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BETTER TOGETHER.

State of Environment Outlook Report for the Western Cape Province

Waste Management

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Authors:
Western Cape Government Environmental Affairs & Development Planning:
Saliem Haider, Lance McBain-Charles, Belinda Langenhoven, Chantal Dryden, Evodia Boonzaaier, Robyn Britten, August Hoon, Vanessa Lakay, Dean Gilbert, Francini van Staden Gerard van Weele, Lize Jennings-Boom

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ABBREVIATIONS AND ACRONYMS

C&D	Construction and Demolition
CBA	Critical Biodiversity Area
CCT	City of Cape Town Metropolitan Municipality
CKDM	Central Karoo District Municipality
CO_2	Carbon dioxide
CH_4	Methane
CWDM	Cape Winelands District Municipality
DEA	Department of Environmental Affairs (previously DEAT)
DEAT	National Department of Environmental Affairs and Tourism (see DEA)
DEA&DP	Department of Environmental Affairs and Development Planning
DST	Department of Science and Technology
DTI	Department of Trade and Industry
DTPW	Department of Transport and Public Works
DFFE	Department of Forestry, Fisheries and Environment
e-Waste	Electronic Waste
eWASA	e-Waste Association of South Africa
FEPA	Freshwater Ecosystem Priority Area
GDP	Gross Domestic Product
GDPR	Gross Domestic Product Per Region
GRDM	Garden Route District Municipality
ha	Hectares
HCRW	Health Care Risk Waste
HDI	Human Development Index
H:H	Hazardous Waste Landfill designed for the disposal of Type 1 waste (designed to accept waste with Hazard Rating 1-4 [extreme to low hazard] in terms of DWAF Minimum Requirements 2nd edition 1998)
H:h	Hazardous Waste Landfill designed for the disposal of Type 1 waste (designed to accept waste with Hazard Rating 3-4 [medium to low hazard]in terms of DWAF Minimum Requirements 2nd edition 1998)
IDP	Integrated Development Plan
IPWIS	Integrated Pollutant and Waste Information System
IWM	Integrated Waste Management
IWMP	Integrated Waste Management Plan
Kg/c/day	Kilogram per capita per day
MIG	Municipal Infrastructure Grant
MIS	Management Information System
MRF	Materials Recovery Facility
MSA	Municipal Services Act 32 of 2000
MSW	Municipal Solid Waste
NDP	National Development Plan
NEMA	National Environmental Management Act 107 of 1998
NEM:WA	National Environmental Management: Waste Act 59 of 2008
NGO	Non-governmental Organisation
NWMS	National Waste Management Strategy
ODM	Overberg District Municipality

PETCO	Plastic Recycling South Africa
PSDF	Provincial Spatial Development Framework
RDI	Research, Development and Innovation
REDISA	Recycling and Economic Development Initiative of South Africa
RTS	Refuse Transfer Station
StatsSA	Statistics South Africa
STRID	Strategy to Reduce Illegal Dumping
VOC	Volatile Organic Compounds
WC IWMP	Western Cape Integrated Waste Management Plan
WCDM	West Coast District Municipality
WCG	Western Cape Government
WCRAG	Western Cape Recycling Action Group
WDF	Waste Disposal Facility
WISP	Western Cape Industrial Symbiosis Programme
WB	Waste Bureau
WMF	Waste Management Facility
WMO	Waste Management Officer

GLOSSARY

Acidic	A condition where pH is below 7
Anthropocentric	The idea that human beings are the central feature of the world; the interpretation of environmental and resource issues solely in terms of human values and standards.
Aquifer	A body of permeable rock that can store significant amounts of water.
Baseline	Information gathered at the beginning of a study which describes the environment prior to development of a project, and against which predicted changes (impacts) are measured.
Basic Service	Basic service is defined as the minimum amount of basic levels of service, provided on a day-to-day basis, sufficient to cover or cater for the basic needs of poor households.
Beneficiation	The transformation or reuse of a product (waste) into a higher value product, which can be a substitute for more expensive raw materials
Brownfield	Real estate, the expansion, redevelopment, or reuse of which, may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. (USEPA)
Disposal	The burial, deposit, discharge, abandoning, dumping, placing or release of any waste into any land.
Driver	Drivers or pressures can be defined as broad categories of factors that influence waste management directly i.e. population growth, economic development, urbanisation, events and tourism.
General Waste	Waste that does not pose an immediate hazard or threat to health or the environment, and includes: • Domestic waste; • Building and demolition waste (excluding asbestos); • Business waste; • Inert waste, or Any waste classified as non-hazardous waste in terms of the regulations made under section 69 of the Waste Act 59 of 2008, and includes non-hazardous substances, materials or objects within the business, domestic, inert or building and demolition wastes.
Gini-coefficient	A measure of inequality. It is normally used to measure income inequality, but can be used to measure any form of uneven distribution. The Gini-coefficient is a number between 0 and 1, where 0 corresponds with perfect equality (e.g. where everyone has the same income) and 1 corresponds with perfect inequality (where one person has all the income, and everyone else has zero income).
Greenfields site	A site on which no development has yet taken place.
Hazardous Waste	Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment
Integrated Waste Management	Employing several waste control and disposal methods i.e. reducing, re-using, recycling, incinerating and landfilling to minimise the environmental impact of commercial and industrial waste streams.
Leachate	Any liquid material that drains from land or stockpiled material and contains significantly elevated concentrations of undesirable material

	derived from the material that it has passed through.
Material Recovery Facility	A centre for the reception and transfer of materials recovered from the waste stream for recycling. Materials are sorted by type and treated.
Minimisation	The avoidance of the amount and toxicity of waste that is generated and in the event where the waste is generated, the reduction of the amount and toxicity of waste that is disposed
Municipal Solid Waste	Waste generated from residential and non-industrial commercial sources, including predominantly household waste (domestic waste), sometimes with the addition of commercial waste collected by a municipality. It includes either solid or semi-solid wastes and generally excludes industrial hazardous waste
Re-use	To utilise the whole, a portion of a specific part of any substance, material or object from the waste stream (again) for a similar or different purpose without changing the form or properties of such substance, material or object.
Recovery	The controlled extraction of material or the retrieval of energy from waste to produce a product
Recycling	The the process of collecting, cleaning, processing and transforming waste materials that would otherwise be discarded.
Transfer Station	A facility that receives solid waste from collection vehicles and reloads that waste into larger vehicles for transfer to a disposal facility
Treatment	Means any method, technique or process that is designed to: • change the physical, biological or chemical character or composition of a waste; or • remove, separate, concentrate or recover a hazardous or toxic component of a waste; or destroy or reduce the toxicity of waste, in order to minimise the impact of the waste on the environment prior to further use or disposal.
Up-cycling	Means to reuse (discarded objects or material) in such a way as to create a product of higher quality or value than the original
Urbanisation	The main process driving the creation and ongoing remaking of towns and cities. The term is often used with reference to the movement of people from rural to urban areas and therefore, expansion of urban areas.
Waste	Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 of this Act; or any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette.
Waste Disposal Facility	Means any site or premises used for the accumulation of waste with the purpose of disposing of that waste at that site or on that premises.
Waste Management	A control system to limit, collect, and dispose of waste, through policies and environmental standards.
Waste Management Facility	A place, infrastructure, or structure or contaminant of any kind, upon or at, a waste management activity takes place and includes a waste transfer station, container yard, landfill site, incinerator, a lagoon, recycling or composting facility.

1. INTRODUCTION

Waste generation is driven by factors such as population growth, economic development, employment levels and urban growth. As consumerism, industrialisation and urbanisation continue to increase, so too does waste generation. This places significant pressure on the ability of facilities and ecosystems to process waste material.

While waste has traditionally been viewed as a by-product or end-of-use material to be disposed of, this opinion has shifted over recent years. "Waste" can play a role as a valuable resource through the reuse of waste in the manufacturing of second-generation products, materials recovery and recycling industry, generation of energy, up-cycling and composting, amongst others. This shift in the approach to waste management reduces the volume of waste disposed in landfills.

The Western Cape continues to make significant strides in improving waste management and, more importantly, the integration of sustainable practices that recognise waste as a resource rather than a liability. However, there is still room for improvement in the province.

This chapter outlines the current pressures driving waste generation and the resulting impacts. ***The state of waste management in the Western Cape is tracked using the following indicators: waste disposal, waste types, waste diversion rates, collection services, waste management facilities and waste planning.*** Data quantifying these indicators in the Western Cape are provided and discussed in this chapter.

2. DRIVERS AND PRESSURES

The South African waste management sector is evolving into one of the most efficient sectors, however the country is still generating large amounts of waste annually and most of our landfill sites are fast approaching full capacity (Infrastructure News, 2022). The National Environmental Management: Waste Act, 2008 (No. 59 of 2008) and the National Waste Management Strategy 2020 (NWMS) call for increased diversion of waste away from landfill with the focus on reuse, recycling and recovery. The waste management hierarchy also states that waste should first be avoided, reduced, reused, recycled or recovered, and only as a last resort, disposed. It is also in line with the concept of a circular economy, which is central to the updated NWMS. Implementing the waste hierarchy and transitioning to a circular economy will require a coherent set of mutually reinforcing regulatory, economic and other interventions; with actions required by all relevant role-players (Nahman, Oelofse, & Haywood, 2021).

Population growth and waste generation are closely linked. As the population increases, there is typically a corresponding increase in the amount of waste generated. This is because more people result in greater consumption of goods and resources, leading to more packaging waste, food waste, and discarded items. Additionally, population growth often leads to urbanization and industrialization, which can further contribute to higher levels of waste production due to increased industrial activities and infrastructure development. Moreover, changes in lifestyle and consumption patterns often accompany population growth, with people adopting more disposable and convenience-oriented products, further exacerbating waste generation. This can include single-use plastics, electronic devices, and other items that contribute to the overall waste stream.

2.1 Climate change

Waste management practices play a pivotal role in climate change mitigation and adaptation strategies. The Intergovernmental Panel on Climate Change (IPCC) identifies waste management as a significant contributor to greenhouse gas emissions, primarily through methane generated in landfills and carbon dioxide from incineration (IPCC, 2022). Methane, a potent greenhouse gas with a higher global warming potential than carbon dioxide over a 20-year timeframe, is released during the anaerobic decomposition of organic waste in landfills. Effective waste management practices, such as waste reduction, recycling, diversion away from landfills and other alternative waste management methods such as composting, can substantially reduce uncontrolled methane emissions while conserving resources and reducing energy demand associated with virgin material extraction and production (IPCC, 2022). Additionally, transitioning to circular economy principles, which emphasise waste prevention, reuse, and recycling, is crucial for achieving global climate targets by reducing overall greenhouse gas emissions and promoting sustainable resource management (IPCC, 2022). Therefore, integrating comprehensive waste management strategies aligned with IPCC recommendations is essential for mitigating climate change impacts and building resilience to future environmental challenges.

For the Western Cape specifically, waste management is central to the province's climate change mitigation and adaptation. The Western Cape is considered highly vulnerable to the impacts of climate change, most notably (local) warming, drying and flooding. For the Western Cape, temperatures are projected to rise by 1°C to 1.5°C by the mid-2030s, and possibly by 2°C, leading to a 5% to 20% reduction in rainfall (WCG, 2014). Already, studies suggest that the Western Cape has the most significant warming trends and variation in rainfall patterns in South Africa, *viz.* a curtailed and late start to the rainy season, with serious repercussions, particularly for agriculture (GreenCape, 2016).

These climate-related hazards pose a substantial risk to the Western Cape's economy, population and ecosystems. This suggests that the province needs to be moving towards waste management practices that reduce the province's contribution to climate change. This needs to take place in overlap with mitigation and adaptation across other environmental sectors – including water resources, land resources and biodiversity. Otherwise, climate change will continue to put pressure on provincial resources, which will become more susceptible to high economic maintenance and economic losses in the absence of economic resilience.

2.2 Spatial development

In the national context, the National Development Plan (NDP) promotes "*New spatial norms and standards – densifying cities, improving transport, locating jobs where people live, upgrading informal settlements and fixing housing market gaps.*" (DEA&DP, 2017)

It is with this action in mind that the National Planning Commission called for a National Spatial Framework, which encompasses principles that seek the reversal of spatial segregation, sustainable consumption patterns, resilience to environmental degradation, access and inclusion of people with disabilities and efficient commuting patterns and circulation of goods. To meet these national objectives as well as to give effect to the Provincial Strategic Objectives, the Western Cape developed a Provincial Spatial Development Framework (PSDF) in March 2014. This provides a policy framework to roll out the Western Cape's spatial agenda (DEA&DP, 2017).

These are:

- ***Resource Management:*** Proactive management of resources as social, economic and environmental assets supported by sustainable living technologies;
- ***Space-economy***: Spatially aligned infrastructure, prioritisation and investment to increase access to opportunities and balance the rural and urban space-economy; and
- ***Settlement:*** An urban rather than suburban approach to settlement, which promotes intensity, integrations, consolidation and sense of place

Various growth management zones are identified in the PSDF. One such zone is the resource related port and industrial development in Saldanha Bay and surrounding areas. The zone is intended to become an oil, gas, and marine repair, engineering and logistics services complex, targeting upstream exploration and production services. An offshore supply base (Transnet National Ports Authority) will be developed to supply rigs with food, materials and waste collection services. Substantial quantities of hazardous waste are anticipated, and Saldanha Municipality does not have a hazardous Waste Disposal Facility (WDF) to accept such waste. A feasibility study investigating a hazardous WDF within the municipality is required.

The Growth Potential of Towns Study (DEA&DP, 2014) determined the growth potential and socio-economic needs of settlements in the Western Cape (outside of the CCT). Quantitative data (i.e. socio-economic, economic, physical-environmental, infrastructure and institutional indicators), supported by stakeholder engagement were combined to identify interventions that might unlock latent potential within settlements and regions, identify areas with most growth potential, and deprived areas with socio-economic needs.

Settlements with very high growth potential and socio-economic needs are Paarl, George, Mossel Bay and Stellenbosch. Ceres, Grabouw, Plettenberg Bay, Worcester, Hermanus, Knysna, Malmesbury, and Vredenburg. Settlements in the Betty's Bay/Pringle Bay and Wilderness have very high growth potential, but low socio-economic need (DEA&DP, 2014).

2.3 Land use and limited municipal airspace

Most waste management facilities in the Western Cape are experiencing landfill airspace pressures to accommodate disposal. Of the 25 municipalities, 17 have less than five years of airspace left (GreenCape, 2022). Municipalities are mandated to ensure the availability of integrated waste management facilities such as WDFs. They can support alternative waste treatment by means of providing material recovery and aggregation. These facilities can be managed by the municipality or contracted to the private sector. Old WDFs are closing, operational costs of existing WDFs increase annually above inflation, and the identification of new WDFs is challenging. As the Coastal Park WDF has limited airspace remaining, most waste would most likely be disposed of at Vissershok WDF in the future. The limited municipal landfill airspace availability for surrounding local municipalities outside of the City, and the fact that the City still needs to finalize its regional landfill site, is a huge concern and will most likely result in transboundary disposal of waste to the waste management facilities between municipalities. It's for this reason that waste diversion must be implemented at its fullest potential at all municipal waste management facilities to extend the existing airspace, save costs and reduce environmental impacts.

The Department received airspace assessment reports for 25 of the 59 operating WDFs. This means that 34 WDFs are operational without monitoring their compliance with airspace limitations.

The Western Cape PSDF (2014) supports "brownfields" development and discourages low density sprawl or "greenfields" development. Brownfield development projects are on previously occupied, derelict or contaminated land, usually requiring remediation prior to development. The Western Cape PSDF (2014) acknowledges that compromises must be made in pursuing the

province's spatial goals, noting that "*risks associated with implementing the transformation agenda (e.g. urban compaction requires more 'brownfields' development where land is expensive, often difficult to procure, and opposition from 'not in my back yard' factions is likely)*".

Brownfield development projects are gaining traction in the Western Cape, in the CCT, Oudtshoorn, Hermanus and Riebeeck West, for example. In some areas, low cost housing is being developed in the buffer zones of waste disposal facilities and at closed waste disposal facilities and it is reported that measures to mitigate and manage the associated potential health impacts are not always adequate. Waste management plans for the storage and removal of waste from residential and non-residential brownfield developments need to be implemented (DEA&DP, 2017).

2.4 Rising cost of landfilling

Rising waste management costs and limited landfill airspace are increasing the price of landfilling in the Western Cape, and in the Cape Town metropolitan area. This increases demand from waste generators for alternative waste treatment solutions, which improves the business case for solutions (GreenCape, 2022). One of the main reasons for the predominance of disposal to a WDF as a waste management option in South Africa relates to the low cost of landfilling, in comparison with alternative options. There is a common understanding that landfilling is 'under-priced' – i.e., that the cost of landfilling is artificially low, which creates a perverse incentive for the continued preference for disposal over alternative waste treatment technologies (Nahman, Oelofse, & Haywood, 2021).

Most municipalities and waste management services in the province rely heavily on WDFs for the disposal of waste. Direct landfill disposal incurs a cost (gate fee) that is charged per tonne. Such gate fees are relatively low in SA compared to more progressive economies (GreenCape, 2022). The net result of WDFs being unlicensed, unregulated, or non-compliant with licence conditions is that many WDFs in South Africa are not properly engineered sites and are deficient in terms of infrastructure and/or operating standards; and as such the costs of landfilling are artificially low. Many landfill sites do not comply with the Norms and Standards for Disposal of Waste to Landfill (DEA, 2013) and to the extent that these requirements are not met, the cost of landfill disposal still remains low. Many municipalities, particularly in cases where WDFs were constructed prior to 2013, do not yet comply with the standards, "and thus the cost of landfilling is artificially low" (DEA, 2018).

