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ABBREVIATIONS

CAGR	Compound Annual Growth Rate
BD	Blue Drop
BDRR	Blue Drop Risk Ratings
CAHF	Centre for Affordable Housing Finance Africa
CCT	City of Cape Town
CRR	Cumulative Risk Ratios
CS	Community Survey
DEA&DP	Department of Environmental Affairs and Development Planning
DEAT	National Department of Environmental Affairs and Tourism
DHS	National Department of Human Settlements
DOI	Department of Infrastructure
DSD	Department of Social Development
DWS	National Department of Water and Sanitation
ESS	Enhanced Serviced Site
GABS	Golden Arrow Bus Service
GCRO	Gauteng City-Region Observatory
GD	Green Drop
GHS	General Household Survey
HDDB	Housing Demand Database
ILI	Infrastructure Leakage Index
IPTN	Integrated Public Transport Network
IRT	Integrated Rapid Transit
MYPE	Mid-Year Population Estimates
NHTS	National Household Travel Survey
NRW	Non-revenue water
PERO	Provincial Economic Review and Outlook
PPR	Persons-per-room
PRASA	Passenger Rail Agency of South Africa
PSDF	Provincial Spatial Development Framework
RDP	Reconstruction and Development Programme
SBT	Sustainable Building Technologies

SDF	Spatial Development Framework
SDG	Sustainable Development Goal
SIV	System Input Volume
SPLUMA	Spatial Planning and Land Use Management Act 16 of 2013
Stats SA	Statistics South Africa
TOD	Transit-oriented development
UISP	Upgrading of Informal Settlements Programme
UN	United Nations
WCG	Western Cape Government
WDM	Water demand management
WHO	World Health Organisation
WSA	Water Service Authority
WWF	Worldwide Fund

DEFINITIONS

Adequate Sanitation	Flush toilets, chemical toilets, and pit latrines with ventilation (VIP).
Impacts	The consequences of changes in the environment for sustainability, specifically on humans, the economy and ecosystems.
Inadequate Dwelling	A narrow definition is utilised in this Chapter accounting only for the habitability component of dwelling adequacy as defined by the Office of the United Nations High Commissioner for Human Rights (OHCHR): "housing is not adequate if it does not guarantee physical safety or provide adequate space, as well as protection against the cold, damp, heat, rain, wind, other threats to health and structural hazards." In this Chapter it includes informal dwellings – whether located in a backyard or informal settlement - and calculated overcrowded formal dwellings.
Informal Dwelling	A makeshift structure not erected according to approved architectural plans, for example shacks in informal settlements or in backyards. Generally it is not constructed with brick and concrete.
Informal Settlement	An unplanned settlement on land which has not been surveyed or proclaimed as residential, consisting mainly of informal dwellings (shacks).
Migration	Movement of all or part of a population to and from a geographical area. The movement may be temporary or permanent.
Resilience	The ability to deal with adversity, withstand shocks, and continuously adapt as disruptions and crises arise over time.
Regional Waste Management Facilities	These are facilities that handle, store, process, and discard waste on a regional scale with various waste treatment technologies available for processing waste and final disposal.
Sustainable Development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

1. Introduction

The growth of human settlements, and the form in which they are developed, are significant drivers of environmental change. The development of human settlements affects the Western Cape's natural resources, placing increased pressure on resources, including land, water, energy, and minerals. In addition, human settlement expansion risks further degradation of biodiversity and sensitive ecosystems in the Western Cape. The availability and quality of basic services and housing is a significant determinant of quality of life, developmental outcomes and environmental impacts.

This chapter analyses the condition and quality of the environment in which people live and aspects that impact human, biodiversity health and well-being. It considers the key drivers and pressures, both caused by human settlements and as a result of them. This is shown through changing population and urbanisation rates and key indicators. Such indicators, serving as proxies for the state of human settlements, include: housing type; housing delivery; access to basic services; the quality of available drinking water; the quality of wastewater treatment; public transportation services; and the provision and function of open space resources. These are contrasted to the reported indicator performance in the 2018 State of Environment Outlook Report (SEOR) throughout.

The chapter shows that the Western Cape, South Africa's fastest-growing province relatively, stands at a crucial crossroads. Booming population presents both opportunities and challenges, demanding new infrastructure and housing while straining natural resources. Yet, amidst these pressures, the province has showcased remarkable progress. The report utilises the newly released Census 2022 data to provide new insights developmental trends. While there is contention with this data the Chapter tries to understand the drivers of the change revealed. In this regard, it reveals significant improvements in basic service access across the board, a testament to ongoing efforts. However, areas like electricity supply and passenger rail demand urgent attention, highlighting issues rooted in national parastatals' performance.

Despite these hurdles, the Western Cape population has embraced new solutions. With formal housing delivery struggling to keep pace with growth, a pivot towards improving informal settlements' basic services and infrastructure appears to have encouraged greater private investment in building materials. Water conservation efforts, spurred by the recent drought, have yielded increased efficiencies, and the implementation of a 50% organic waste ban marks a significant step towards a more sustainable future. This Chapter delves

deeper into these triumphs and challenges, offering a comprehensive analysis of the Western Cape's human settlements and infrastructure landscape, providing an update on progress toward a resilient and equitable future.

2. Drivers and Pressures

2.1. Population Growth

Census 2022 results were released during the drafting of this report, providing critical insight into the demographic changes in the province, and the environment in which the population resides, since the last census in 2011 and the General Household Survey (GHS) in 2016. Therefore this Chapter of the State of Environment Outlook Report (SEOR) has focussed considerably on this release and analysed some of the significant results that have emerged.

Comparing Census 2022 to the General Household Survey (GHS) 2016 (Stats SA , 2016) shows that the total population of the Western Cape grew by 18%, totalling 7.43 million people in 2022. This equates to a compound annual growth rate (CAGR) of 2.8%, significantly increasing from the previous five-year period. Comparatively, the number of households in the Western Cape increased by 2.7% per annum (CAGR). With an intercensal population growth rate of 2.2% per annum (CAGR), the Western Cape was the proportionally fastest growing Province, between 2011-2022.

Population growth and urbanisation impact the environment through land use change, resource consumption as well as production of pollution and emissions. As the fastest growing province in the country, the Western Cape experiences immense pressure on its existing infrastructure systems and demand for system expansion, as well as massive pressure on the natural environment. The quality of the environment, both the human and natural environment, is significantly influenced by the accessibility and level of public infrastructure services provided by the three spheres of government and parastatals.

Figure 1 shows the distribution of households within Western Cape from 2011 – 2022 by District. As can be seen in the figure, the City of Cape Town (CCT) accounts for the majority (64%) of total households in the province. The proportional distribution of households in the City has remained relatively stable over the period 2011-2022, with the City population remaining static in comparison to the province as a whole. However, while not visible in Figure 1, due to the relevant scale of the Districts, it is important to note that the Garden Route and Overberg Districts both grew at disproportionate rates, respectively recording 35% and 47% growth in households over the 2016-2022 period alone (Stats SA , 2016). In contrast, the Cape Winelands is reported as having only grown by less than 3% over the six-

year period. Overall, the population growth rate in the province increased from 2.5% between 2011-2016 to 2.7% in 2016-2022 per annum (CAGR).

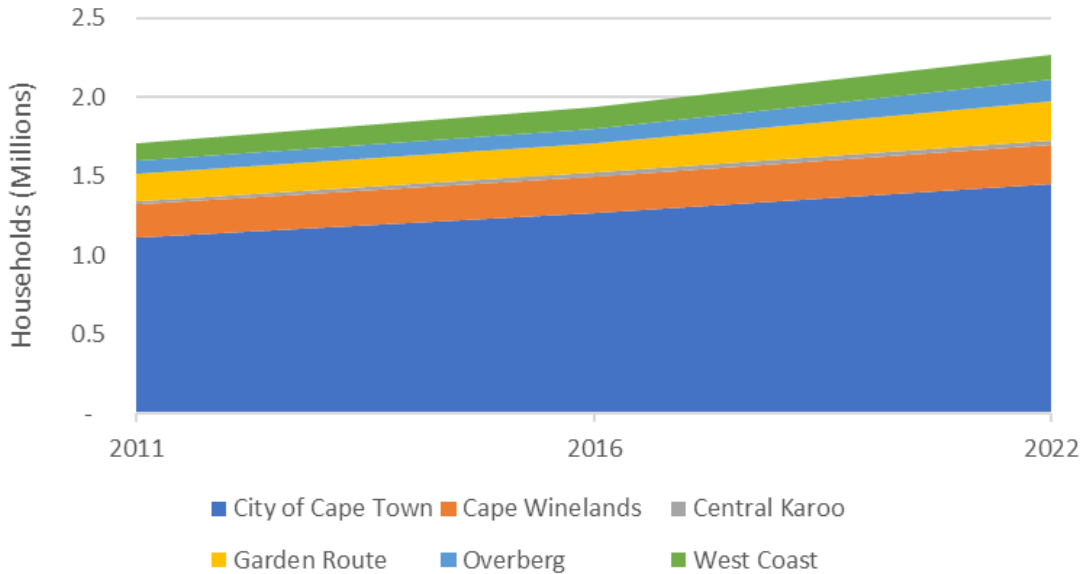


Figure 1: Number of households by District, 2011 - 2022
 Source: Authors analysis of Stats SA Census 2011, 2022 and General Household Survey 2016.

