascoyne region are:

- Investigate designating a strategic industrial area in Carnarvon to facilitate the development of additional facilities.
- Assess whether existing 67A licensed facilities in neighbouring regions can be increasingly utilised to alleviate FOGO capacity need.

These are discussed in more detail in Table 36 below. The principles are outlined once more in Figure 2 for reference.

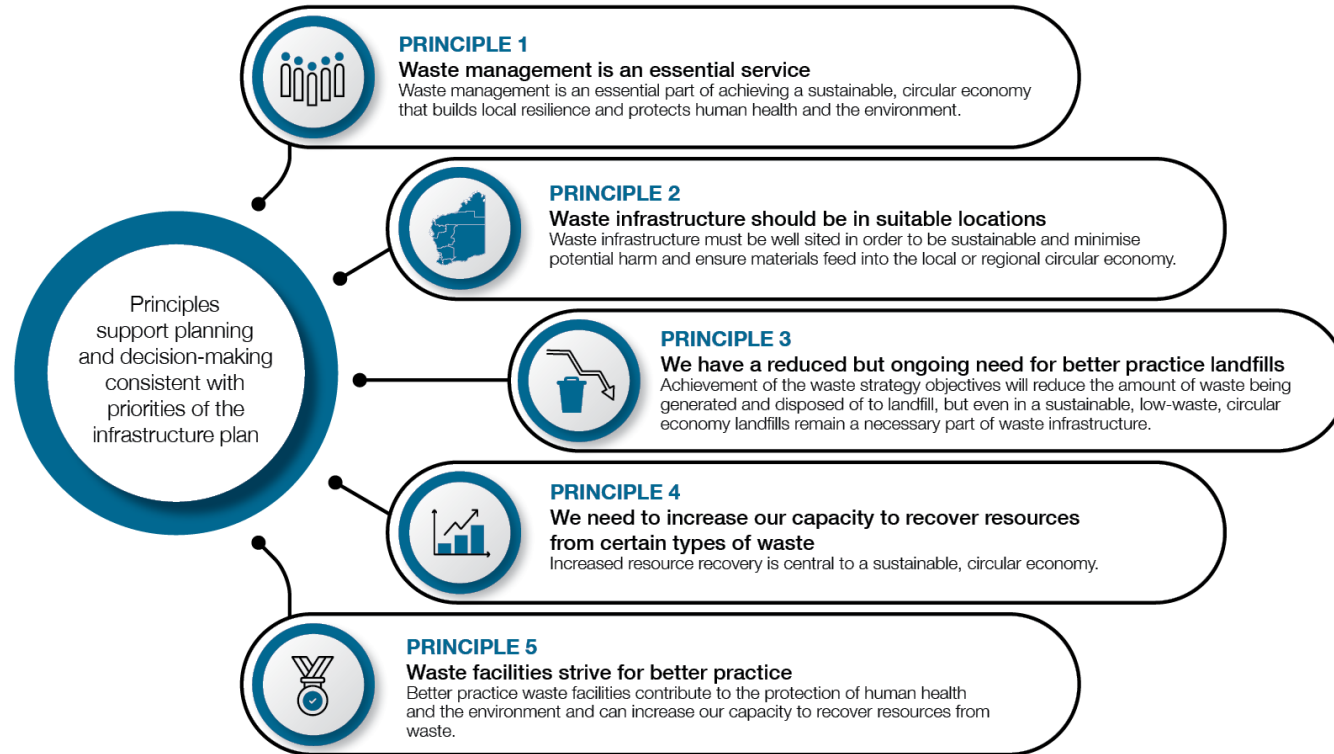


Figure 2 Principles of the State waste infrastructure plan

Table 36 Consideration of infrastructure plan principles and priorities in the Gascoyne

Capacity needs to achieve waste strategy targets	Consideration of infrastructure plan principles	Findings in response to meeting the waste strategy target (with assigned priority ranking)
500 tonnes of capacity for C&D recovery	<p>Principle 1: Waste management is an essential service Expansion of regional material recovery activities, especially near regional centres, will create an additional need to recover C&D material. Small populations in the Gascoyne are a major barrier to developing recovery infrastructure because of the lack of feedstock, but mobile recovery facilities may be considered.</p> <p>Principle 2: Waste infrastructure should be in suitable locations The Gascoyne will require consolidation infrastructure to facilitate material transfers to other regions. The small quantities across several material streams indicates an opportunity to develop an integrated waste management facility, or precinct, that practises a diverse range of consolidation activities. Carnarvon is the ideal siting for a new facility because the area has the greatest generation rate in the region, as well as access to transportation networks (to both the Pilbara and Perth) and low constraints for new waste facility developments.</p>	<p>Medium Options for a waste precinct in Carnarvon could facilitate low-risk development of co-located consolidation or recovery facilities.</p>
1,000 tonnes of capacity for material recovery	<p>Principle 1: Waste management is an essential service As for C&D material, commingled recycling recovery may expand to achieve waste strategy objectives, although not to a capacity to justify the development of a dedicated facility. The greatest opportunity is to offer a collection service to the regional centre of Carnarvon.</p> <p>Principle 2: Waste infrastructure should be in suitable locations An integrated approach to material consolidation should consider commingled recycling recovery.</p>	<p>Medium Options for a waste precinct in Carnarvon could facilitate low-risk development of co-located consolidation or recovery facilities.</p>
6,000 tonnes of capacity for organics recovery	<p>Principle 1: Waste management is an essential service The lack of existing infrastructure to consolidate or process organic material reduces opportunities to achieve waste strategy Recover targets and decrease reliance on landfill disposal. Opportunities to develop organics processing infrastructure in the northern regions should be supported by feedstocks from the Gascoyne, such as a garden organics collection services in Carnarvon.</p> <p>Principle 2: Waste infrastructure should be in suitable locations</p>	<p>Medium Options for a waste precinct in Carnarvon could facilitate low-risk development of co-located consolidation or recovery facilities.</p>