The City of Cape Town (CoCT)'s gate fees are high and has been steadily increasing their fees since 2013. The CoCT has the highest landfill gate fees (R557 excl. VAT / tonne) than any of the other metros in the country. This is expected to increase above inflation for the coming years with an increase of ~8.9% for the next two years (GreenCape, 2022). This makes Cape Town an attractive location for waste beneficiation solutions and alternate waste treatment technologies that rely on gate fees as a source of income. Landfill disposal fees is a source of revenue generation for municipalities and it is thus important for municipalities to align disposal gate fees with the cost of managing waste disposal facilities. It should be noted that although the cost of landfilling in the Cape Town metropolitan area is expected to increase by 8.94% in 2022/23 and 8.91% in 2023/24, the cost of refuse collection is expected to increase by an average of only 4.5% over the same period (GreenCape, 2022). Before the provincial organic waste landfill restrictions are fully realized in 2027, the cost of landfilling will be a key enabler for an alternative solution to landfill disposal for private sector organic waste (GreenCape, 2021).

3. STATE

Waste management in the province is mainly focused on providing guidance to district and local municipalities. Disposal at landfills is considered unsustainable as it leads to soil, water and air pollution if poorly managed (DEA&DP, 2013a), in addition to competing for land on the rural urban fringe, which also increases the distances between waste generation points and waste disposal facilities. Various pieces of waste legislation have been developed with the aim of reducing the impacts of waste on society and the environment, and on increasing the diversion of waste away from landfilling towards waste beneficiation (reuse, recycling, recovery and treatment).

The Western Cape faces numerous waste management challenges, similar to those in the rest of the country. The Provincial Integrated Waste Management Plan (IWMP) outlines a number of gaps (in information and waste management services and infrastructure) for the province, based on which the following prioritised needs were identified:

- Collection - Access to waste collection services, equality of waste management services and effective communication;
- Treatment and disposal - Additional Integrated Waste Management (IWM) infrastructure (recovery, treatment and general and hazardous WDFs that are appropriate to the local conditions) and increased compliance at WMFs;
- Reduce, re-use and recycle - Reliable data and information from industry, businesses and households (general and hazardous waste) that will assist in waste diversion and valuation in relation to economic pressure;
- Sound institutions and proactive policies - Institutional strengthening and capacity building to enforce laws governing waste management. Private sector involvement to improving cost effectiveness, quality and coverage of service areas. Transparent information management and public awareness are required;
- User and provider inclusivity - Involve all the stakeholders from planning through implementation and monitoring of changes to ensure effective communication between users and providers and raise public awareness; and
- Financial sustainability of services - Sustainable sources of revenue and investment finance.

3.1 Waste Generation

Waste generators and handlers triggering certain thresholds stipulated in the National Waste Information Regulations (R625 of 2012) (hereafter referred to as the WIS regulations) must register with and report waste figures to either the national DFFE, through the South African Waste Information System (SAWIS) or the Integrated Pollutant and Waste Information System (IPWIS). The WIS regulations divides waste into two main categories, as defined namely, Hazardous and General waste and further outlines more categories that waste holders can report on. Municipalities are required to submit monthly reports via the IPWIS, reporting on waste volumes disposed and diverted from waste disposal facilities. Municipalities use weighbridge records, landfill airspace calculators or the DEA&DP's waste calculator to complete the waste reports. Waste generation rates (kilogram per capita per day (kg/c/day)), vary between municipalities. The World Bank calculates an average waste generation rate of 2 kg/c/day for highly populated urban areas (Urban Development Series: What a Waste, 2012). The CCT and Overstrand waste generation rate of 1.67 kg/c/day compares favorably[1] with the World Bank rate. All other local municipalities produce substantially less waste, due to the lower population density and their predominantly rural nature.

[1] *The rate is also highly dependent on income levels, and Overstrand formal population are on a higher socio-economic scale. It must also be noted that it is a migration area where many foreigners move in seasonally, and hence higher generation rates over holiday season.*

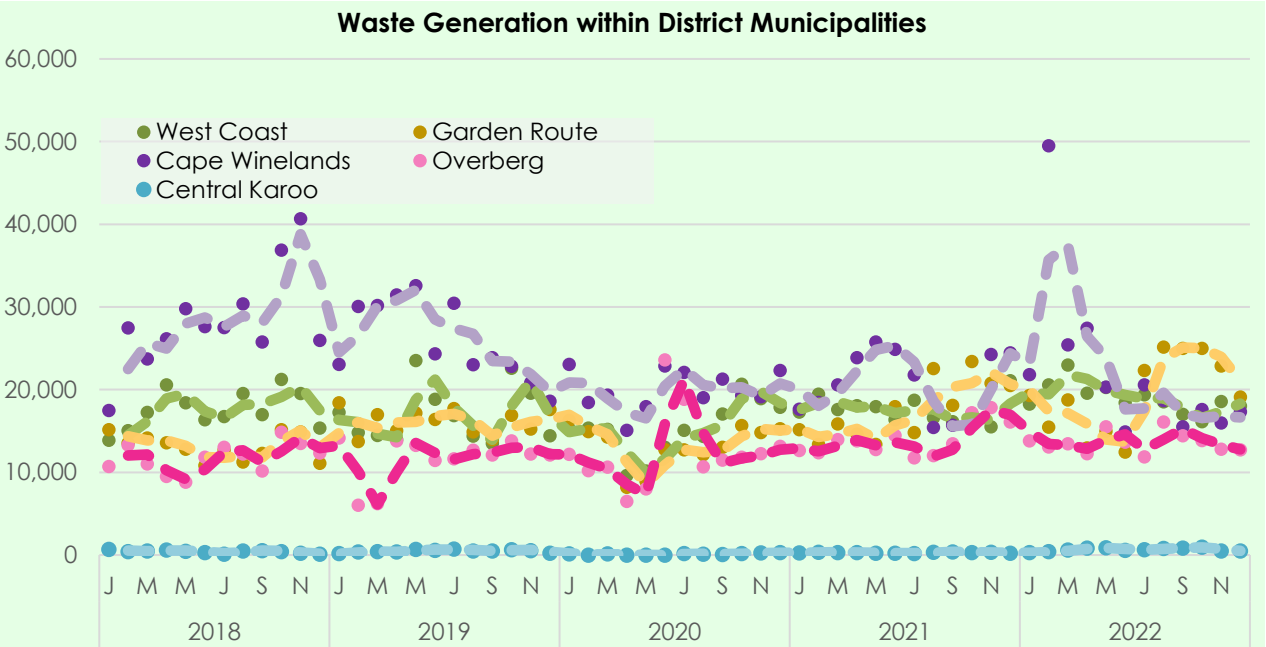

Figure 1 Waste generation in District Municipalities (2018-2022)

The focus on landfill diversion, and specifically waste beneficiation, has accelerated over the last couple of years, and has been evident at all ends, from government through to business, industry, and the general public. Disposal to landfill is a competing activity to waste beneficiation and continues to be the prominent waste disposal option in South Africa. The estimated waste generated within the Western Cape was 3.11 million T in 2021 and is now 3.31 million T in 2022. Figure 1 and 2 shows the waste generated in the 5 districts and the CoCT in the Western Cape.

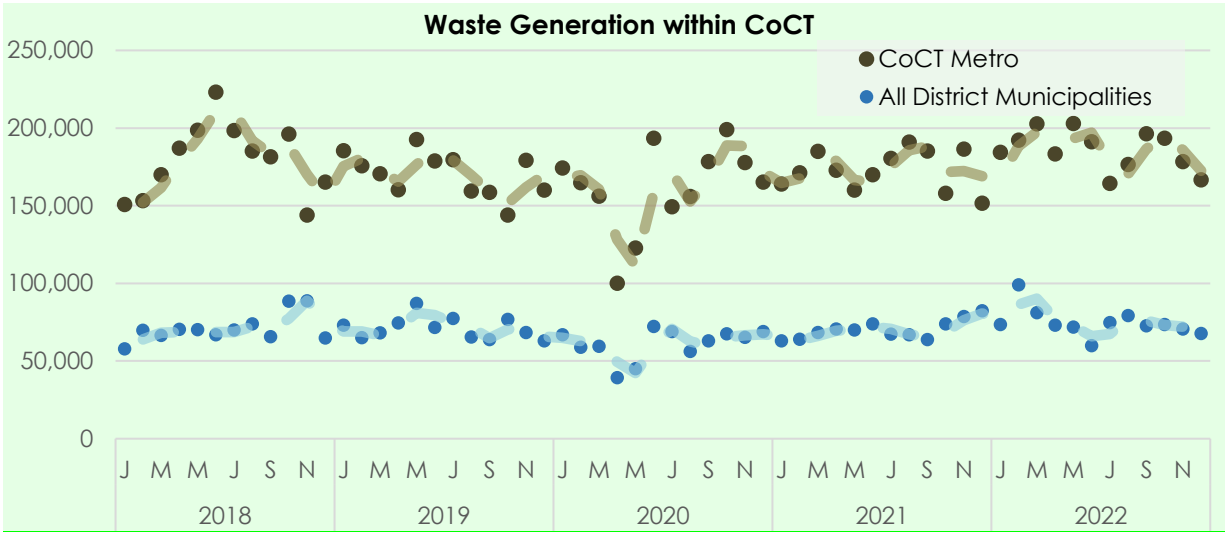

Figure 2 Waste generated within the City of Cape Town (2018-2022)

Figure 3 Total general and hazardous waste generation (2018-2022) - compared to 2018 quantities shows that general waste accounts for approximately 90% of the waste that is generated (disposal + diversion) within the province, as compared to hazardous waste. The total amount of waste generated in the province has decreased by 14% since 2020 and can be attributed to the changes in the economy and the impact of the COVID-19 but since then, the waste generated has started to increase back to similar levels compared to 2018. It is also evident that the amount of hazardous waste has decreased since 2018 accounting for 11% in 2018 to only 5% of total waste generated in 2022, which can be attributed to the liquid waste ban at landfills in the province, forcing hazardous waste generators to find alternative solutions to treat or beneficiate liquid waste types prior to

disposal.

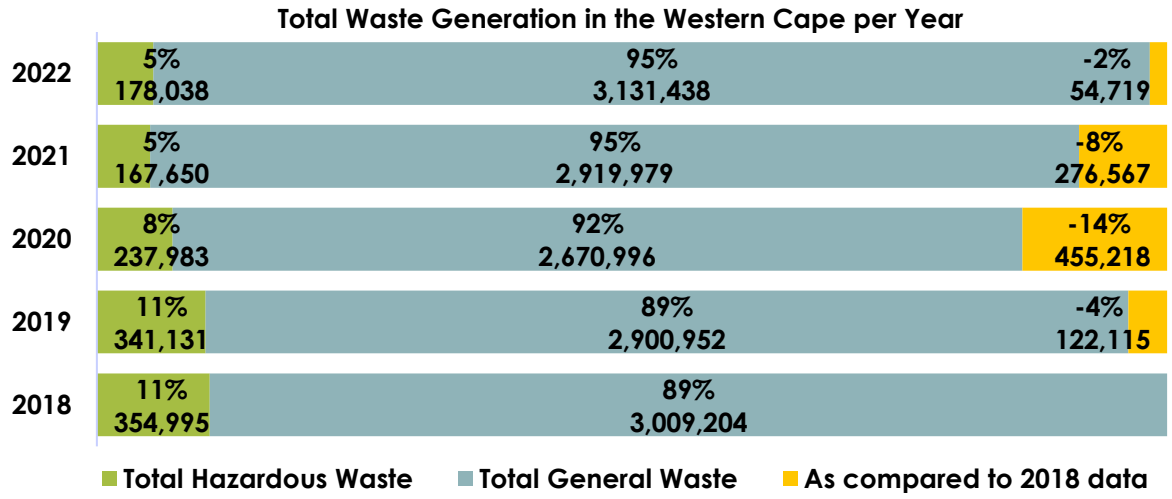

Figure 3 Total general and hazardous waste generation (2018-2022) - compared to 2018 quantities

In Table 1 Hazardous waste types generated by the Western Cape (2018-2022), the hazardous waste generation in the Western Cape is mainly due to three (3) main waste types namely, inorganic, other organic waste (without halogens or sulphur) and sewage sludge waste. The amount of inorganic waste has decreased by 83% from 2018, other organic waste (without halogens or sulphur) by 76% and sewage sludge has increased by 76%.

Table 1 Hazardous waste types generated by the Western Cape (2018-2022)

Hazardous waste types	2018	2019	2020	2021	2022
Inorganic waste	117 267	111 751	25 541	16 724	20 417
Asbestos containing waste	8 163	9 161	11 432	8 399	14 536
Waste oils	35 755	37 556	25 068	17 667	7 768
Organic solvents without halogens and sulphur	91	472	795	1 195	668
Other organic waste without halogens or sulphur	119 981	117 609	111 756	47 283	28 332
Tarry and bituminous waste	919	1 412	1 473	2 352	2 555
Mineral waste	5 097	171	376	441	235
Sewage sludge	47 541	48 788	45 806	60 778	83 829
Miscellaneous	19 886	13 831	14 888	11 885	9 536
Brine	-	36	-	280	9 577
* Combined	296	344	847	645	584
Total	354 995	341 131	237 983	167 650	178 038

Note: ** The Combined waste type is the addition of all the waste types that each have a combined value less than 500T over 2018-2022.*

Table 2 Western Cape waste data (2018-2022)

	2018	2019	2020	2021	2022	Rate Change 2018 to 2021
[2]**Disposal**	2 136 969	2 194 856	2 074 427	2 150 015	2 230 174	4%
[3]**Diversion**	872 236	706 096	596 569	769 965	901 264	3%
[4]**Generation**	3 009 205	2 900 952	2 670 996	2 919 980	3 131 439	4%

Table 2 shows that within the general waste stream, the Western Cape Province had an increase in disposal of 4% from 2018 to 2022. The table also shows that waste recovery and recycling have increased by 3%, an improvement since 2018. The Western Cape had an overall diversion rate of 29% in 2022.

3.2 Waste characterisation

Waste is characterised in accordance with the National Environmental Management: Waste Act 59 of 2008 (NEM:WA) waste definition as:

- "*General waste: means waste that does not pose an immediate hazard or threat to human health or the environment, and includes domestic, business, building and demolition waste and inert waste*"; and
- "*Hazardous waste: which includes any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical and toxicological characteristics of that waste, have a detrimental impact on health and the environment*", which includes amongst others, sewage sludge and health care risk waste (HCRW i.e. medical waste)".

3.2.1.1 General waste

General waste is captured in Figure 4 under five main categories, namely:

- **Municipal waste:** Waste from households including e.g., organic waste (food waste and garden waste), plastics, paper, metals, construction and demolition (C&D) waste, household hazardous waste, sanitary waste.
- **Commercial and industrial waste:** General waste from commerce and industry.
- **Organics:** Mostly refers to garden/green waste collected from split-bag systems or dropped off at municipal waste drop-off facilities.
- **Construction and demolition waste:** Waste from construction and demolition processes that has been dropped off at a municipal waste drop-off facility and collected during clean-up operations of illegally dumped waste.
- **Other:** Other general waste that does not fit in the aforementioned categories.

[2] Disposal of waste is reported to the IPWIS.

[3] Diversion of waste is reported to IPWIS via the treatment, recycling and recovery of waste.

[4] Generation is the sum of waste disposal and waste diversion.

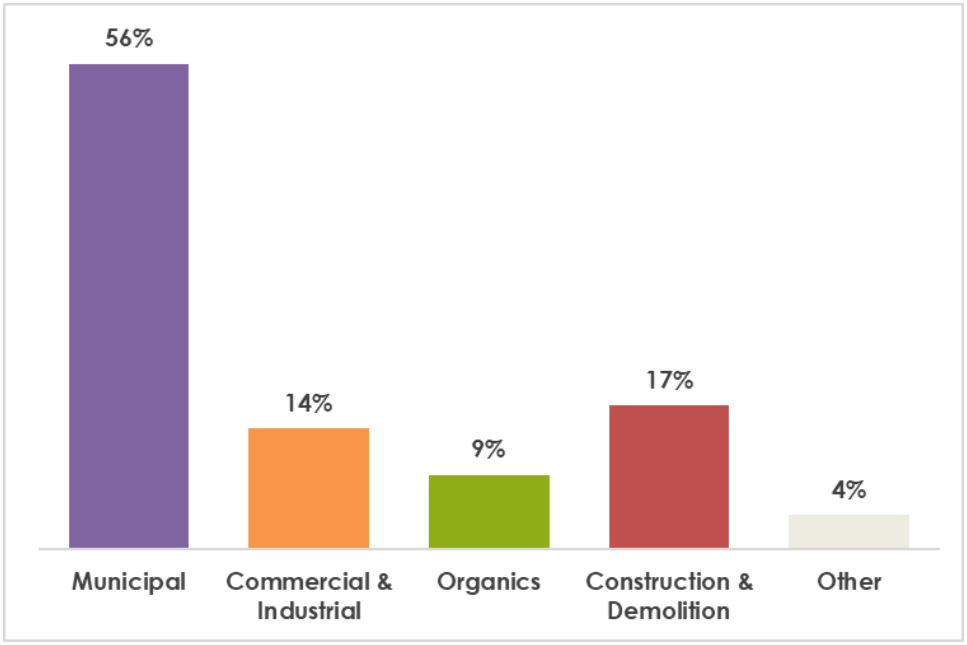

Figure 4 Composition of general waste generated (2018-2022)

As per Figure 4, municipal waste makes up the largest percentage of general waste generated in the province. To obtain an understanding of the composition of municipal waste, various waste characterisation studies have been undertaken within municipalities. The results of several waste characterisation studies undertaken between 2012 and 2021 are indicated in Figure 5.