The rate of growth in population in the Western Cape, is determined by two main factors:

1. The natural population growth rate, determined by the number of births versus number of deaths; and
2. The rate of migration, determined by the number of people/households leaving the Province versus the number moving into the province from other provinces or foreign countries.

The number of households, and thus the number of houses, and connections required for basic service infrastructure, is closely linked to the growth in population. However, the average size of households tends to change over time and according to socio-economic factors. Therefore, the rate of population growth over the longer term usually will not equal the rate of growth in households for the same region. In this regard, the household size has been declining over the long term in the province. In the Western Cape, the average household size has decreased from 3.6 people per household in 2001 (Stats SA, 2003) to 3.3 in 2022. However, the population growth rate for the Western Cape is reported to have increased significantly between 2016-2021, while the household growth rate increased only marginally, and as a result, the household size has increased minutely. This may suggest that the decreasing trend has begun levelling out. This has implications for the rate of land

consumption and the number of new households to be serviced in the future, in turn impacting on the state of human settlements, infrastructure and the environment in the province.

2.2. Migration

The rate of migration into the Western Cape is influenced by a range of factors such as economic, social, political, cultural, and environmental health. People migrate due to push and pull factors. Given that the Western Cape has the lowest official unemployment rate in the country, at 20,9%¹, in comparison to the national unemployment rate of 32,6%, it is clear that economic opportunity plays a significant push and pull role in migration to the Western Cape.

According to data from Stats SA (2023a), between 2011 - 2021, total in-migration into the Western Cape was estimated at 185 600 people, as shown in Figure 3. Migrants from the Eastern Cape have historically constituted approximately 40% of this migration into the Western Cape. However, the rate of migration from Gauteng (the second largest contributor of in migration) has increased the fastest over time, increasing at a compound annual growth rate (CAGR) of 2.7% between 2016-2011.

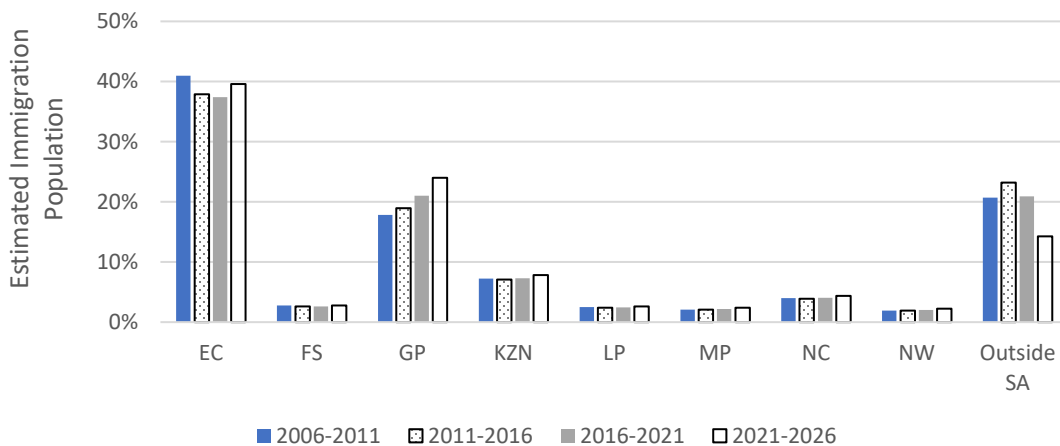


Figure 2: Estimated percentage migration streams into Western Cape, 2011 - 2026
 Source: Own analysis of the Mid-Year Population Estimates (MYPE) 2022, Stats SA.

International immigration decreased slightly from 2016 to 2021, and it is projected to keep declining significantly between 2021 and 2026. It is not clear what would cause this decline

¹ Quarterly Labour Force Survey, Quarter 2: 2023

but it may be partly attributable to post-COVID-19 travel restrictions and movement which continue to impact movement patterns as pointed out in the census report (Stats SA, 2023d). It is important to note that climate change is impacting migration patterns in Sub-Saharan Africa and its impacts will intensify in future. This is particularly evident in rural to urban migration, where climate change is likely to impact on rural agricultural activities and force rural households to seek alternative livelihood strategies in urban centres. Sea level rise and increasing frequency and intensity of natural disasters will further drive new migration patterns in Sub-Saharan Africa in future (Ibrahim & Mensah, 2022).

Figure 3 shows that rate of annual in-migration to the province increased between the period 2016-2021. However, the rate of out-migration has increased faster than in-migration resulting in a marginal decline of net annual migration between 2016 - 20221.

Reporting on the estimated number of undocumented immigrants has proven a difficult task. While census data provides some indication of the number of immigrants, it is especially difficult to keep track of who is undocumented and therefore illegally in the country. Undocumented respondents may be inclined to self-report as South African or avoid reporting at all, both of which may contribute to an increased margin of error inherent to official statistics. Net migration, which is calculated as the difference between in-migration and out-migration, is projected to decline over the 2021-2026 period. However, despite the decline, net migration remains positive as the rate of people moving into the province is still significantly higher than those leaving.

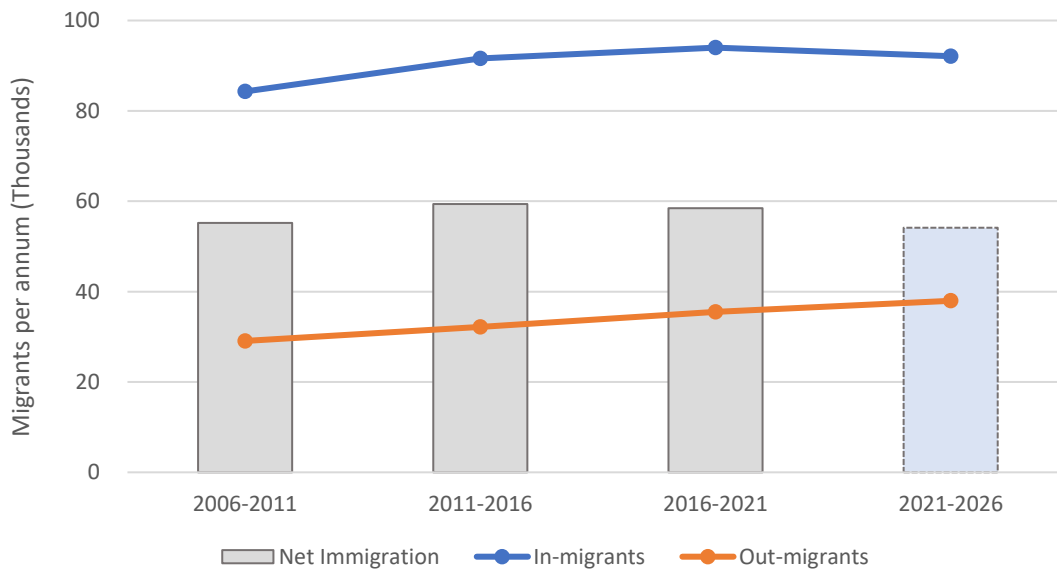


Figure 3: Average annual Western Cape migration, 2006 - 2026
 Source: Own analysis of the Mid-Year Population Estimates (MYPE) 2022, Stats SA.

2.3. Urbanisation and Growing Human Settlements

According to the Census 2022, there have been some remarkable shifts in urban demographic patterns in the country. Perhaps most notably, as reported by the Gauteng City region Observatory (GCRO, 2023), the Census reported that the rate of population growth in Johannesburg had declined to such an extent (0.7% CAGR) that the City of Cape Town was only marginally smaller at the point of the Census. Further, given the 3% CAGR for the population of Cape Town, it is estimated that by 2024 it will have surpassed Johannesburg to become the largest municipality in the country.