Capacity needs to achieve waste strategy targets	Consideration of infrastructure plan principles	Findings in response to meeting the waste strategy target (with assigned priority ranking)
	<p>The Gascoyne will continue to landfill organic waste unless processing infrastructure in neighbouring regions can be accessed. Given the access to agricultural markets and proximity to mining rehabilitation programs, the Gascoyne may be strategically placed to receive recovered organic products from an inter-regional facility. Consolidation in Carnarvon will have close access major generation sources, along with transportation to potential processing in the Pilbara or Mid West.</p> <p>Principle 5: Waste facilities strive for better practice Review organics recovery facility compliance with the <i>Guideline: Better practice organics recycling</i> to understand capacity risk for this facility type.</p>	
500 tonnes of capacity for scrap metal recovery	<p>Principle 1: Waste management is an essential service As for C&D material, scrap metal recovery will expand to achieve waste strategy objectives, although not to a capacity to justify development of a dedicated facility.</p> <p>Principle 2: Waste infrastructure should be in suitable locations An integrated approach to consolidation should consider requirements for scrap metal recovery.</p>	<p>Medium Options for a waste precinct in Carnarvon could facilitate low-risk development of co-located consolidation or recovery facilities.</p>
Used tyre storage	<p>Principle 3: We have a reduced but ongoing need for better practice landfills Waste management of tyres in remote locations poses challenges. Existing landfills are being used for collection and consolidation of tyres and present a suitable centralised location for waste management in remote regions. About 1,800 tonnes per annum of rubber/tyre material is projected to be generated in the Gascoyne region and this will continue to be generated, highlighting better practice landfills as an important part of the Gascoyne's waste management.</p> <p>Principle 4: We need to increase our capacity to recover resources from certain types of waste Tyres can be processed but infrastructure may only be available in Perth so the recovery of rubber/tyre materials in the Gascoyne region is dependent on consolidation and transport to enable recovery. Consolidation and transport will remain the likely fate given the insufficient quantity to support regional processing.</p> <p>Principle 5: Waste facilities strive for better practice</p>	<p>Medium Two facilities are listed in the region for Category 57 with total capacity exceeding 2,000 tyres. These may be sending tyres to Perth. There is an opportunity to consolidate volumes and transport these tyres for reprocessing outside the region.</p>

Capacity needs to achieve waste strategy targets	Consideration of infrastructure plan principles	Findings in response to meeting the waste strategy target (with assigned priority ranking)
	<p>One class 64 putrescible landfill in the Gascoyne is also a tyre storage facility. See the landfill capacity risk assessment below to further understand how the loss of this facility may occur, noting that this may reduce the ability to consolidate rubber/tyre arising in the Gascoyne.</p>	
Landfill capacity risk assessment	<p>Principle 1: Waste management is an essential service Based on current, planned and approved landfill capacity, the Gascoyne region has sufficient landfill capacity to 2039. However, under a low-risk approach to landfill, capacity constraints could be reached in 2028 because there are three facilities classified as at risk (208,000 tonnes capacity).</p> <p>Principle 3: We have a reduced but ongoing need for better practice landfills There is a deficiency of local inert landfill infrastructure, resulting in putrescible landfills having an ongoing requirement to treat small quantities of inert material. This requirement could be alleviated with the development of local resource recovery capacity for C&D material. Existing landfill facilities are well distributed across the region, resulting in low constraints for accessing disposal infrastructure.</p> <p>Principle 5: Waste facilities strive for better practice There is a high need to review and de-risk existing landfills through better practice management standards and post-closure planning, as 100 per cent of landfills in the Gascoyne have not completed or updated a plan within the past 10 years.</p>	<p>Low Updated rural landfill risk assessment methodology of unlicensed landfill and REMS landfills can be used to effectively assess the potential risk of environmental, human health and amenity impacts.</p> <p>Low Quantification of waste generation and infrastructure needs for the local mining sector would decrease the scope of infrastructure planning and could lead to complementary activities that support local communities.</p>