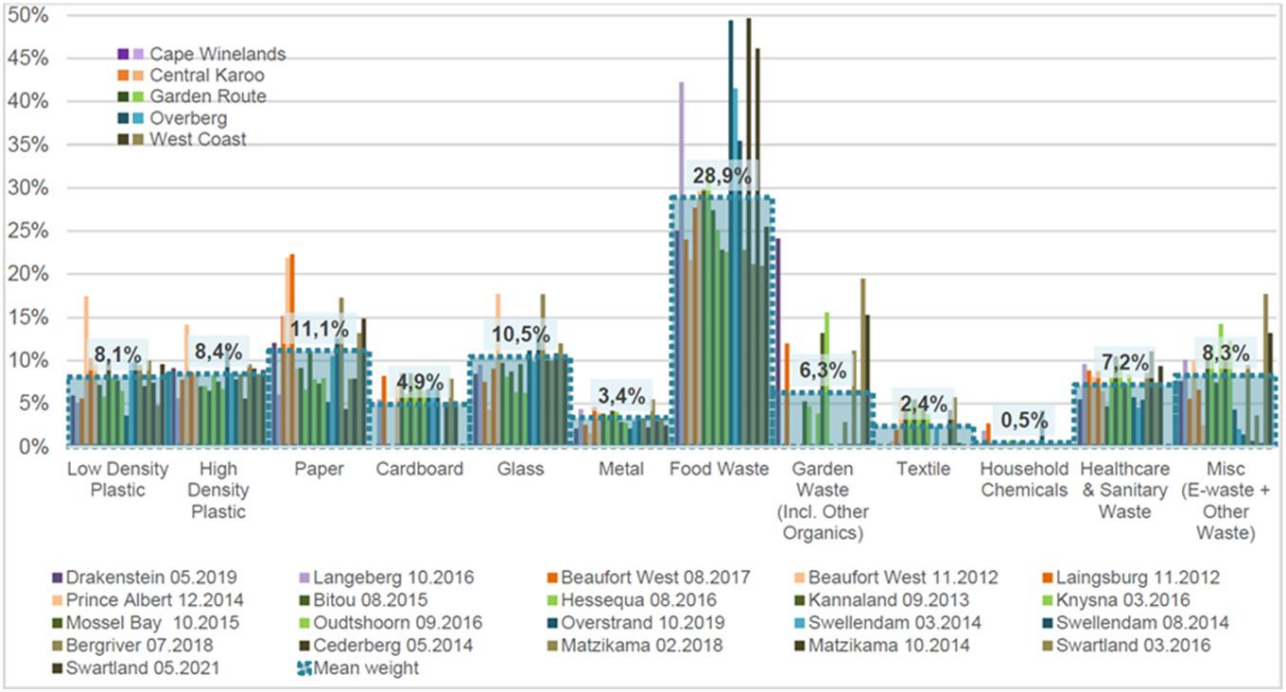

Figure 5 Composition of municipal waste in the Western Cape

(Source: Anders & Coetzee, 2022)

3.2.1.2 Hazardous waste

Three hazardous Waste Management Facilities (WMF) are used for hazardous waste disposal in the Western Cape Province, including two hazardous WDFs located at Vissershok in CoCT, one operated by Enviroserv-Averda (previously Wasteman) (referred to as the Vissershok WDF) and the second operated by CoCT (referred to as the CCT Vissershok WDF), as well as a facility at

PetroSA in GRDM (DEA&DP, 2017).

Figure 6 Hazardous waste disposed at WDFs in the Western Cape (2018-2022) shows that the private hazardous waste facilities dispose on average 97% of all hazardous waste over the 5 years as compared to CoCT Vissershok WDF. The Vissershok CoCT WDF continues to have the highest metro landfill gate fee in South Africa, which is expected to rise above inflation in the coming years.

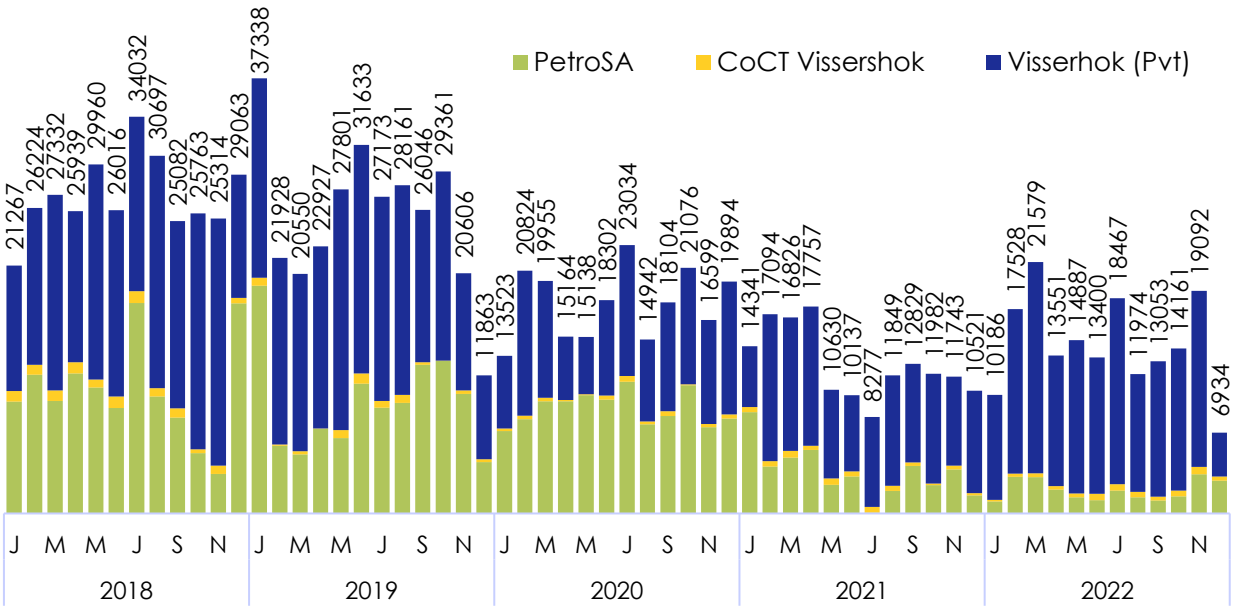

Figure 6 Hazardous waste disposed at WDFs in the Western Cape (2018-2022)

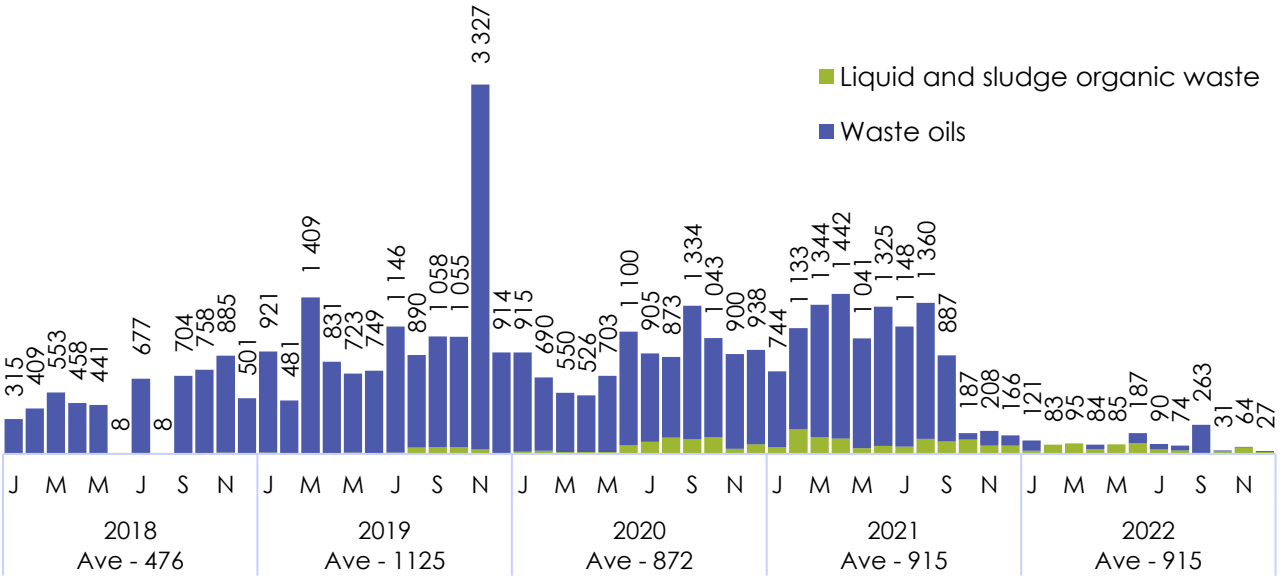

Figure 7 Waste diverted from hazardous WDFs (2018-2022)

Hazardous waste diversion within the Western Cape is primarily constituted of waste oils diverted by two (2) entities, namely entities FFS Refiners and No 44 Fuel Brand. The amount of waste oils diverted increased between 2018 and 2019 but has decreased since 2021. This decrease is likely due to the pandemic affecting business and industry operations. The diversion of waste oils has fallen very sharply in Oct 2021 to levels that are on average 90% reduced. This is largely because FFS Refiners stopped recycling oil in April 2021 and was due for decommissioning in June 2022.

3.2.1.3 *Sewage sludge*

Sewage sludge has been identified as a hazardous waste type of concern. The significant increase in the amount of sludge generated during 2021 (**Table 1**) is likely due to a contract issue that was being resolved by the CoCT and its service provider. The sewage sludge was stockpiled for some months and once the contract was resolved the material was taken to the privately owned Vissershok WDF. The Department drafted a Sewage Sludge Status Quo Report (2020/21) which indicated that a large percentage of sewage sludge is still being disposed at landfill. With limited landfill airspace in the Province, municipalities are encouraged to consider diversion and beneficiation options. The Department also has recently drafted a guideline focused on the beneficiation of sewage sludge and hosted a workshop with municipalities and other stakeholders to discuss beneficiation options for sewage sludge.

3.2.1.4 *Organic waste diversion*

The figure below displays the organic waste diversion percentage per district from the 2018 base year considering the 35% assumption referred to previously in this report. The assumption that 35% of municipal waste has an organic nature and compares that against the Departmental diversion target for 2022.

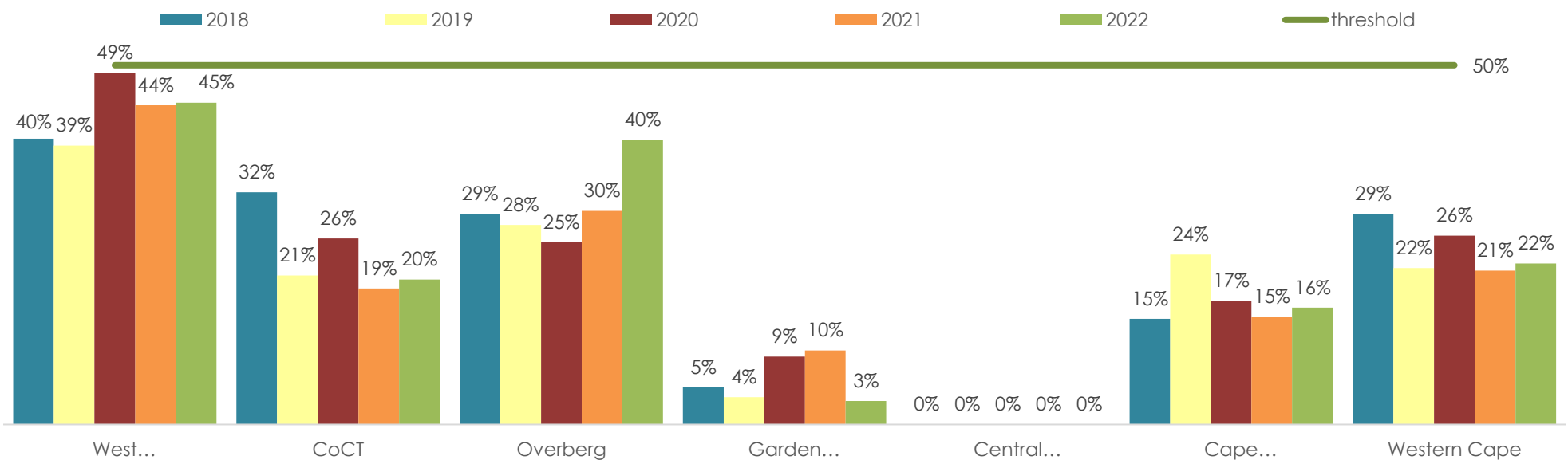

Figure 8 Organic waste diversion baseline for the Western Cape

Note: *The graph takes at the base year of 2018 and takes into consideration the 35% assumption referred to in this report.*

The Western Cape organic waste diversion rate for 2022 is 22%. The trends show that the West Coast district had an increase in organic waste diverted from landfill in 2018 to 2022 by 5%. Within the CoCT, the amount of organic waste being diverted has decreased over the period from 32% in 2018 down to 20% in 2022. The Overberg District has an increase in organic waste diversion rate from 29% in 2018 to 40% in 2022. The organic waste diversion in the Garden Route district, although low, has improved from 5% in 2018 to 10% in 2021 but fell again in 2022 to 4%. The Cape Winelands District has been steady in diverting organic waste hovering slightly around 16% mark.

3.3 Waste management facilities

There are 160 general WDFs in the Western Cape, 3 hazardous WDFs and very few accredited hazardous waste laboratories. The number of WDFs decreased between 2019 and 2022, largely due to surrender of WMLs (removal of waste bodies) and sanitizing existing databases for operational waste facilities within the Western Cape. Other WMFs include material recovery facilities (MRF), refuse transfer stations (RTS), drop off and composting facilities. Since 2017 to date, 306 facilities registered for the various National Norms and Standards, which mainly includes facilities for storage, sorting, shredding, grinding, crushing, screening or bailing and composting of general waste.

3.3.1.1 Conditions of waste management facilities

The table below shows district municipal regions that were covered by the Departmental audits done during the reporting period. Most of the audits were done in the Garden Route District as it holds the most waste facilities in the Western Province, with an average compliance score of 49%. This is followed by the West Coast District amounting to about 55%, the Overberg District, amounting to about 48%, Cape Winelands District, amounting to about 78% and Central Karoo with an average compliance of 38%. It should be noted that this is not weighed according to volume of waste (which is perhaps a more ideal way of presenting progress).

Table 3 Waste facilities audited (2019-2022)

DISTRICT MUNICIPALITY	AUDITS	AVERAGE COMPLIANCE
Cape Winelands	12	78%
Central Karoo	8	38%
Garden Route	36	49%
Overberg	15	48%
West Coast	24	55%
AVERAGE COMPLIANCE LEVEL		**52%**

Table 4 Compliance Rating Criteria

	STATUS INDICATOR	REQUIRED ACTION
84.5% ≤ X ≤ 100%	**Compliant**	Minor Improvements
64.5% ≤ X < 84.5%	**Partially Compliant**	Improvements
0% ≤ X < 64.5%	**Non-Compliant**	Major Improvements

The Compliance Rating Criteria table above is the Departmental audit ratings based on the scores received when audits are conducted. The key challenges experienced at the WMFs are lack of cover material, windblown litter, fencing and maintenance thereof, storm water management, groundwater monitoring, limited machinery, organic waste diversion from landfill and a lack of suitably qualified staff amongst others. The burning of waste by municipalities have hugely decreased over the years and reported cases are mostly fires that is started by illegal waste pickers at the facilities, which is usually swiftly dealt with municipalities.

3.3.1.2 Municipal Landfill Airspace

Most waste management facilities in the Western Cape are experiencing landfill airspace pressures to accommodate disposal of waste. Municipalities are mandated to ensure the availability of disposal facilities such as landfills. They can support alternative waste treatment by means of providing material recovery and aggregation. These facilities can be managed by the municipality or contracted to the private sector.

Many landfills in the Western Cape were historically established, without containment barrier liners. As these containment barrier liners are composite materials, they have to be designed with utmost care and various engineering related consideration. Such landfills also require public participation processes during an Environmental Impact Assessment. The administration that is required to procure the construction and installation of containment barrier liners is comprehensive. The Department has found that the lead time, from the date of the application to the date on which the landfill is ready for disposal activities, is approximately 5 to 7 years, for expansion of existing landfill. The lead time for the establishment of new landfills is even more.

The limited municipal landfill airspace availability for surrounding local municipalities outside of the City of Cape Town, as well as the City still needing to finalise its regional landfill site, is a huge concern and will most likely result in transboundary disposal of waste to the waste management facilities between municipalities. It is for this reason that waste diversion must be implemented at its fullest potential at all municipal waste management facilities to extend the existing airspace and save costs.