The rate of population growth across most of the province was reflective of this trend, with a CAGR of 2.8% for the Western Cape between 2016-2022 or 2.2% between the last two censuses. As a result of this rapid growth the Western Cape has, in the last decade, also surpassed the Eastern Cape to become the third largest province by population in the country. The significant in-migration flows from the Eastern Cape to the Western Cape, as discussed in section 2.1, are a direct driver of this demographic shift. Overall, the Western Cape experienced 2.2% CAGR in the intercensal period, significantly higher than the rate of growth nationally, at 1.7% compound annual growth.

This latest development is part of a long-term trend, reflected in the fact that in 1996, the Western Cape was only the 5th largest province in the country. Over the longer term, only Gauteng has experienced proportionally similar rates of growth, although in absolute terms, its population has grown by twice as much.

3. State

3.1. Housing Demand and Delivery

The significant rate of population growth experienced in the Western Cape, as discussed in Section 2, exerts substantial pressure on the public sector to provide sufficient services to cater for new growth, while simultaneously attempting to address existing backlogs. If adequate services cannot be provided to meet this growth, residents must resort to informal housing, located on unlawfully occupied lands, with dire impacts on quality of life for residents and the natural environment. Conversely, where the private and public sectors are able to supply adequate housing and services, a reduction in households residing in informal settlements should be perceptible, with significant associated environmental and societal benefits.

Although the review period of this SOER is 2018-2022, the Community Survey (CS) 2016 serves as the baseline for evaluating changes in the state of human settlements and infrastructure as related to the environment in the Western Cape. Primarily, 2016 is utilised as it is the most significant survey undertaken by Stats SA in the 2011-2022 intercensal period. Secondly, much of the data analysed in the 2018 State of Environment: Human Settlements Chapter was 2016 data, so the comparison is appropriate for this review window.

Housing Demand Baseline

According to analysis of the CS 2016 and the GHS 2016, the number of households residing in inadequate housing conditions at the time was approximately 539 000 households. This figure represents all households living in informal dwellings, whether in informal settlements or the backyards of other dwellings, and those living in overcrowded conditions in formal or brick and concrete housing. The number of inadequately housed households is the total demand for new housing at the time. Inadequately housed households represented 26% of all households in 2016.

3.1.1. Housing Delivery

Public Sector Housing Delivery

Historically, subsidised public sector housing has been a major contributor to total housing supply in Western Cape urban centres and as a result, the housing programme has also been a primary driver of municipal infrastructure service expansion. For example, it is estimated that 43% of registered housing stock in George City Area is government subsidised

housing (WCG & CAHF, 2022), which demonstrates the impact the public sector housing programme can have on urban development. Census 2022 reports that approximately 24% of households in the province identify themselves as residing in government subsidised housing.

Although it is still a critical provider of new supply, particularly for low-income households, delivery of public sector subsidised houses has declined from approximately 13 000 in 2012/13 to approximately 7 800 in 2022/23, a reduction of 40%. The rate of delivery was also significantly impacted by the COVID-19 pandemic as can be seen in Figure 4.

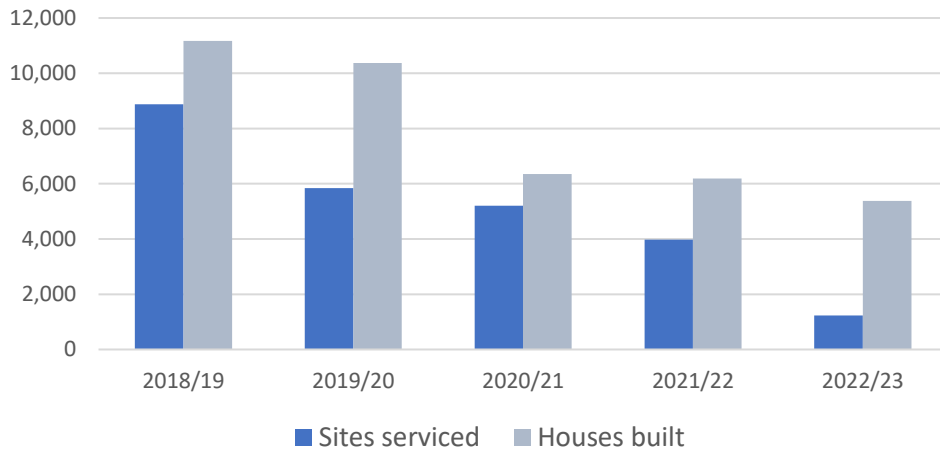


Figure 4: Number of houses built and sites serviced in the Western Cape, 2018/19 – 2022/23
 Source: Department of Human Settlements (now the Department of Infrastructure) Annual Reports 2018/19 to 2023/24

This decline is largely attributable to declining capital grants in real terms from the national fiscus. The shrinking budget has been compounded by construction costs escalating above inflation and increasing standards required for subsidised houses driving up the cost per unit. Lastly, there has been a growing shift towards informal settlement upgrading and therefore, a reallocation of fiscal resources away from top structure provision, although this has yet to manifest in increased site delivery, which is expected in the medium-term. A small but growing number of serviced sites are provided to beneficiaries as an end-product, for self-build consolidation, through the Upgrading of Informal Settlements Programme (UISP).

Private Sector Housing Delivery

Data reported by large municipalities² to Stats SA on the number of formal residential dwelling units completed by the private sector shows that, on average, between 2018-2022, approximately 12 600 new units³ were completed per annum in the Western Cape (Stats SA, 2022d). This contrasts with an average growth of 55 000 households per annum between 2016 -2022.

As shown in Figure 5, most of the private sector residential delivery over the past decade was in Cape Town, and with delivery in CCT during 2022 accounting for 78% of all units in the Province that year⁴. It is also clear that private sector delivery began declining before COVID-19 and then rapidly deteriorated during the lockdowns of 2020 but has recovered strongly. The increased rates of completions may be partly attributable to correcting for the shortfall in 2020 and the increased migration to the Western Cape from other Provinces and countries. The latter is evident in that private sector completions in the Western Cape accounted for 44% of the national total in 2021 and 2022, while the province only accounted for 11% of total households in the country in 2021 (Stats SA, 2021).

This rapid and outsized growth in housing supply places tremendous demands on infrastructure in the Province which must expand to meet demand, both for those residing in formal and informal housing, while simultaneously addressing the current housing and infrastructure backlog.

² In the Western Cape this includes: Bitou; Breede Valley; City of Cape Town; Drakenstein; George; Knysna; Mossel Bay; Oudtshoorn; Overstrand; Saldanha Bay; Stellenbosch; and Swartland.

³ It is possible that some double counting occurs where a newly built house by a private developer is purchased with the assistance of a demand side subsidy (First Home Finance)

⁴ This figure may be overstated as Stats SA estimates that the large Municipality dataset accounts for 80% of private sector delivery nationally and a similar trend is likely in the WC – with all unaccounted for residential growth in the dataset located outside the metro.

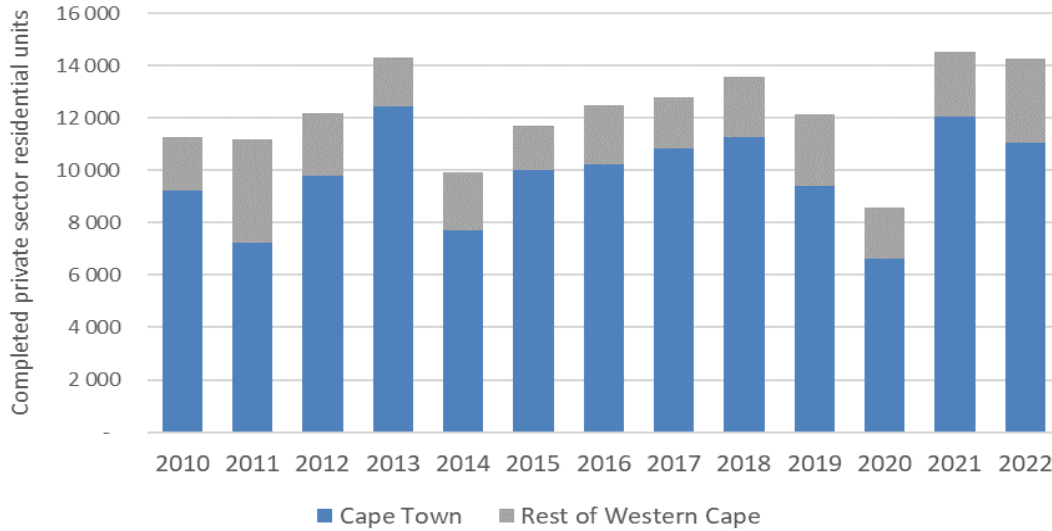


Figure 5: Formal dwellings completed in the Western Cape by the private sector, 2010-2022
 Source: Own analysis of Stats SA Private Sector Completions (P5041.3)

Despite representing an outsized share of new units nationally, overall, the number of private sector units delivered during the 2019-2022 review period was 16% lower than the preceding 2015 - 2018 review period. Therefore, performance in terms of this indicator appears to have worsened over the review period.