The Department received airspace assessment reports for 25 landfills out of the 59 operating landfills. This means that 34 such landfills are operational without monitoring their compliance with airspace limitations. Figure 9 below illustrates the relative lifespan years left for 25 WDFs within the Western Cape. Most landfills illustrated in the figure below have less than 15 years of airspace left. As landfills close, additional pressure is placed on existing landfills, thereby drastically decreasing the landfill airspace at the existing facilities. There is an increasing demand for regional landfills and alternative waste management technologies to be used to divert waste from landfills and to prolong the lifespan of the available WDFs in the Western Cape.

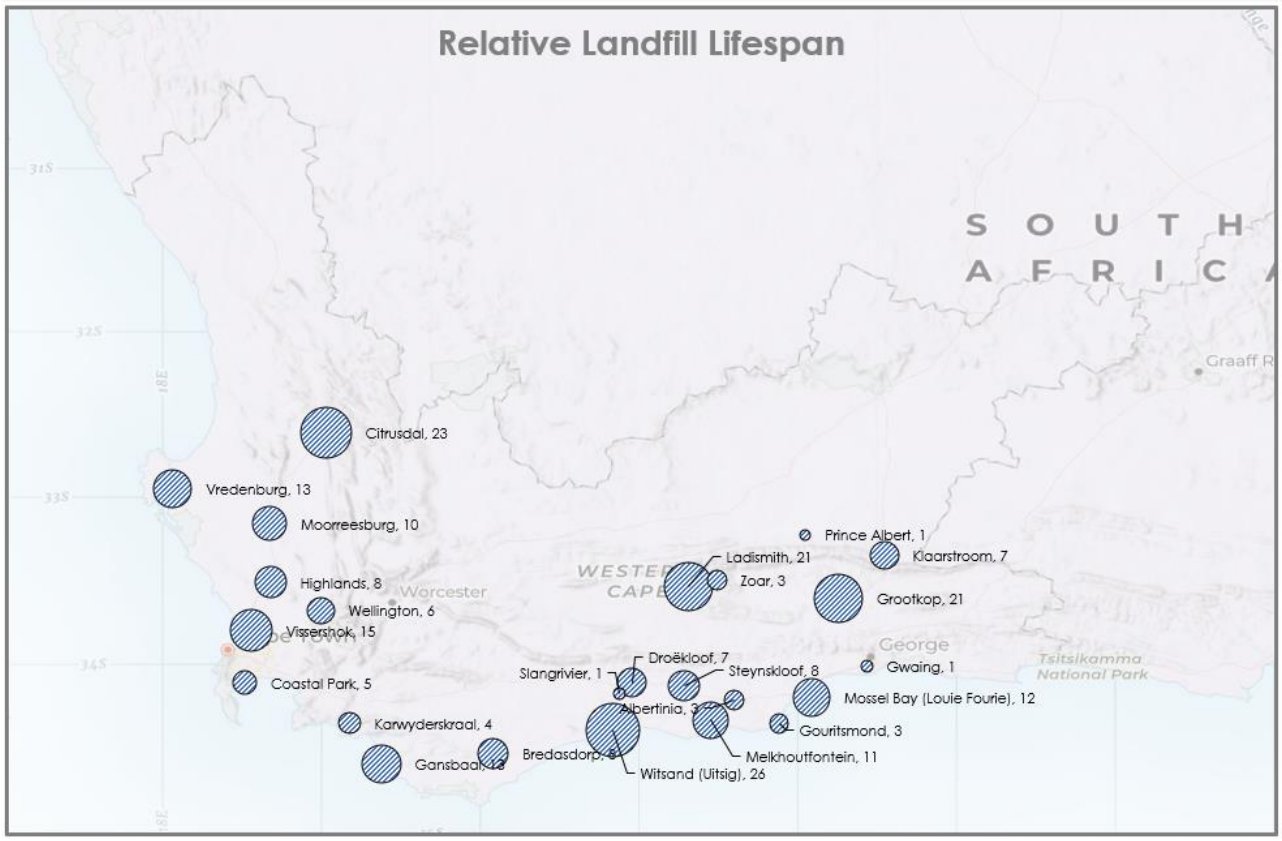

Figure 9 Relative landfill lifespan - WDFs and the number of available airspace in years (represented in bubble size)

3.3.1.3 Regionalisation of waste management services

There were eight (8) regional waste management facilities in various stages of operation within the Western Cape, but it has been reduced to seven (7) as the CoCT will restart the EIA process to establish a regional facility as lengthy, drawn out issues matters and appeals have led the City to consider a new application. The West Coast District WDF, Cape Winelands District and Garden Route District are in various phases of construction and planning. Karwyderskraal in the Overberg, Vredenburg in the Saldanha Bay Municipality and Highlands WDF in Swartland Municipality are operational. The Central Karoo are in the initial stages of feasibility planning for their regional waste management services.

Once these regional landfills are established, it will reduce the pressure on the existing infrastructure to improve solid waste management. Other initiatives are also required to reduce the load on the existing waste management facilities, and emphasis is placed on the importance of diverting waste. Municipalities are generally responsible for the management of solid waste services, however, much of this have been outsourced to the private sector and informally through waste picking. Due to lower economic growth, the government cannot meet the growing infrastructure demand, Public Private Partnerships (PPPS) is thus an effective way to work together to deliver the much-needed infrastructure in the solid waste management sector. Some of the risks involved in these partnerships include the low capacity of contracted companies and the available budget for maintaining the partnerships.

Figure 10 Landfill planning and operation

3.4 Waste collection services

Municipalities in the province provide a weekly waste collection service to communities. In the case of informal areas, residents take their waste to communal skips, which are then emptied by the Municipality. Service levels vary between municipalities as seen in Table 5.

Due to the high levels of unemployment and poverty within municipal areas, many households and citizens are unable to access or pay for basic services; this grouping is referred to as "indigent". Municipalities are required to develop, adopt and implement indigent policies to ensure that the indigent can have access to the services included in the Free Basic Service (FBS) programme. They must develop an indigent policy, to list its implementation plan, its criteria for indigent assessment, its approach to indigent management, as well as the methods it will employ to engage communities about FBS. A register must be kept of all residents deemed as indigent and municipalities are also responsible for drawing on the support of appropriate implementation providers. It is the Municipality's responsibility to monitor and track the effective implementation of FBS as per Schedule 4b: South Africa Constitution Act No. 108 of 1996 (DPLG, 2005).

Table 5 Refuse removal levels per municipality

MUNICIPALITY	BASIC REFUSE REMOVAL % (2018/2019 ANNUAL REPORTS AND LATEST IWMPS)	BASIC REFUSE REMOVAL % (2019/2020 ANNUAL REPORTS AND LATEST IDPs)	BASIC REFUSE REMOVAL % (2020/2021 ANNUAL REPORTS AND LATEST IDPs)
Beaufort West	100	100	100
Bergrivier	100	100	100
Bitou	88.6	100	100
Breede Valley	100	76.6	100
Cape Agulhas	100	100	100
Cederberg	100	100	100
CoCT	99.2	100	96.5
Drakenstein	100	90.6	100
George	93.3	100	99.8
Hessequa	74.4	97	95.6
Kannaland	79.2	79.2	94
Knysna	93.1	94	93
Laingsburg	100	100	100

Langeberg	100	71.5	71.5
Matzikama	100	100	100
Mossel Bay	87.2	92.6	100
Oudtshoorn	87.4	87	100
Overstrand	100	100	100
Prince Albert	100	100	100
Saldanha Bay	96.5	100	100
Stellenbosch	100	94.1	100
Swartland	100	100	100
Swellendam	87	100	100
Theewaterskloof	100	100	100
Witzenberg	100	100	100
Western Cape	**95.4**	**95.3**	**98.0**

3.5 Costs of existing waste management systems

Most municipalities generate revenue to cover their operating expenses, with some generating a surplus and others a deficit. The rising cost of managing waste collection, transportation and disposal of waste is a huge concern (DEA&DP, 2017), with costs impacted by the following:

- Cost recovery from waste management services is poor;
- Tariffs do not reflect costs (in certain municipalities, over 80% of the municipal budget is allocated for the collection and transportation of waste);
- Non-payment of tariffs reduces potential income;
- Lack of ring-fenced funds for waste management;
- New legislative requirements (DEA, Norms and Standards for the Disposal of Waste to Land (2013)), particularly associated with the establishment and development of new waste disposal facilities, due to more costly stringent liner conditions;
- Municipalities struggle to obtain funds for licenses for closure and rehabilitation (capping budgets); and
- Difficulty in accessing donors and MIG funding (especially district municipalities).

4. IMPACTS

Poor management of waste and WMFs, has an adverse impact on the environment, manifesting as impacts such as contamination to air, land and water sources, spread of diseases, poor living conditions, and land use changes.

4.1 Land use

Waste disposal facilities are generally unwelcome spaces due to odour, traffic, noise, dust and vermin. Waste disposal facilities are bio-chemically active places where decomposition occurs to break down waste into its constituent compounds, interacting with environmental systems, often with disastrous results for natural ecosystems when not well managed. The longevity and concentration of waste also means that, despite the best preventive measures and designs, the potential impacts of landfills extend beyond closure, even well beyond 50 years (DEA&DP, 2013a).

With waste disposal facilities rapidly reaching capacity across the Western Cape, new sites are needed, limiting the availability of land for other land uses, such as housing or industry. The loss of land extends beyond the footprint of a waste disposal facility to the offsite land compromised by the impacts associated with the waste disposal facility (buffer zone).

Locating new waste disposal facilities too far from waste sources escalates OPEX, while sites closer to sources (in urban areas) could infringe on quality of life: it is extremely difficult to identify suitable locations for WMFs.

4.2 Community impacts

Community health is affected by general nuisance effects such as odour and elevated levels of dust and wind-blown litter. In addition, waste accumulation can promote the spread of disease vectors with deleterious health effects associated with pollution, e.g. birth defects, cancer and respiratory illnesses (DEA&DP, 2013a).

Air, soil and water contamination may also affect community health. Poorly managed landfills emit dust and hazardous compounds (e.g. methane (CH_4), carbon dioxide (CO_2) and aldehydes) and, similarly, poorly managed leachate can contaminate surface water, groundwater and land (soil) resources.

In many developing countries, informal waste pickers at collection points and disposal sites recover a significant proportion of waste and, in South Africa, poor access control allowed this informal sector to flourish. An estimated 80-90% (by weight) of paper and packaging is recovered by informal waste pickers in South Africa (CSIR, 2016). Informal waste pickers have a high level of exposure to contaminants, food waste, and are at risk of injury.

4.3 Contamination

4.3.1.1 Landfill leachate

Leachate generation occurs near the ground surface as water percolates through the landfill, exiting usually at or near the base of the landfill. The source of water for leachate is precipitation, moisture in incoming waste as well as chemical and biological activity within the waste pile. If uncontrolled, landfill leachate can contaminate groundwater and surface water.

The main contamination risks are due to high organic concentrations and ammonia in leachate. Pathogenic microorganisms may also be present, although counts reduce rapidly with time in the landfill. Chemicals exceeding human health exposure limits may also be present.

Leachate may have acute and chronic impacts on environmental resources, affecting species directly and their habitats. Older, poorly designed WDFs and sites where permitting requirements and industry standards have not been applied, pose the greatest leachate risk.

4.3.1.2 Methane

Landfill gas is a complex mix of gases created by the action of microorganisms within a landfill, typically comprising approximately 40 to 60% CH_4, with the remainder being mostly CO_2 and trace amounts of other Volatile Organic Compounds (VOCs) (<1%).

Landfill CH_4 is produced when organic materials are decomposed by bacteria under anaerobic conditions (i.e. in the absence of oxygen). Methane production is a function of waste volume, waste composition, moisture content, landfill design and operating practices, and climate. Unless captured by a gas recovery system, CH_4 generated by the disposal facility is emitted directly through the landfill cover surface. Landfill gas contributes to the mechanisms responsible for climate change, as CH_4 is a particularly virulent greenhouse gas (refer to the Air Quality chapter for more detail).

The decomposition of organic waste occurs in an aerobic phase, which increases the concentration of carbon dioxide (CO2), which replaces the oxygen (O2) in the air, or in an anaerobic phase that increases the methane (CH4) concentration. Thus, the main components of landfill gas consist of CO2 and CH4. CH4 is a colourless, odourless asphyxiant, flammable, non-toxic gas that is lighter than air with a vapour density of 0.6. CH_4 is explosive between the concentrations of 5% - 15% by volume in air. This concentration range is referred to as the explosive range with the two extremes being referred to as the lower (LEL) and upper (UEL) explosive limits respectively. Therefore %LEL would be a percentage of 5% by volume of air. This enables one to detect low methane concentrations. However, the % LEL CH_4 can, in most cases, not be plotted together with % O2 by volume air, as the CH_4 may be at least two orders of magnitude lower than the O2. Likewise, CO2 is measured in parts per million (ppm) as the natural concentration of CO2 in the atmosphere is only 400ppm which is 0.04% by volume in air.

The Department has taken upon itself to do early warning landfill gas monitoring at most of the operating WDFs, where it conducts Departmental audits, as the municipalities is not by the financial and technical means to carry out this mandated Waste Management Licence condition. This is done to detect high levels of CH_4, which carries an explosive or fire risk, and if detected, this is then communicated to the Licence Holder, who must implement immediate

mitigation measures. Most landfills that have been monitored during this reporting period have not produced elevated levels of CH_4, and this can either be due to the natural release of gas through various pathways, dry climate or small amounts of organic waste being disposed.

4.3.1.3 Illegal dumping and littering

Illegal dumping is widespread throughout all municipalities within the Western Cape. Though the volumes of waste from illegal dumping have yet to be fully quantified over the Province, the overall budget required for clean-up operations is immense. Municipalities spend millions of rands annually cleaning up waste dumped illegally.

The majority of waste dumped illegally in the Western Cape Province consists of Construction & Demolition (C&D) waste (builder's rubble), absorbent healthcare products (e.g. sanitary towels) and general domestic waste. In windy conditions, illegally dumped plastic and paper waste often ends up across large tracts of land, in rivers, on fences and in the ocean.

The reality is that an area that is cleaned only remains clean for a few days before waste starts to accumulate again, because the root cause of the problem is not being addressed.

In an attempt to address the root causes, many municipalities roll out pilot projects and conduct awareness campaigns on illegal dumping to encourage community buy-in and heighten knowledge of waste management within their communities.

The DEA&DP hosted a workshop on 3 November 2020 with municipal Waste Managers and other stakeholders to ascertain the root causes of illegal dumping and identify solutions, based on municipal best practice. As a result of the discussions at the workshop and inspections/discussions at municipalities, the draft Strategy to Reduce Illegal Dumping (STRID) was developed by DEA&DP to provide municipalities, the private sector, the public and other role players with impartial, factual information about illegal dumping challenges and participate in developing, sharing and testing solutions in the Western Cape Province.

The draft STRID research revealed that Illegal dumping hotspots are often located in informal settlements, as well as in high-density residential areas, or open areas surrounding these communities. It was also reported by municipalities that hotspots are often located along the roads leading up to Waste Disposal Facilities. This trend of illegal dumping mainly occurs outside the operating hours of the WDFs and is frequently conducted to avoid paying disposal costs or to dispose of non-permissible waste.

Some of root causes for illegal dumping included:

•People, businesses included, are unwilling or unable to pay a disposal fee when required.
•Insufficient waste receptacles and the misuse of wheelie bins can lead to waste being illegally dumped.

•Informal traders / hawkers often generate large volumes of waste materials, with nowhere to dispose of it legally.

•At times, inaccessibility of the waste bins for purposes of disposal may lead to illegal dumping.
•Small scale builders with bakkies often have waste that needs to be disposed, and if drop-off sites are closed by the time the last load of the day still needs to be disposed of, and with a need to pick up materials at the start of the next day, the load of waste may be illegally dumped instead.

The draft STRID has further highlighted that theft of wheelie bins, protest action, transportation challenges, and unwillingness or inability to drive to dispose of waste, all contribute to waste dumped illegally.

The draft STRID identified solutions to illegal dumping, amongst others:

- identify hotspots and plan accordingly,
- use the EPWP for clean-ups,
- use monitoring and control tools to identify hotspots,
- make use of mini drop-offs, mini skips and skips,
- individualise collection methods for different areas of the municipality,
- involve the community in clean up initiatives.

Illegal dumping in the Western Cape is not an isolated problem that can be solved with one solution. It will require a multi-pronged approach to decrease illegal dumping.

The recommendations from the draft STRID, gained from municipalities and academic research, highlights the need for community engagement and buy-in to incorporate solutions that empower a community to take ownership of their surroundings.

Through the identification of illegal dumping hotspots, the graphical representation thereof and subsequent community engagement, a municipality can establish the root causes of illegal dumping within areas of their municipality.

Dependent on waste types and waste generators, as well as the circumstances that drive the continuous illegal dumping within an area, unique approaches should be identified. Implementation of the multi-pronged approach should then be piloted on a scale that is affordable to the municipality and thereafter, with the successes and challenges now highlighted, a wider approach could be funded.

The current initiatives to reduce illegal dumping across the Western Cape have paved the way for municipalities with similar social settings to implement their own interventions through the involvement of their communities, academia and implementation of by-laws via their law enforcement units.

5. RESPONSES

Without proper waste management, towns and cities would battle to gain public and investor confidence in establishing a thriving economy. In this regard, sustainable development necessitates the functioning of urban cities to protect urban communities and the environment. Therefore, waste management, as discussed in earlier sections, should be seen in the context of sustainable development.