3.1.2. Housing Demand

To be selected for a housing opportunity in most subsidy projects, a beneficiary must be registered on the Housing Demand Database (HDDB). Therefore, the database is a proxy for registered demand for subsidised houses in the Western Cape, particularly from those households with monthly incomes below R3 500 which can potentially qualify for a fully subsidised house. It is important to note that the household information captured on the HDDB is not yet verified, and to remain accurate, relies on updating by households. Therefore, intra and inter provincial household mobility is often unaccounted for on the HDDB. Based on the latest available data as of March 2023, the total registered ‘waiting’ demand on the HDDB in the Western Cape was approximately 600 000 household entries. Of this total demand, 59% was registered in the City of Cape Town as shown in Figure 6 below. As discussed in the section above, comparatively, 64% of all households in the province live in Cape Town and according to Census 2022 Cape Town accounts for a similar 66.5% of inadequate housing in the province, when excluding overcrowding⁵. Some of the

⁵ Detailed municipal level data was not yet available for Census 2022 when compiling this analysis and could only be calculated at the provincial scale with available data.

difference between census findings and the HDDB may be related to higher incomes in the Metro and potentially, a greater proportion of the population residing in inadequate housing may have migrated to the Western Cape and either be registered in another Province or ineligible to register.

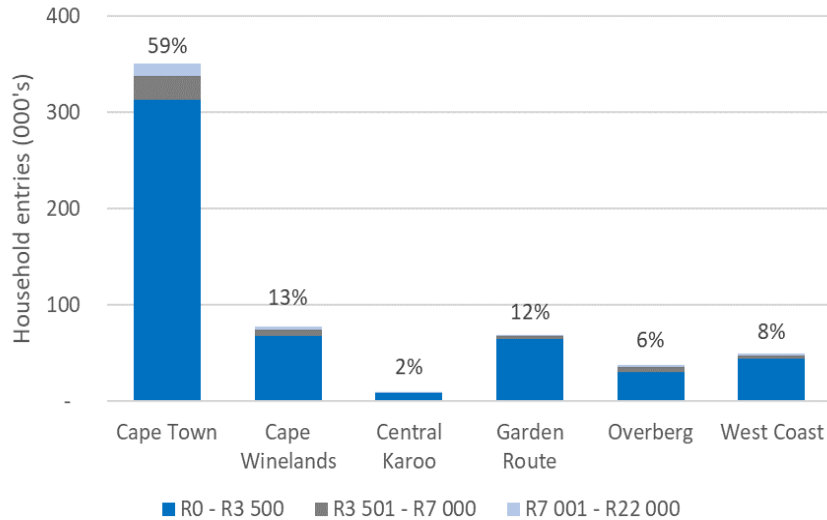


Figure 6: Entries on the Western Cape Housing Demand Database by district, 2023
 Source: Western Cape Housing Demand Database, March 2023

The previous SEOR Human Settlements Chapter stated that, as of July 2017, 535 800 households had registered their demand for housing. Therefore, registered demand has increased by approximately 12% since, equating to a 1.9% CAGR which is marginally lower than the total provincial household CAGR of 2.2% over a comparable period (2016-2022).

Overcrowding

In addition to informal housing, households residing in overcrowded formal or brick and concrete dwellings are also considered as inadequately housed, and are an additional source of unmet housing demand. Overcrowded dwellings can pose significant health and safety risks and can negatively impact the environment. An example of this can be seen in parts of the metro-southeast of Cape Town where resident densities, through overcrowded dwellings and additional backyard dwellings, have far exceeded the initially planned densities for the infrastructure, contributing to a significant rise in the number of raw sewage spills.

Overcrowding is difficult to quantify and therefore is often not accounted for, when determining unmet housing demand. However, the full Census results provide the requisite variables to estimate the number of overcrowded households by municipality.

Unfortunately, at the time of this analysis, the requisite variables had not been released for Census 2022 nor were they publicly available for the 2016 Community Survey. However, the GHS, an annual representative sample survey⁶, also provides sufficient data variables to estimate overcrowding. Therefore, the 2016 and 2022 general household surveys were used to analyse overcrowding and then overlaid with the CS and Census results respectively. While this methodology is not perfect, and will provide lower accuracy than using census figures alone, it is considered adequate for the purposes of comparison between the two time periods.

Analysis of the GHS 2022, using the methodology described in the Info Box below, shows that there were approximately 141 000 households residing in overcrowded formal or brick/cement dwellings. This represents a 13% decline in such households since the 2016 GHS which reported approximately 161 000 overcrowded households residing in brick/concrete or formal housing. This represents a positive outcome for the Western Cape over the review period.

Info Box 1: Defining, benchmarking and measuring overcrowding.

There are no universal benchmarks of overcrowding. Commonly cited simple benchmark figures range from 1.5 (American Crowding Index) to 3 (UN-habitat) persons per habitable room (i.e. excluding the kitchen and bathroom) (World Health Organisation, 2018). Many regions and countries also apply more complex benchmarks based on household make up, age and relationships of occupants. However, such an analysis cannot be applied at scale. For this reason, persons-per-room (PPR) is the most widely utilised measure, according to a broad review (US Department of Housing and Urban Development, 2007).

In the Western Cape, a previous housing demand study undertaken by the then Department of Human Settlements (WCG, 2015) utilised a benchmark of 2 people per habitable room, aligning with other key local benchmarks (University of Cape Town & Childrens Institute, 2023).

This Chapter, therefore, utilised the measure of 2 people per habitable room as the benchmark for determining an overcrowded household.

⁶ Other than residents in workers' hostels the survey does not cover other collective living quarters such as students' hostels, old-age homes, hospitals, prisons and military barracks, and it is therefore the only representative of non-institutionalised and non-military persons or households in South Africa.

In Census 2011, and in the General Household Survey pre-2014, the reported “total rooms” per household statistic was habitable rooms only – so could be directly compared to the number of people residing in that household to determine whether it was overcrowded or not. However, post 2014, the “total rooms” indicator was adjusted to reflect all rooms, habitable and non, in a household. Therefore, the analysis of 2016 and 2022 required a calculation of habitable rooms, by deducting the number of bathrooms, toilets and kitchens from the total rooms, for every permutation of household size, total rooms and respective rooms of each type.

While technically the two methodologies above should provide approximately comparable results, given the difference in datasets and methodology, there is greater confidence in the comparability of the 2016 and 2022 results to each other, than against the 2011 results.

3.1.3. Housing Supply Versus Demand

Assuming there is no pre-existing surplus of housing in a market, when the number of new households entering a market exceeds the rate of new houses built, the number of households surplus to houses built will either co-habit with other households, commonly leading to overcrowding, or households will, out of necessity, erect/rent a new informal dwelling to live in. This informal dwelling will typically be located in either the back yard of another dwelling (commonly a formal dwelling) or on unlawfully occupied land in an informal settlement.

Therefore, where the growth in households (demand) exceeds new houses (supply) the result is additional overcrowding and informality in urban centres. In the Western Cape, there is relatively robust data on the number of new private sector residential dwellings delivered per annum and the total number of new subsidised units completed by the public sector, as discussed in Section 3.1.1. Therefore, the number of new formal residential units completed per annum can be measured with a high level of confidence. The number of new households formed in the Western Cape, through natural growth, household atomisation and immigration, is determined through various surveys undertaken by Stats SA. The most recent and comprehensive of these surveys was Census 2022 – undertaken 11 years after the previous Census in 2011.