Municipalities in the Western Cape are constrained, *inter alia,* by limited resources (financial and human), ineffective use of equipment and personnel, illegal dumping, dwindling landfill airspace and the rising costs of integrated waste management infrastructure. Although some municipalities are addressing these problems, major service delivery improvements are required to provide sustainable waste management services as contemplated by the National Environmental Management: Waste Act 59 of 2008 (NEM:WA).

5.1 5.1 Extended Producer Responsibility (EPR)

Extended Producer Responsibility (EPR) is a product stewardship type policy approach under which producers are given significant responsibility for its product across that product's life cycle. Following the initial postponement of the implementation of the EPR Regulations for the Electrical

and Electronic Equipment (EEE), Lighting and Paper and Packaging sectors and the subsequent amendment of the Regulation and Notices by DFFE, Producer Responsibility Organisations (PROs) were required to register with the DFFE before 5 November 2021.

PROs are non-profit companies that have been established either by producers or any person to support the implementation of a relevant EPR scheme. These PROs ensure that waste materials are diverted from landfill (supply) and to ensure end market development (demand). In the past, producers in specific sectors were not mandated to practice EPR. However, as of November 2021, producers within the paper, packaging and some single-use products, the lighting, and the electrical and electronics sector must register and adhere to the requirements of an EPR scheme (GreenCape, 2022). Based on discussion with DFFE, PROs did not receive concurrence timeously hence the implementation of the EPR schemes were delayed by six months. In July 2022, all PROs that submitted the EPR fee before 5 November 2021 were granted with concurrence for EPR scheme implementation. PROs and their members must determine the EPR fee and apply the fee proportionally to all members based on the identified products placed on the market, to DFFE and this fee must be publicly available on the PRO website. EPR and its implementation is new to the country and many challenges have been highlighted by DFFE. For example, some PROs and producers never submitted their EPR fees, some EPR schemes refusing to pay the EPR levy, and the concept of "free riders" which are entities that are legally required to comply with the regulations but have not registered. DFFE are aware of the challenges and are working with the relevant stakeholders to address them.

5.2 Waste Management

The DEA&DP Western Cape IWMP (2023-2027) incorporates a waste management implementation plan, with an overarching vision of "A *resource-efficient, inclusive and thriving society that ensures a clean environment*." Four overarching goals and objectives, based on a set of six priority needs, were developed in order to achieve this vision:

- Goal 1: Strengthened education, capacity and awareness and advocacy towards integrated waste management;
- Goal 2: Improved integrated waste management planning and implementation for efficient waste services, technologies and infrastructure;
- Goal 3: Effective and efficient utilisation of resources; and
- Goal 4: Improved compliance with the environmental regulatory framework.

5.2.1.1 Waste Minimisation

The National Waste Management Strategy, 2020 (NWMS) highlights waste minimisation as a key strategic pillar (Pillar 1), with focus being placed on minimising the impact of waste and especially plastic packaging on our coasts, coastal waters, rivers, wetlands and human settlement environments, by amongst others, diverting waste away from landfill; increasing re-use, recycling, recovery and alternative waste treatment; and maximising the role of the waste sector in the circular economy. The circular economy is an approach to minimising the environmental impact of economic activity by reusing and recycling processed materials to reduce:

(a) the need to extract raw materials from the environment;

(b) the need to dispose of waste, and

(c) keeping materials in the system for as long as possible.

COVID-19 had a detrimental effect on the waste economy especially during the hard lockdown periods. In many instances recycling was halted, and this created havoc in the market with many

SMMEs and waste pickers having their livelihoods disrupted. While the lifting of the restrictions has improved the waste economy, the levels of recovery has not been the same as before the pandemic. The drive to divert as much recyclable waste as possible from landfill sites in the Western Cape is ongoing. The South African Plastics Pact was launched in January 2020, and was the 5th pact internationally to be established, and the first on the African continent. High impactful initiatives like the Plastic Pact and food prevention voluntary agreements are being driven by the private sector, while catalytic legislation like the Extended Producer Responsibility (EPR) regulations and the submission of Industry waste diversion plans for the recovery of recyclable packaging, lighting and electrical goods, and further extended to portable batteries, pesticides and lubricant oils will create the necessary enabling environment to increase waste diversion.

Municipalities are also more capacitated to implement waste diversion initiatives through the various knowledge sharing and capacity building opportunities created by provincial and national departments. Markets and the demand for recyclable material still play a critical role in the success of diversion efforts. Legislation that ensures percentages of recyclate and the growth of the secondary materials economy will certainly play a positive role.

The Department continues to drive and support initiatives that divert organic waste from landfill to the set target of 50% by 2022 and 100% diversion by 2027. The cost of waste diversion remains a challenge for municipalities and only a few have extensive separation at source programmes in place across all communities while others are still conducting pilot projects. The systems for waste recovery vary across municipalities. Some implement a two or three bag separation at source system, while others allow access to comingled waste at transfer stations or at material recovery facilities.

The figure below indicates the number of waste minimisation initiatives implemented per local municipality in the Western Cape and indicates the separation at source initiatives implemented per municipality. It is important to read these initiatives in conjunction with waste diversion information as recorded on the IPWIS as provided in the table below. The effectiveness or the scale of implementation of initiatives can be determined through this comparison. The accuracy of information reported by municipalities is an ongoing challenge.

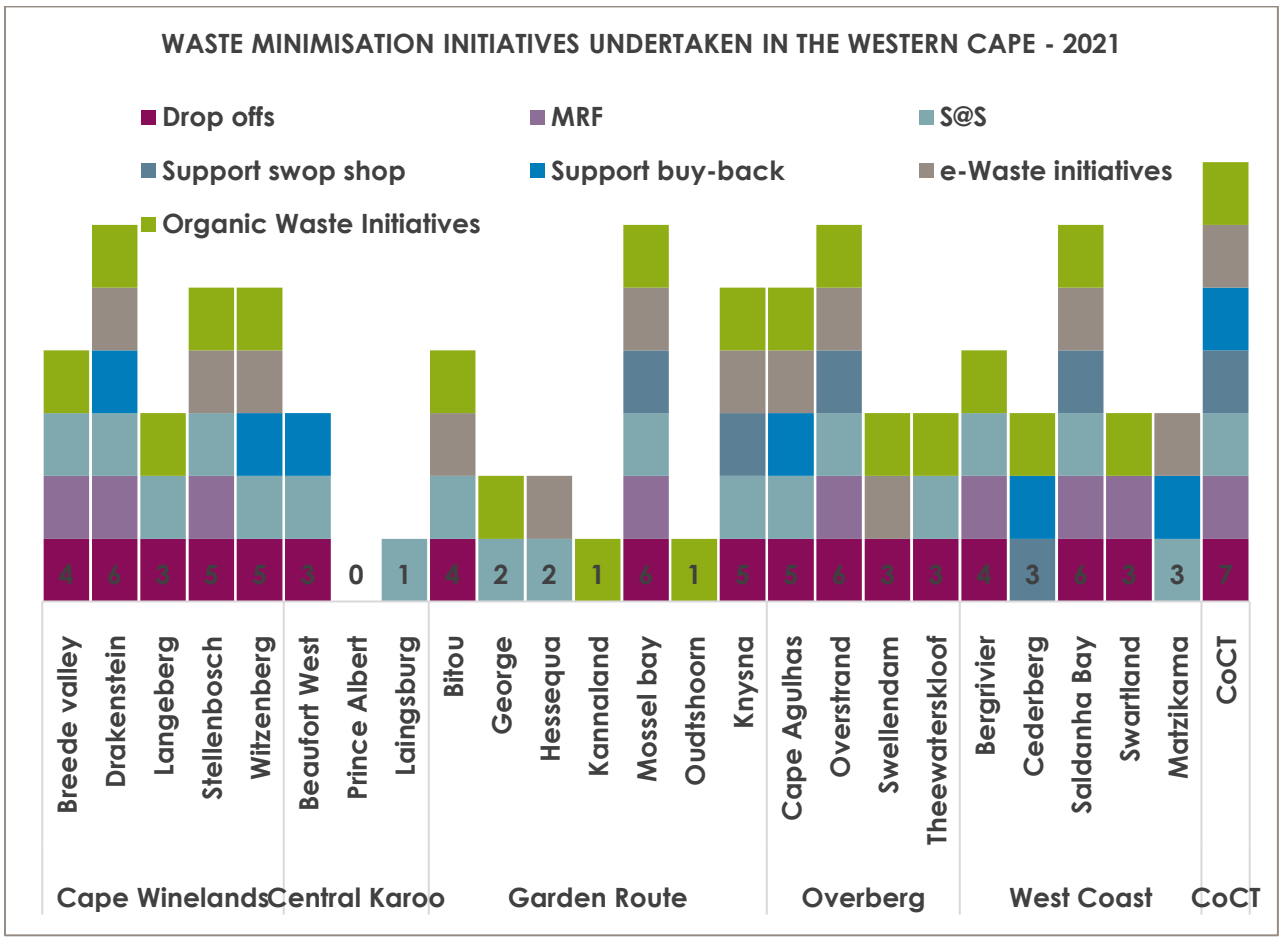

Figure 11 Waste minimisation initiatives undertaken by municipalities (per district, 2021)

Municipalities play an important role in encouraging recycling initiatives within a municipal area and when implemented successfully can create many opportunities for employment in the area as well as contribute to the diversion of waste from landfill. Table 6 shows the diversion rate per local municipality, where since 2021, the CoCT, Overberg and Cape Winelands district municipalities increased their waste diversion efforts.

Table 6 Western Cape waste diversion and rate per District Municipality (2018-2022)

District & Year	Diversion (T)					Diversion Rate				
	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
West Coast	89213	78354	65709	68989	75253	42%	38%	36%	33%	33%
CoCT	647419	466650	422943	551856	665560	30%	23%	22%	27%	30%
Overberg	50458	48939	39147	64795	68770	36%	35%	26%	38%	42%
Garden Route	10464	15448	20029	39920	37123	7%	8%	13%	19%	16%
Central Karoo	100	56	0	0	0	2%	1%	0%	0%	0%
Cape Winelands	74582	96648	48741	44405	54559	22%	31%	20%	18%	21%

Western Cape	872236	706096	596569	769965	**901264**	29%	24%	22%	26%	**29%**

The Department therefore continues to strengthen capacity through the IPWIS training and waste data verifications conducted at identified facilities. The implementation of separation at source or any other waste diversion system relies on waste awareness, and some have demonstrated creativity in this regard.

The implementation of the Extended Producer Responsibility (EPR)regulations for the packaging and lighting sector which came into effect on 5 May 2021 is having a positive impact on recycling enterprises and the integration of informal waste picker into waste recovery systems. EPR schemes have set targets to attain and are willing to partner with municipalities to ensure that recovery of recyclables from the waste stream is maximized. This can have great benefits for struggling municipalities when they integrate SMME's and waste pickers into their waste diversion system. Industry has expressed willingness to invest in the required infrastructure if access to the waste material and land is made available to these collectors.

Waste awareness on the value of waste as a resource well as the negative impacts of mismanaged waste on health and the environment is an ongoing focus area for the department. Waste minimisation training and co-design workshops were hosted with various stakeholders over the period of review.

The focus of DEA&DP's waste minimisation initiatives has been primarily twofold, to meet the objectives of the DEA&DP IWMP Goals 1 and 3, including:

- A separation at source guideline for municipalities to assist them with implementation of the S@S programmes.
- A waste awareness guideline for municipalities.
- A waste management services procurement guideline to assist them with integrating SMME's and waste pickers into their waste diversion system.

– Waste minimisation workshops to equip municipal workers to implement waste minimisation initiatives within municipalities.
– Co-designing solutions with informal settlement communities to minimise the impacts of waste on health and the environment.
– Various online knowledge sharing, and capacity building sessions were hosted with various stakeholders on the diversion of waste to landfill.

5.2.1.2 Tyres

On 30 October 2017 Barbara Dallas Creecy, Minister of Forestry, Fisheries and the Environment, gazetted Notice 1148, calling members of the public to submit Tyres Waste Management Plans.

On 11 September 2019 in Government Notice 1151, the Minister informed members of the public of the completion of her consideration of the Industry Waste Tyre Management Plans, which were submitted to her for approval. Upon consideration the Minister found none of them acceptable for approval and subsequently closed the process. On 29 November 2019, the Minister issued a Notice in terms of Section 29(1) of the National Environmental Management: Waste Act, 2008 (NEMWA) for the Council of Scientific and Industrial Research (CSIR) to develop an industry waste management plan (IndWMP) for tyres. The 1st draft of the CSIR Tyre Waste Management Plan was published for public comment in March 2020, with further drafts published in 2021. The Waste Bureau has been overseeing operations during this time.

5.2.1.3 *Health Care Risk Waste*

Health Care Risk Waste, a category of hazardous waste, is mainly collected for treatment and disposal by service providers registered on the Western Cape IPWIS. These service providers operate 2 incinerators and 1 electro thermal deactivation plant. There are +/-6000 health care risk waste generators registered on the Integrated Pollutant and Waste Information System. As per the Western Cape Health Care Risk Waste Management Regulations, 2013 and the requirements for external transport, namely regulation 5 (1)(c), a generator may not release health care risk waste to a transporter for external transport unless the generator has prior to the release of the waste obtained a copy of the tracking document from the transporter containing information as set out in Parts A, B and C on Form 1 in Annexure 3. During 2022, more emphasis has been placed on source documents being completed correctly as the Department has noticed considerable gaps in information provided on the health care risk waste tracking and collection (waste manifests) documents presented by health care risk waste generators for the data verification exercises.

5.2.1.4 *Alternative waste treatment*

Alternative waste management options, other than disposal, is becoming crucial for municipalities responsible for waste management. This is due to the very limited landfill airspace available in the Western Cape, the difficulty in establishing new landfill sites and the waste beneficiation options that exist to stimulate waste economies. The National Norms and Standards for Organic Waste Composting and Treatment of Organic Waste have eased the environmental requirements of certain alternative waste management technologies. Municipalities are however left with different options regarding which technology will fit best for their waste types and volumes based on a multitude of factors. Before embarking on a waste management option or technology, municipalities must know the volume and character of the waste being generated, by having waste characterisation studies done for the waste which the municipality is primarily responsible for. The Department has developed and is continuously developing its Alternative Waste Management Technologies and Landfill Airspace Tool which must be used by municipalities to make informed decisions about waste management.

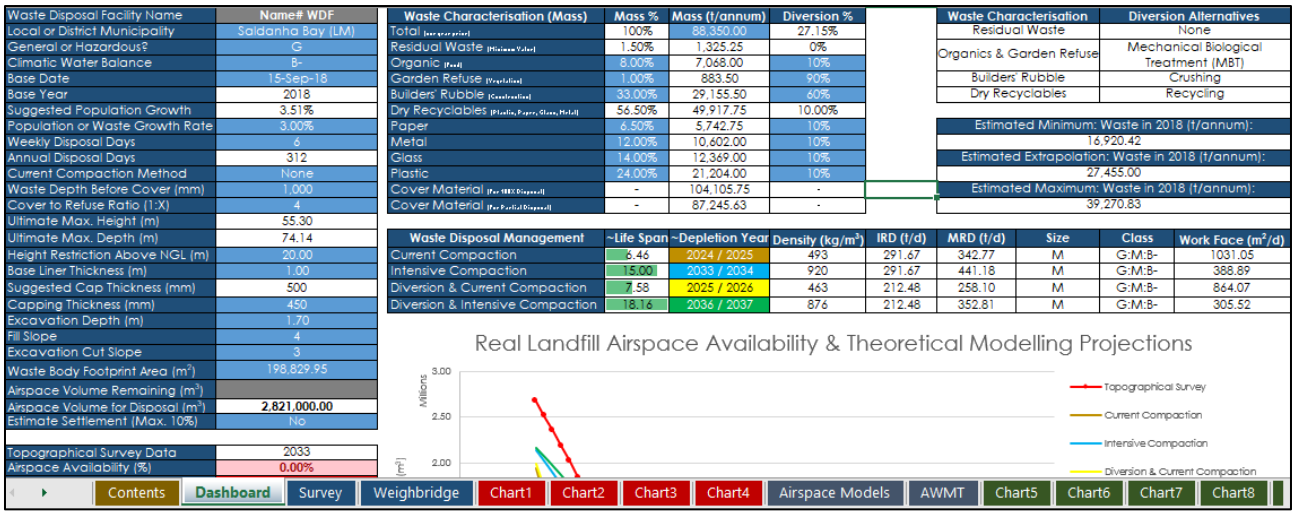

Figure 12 View of the alternative waste management technologies and landfill airspace tool

Options covered by the Alternative Waste Management Technologies and Landfill Airspace Tool include organic waste composting, anaerobic digestion, builders' rubble crushing, incineration, management of dry recyclables by means of clean and dirty materials recovery facilities, and landfilling. The separation/segregation of waste at source is quite important to ensure that the value of waste materials is not reduced due to contamination, which may require the

contaminants to be removed before such waste can easily be converted into product or raw materials. However, other technologies also exist and need to be explored by municipalities.

5.2.1.5 Western Cape Industrial Symbiosis Programme

The Western Cape Industrial Symbiosis Programme (WISP), delivered by GreenCape, supports private sector investment in building value chains that enable economic value to be derived from commercial, industrial and agricultural waste. It is a resource efficiency approach where unused or residual resources are used (by another entity), for mutual benefit, leading to a more resource efficient and lower carbon economy. Large amounts of wood, plastics, food, agricultural waste and fabric (textiles and carpeting) are currently disposed of at Waste Management Facilities (WMF), but could be readily diverted subject to recycling capacity. Since its inception in 2013, WISP has delivered significant cost savings to its members and created new job opportunities.