Census 2022 data

The Census reported a number of findings which were incongruent with trends expected from previous estimates based on smaller samples (Community survey; general household survey; MYPE) and at the time of writing this Chapter, the results were still subject to intense scrutiny. Regarding supply and demand in the housing market, Census 2022 released two very significant findings:

1. The total number of households in the province were significantly higher than anticipated. Quantec and the General Household Survey 2022 estimated total households to be between 1.9 and 2.08 million respectively. The Census 2022 however found that there were 2.26 million households in the province – representing a 9-14% increase from previous best estimates.
2. Census 2022 results report a marked decline in the number of households residing in informal shack dwellings. It found there were approximately 250 000 households residing in informal shack dwellings, a decline of 69 000 households from that reported by the Community Survey 2016 and 45 000 from Census 2011. Therefore, a complete trend reversal was reported, with total informal dwellings growing at a compound annual rate of 1.5% between 2011 – 2016 and then declining at an annual compound rate of 4% between 2016 – 2022.

It is expected then that for the total number of informal dwellings to decrease, new adequate housing supply completed over the period must exceed new demand, which then supplies, and commensurately reduces, the pre-existing housing backlog. However as is shown in Figure 7, new formal units completed cannot account for this significant change in housing stock alone. As was unpacked in Section 3.1.1, new formal private sector housing delivered per annum, between 2016-2022, averaged only 12 600 units and the public sector 9 500. Therefore, cumulatively an average of approximately 22 100 new formal units were delivered per annum in the Western Cape over the period. However, between 2016-2022, an average of 55 000 new households were established in the Western Cape yearly, resulting in a deficit of approximately 32 900 dwelling units per annum. In total, over the period between the 2016 Community Survey and the 2022 Census, the number of households grew by 330 000, while new formal stock increased by only 155 300 units, at most. Therefore new, formal, housing stock was not sufficient to meet even half of new growth demand, let alone reduce the pre-existing backlog.

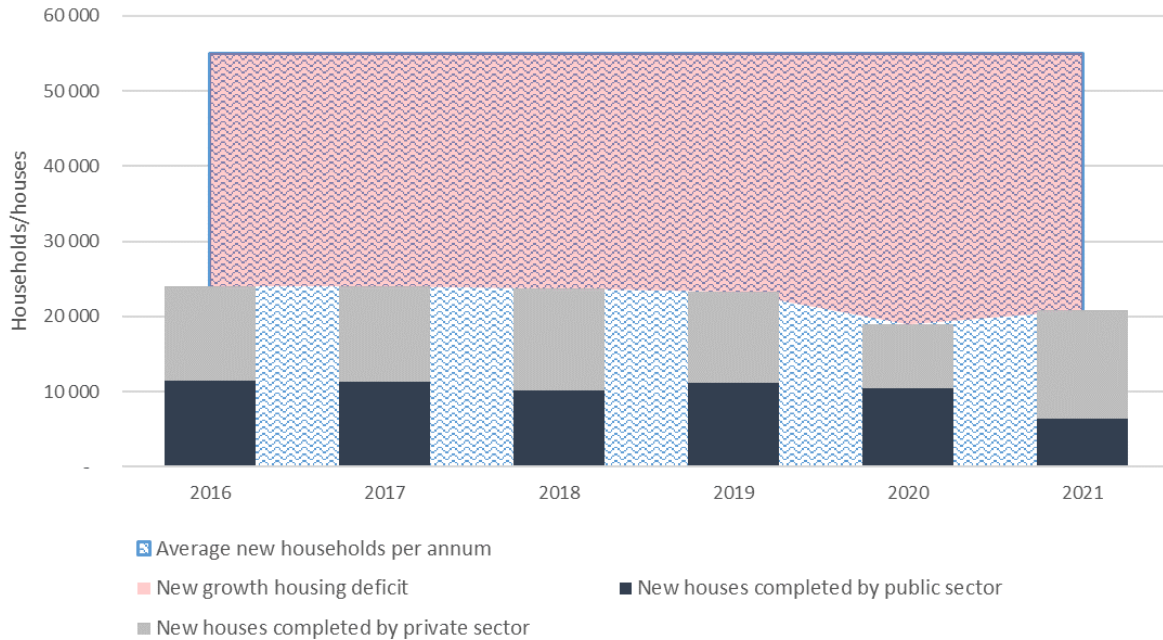


Figure 7: Housing demand, new supply and resulting deficit per annum, 2013-2021.
 Source: Authors analysis of Stats SA Private Sector Building Completions; Community Survey 2016; Census 2022; DOI annual reports.

It would be expected that such a deficit of new stock would have to result in commensurate growth in households residing in informal dwellings. Given this discrepancy, the Census 2022 results must be considered with caution. Beside for possible statistical inaccuracies, which may have arisen due to the Census 2022 undercount (discussed further in Info Box 2), this research identifies two hypothesis that could each potentially account for some of the statistical divergence.

1. There has been a large-scale change in the materials households residing in informal settlements use in construction on of their dwellings. **Improving their informal dwellings to a more permanent nature** using materials such as bricks and cement, instead of corrugated iron and adhoc materials that are commonly associated with informal dwellings. In such instances, residents would likely report themselves residing in a brick or concrete dwelling, which historically was largely reserved for formal adequate housing. While these would not be considered legally formalised dwellings, if constructed from brick or concrete, it would likely not be reported as an informal dwelling in terms of the Census questionnaire. This is considered the main driver of the observed changes however there is limited reliable public data on such incremental improvements. It is also unclear what would have caused such a significant shift over the last 6 years compared to historic trends.

2. The **proliferation of small-scale rental units**, particularly in low-income areas of Cape Town may have contributed. These units typically represent a significant increase in site density, and while they are largely not formalised in terms of planning permissions, they are commonly built from bricks and are of a permanent nature. Therefore, residents of such units would likely report themselves residing in a brick dwelling, flats or formal backyard dwelling, and not an informal dwelling. Incremental improvement of formerly informal backyard dwellings may also have contributed.

By comparing new completed dwellings data to reported growth in household type, it is possible to examine what types of housing would fall under this typology of unformalised but higher standard of construction housing, using brick and concrete. This comparison is shown in Figure 8, which shows the average newly built houses recorded per annum between 2016 – 2022 and the reported growth in households by the equivalent housing type (Stats SA 2016; 2022). This shows two key findings: firstly it reflects an even larger discrepancy between the datasets, than when just comparing new units to total new household growth (given that informal households actually declined according to Census 2022); and secondly, by far, the majority of new adequate housing reported in Census 2022 was freestanding, which amounted to 66 000 households moving into brick and concrete freestanding housing per annum, on average.

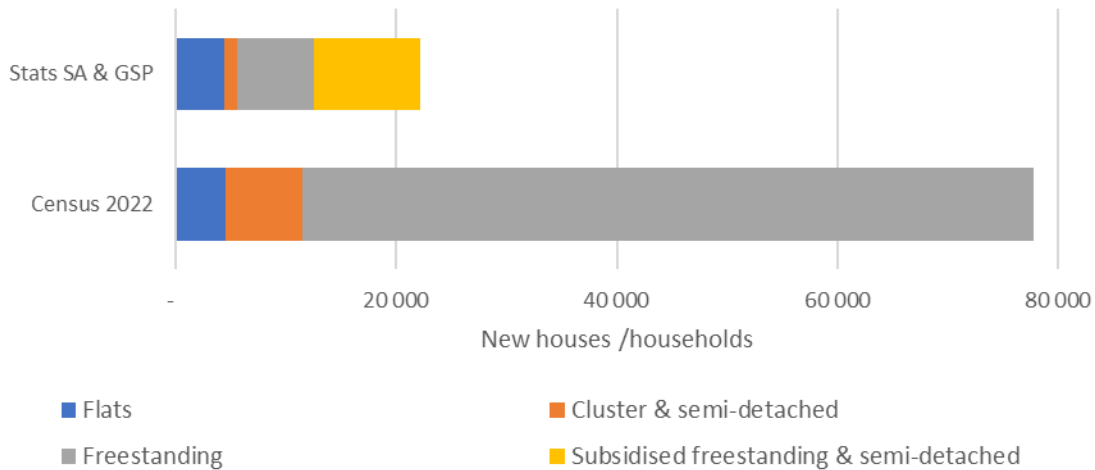


Figure 8: Comparison of average new household and unit growth by type, 2016 – 2022
 Source: Analysis of Community Survey 2016; Census 2022; Stats SA private sector completions; DoI delivery statistics.

The Census 2022 results do report a 33% increase in households residing in formal backyard dwellings since 2016, this only represents an additional 18 800 households over the period. While this could account for the reported 16 850 reduction in households residing in informal

backyard dwellings, it would only account for an additional 3 100 units per annum, a marginal increase on the observed rate of growth between 2011-2016.

Similarly households residing in apartments (flats) grew 36% between 2016-2022, significantly higher than total observed household growth of 15%. According to data collated by Stats SA, the private sector completed on average 4 400 apartments per annum between 2016-2022, while analysis of Census figures indicates that 4 500 new households resided in flats on average, yearly. Therefore, formal completions would likely account for most, if not all (multiple households per dwelling would account for some of the surplus households) of the reported growth in households residing in flats. Consequently, a surge in households residing in new multi-storey small scale rental units (identified as flats), located in informal settlements, is not likely to account for the vast increase in adequate housing.

Contrasting the delivery of semi-detached housing and the reported growth in Census is challenging, as there is not a collated dataset reflecting the typology of new subsidised housing units, which are a mixture of freestanding and semi-detached housing, depending on the project location and local context.

Info Box 2: Census 2022 Data Integrity and Confidence Levels

Stats SA published the net coverage error rate (which is the difference between over-counts and under-counts) for Census 2022, as indicated by the post enumeration survey, which reflected the Western Cape as the poorest in the country by a significant margin, at 35.6% for households compared to a national average of 31% (Stats SA, 2023c). This is very high by both previous Census and international standards. While this is not a significant issue if the undercount is sampled at random, as statistical methods could easily adjust for this, the error rate is variable by geographic types (49% on farms vs 14% in traditional areas), and housing types, with Stats SA stating they had issues accessing gated communities, as an example. However, Stats SA applies statistical methods to mitigate these issues and the Statistician General has stated their confidence in the results after validation testing.

Many prominent researchers and academics have however questioned the resultant accuracy levels of the Census given the issues mentioned above and some of the surprising initial findings (Everatt, 2023) (71point4, 2023) (Davis, 2023) (Gauteng City-Region Observatory, 2023).

There are certainly very surprising municipal level results emerging in the Western Cape, which require further investigation. Only when sub-municipal data is made available, will it be possible to test the veracity of results with confidence. This is perhaps best reflected by a statement from the Head of Wits School of Governance (Everatt, 2023) who stated that, “at aggregate level, Census 2022 is robust. At sub-national – and especially sub-provincial – levels, however, it may be less so. Only time and data analysis will tell.”

Although the public confidence in Census 2022 results may have been negatively impacted, the results are nonetheless the largest sample taken in a decade and are the best source of information on the current state of the population. For this reason, it is the de facto source for current population statistics in this Chapter. However, it should be remembered that these are newly released results that are still undergoing rigorous assessment by researchers across the country and may turn out to be less accurate than hoped, particularly at the sub-provincial level.

Housing Situation

Ultimately, the total unmet housing demand can be measured as the sum of those living in inadequate dwellings, which is largely informal dwellings in informal settlements or backyards, and overcrowded households residing in brick/concrete or formal dwellings. Figure 9 shows a breakdown of these housing situations and reflects that the proportion of households adequately housed in the Western Cape has increased from 74% in 2016 to 82% in 2022 – an increase in absolute terms of approximately 418 000 households.

This represents a significant improvement over the review period and continues the trend from 2011. It must be reiterated however, that most of the additional 418 000 ‘adequate’ units are likely brick/concrete houses located in informal settlements or backyards, and may not be adequately serviced or safe for habitation.

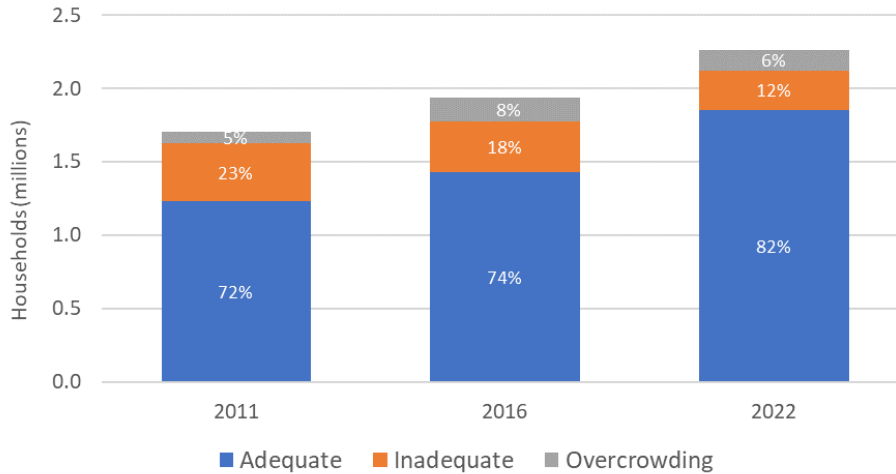


Figure 9: Households by dwelling adequacy in the Western Cape, 2011-2022

Source: Source: Authors analysis of Stats SA Census 2011 and 2022; Community Survey 2016; and General Household Survey 2016 and 2022.

Census 2022 data also does not reflect significant growth of informal settlements during the COVID-19 lockdowns and associated economic impacts of 2020 or 2021 as was widely reported. However, Departmental data shows that between 2017-2021, post the COVID-19 pandemic, the number of informal settlements in non-metropolitan areas of the Province increased by 129 (42%) to 431 informal settlements, while the number of structures more than doubled to approximately 99 000 structures (Provincial Treasury, 2022). As stated in the PERO (Provincial Treasury, 2022), between 2017-2022, the number of informal settlements in the Garden Route increased by 67 to 214, the Cape Winelands by 25 to 110, the Overberg by 15 to 55, while the West Coast increased by 23 to 47 informal settlements. Only in the Central Karoo did the number of informal settlements decline by 1 to 5.

3.1.4. Settlement Patterns and Housing Type

The linkages between urban settlement development patterns, or urban morphology, and sustainability are well established. While all urban development and human settlement growth have impacts on the natural environment, the extent of this impact per capita can be significantly altered by the form of urban development in which a person resides.

Residential density, location of population in relation to jobs, as well as, the availability of public transport systems, are all significant determinant of this impact. Higher residential densities reduce environmental impact by consuming less land and services and supporting shorter trip distances to economic and social amenities, which in turn reduces associated pollution and emissions. Jobs being located closer to the population have the same effect of shortening trips and high public transport usage dramatically reduces the number of

private vehicles on the road. There are also key linkages between the viability of public transport and residential densities, as well as urban morphology.

South African urban centres are notorious for their sprawling nature and low densities, outside of informal settlements. Historically, Apartheid planning as well as the provision of low-density subsidised housing on the urban periphery, due to land costs and availability, has been a significant contributor to entrenchment of this form. Spatial planning and private sector development have reinforced this trend. However, there has long been a growing recognition of the need for denser urban settlements in South Africa.

While the relative location of residential and non-residential development is a key driver of urban sustainability, it is a challenging metric to measure at the Provincial scale as it requires significant local contextual nuance and analysis. Instead, in this Chapter, the typology of new development is considered as a key variable in achieving denser urban settlements. While such development may potentially be poorly located, and therefore dampen the benefits of densification, by and large, denser development typologies will be more sustainable. They tend to reduce land consumption, consume less services (water, electricity etc), produce less waste and promote the viability of public transport.

The Stats SA private sector completions dataset collates new housing units completed, by typology, which provides insight into changing demand and supply trends and is indicative of the density of new development in the province. In this regard, the Western Cape has been improving over the long term, with the proportion of freehold residential dwellings (typically the lowest density residential typology), as a share of all new private sector dwellings, declining from 79% in 2011 to 52% in 2022. This is shown in Figure 10, which further reflects that in 2022, 38% of new residential dwelling units were flats and 10% were townhouses. Progress has continued in the review period with free standing dwellings representing 50% of new dwellings on average, in comparison to 67% in the previous review period (2014-2018). This trend represents a positive change in improving urban sustainability in the Western Cape.