5.3 Policy, tools and legislation

National and provincial legislation governs waste management and related aspects such as the environment, health, air quality, hazardous substances and water resources. Also applicable are a number of international conventions pertaining to hazardous substances and waste, to which South Africa is party to.

There have been numerous, recent changes to South African environmental and waste legislation; to highlight a few:

5.3.1.1 Scheduled National Landfill Restrictions (2020/21) (R.636 of 23 August 2013)

The National Norms and Standards for the Disposal of Waste to Landfill (R.636 of 23 August 2013) provides directives for the disposal of waste to landfill. Included in these norms and standards is a list of wastes that cannot be disposed of at landfill. The following waste streams will be banned from landfilling as of 23 August 2021:

- Persistent organic pollutant pesticides listed under the Stockholm Convention;
- Hazardous e-waste other than lamps;
- Brine or waste with a high salt content (TDS > 5%), and a leachable concentration for TDS of more than 100 000mg/l.
- Batteries other than lead acid;
- Macro-encapsulation of waste, meaning the isolation (or long-term storage) of waste through containment in containers within a sealed or reinforced cell in a specifically prepared and engineered area within a permitted hazardous waste landfill.

There are no restrictions expected for 2022; however, 2023 will require 50% of garden waste to be diverted from landfill (GreenCape, 2022).

5.3.1.2 Norms and Standards for the Assessment of Waste for Landfill (GN 635 of 2013)

Prescribe the requirements for the assessment of waste prior to disposal at landfill. Provides a standard assessment methodology for waste prior to disposal at landfill and advises on the total and leachable concentration limits.

5.3.1.3 *Liquid waste landfill restrictions*

The national Norms and Standards for the Assessment of Waste for Landfill Disposal (R.636 of 2013) provides directives for the disposal of waste to landfill. Included in these norms and standards is a list of wastes that cannot be disposed of at landfill. As of August 2019, all liquid waste is banned from landfills. WDFs must ensure that whatever volume of liquid waste is brought to their disposal sites must be reduced to having less than 40 % moisture content to minimise leachate generation. As such, the banning of liquids strengthens the business case for organic associated liquid waste beneficiation.

5.3.1.4 *Composting Norms and Standards (GN561 of 2021)*

In June 2021, the norms and standards for organic waste composting came into effect. The objective being to exempt composting facilities processing over 10 tonnes of organic waste a day from requiring a waste management licence, and associated EIA process. The purpose being to provide a "best practice" approach to composting that will prevent / minimise negative impacts on the bio-physical, social and economic environment. These norms and standards apply to composting facilities that (a) process less than 10 tonnes and (b) more than 10 tonnes a day of organic waste. These norms and standards should reduce the red tape associated with the licensing process (GreenCape, 2022).

5.3.1.5 *Draft Norms and Standards for the Treatment of Organic Waste (GN 275 of 2021)*

Where the composting norms and standards mentioned above are focused specifically on composting treatment, the newly published norms and standards for the treatment of organic waste focus on a wider range of treatment technologies, including mechanical, chemical, anaerobic, aerobic, and thermal technologies (GreenCape, 2021).

5.3.1.6 *Plastic carrier bag and flat bag regulations amendments (GN317 of 2021)*

The amendments to the Plastic Carriers Bags and Plastic Flat Bags Regulation (R.625 of 2003) were published on 07 April 2021. These amendments phase in post-consumer recyclate content requirements for plastic carrier bags or plastic flat bags manufactured, traded, or distributed in SA. The first phase kicks in from 01 January 2023 and requires a minimum of 50% post-consumer recyclate to be used. This is to increase to 75% from 01 January 2025, and 100% from 01 January 2027. These regulations should increase the demand for plastic recyclate and subsequently plastic waste recycling (GreenCape, 2022).

5.3.1.7 *Mandatory Extended Producer Responsibility Regulations*

The final amendments (GN400 of 2021) to the EPR regulations (GN718 of 2020) were published in May 2021, and set a framework for the development, implementation, monitoring and evaluation of EPR schemes for identified products, and which "Producers" of these identified products must adhere to. Accompanying amendments (GN20 of 2021 and GN400 of 2021) to the three EPR notices for the paper, packaging and some single-use products (GN1187 of 2020), electrical and electronic equipment (GN1185 of 2020), and the lighting (GN1186 of 2020) industries were also published (GreenCape, 2022).

5.3.1.8 *Organic Waste Management in the Western Cape*

National bans and legislative framework

Organic waste is a recognised global issue which is also affecting South Africa. South Africa is experiencing severe constraints in terms of the availability of landfill space as well as challenges in operating and decommissioning landfills in a manner that is compliant with licensing conditions and the norms and standards of disposal of waste to landfill. In addressing these issues, the National Waste Management Strategy (2020) focuses on diverting waste from landfills including organics through treatment, composting and energy recovery as well as regulations in the form of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), National Norms and Standards for disposal of waste to landfill (GN No. R. 636 of 2013) to restrict and prohibit certain waste types from going to landfill, and these include infectious animal carcasses and animal waste, liquid waste and a 50% ban of green waste in 2023.

The norms & standards requires 25% diversion of separated garden waste from landfill to take effect within 5 years, and 50% diversion within 10 years, i.e., from 2018 to 2023 and the remaining 50% diversion within 2023 to 2027, respectively. With respect to liquid waste, the regulations state that waste which has an angle of repose less than 5 degrees or waste with a moisture content of less than 40%, had to be completely diverted from landfill by August 2019.

In addition to fast-track the beneficiation of organic waste, DFFE has subsequently published the National Norms and Standards for Organic Waste Composting published as GN No. 561 on the 25 June 2021 and The Draft National Norms and Standards for the Treatment of Organic Waste published as GN No. 275 on the 29th March 2021 aims at controlling the processing of organic waste material at any facility that falls within the threshold as indicated above as stated in the Norms and Standards in order to avoid, prevent or minimise potential negative impacts on the biophysical environment. The promulgation of the said National legislation for the beneficiation of organic waste therefore strengthens WCG's position to maximize the diversion of organics from landfills towards value adding opportunities.

Western Cape perspective

The Department of Environmental Affairs & Development Planning (DEA&DP) took a policy decision in 2017, to institute and set a target of 50% organic waste diversion by 2022 and a full (100%) prohibition of organic waste disposed to landfill by 2027. The landfill restriction and prohibition on organics will also ensure that national waste diversion targets are met. The provincial position is therefore to maximize the prevention strategies and to increase the diversion rates of organic waste from landfills to opportunities that are value adding. Furthermore, all licenses issued by the Department have been amended and municipalities are obligated to submit Organic Waste Diversion Plans. An Organic Waste Diversion Plan will enable various organic waste types to be appropriately beneficiated locally or within the district municipality. DEA&DP has developed and workshopped a generic diversion plan aimed at assisting municipalities to develop its own diversion plan.

Figure 8 below provides the timelines for the restriction and prohibition of these waste types to landfill as well as the WC target of 50% by 2022 and 100% by 2027 that has been incorporated into our Provincial IWMP as well.

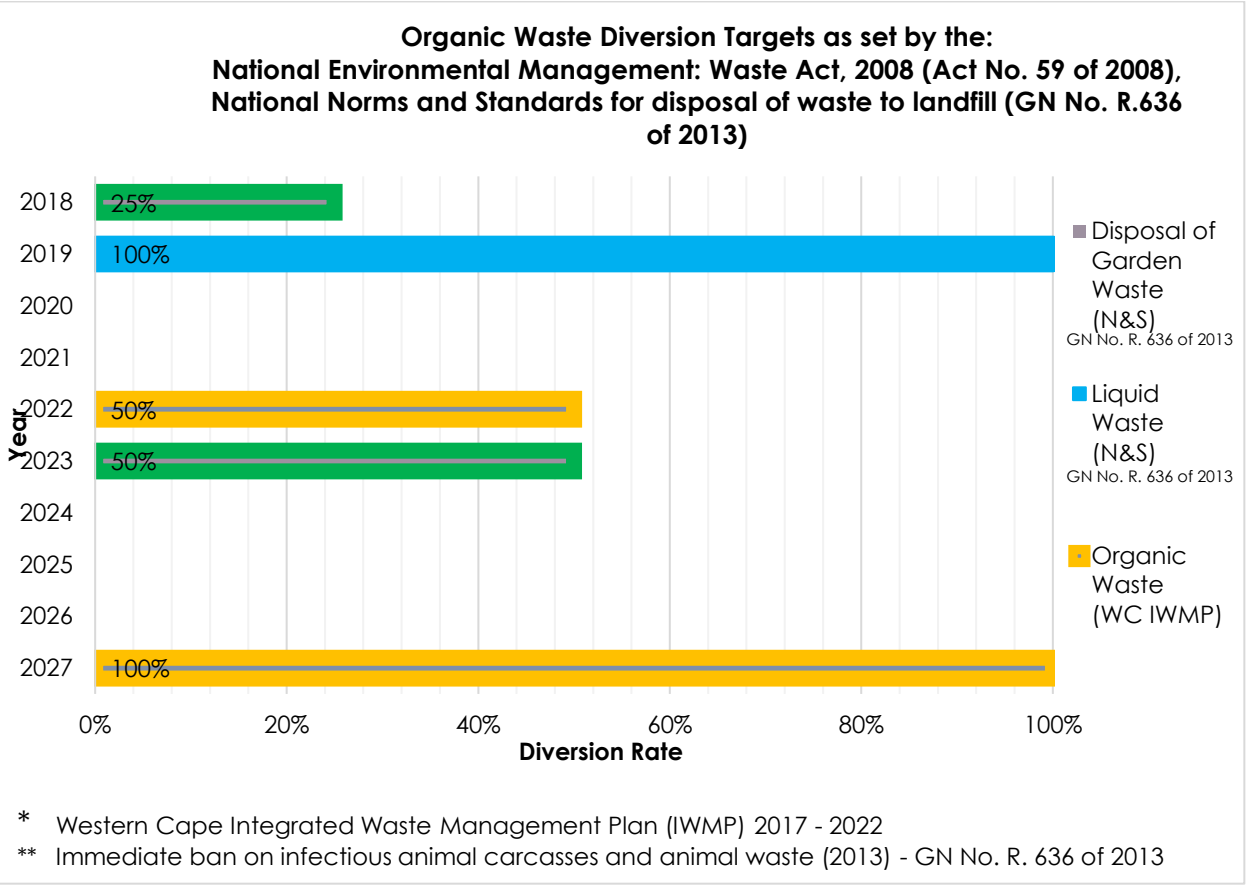

Figure 13 Timelines for the restriction and prohibition of waste to landfill

Provincial Organic Waste Strategy

The development of the Western Cape Organic Waste Strategy in 2019 was necessitated to identify key actions to meet the provincially set landfill organic waste diversion targets. These actions include interventions in four key areas namely: waste preventions strategies; strategies to secure the supply of organics from the waste stream; strategies that support the development of organic waste recovery and strategies to promote the beneficiation of organic waste. The strategy also promotes strengthening partnerships between municipalities and the private sector. As mentioned above the municipal requirement to draft diversion plans with set annual targets and identify the means to meet those targets, will put pressure on waste management companies and the municipality alike to manage organic waste better. Figure 14 below is a representation of the Provincial framework for increasing Organic Waste diversion from landfill.

Figure 14 Provincial framework for increasing organic waste diversion from landfill

(Provincial Organic Waste Strategy, March 2020)

The Department continues to support and establish regional and collaborative approaches amongst generators and beneficiaries of organic waste through online seminars and supporting municipalities with the development and implementation of organic waste diversion plans to reach the diversion targets. In addition, Infrastructure and technologies for the diversion and beneficiation of organic waste are also supported through these online seminars to finding solutions to organic waste management in the Western Cape.

5.4 Waste Management By-Laws

The Department developed a prototype waste management by-law, to help local municipalities compile local waste management by-laws. This by-law was vetted in 2019 and distributed to all municipalities.

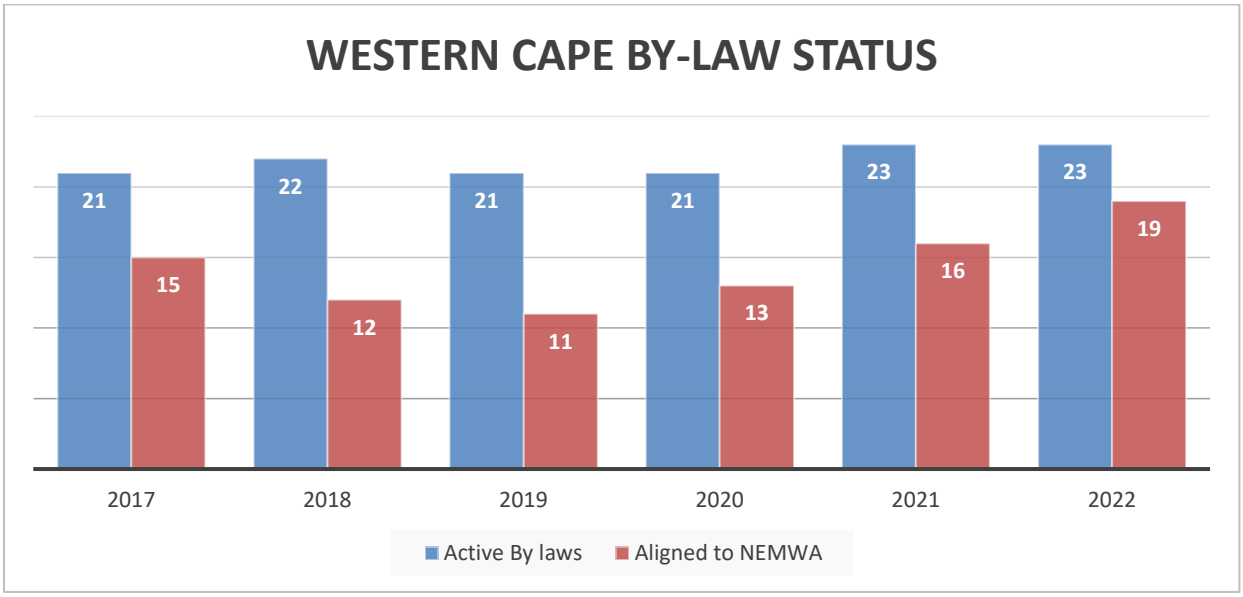

Figure 15 Western Cape by-law status

From the table above it is evident that by-law development has received more favourable attention over the past few years. 21 Municipalities have had by laws since 2017, some of these requiring alignment to NEM:WA. Therefore, alignment has increased steadily since 2019, after the vetting of the standard model by law of DEA&DP.

Also worth noting is that the Garden Route District Municipality has a by-law that was accounted for in 2018 but has not been added to reports that follow. This is also the only district with a waste management by-law.

5.5 Green Economy

Green Economy Project

The WCG recognises the valuable contribution the waste sector makes towards the growth of the Green Economy in the Western Cape. It also recognises that SMMEs play a significant role in diverting waste from landfill sites for reuse, recycling and beneficiation, and has the potential to grow even further should a nurturing environment exist for these enterprises to flourish. This approach is supported by various academic studies that argue that government should encourage and support the development of markets for recyclable materials inclusive of providing financial and infrastructural support to recycling companies. While SMMEs are key drivers of economic growth and job creation in South Africa, their prioritization together with the need to develop local economies are often not reflected in the allocation of municipal related contracts.

The Department assisted Drakenstein, Witzenberg, Cape Agulhas and Swellendam Municipalities to design and plan for the implementation of waste minimisation projects that includes the integration of waste pickers (hereafter collectively referred to as Waste Preneurs) and SMMEs into their waste diversion systems. The Department prescribed certain principles, procedures and systems to ensure Waste Preneurs are incorporated and have access to recyclable material and improve their livelihoods, while achieving local economic development and job creation targets within the municipality.

Western Cape Recycling Action Group (WCRAG)

The Western Cape Recycling Action Group (WCRAG) aims to address issues pertinent to the growth of the recycling sector and the green economy in the Western Cape. Interventions for 2021 consisted of three (3) themed seminars conducted virtually due to the continued COVID-19

lockdown restrictions implemented and as indicated below:

Support Workshop for Innovative Recycling Technology: The seminar showcased innovative solutions and good practice within the recycling sector which included technology solutions taking the whole waste value chain into account, micro recycling plants for plastic recycling, waste awareness in schools and solid waste public awareness and education within the CoCT.

SMME Support - Best Operational Practice and Compliance: The seminar focused on good operational practices in the recycling sector and good practice models for SMME's to become operationally smart. With the onset of COVID-19, many SMME's struggled to operate within the restricted environment and had limited access to recyclable material which resulted in some businesses closing. The seminar therefore provided good operational practices from SMME's that have had to change their business models to adapt to the current climate. The National Recycling Enterprise Support Programme to drive entrepreneurship and job creation provides grant funding to emerging enterprises and continues to be a source of support to SMME's and also presented on funding opportunities for small businesses.

Collaboration for wastepreneurs integration: The seminar focused on the support and the growth of the waste economy with specific focus on planning for the waste picker and small and micro waste entrepreneur's integration into the municipal systems in the Western Cape. One of the key elements was the supply of waste materials and the access to waste and further support rendered on promoting viable business cases of waste.

5.6 Knowledge Management

Local municipalities have designated responsibility for refuse removal, refuse dumps and solid waste disposal whereas district municipalities are responsible for solid waste disposal sites serving the whole district. The provincial authority must regulate and enforce national legislation. The DEA&DP has developed various municipal programmes to support municipal waste management (DEA&DP, 2017).