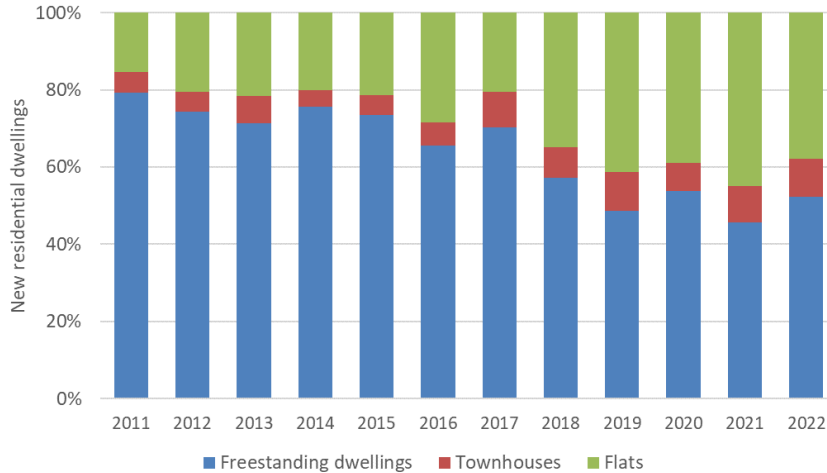


Figure 10: Breakdown of new residential development in the Western Cape by typology
 Source: Authors analysis of Building Completions reported by Stats SA, 2014 – 2022

It is important to note however, that the figures above represent private sector delivery only and do not include subsidised houses delivered by the public sector, which accounted for approximately one third of all new, formal, houses in the Western Cape in 2022. However, as discussed in the previous section, there is currently no collated dataset reflecting the typology of new subsidised housing units delivered across the province, which are a mixture of freestanding and semi-detached housing depending on the project location and local context. There has, however, been a definite shift towards higher density subsidised housing, with most if not all units in the Metro being multi storey semi-detached units. Therefore, this indicator is trending positively for improved sustainability of settlements in terms of development form.

3.2. Infrastructure Access and Quality

The Bill of Rights states in Section 26 of the Constitution that everyone has the right to have access to adequate housing and further in Section 27 states everyone also has the right to have access to water. While the Bill of Rights does not elaborate on other basic services, the Constitutional Court recognised that adequate housing as envisioned in Section 26 includes more than bricks and mortar, it requires available land, appropriate services such as the provision of water and the removal of sewage and the financing of all of these, including the building of the house itself.

Access to quality basic services such as electricity, water, sanitation and waste removal is essential for alleviating poverty and inequality, providing dignity, which will inevitably raise

living standards and facilitate greater economic opportunities for all. It is important to note that equal access requires both physical access to the infrastructure, a service that is well maintained and for households to be able to afford the requisite minimum consumption of services.

This section unpacks the delivery of basic services over the review period and considers the quality of these services where possible.

3.2.1. Access to Potable Water

Adequate water provision is vital for health and hygiene. It is the responsibility of a Water Service Authority (WSAs), which is the relevant municipality (District, Local or Metro), to ensure households receive adequate basic water service provision. A Water Service Provider (WSP) may be appointed by a WSA to provide water to its residents and customers.

In an urban settlement, adequate water provision is water piped to a dwelling or communal tap within an accessible distance. According to census data (Stats SA, 2011 & 2022), the proportion of households with access to some form of piped potable water has remained largely static over the past decade, at approximately 99% of households. However, as can be seen in Figure 11, the proportion of households which have direct access to piped water, either in their home or yard, has increased from 88% to 93% of households. This indicates that fewer households (both proportionally and in absolute terms) are now reliant on communal water services. The majority of this improvement has occurred in the past 5 years, with direct access increasing by 4 percentage points from 89% in 2016 (Stats SA, 2016).

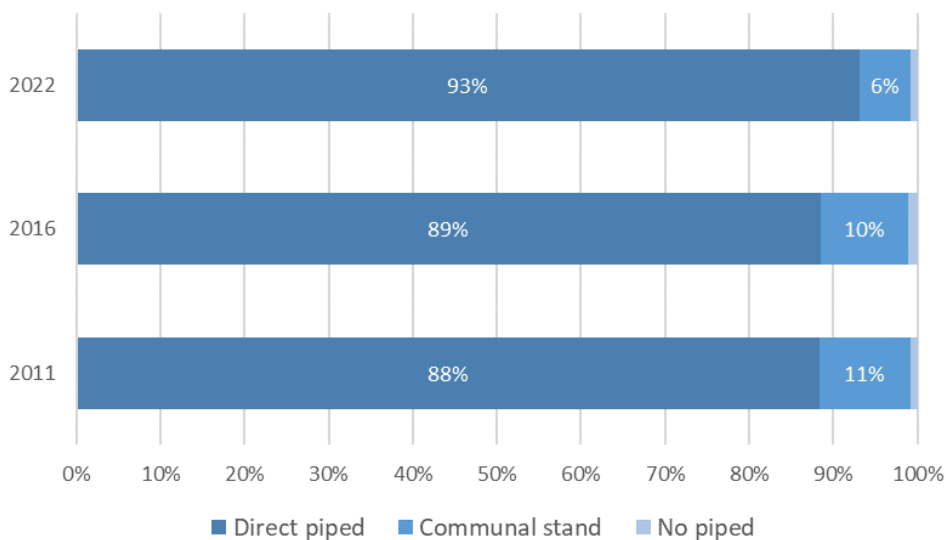


Figure 11: Breakdown of water access in the Western Cape by type, 2011-2022

Source: Authors analysis of Stats SA Census 2011, 2022 and General Household Survey 2016

As shown in Figure 12, this improvement has been reported across all Districts in the province over the 2016-2022 period. Although in total, the number of direct piped access households increased by 23% over the period, this was not evenly distributed, with Overberg increasing the number of households with direct piped water access by over 50% during the five years, for example. In total, figures reported by Census 2022 indicate that almost 400 000 additional households have been serviced with direct piped water since 2016. Despite this, due to population growth, the number of households with no access to piped water has remained static over the period at approximately 20 000 households.

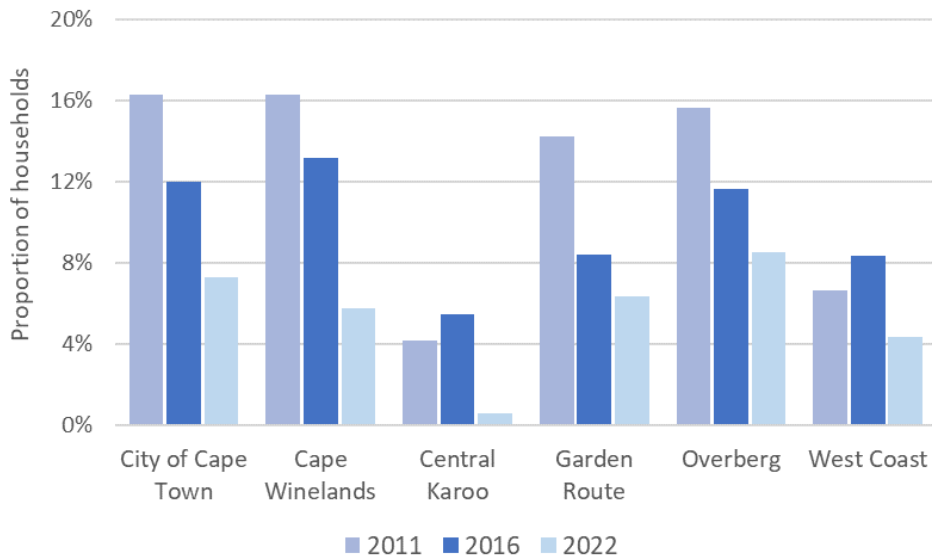


Figure 12: Percent households without piped water (incl communal) access, 2011–2022
 Source: Authors analysis of Stats SA Census 2011, 2022 and General Household Survey 2016

3.2.2. Quality of Drinking Water

The *Blue Drop* Certification programme was introduced in 2008 by the national Department of Water and Sanitation as an incentive-based regulation measure for all Water Services Institutions, in an effort to ensure the provision of safe water to all citizens in the country. The programme aligns with the World Health Organisation’s (WHO) Water Safety Planning initiative, and by virtue, extends to the South African National Standard SANS 241:2015 minimum requirements for drinking water.

When the *Blue Drop* programme was launched, it became the standard for promoting transparency and ensuring confidence in the quality of drinking water nationally. However, in 2014 the (DWS, 2022a) discontinued the programme, and it was only relaunched during

this review period, in 2021/22, when the 2022 Blue Drop Progress report was released. The 2023 Blue Drop Report provides an update of the Blue Drop scores, last published in 2014, as reflected in Table 1 below.