5.6.1.1 Authority Structures and Mandates

The DEA&DP Directorate: Waste Management develops and implements waste management plans, legislation, policies, norms and standards, guidelines, regulations and systems which support communities, municipalities, industry and the private sector through the implementation of project-directed measures and initiatives. The main purpose is to improve integrated waste management in the Western Cape Province.

The Directorate falls within the Chief Directorate of Environmental Quality within DEA&DP and facilitates Integrated Waste Management through:

- Integrated waste management planning: supporting municipalities and industry by facilitating and improving the management of waste;
- Regulating waste management facilities: providing technical assistance and training to municipalities to improve the construction, management and operation of waste management facilities in the Western Cape;
- Administer licensing applications and the development of integrated waste management plans;
- Waste policy and minimisation: promoting the minimisation, reuse and recovery of waste material and stimulation of the waste economy, job creation and policy development; and
- Waste information management: providing a central information hub for IPWIS by enhancing data collection mechanisms; improving waste quantification and record keeping, providing technical assistance and training to municipalities and industries.

The DEA&DP has established three governance platforms, including the Provincial Waste Management Officers Forum; Western Cape Recycling Action Group (WCRAG); and Industrial Waste Management Forum.

5.6.1.2 Waste Management Officers (WMO)

In accordance with Section 10(3) of NEM:WA, municipalities must appoint a WMO to co-ordinate waste management.

Figure 16 summarises the distribution of WMOs across the district municipalities in the Western Cape Province (DEA&DP, 2017).

The Municipalities who did not designate Waste Management Officers are Kannaland, Oudtshoorn, Cederberg and Matzikama.

Figure 16 Western Cape designated waste management officers (per area)

5.7 Financing

Landfills must compete for land-use on the urban fringe with the result that distances between waste generation points and waste disposal facilities are increasing. The consequent costs together with costs to ensure compliance with national standards means that landfilling is becoming a less cost-effective option for waste management. This is further compounded by the fact that the true costs of landfilling are not charged to users: there is thus a need for full cost accounting. Municipal financial systems are not geared to do this and, by implication, means that the true cost savings of diverting waste from landfills is not recognised by municipalities, curtailing implementation of waste recycling and recovery systems (Belinda Langenhoven, pers.comm.).

Integrated waste management infrastructure is not recognised as bulk infrastructure and, public sector funds are not specifically allocated for new developments, resulting in backlogs in service delivery and limited landfill airspace. Municipalities may obtain project funding from the MIG, provided that projects are identified and budgeted for in the municipal sector plans and IDPs. However, little MIG funding is being allocated for integrated waste management infrastructure.

Regionalisation is considered as a potential solution to airspace shortages and to counter the high cost of containment barrier design of all new WDFs as required by section 3(1) and (2) of the National Norms and Standards for Disposal of Waste to Landfill, 2013, by spreading the costs across participating municipalities.

5.8 Integrated Waste Management Infrastructure

The Western Cape provincial vision is to ensure the provision of a sustainable waste service (OneCape 2040, 2012). Improvements in waste infrastructure and systems will reduce costs, environmental risk and also create new opportunities in integrated waste management.

The DEA&DP Strategic Plan (2015 - 2020) emphasises the importance of investing in infrastructure and human resources in order to improve compliance. Municipalities do not have the required resources to deal with failing and aging infrastructure and underinvestment in the maintenance of infrastructure in the past has caused significant backlogs and deteriorating municipal infrastructure (DEA&DP Strategic Plan 2015-2020). The Western Cape Infrastructure Framework (WCIF, 2013) indicates that the province is generally well served with infrastructure even though infrastructure provision and service delivery in rural areas still presents a challenge.

According to the WCIF (2013), one of the biggest challenges in the waste sector is the lack of information with regard to waste volumes and composition, information required for planning and infrastructure interventions. The framework highlights that larger municipalities in urban areas struggle to source funds to achieve waste diversion targets and compliance with the NEM:WA and NWMS. The inefficient recovery of costs through tariffs and small budget allocation to waste management, results in insufficient funds for infrastructure or to manage waste services effectively.

6. GHG Emissions for the Waste Sector

There are some major gaps in the data from waste disposal and wastewater treatment in the Western Cape. The information presented below is based on the best available data at this stage, but there is a need to undertake a more detailed analysis of the waste and wastewater sectors in order to improve the quality of GHG emissions reporting.

There is currently no available information on the biological treatment of solid waste as well as incineration and open burning of waste, either at the national or provincial level. This is another gap that will require further assessment.

The emissions from Solid Waste Disposal included in the table comes from the waste generation figures submitted to the IPWIS system as well as information from the national GHG Inventory for South

Africa, which was used to supplement the Western Cape data. The wastewater treatment information is taken from the national GHG inventory for South Africa.
In calculating the total CO_2e figure for the waste sector it is necessary to multiply the CH_4 and N_2O tonnes emitted by their Global Warming Potential (GWP) in order to convert it to CO_2e. By converting all the GHGs to CO_2e it allows us to add them together in order to provide a total GHG emissions picture for the sector. All GHGs are compared to CO_2 as it has a GWP potential of 1. The GWP for CH_4 is 25 and the GWP for N_2O is 298.

Table 7 GHG Emissions for the Western Cape

Source	GHG emitted (tonnes)			
	CO2	CH4	N20	CO2e
4 A – Solid Waste Disposal		101 711		2 197 425
4.D – Wastewater treatment				
4.D.1 Domestic wastewater treatment		2 373	232	128 461
4.D.2 – Industrial Waste Water Treatment		811		20 275
TOTAL		**104 895**	**232**	**2 346 161**

Next steps for this sector are to work on identifying data sources for the current gaps, which will then allow us to undertake more detailed district assessments and specify key areas where action needs to take place to access the data.

7. Human Rights & Gender Gap Analysis

The Western Cape Integrated Waste Management Plan (WC IWMP) was reviewed during the 2021/22 and 2022/23 financial years. A Gender Gap Analysis of the WC IWMP was undertaken to ensure that gender and human rights aspects were considered in the review of the Plan and that all waste management programmes, practices and planned waste management activities are gender responsive. Proposed recommendations were provided and were incorporated during the revision and updating of the WC IWMP.

7.1 Human Rights & Gender Key Findings

Waste refers to a substance, material or object which is no longer suited for its intended use. Waste is not a neutral concept and is determined by factors such as lifestyle, social structure, gender, class, and ethnicity (NPAP, 2021). The Department of Environmental Affairs (DEA) 2016, now referred to as the Department of Forestry, Fisheries and the Environment (DFFE), indicates that gender issues are important in waste management as there is a direct link between waste management and other social aspects. The DEA (2016) states that since women and men perceive waste differently; the generation of waste, and hence the definition and designation of what will become 'waste', becomes important. Furthermore, because of gender perceptions, gender norms and traditional gender roles, women often face various barriers in the workplace. This applies in both the informal and formal waste management settings.

Waste Generation and Collection

- Women and men have different behaviour in terms of waste generation, and their roles in the home and within their communities often differ when it comes to waste management (GA Circular, 2019). Women's roles and responsibilities in the home as cooks and caretakers,

meaning that they are often responsible for the purchasing of household products. Women are also generally responsible for waste management at home. Nainggolan et al. (2019), notes that women seem more responsive to more sustainable waste management solutions; depending on location and income, women are more likely to accept sorting recyclables as part of their household waste disposal duties when compared to men.

- In the absence of adequate waste collection services, women are often also involved in voluntary community clean-ups and collection of waste (DEA&DP, 2021). Since women have a key role in terms of waste management at the household and community levels, they must be considered key actors when considering and implementing waste reduction and waste management measures. Woroniuk and Schalkwyk (1998) argue that environmental messages are more effective if they are tailored to relevant target audiences e.g. male/ female. Similarly, the youth, elderly and people with disabilities must also be included in targeted environmental and waste awareness programmes. Engaging youth in these programmes may lead to a change in behaviours and attitudes and may also influence their parents and families (SGP, 2012).

- The types of waste generated between men and women, children and the elderly differ. For instance, women have different sanitation needs and preferences e.g. menstruating women and girls make use of various sanitary products, which range from re-usable items to disposable pads and tampons. Cultural taboos and menstruation-shaming may impact which sanitary products women use and how it is disposed of (WEN, 2018). Menstrual pads contain a considerable amount of plastic. It is estimated that a pack of pads is equivalent to five plastic bags (Natracare, 2022). Discarded menstrual pads often end up at landfill sites or contributes to the pollution of beaches and oceans if not disposed of correctly (WEN, 2018) e.g. if pads are flushed down the toilet.

- According to Recycling Magazine (2019), elderly people are more likely to require health care and incontinence products, which generates an increase in these waste types. Regarding obstacles in waste management, mobility issues associated with the elderly and disabled could hamper their ability to manage their waste (Recycling Magazine, 2019). Jensen and Nielson (2001) point out that the design of current waste bins, and receptacles for receiving recyclables presents barriers for disabled and elderly persons. In a survey done by Jensen (1997) in Danish Building Research Institute (2000), people with disabilities indicated that waste management messages could be more accessible if they included alternatives such as audio communication, which could reach people with visual impairment and learning disabilities. It was also suggested that pictograms and Braille be used at waste receptacles. Participants indicated that the design of waste bins, waste receptacles and compost bins should be improved to address physical barriers experienced e.g. paper banks and compost bins should be fitted with inlets/lids placed at an appropriate height so that children could reach it. Another suggestion was that containers are fitted with a smaller lid incorporated in the existing lid as many complained that the existing lids were too heavy to handle.

Health and Environmental Impacts

- The levels, frequency and sources of exposure to hazardous substances can vary depending on gender roles in life and work (Bosché, 2020). Most paid care workers such as nurses, and personal care workers, are women. When performing duties, these workers often come into contact with absorbent hygiene product (AHP) waste e.g. soiled nappies which could possibly be contaminated by infectious diseases. Gender roles in the waste sector also determine exposure to hazardous waste, whereas in some countries men may be responsible for collecting e-waste, women are exposed to hazardous chemicals when extracting valuable metals (Bosché, 2020). Similarly, when waste pickers sort through waste at landfills and illegal dumping hotspots, they are exposed to AHP waste, dumped medical waste, chemicals and so on.

- The impact of exposure to chemicals and waste may be different depending on biological sex (Bosché ,2020). Although both men and women would be affected if ingesting or inhaling harmful chemicals from plastics, toxins contained in plastic have different effects on women and men due to biological differences such as body size and proportion of fatty tissue (Stiftung, 2021). Since women's bodies contain more fat, they accumulate more phthalate plasticisers and other oil-soluble chemicals (Stiftung, 2021). Phthalates and other additives found in plastic, such as BPAs, vinyl chloride, styrene and acrylonitrile could have adverse effects on women, leading to infertility, spontaneous abortion, adverse birth outcomes and the risk of developing breast cancer (Forsey and Bessonova, 2020). When women are exposed to water that is polluted with chemicals, these toxins can be passed to their children, prenatally or via breastmilk (Forsey and Bessonova, 2020).

The Waste Economy

- Youth unemployment is one of the most pressing socio-economic concerns in South Africa. According to the Provincial Treasury (2022), youth unemployment increased in the province when comparing Q1: 2017 with Q1:2022. The narrow youth unemployment rate was 30.8 % in Q1: 2017 compared to 32.6% in Q1: 2022. Meanwhile the expanded youth unemployment rate increased from 34.2% in Q1: 2017 to 37.3% in Q2:2022.

  The waste economy has been identified as a key sector for economic growth and job creation. A key focus should thus be to expand waste skills training and job creation initiatives, which is aimed specifically at the youth. People with disabilities are often excluded from employment due to aspects such as discriminatory attitudes and practices, unsupportive work environments and lack of skills (WCG, 2019). Employment and skills training for people with disabilities should also be prioritised in the waste sector.

- Gender inequalities and norms are found in almost every aspect of waste management and are found throughout the waste value chain. Management and decision-making positions are generally held by men across government and the private sector; women often perform administrative roles or perform functions such as waste sorting or sweeping (DEA&DP, 2021). Gender bias may also play a role in recruitment practices, in which potential employers perceive women as not physically strong enough to carry out certain activities, and thus prefer to hire men (NPAP, 2021). Furthermore, in the private sector, men are also mostly owners and/ or managers of the businesses that are given contracts to manage and collect waste within

the municipalities (DEA&DP, 2021). This could be attributed to the ease of access men have to acquire capital/ credit to establish their own companies. Women's access to finance is disproportionately low as they do not necessarily own land or assets that banks require as collateral (DEA&DP, 2021).

- Waste pickers are vulnerable members of society and face many challenges. Women waste pickers however face further constraints due to gender inequalities in the sector and society in general. Globally, waste pickers are often oppressed and marginalised based on factors such as race, religion, caste and nationality (DEFF and DSI, 2020). It is important to note that women waste pickers' challenges are therefore intersectional i.e. not all women are affected in the same ways and some women face additional forms of oppression and marginalisation (Dias and Ogando, 2015b cited in DEFF and DSI, 2020). Black, low-income and illiterate women, and/ or women who work informally, experience challenges more severely (Wiego, n.d.).

  - Women must frequently decrease the hours they work as waste pickers due to their reproductive and social roles, which requires them to be primarily responsible for the unpaid labour of caring for their children (DFFE, 2020), the infirmed or elderly. This leaves them with less time to generate an income than men (Dias and Fernandez, 2013, cited in DEFF and DSI, 2020). In Ghana, it was found that although women waste pickers have more flexibility in terms of work hours, they were often unable to meet their targets as it was in conflict with their social and reproductive roles (NPAP, 2020).

  - Women might not be allowed access to recyclables with the highest value (Wiego, 2014). Usually, men have access to higher value material such as e-waste, plastics and builders' rubble while women are left to collect the dirtier and less valuable materials (DEA&DP, 2021). According to NPAP (2020), payment received for recyclables varies between men and women, and usually depends on the bargaining power of pickers. This concern has been raised by Koena (2021), who has indicated that women often face exploitation and are offered less per product compared to males when selling their products at buy-back centres. Because of women's role in society and the sexual division of labour, women are often limited to sorting processes, whereas men are able to collect materials on the streets or from large generators (Dias and Ogando, 2015). Furthermore, when waste picking is formalised, women are often not able to enjoy the same opportunities as men for fair earnings (Wiego, 2014).

  - When women hold positions of power, they are often not respected. Stereotypical assumptions regarding women's use of emotion and different communicative patterns contribute to women waste pickers being ignored in group meetings or formal settings (Dias and Ogando, 2015). Women's additional workload and responsibility in their homes may also limit their time to be able to take up leadership positions (Dias and Ogando, 2015).

  - The high levels of crime and gender-based violence (GBV) in South Africa mean that women and gender non-conforming people face additional safety risks when doing street waste picking. It has been reported that women street waste pickers in Johannesburg work with male friends/ partners to reduce their vulnerability (DEFF and DSI, 2020). Safety risks, along with the heavy weight of loaded trolleys have led many women to either work in much smaller

areas or to migrate to landfills (Mokobane, 2016, cited in DEFF and DSI, 2020). Although landfills pose various safety risks on a social and interpersonal level, some waste pickers indicated that working on the landfill provides them with a sense of community (Schenk et al., 2015). Schenck et al. (2015) has also identified possible safety risks and tensions amongst waste pickers based on their nationality, gender and race. Women highlighted the risk of being raped and robbed as well as the dominance of men over women with respect to waste materials (Schenk et al., 2015).

- Waste pickers often work under unhygienic and dangerous conditions. At landfills, they are at risk of injuries such as cuts from glass and wire, needle pricks, being run over by trucks, exposure to fire (Schenk et al., 2015; Cruvinel et al., 2019) and poor air quality. Health risks include the potential to develop respiratory diseases, eye infections, stomach problems, typhoid fever, diarrhoea, musculoskeletal disorders and carcinogenic effects (Jayakrishnan et al., 2013; Chokhandre et al., 2017; Mol et al., 2017). It has been reported that hazardous waste such as e-waste may have a particularly negative impact on pregnant women, as exposure may lead to adverse birth outcomes i.e. pre-term birth, low birth weight, still-birth and congenital malformations (WHO, 2016). Studies indicate that female waste pickers report a high incidence of infections of the reproductive and urinary systems, most likely caused by the lack of toilet facilities and potable water in the areas where the waste is collected and treated, as well as by the inadequate treatment of the waste (Jayakrishnan et al., 2013). A lack of sanitation facilities also mean women are not able to change their sanitary pads when menstruating, causing leaking and discomfort (Joshi, 2017). Waste picking at the landfill may also result in knee and back problems from bending to pick up waste. In Ghana, several women waste pickers indicated issues with their knees and waist, whereas the male waste pickers were less impacted due to being more energetic and younger (NPAP, 2021). Further to the above, the absence of childcare, changing and breastfeeding facilities put children and infants who accompany their mothers during waste picking activities at risk.

Waste Management as a Human Rights Issue

Poor waste management, illegal dumping, the lack of waste management services and the resultant health and environmental impacts thereof negatively impact on the rights of citizens. Gender mainstreaming and human rights approaches to waste management ensures that the needs of all vulnerable groups are taken into consideration as required by South African environmental legislation.

The environmental right is set out in Section 24 of the Constitution's Bill of Rights which states that:

"Everyone has the right:

a) to an environment that is not harmful to their health or well-being; and

b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that-

I. prevent pollution and ecological degradation;

II. promote conservation; and

III. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

The National Environmental Management Act, 1998 (Act No. 107 of 1998) aims to ensure that the State respects, protects, promotes and fulfils the social, economic and environmental rights of everyone. The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) is the governing Act for waste management and aims to reform the law regarding waste management to protect human health and the environment. The Act makes provision for the National Waste Management Strategy, 2020 (NWMS), which addresses women and other vulnerable groups. The Act emphasises the constitutional right for everyone to have an environment that is not harmful to their health and to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures. The Act identifies that the impact of improper waste management practices is often borne disproportionately by the poor in many areas of the country. The Act also highlights the requirements for sustainable development through waste avoidance, reduction, re-use, recycling or recovery and safe disposal as a last resort.

As previously mentioned, the waste sector has been identified as a key sector for economic growth and job creation. Given the high levels of inequality (including gender inequality) in the country, it is important that everyone has equal opportunity to access the benefits of the waste economy and not be discriminated against based on e.g. gender, disability, sexual orientation and race.

A lack of waste management facilities and infrastructure can increase the incidences of illegal dumping (DEA&DP, 2022). Illegal dumping and littering are widespread in the province and illegal dumping hotspots can often be found in or near informal settlements, which are generally characterised by a lack of services and infrastructure. Furthermore, the proper management and disposal of waste will help to prevent negative environmental and human health impacts. Acknowledging the link between human health and the environment aligns with the One Health approach of the Province. One Health aims to achieve a holistic and systems-based approach that recognizes the interconnection between the health of humans, animals, plants and the environment (FAO et al.,2022).

7.2 Summary of Gaps

The gaps that were identified during the Gender Gap Analysis are summarised as follows:

- Widespread illegal dumping, which could lead to environmental and health impacts.
- Lack of waste management services especially in informal settlements, which may lead to illegal dumping.
- Lack of compliance at waste management facilities, which could lead to environmental and human health impacts.
- Limited focus on managing AHPs (sanitary waste).
- Need for more targeted waste management awareness programmes.
- High levels of youth unemployment.
- Limited employment opportunities for people with disabilities.
- In the waste sector, women are underrepresented in management and decision-making positions.
- Waste pickers, especially women waste pickers face many challenges when performing their work.

- Women have limited accessibility to capital and access to tenders for waste management services in municipalities.
- Localised gender disaggregated data in waste management is constrained.
- Waste management jobs are limited to short periods and low-income jobs.
- Waste management systems are not designed for women, youth, elderly and people with disabilities.

7.3 Responses

The Directorate: Waste Management has implemented and is currently implementing several activities to address the gender and human rights issues linked to waste management. A brief description is provided:

- **Promoting women in waste management**
  The Department hosted Women in Waste Workshops during 2019 and 2020 to create a platform to celebrate the role of women in the recycling sector and for women to engage on challenges they face in the waste sector. It is noted that women's success in the waste sector must be acknowledged, especially amid the broader societal challenges of gender bias and inequality. Participants at the workshops included provincial government officials, municipal officials, waste management officers, waste entrepreneurs, and representatives from producer responsibility organisations (PROs).

- **Dignified waste management solutions for Absorbent Hygiene Products**
  In seeking sanitary waste management solutions within informal areas, a co-design approach was undertaken in the Khayelitsha Informal Settlement in Cederberg Municipality. The aim was to develop dignified waste management solutions inclusive of the management of sanitary and nappy waste, which is often overlooked. In 2023, a co-design workshop was conducted with the Overhills community in Kleinmond to seek solutions to their sanitary waste problems. While both men and women participated in the workshop, it was mainly represented by females.

- **"Give Dignity" Campaign**
  Every month, millions of women across the globe suffer the indignity of not having access to or are not at the means to afford safe and hygienic sanitary products during their menstruation cycle. This is common amongst vulnerable groups whose basic needs are not being met due to high levels of poverty, unemployment, and inequality. Women waste pickers fall into this category. These women often work long hours at waste disposal facilities or travel great distances to collect recyclables from households to put food on the table. The "Give Dignity" campaign was launched to bring relief and dignity to this sector of the recycling fraternity so that they can have access to these sanitary products, inclusive of, but not limited to sanitary pads. The campaign aimed to garner donations for dignity bags which contained personal hygiene products like soap, deodorant, toothpaste, and so on. While the aim was mainly to provide these women with access to sanitary pads, the use of environmentally sustainable products such reusable menstrual cups and washable sanitary pads was also promoted. A request for assistance was sent out to all Western Cape Recycling Action Group (WCRAG) stakeholders to allow an opportunity for industry to support the project, with a target of supporting at least 300 waste pickers. Over a period of two months, more than 6000 items

valued at over R120 000 were received. This allowed bags to be provided to around 380 women waste pickers across the province.

- **Tackling illegal dumping**

  A codesign process was performed with the Breede Valley Municipality to aid the illegal dumping crisis in the area. This was undertaken with Councillors, recyclers and municipal officials of the area. In this workshop it was clear that women were more vocal on trying new waste management strategies and this included that illegal dumping hotspots be cleaned to be used for alternative practices that would benefit the community. The process, however, yielded a result of skip monitors being appointed, since these were the main points of illegal dumping in the area. The skip monitors aid with awareness of those disposing their waste and separation of waste as far as reasonably possible. A second, further solution seeking workshop is still to be held with the Municipality.

  A Strategy to Reduce Illegal Dumping (STRID) in the Western Cape was developed. The focus of the Strategy is to identify the reasons for illegal dumping and to try and find solutions to curb illegal dumping – mostly through existing municipal interventions. The STRID promotes a multi-pronged approach to decrease illegal dumping by taking into consideration the unique social, economic, and environmental context within each municipality. The STRID is currently being updated with the latest interventions undertaken by Municipalities in the Western Cape and will be finalised for implementation thereafter.

- **Improve waste management in informal settlements**

  The Directorate: Waste Management is currently developing an Integrated Municipal Waste Management Guideline for Informal Settlements in the Western Cape as a deliverable for the 2023/24 financial year. This follows on from the Status Quo on Waste Management in informal settlements within the Western Cape developed in 2019 and supports the rollout of the co-design methodology. The main aim of the guideline is to assist Municipalities to improve their overall waste management services provided in informal settlements, thereby minimising land, water and air pollution, illegal dumping and littering and creating employment opportunities for the jobless.

- **Assisting municipalities to obtain funding for unserviced areas**

  Municipalities, depending on their size and classification, can access either the Municipal Infrastructure Grant (MIG), Integrated Urban Development Grant (IUDG) or the Urban Settlement Development Grant (USDG) to purchase specialised waste vehicles. The specialised waste vehicles are specifically meant to provide services to previously unserviced poor areas within the municipality. Municipalities are required to complete individual Technical Assessment Reports and attach other relevant supporting documentation and submit to the Directorate: Waste Management for review. If all the requirements pertaining to the "Norms and Standards for Specialised Vehicles for Waste Management" are met, then the application will be recommended and forwarded to the Department of Forestry Fisheries and the Environment (DFFE) for further consideration. The Department of Cooperative Governance and Traditional Affairs makes the final decision on whether to approve the Municipality's application. The Directorate has recommended MIG applications for Prince Albert, George, Witzenberg and

Kannaland Municipalities in the 2022/23 financial year and Stellenbosch Municipality's IUDG application so far for the 2023/24 financial year.

- **IWMP reviewed to include gender aspects**

  The WC IWMP 2017-2022 was reviewed, and several gaps identified in terms of gender and human rights issues. The Gender Gap Analysis Report provided recommendations to be included in the review of the WC IWMP to address the identified gaps. The Gender Assessment Structure utilised was based on DEADP's Practical Guide to Mainstreaming Gender into Public Policy. The WC IWMP was assessed based on the following aspects:

  - Policy background
  - Policy development process
  - Language and approach
  - Gender sensitivity
  - Human rights
  - International and legislative gender framework
  - Resources

  The WC IWMP 2023-2027 has since been drafted and incorporated recommendations made in the Gender Gap Analysis Report. The Gender Gap Analysis assisted in highlighting gender and human rights aspect in the review and development of the WC IWMP and ensured that a gender lens was applied when developing activities for implementation. The aim is thus for planned interventions and activities to be more responsive to gender and human rights.

- **Repair and Refurbish Situational Analysis and Future Skills Development Programme**

  In 2023, the Department developed a Situational Analysis of the Repair and Refurbish Sector for Household Electrical and Electronic Equipment in the Western Cape. With limited information available, it found that men were the main custodians of these businesses and that the sector is very limited, especially with regard to information sharing and skills in general. The Situational Analysis found that there are currently entry barriers for youth in low-income communities to access formal training in the sector. High colleges fees, stringent entry requirements and lengthy training programmes as well as outdated curriculums and teaching methodologies may be part of the reason for not attracting young people into the field.

  With the accompanying Strategy & Action Plan for the Repair and Refurbish Sector for Household Electrical and Electronic Equipment in the Western Cape, the Department will undertake a programme to allow for young females involvement and skills development. Recent developments in the Higher Education and Training band indicate that training institutions are realigning their curriculum to respond more effectively to marketplace and workforce needs and hence are willing to design tailor-made programme of this nature.

  The Department will therefore, invite 15 post matric young women to partake in a short-term skills development programme to be trained as certified repair technicians. This will create enabling conditions for job creation and skills development in the waste sector, while creating opportunities for gender mainstreaming and equity when identifying opportunities for skills development and job creation amongst young women beneficiaries. It will contribute towards

improving the socio-economic circumstances of targeted groups and contribute towards their upliftment and overall wellbeing.

7.4 Action Points

Activities listed in the Implementation Plan of the WC IWMP 2023-2027 which are linked to gender, and human rights are provided below:

- Increase awareness campaigns on littering and illegal dumping.
- Roll out the Strategy to Reduce Illegal Dumping in the Western Cape.
- Continue with co-design workshops to address waste management challenges with targeted communities.
- Support municipalities with the development of IWMPs with the inclusion of a gender-based assessment
- Review and update Guideline/template style/ for IWMP development.
- Continue to host WCRAG knowledge sharing support engagements with Industry small, medium amd micro enterprises (SMMEs) and other stakeholders in the recycling sector.
- Identify and engage with municipalities in need of MIG funding for waste collection vehicles / yellow fleet.
- Continue to support motivations by municipalities for the procurement of waste collection vehicles /yellow fleet to increase service levels in unserviced areas.
- Implement strategy and action plans to promote the repair and refurbishment sector and other targeted sectors.
- Provide assistance and support (through PROs e.g. fibrecycle and through working with municipalities) to SMME's in the waste sector.
- Provide wastepreneur integration support to municipalities.
- Implement strategy and action plans to stimulate the repair and refurbish sector (textiles, furniture etc.) in a manner that leads to job creation and skills development for vulnerable sectors of society.
- Initiation of procurement strategies that facilitate wastepreneur (SMME and waste picker) integration.
- Promote the diversion and beneficiation of AHPs.

8. CONCLUSION

OUTLOOK: CONCERN

Waste generation is a direct consequence of an increase in population, a rise in living standards, rapid urbanisation and economic growth. More people are moving into cities in search of employment and a better quality of life, and better access to infrastructure and services. This has implications for planning, service provision and resource consumption, all key demand side pressures for the province. The focus on landfill diversion, and specifically waste beneficiation, has accelerated over the last couple of years, and has been evident at all ends, from government through to business, industry, and the general public. Disposal to landfill is a competing activity to waste beneficiation and continues to be the prominent waste disposal option in South Africa. The estimated waste generated within the Western Cape is 3.31 million T in 2022. General waste accounts for approximately 90% of the waste that is generated (disposal + diversion) within the Province, and the remaining 10% being hazardous waste. The total amount of waste generated in the province has decreased by 14%, and waste disposal by 4% from 2018 to 2022. Waste recovery and recycling have increased by 3% over the same period. The Western Cape currently has an overall diversion rate of 29% for 2022 and organic waste diversion rate for 2022 is 22%.

Poor waste planning has become a growing environmental problem at national, and in some cases a regional and local level. The main method to manage waste in South Africa is disposal at WDFs, and approximately 90% of waste generated in South Africa reports to WDFs. There are 164 general WDFs in the Western Cape, three hazardous WDFs, three HCRW treatment facilities (2 incinerators and 1 electro thermal deactivation plant) and very few accredited hazardous waste laboratories. Other WMFs include MRFs, RTSs, drop off and composting facilities.

An overview of the key pressures, impacts, challenges, progress and recommended critical areas for action is provided in Table 8. Table 9 contains the outlook for the future of waste management, based on the findings of this chapter. All these aspects have been identified in this chapter, and should be referred to in order to obtain more detail and a complete understanding of waste management in the Western Cape.

Table 8 Overview of key waste management aspects

Aspect	Summary of key points
Pressures	– Population – Employment – Economy – Income inequality and social well-being – Human settlements – Spatial development – Land use – Informal settlement – Housing and municipal services
Impacts	– Land use – Health effects – Contamination
Challenges	– Waste characterisation and generation – Limited information regarding waste volumes and composition, which is required for planning purposes and infrastructure interventions.

Aspect	Summary of key points
	– Lack of information on liquid and solid waste from agricultural production processes. – Waste avoidance, reduction and recycling – The impact of COVID-19 on the recovery of recyclables from the waste stream and the waste economy. – Improvement of waste collection services and service delivery in response to communal needs in areas where little to no waste services are provided. – Restriction and prohibition of certain waste types from going to landfill/alternative disposal methods needed to be found and implemented. – Limited infrastructure and technology options available for the diversion and beneficiation of organic waste. – Lack of reliable data from industry, businesses, municipality, and households (general and hazardous waste). – Lack of adequate waste minimisation systems. – Lack of awareness and education initiatives specifically on waste minimisation related to separation at source and recycling initiatives. – Waste management facilities – Shortage of airspace and securing available land for new WDFs. – Lack of cover material, windblown litter, fencing, storm water management, limited machinery and operational staff. – Need for additional integrated waste management infrastructure (recovery, treatment and general and hazardous WDFs). – Cost implications of the introduction of National Norms and Standards for Disposal of Waste to Landfill (2013). – Limited compliance with permits and licencing conditions at WMFs. – Illegal dumping. – Municipal operations – Need for institutional strengthening and human capacity building. – Need for private sector involvement for improving cost effectiveness, quality and coverage of service areas. – Lack of transparent information management and improved public awareness. Waste collection services Attaining access to waste collection services, inequality of waste management services. Ineffective use of equipment and personnel. Lack of infrastructure provision and service delivery in rural areas. – Financial resources – Limited financial resources, ineffective cost recovery for disposal at WMFs, delays in finalising municipal budgets, theft and vandalism of infrastructure, reduced operational budgets and the ineffective use of equipment and personnel (Oelofse & Godfrey 2009). – Rising costs of integrated waste management infrastructure. – Need for sustainable sources of revenue and investment finance.
Progress	– Policy, tools and legislation – Development of regional environmental sustainability and reliance – Development of a green economy – reduction, reuse and recycling – Integrated waste management infrastructure

Aspect	Summary of key points
	– Regionalisation and innovation of waste services – Alternative waste treatment. – Continuous improvement of the IPWIS pertaining to user friendliness and functionality.
Critical areas for action	– Strengthened education, capacity and advocacy towards integrated waste management – Improved integrated waste management planning and implementation for efficient waste services and infrastructure – Effective and efficient utilisation of resources – Improved compliance with environmental regulatory framework

Table 9 Summary of the outlook for waste management in the Western Cape

Indicator	Quantification	Target/Desired State	Trend
Waste Generation	– Waste generation in the province is increasing annually. – Waste disposal and diversion data reported to the IPWIS by municipalities and industries is limited. – IPWIS verifications are conducted annually to validate the submitted waste data to the IPWIS.	Municipalities are working towards the national diversion target of 50%.	**Increasing** 
	– Implementation of diversion initiatives and alternative waste management projects has improved waste diversion rates.		**Improving** 
Waste Characterisation	– Organic waste (Food waste (28.9%) plus garden waste (6.3%)) represents the largest portion of waste generated i.e. approximately 35% of municipal waste generated. – Glass, plastic and paper also make up a large portion of the waste generated. – Meanwhile, household chemicals make up the smallest portion of municipal waste generated.	Reliable data and information from industry, businesses and households (general and hazardous).	**Improving** 
Waste Management Facilities	– Increased number of WMFs that are operational in 2022 vs 2017, due to registration of Norms and Standards waste facilities.	Sufficient integrated waste management infrastructure (recovery, treatment, general and hazardous WDFs) to deal with projected waste volumes.	**Improving** 
	– Majority of the WMF have less than 5 years of operational capacity remaining.		**Concern** 
	– All districts in the Western Province have plans in different stages for regional waste facilities and services.		**Improving** 
	– Based on the Departmental audits done during this reporting period 67% of WMFs are non-compliant, 23% were partially compliant and 10% fully compliant.	Increase in compliance of WFMs.	**Concern** 
Waste Collection Services	– inadequate services to backyarders, – expanding of informal settlements – unsuitable terrain where informal settlements are established – land invasions on public and private land.	Access to waste collection services by all communities.	**Concern** 

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Department of Environmental Affairs and Development Planning
Leeusig Building, 3rd Floor, 1 Dorp Street, Cape Town, 8001
Private Bag X9086, Cape Town, 8000
Telephone: +27 (0)21 483 4091 / Facsimile: +27 (0)21 483 3016
Email: enquiries.eadp@westerncape.gov.za

Western Cape Government
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