Table 1: Blue Drop scores from 2011 to 2023

Area	Water Service Authorities	2011	2014	2023
Cape Winelands District	Breede Valley	85.93	89.16	60
	Drakenstein	95.72	72.14	94.1
	Langeberg	32.39	72.3	44.7
	Stellenbosch	95.74	80.12	69.9
	Witzenberg	97.56	95.77	81
CCT	City of Cape Town	97.61	95.86	98.1
Central Karoo District	Beaufort West	92.01	89.52	53
	Laingsburg	80.54	26.06	47.8
	Prince Albert	70.72	34.18	28.2
Eden District	Bitou	96.12	90.43	81.7
	George	96.26	82.77	94.95
	Hessequa	14.1	55.18	50.1
	Kannaland	22.05	31.66	25.8
	Knysna	89.76	61.62	78.9
	Mossel Bay	95.27	78.76	87.4
	Oudtshoorn	36.88	51.29	63.9
Overberg District	Cape Agulhas	73.01	69.48	90
	Overstrand	90.56	90.79	99.99
	Swellendam	80.5	57.25	58.6
	Theewaterskloof	75.41	64.18	89.6
West Coast District	Bergrivier	85.2	63.79	85.1
	Cederberg	51.05	39.96	35.9
	Matzikama	32.98	48.64	55.2
	Saldanha Bay	87.69	69.38	94.6
	Swartland	92.89	74.26	93.8
Table legend				
Improving score				
Worsening score				

Source: Adapted data from Department of Water and Sanitation (2023a)

The cumulative provincial Blue Drop score is no longer published in the 2023 report release. However, the Western Cape has shown overall improvement. Among the water systems audited in the Western Cape, those that scored more than 50% in their blue drop score increased from 72% in 2014 to 77% in 2023. As depicted in Table 1, 10 WSAs Blue Drop score deteriorated between 2014-2023.

Water supply systems need to score at least 95% in the Blue Drop Certification assessment to receive a Blue Drop Certificate. The number of WSAs that received their Blue Drop certification increased from 8 WSAs in 2014 to 15 WSAs in 2023 (out of 25 WSAs), showcasing that the trend has improved since the last reported year. The best performing WSA with a Blue Drop score of 99.99% is Overstrand municipality, followed by the City of Cape Town with a score of 98.1% (Department of Water and Sanitation, 2023a).

The Blue Drop Risk Ratings (BDRR) is also a significant metric to report on, which reports on *specific risk indicators* at a specific moment in time (i.e., snapshot view) of the water system⁷. The BDRR is expressed as a percentage before a system reaches its maximum critical state. It is represented as following: Critical (>90%), High (70 – 90%), medium (50 to 70%), low risk (<50%). The higher the BDRR value, the higher the risk and need for urgent intervention. This means that the WSS needs to undertake corrective measures urgently. Figure 13 shows the average BDRR scores for all water supply systems in a WSA and shows that the majority of water supply systems in Western Cape are in the low-risk category. Only one WSA is in critical risk, Kannaland Municipality. The municipality has four water systems, three of which have scored a BDRR of above 99.5%. According the (DWS, 2022a). One of the reasons for the municipality's poor BDRR score is due to the lack of compliance for technical skills and the absence of a Water Safety Plan.

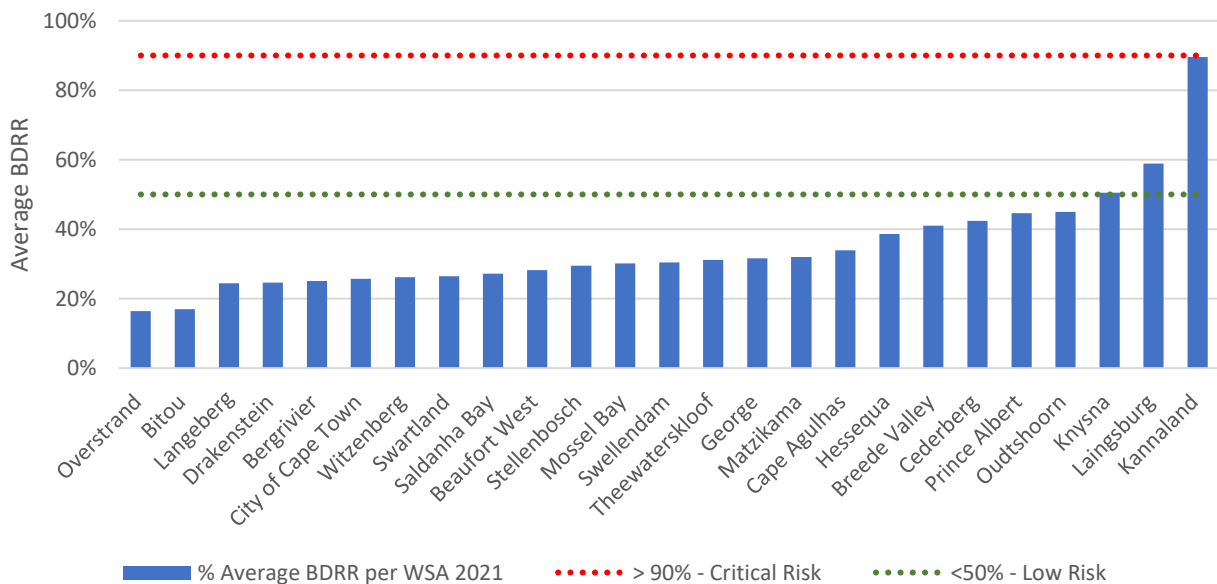


Figure 13 : Percentage average BDRR per WSA in 2021
Source: Adapted from DWS, 2021

⁷ Using a risk-based regulation calculator such as the BDRR allows municipalities and other Water Services Authorities (WSA) to prioritise critical risk areas and subsequently the adopt corrective measures by WSA.

3.2.3. Bulk Water System

The Western Cape is a water scarce province, that has been severely impacted by significant drought events in the recent past. During the period under review, the Western Cape emerged from an extreme drought event. This event has re-shaped consumption in the Province and had a significant impact on bulk supply plans for the future. Projections of future rainfall show further decline due to the impacts of climate change. Simultaneously, population growth and economic development result in increasing demand for water. In the past, the increasing demand for water has been managed by building dams, diversions, and inter-basin transfers. However, the Western Cape has very limited new surface catchment areas which can be unlocked. Therefore, beyond augmentation of existing surface schemes or improving water use efficiency (through demand management), new bulk supply capacity must be sourced from alternative, much costlier sources.

During the major Western Cape drought, between 2015-2018, the efficiency of the system improved significantly, in large part due to successful demand management strategies. This improvement is evident in Figure 14 which shows that between 2015-2018, the average consumption per capita decreased by 36%.

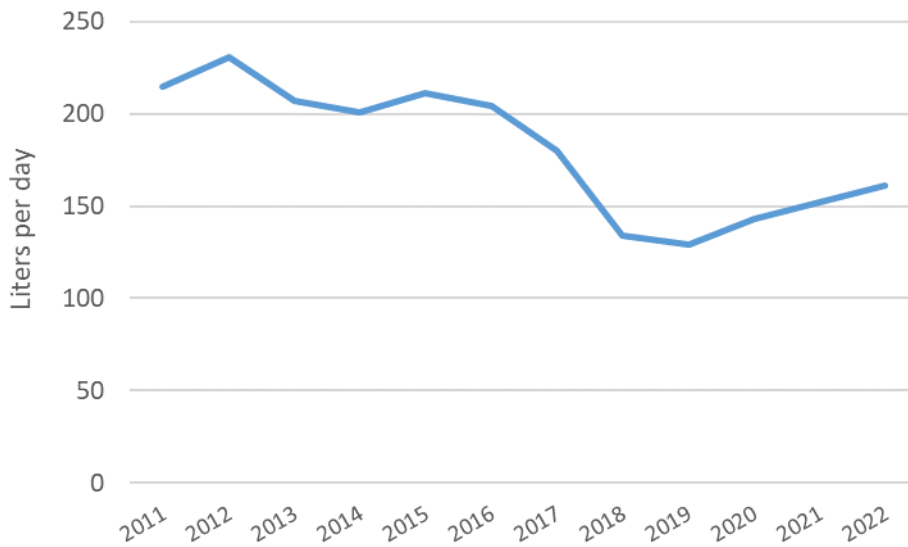


Figure 14: System input volume litres water per capita per day
 Source: Adapted from data in DWS No Drop Report 2023

A large part of this can be attributed to reduced demand, through capital investment by farms, industrial users and households (crop changes, improved irrigation techniques, water-reuse systems, improved industrial processes, household water storage tanks, shifting to less water intensive gardens) or through behavioural change (households watering gardens in

evening, covering the pool, showering instead of bathing etc.). Another significant contributor to improved consumption efficiency is attributable to greatly improved management of infrastructure and the reduction of non-revenue water.

It is important to note that consumption per capita must be considered in conjunction with population access statistics and the provision of free basic water allocations, as declining consumption may represent water efficiency or reduced access. In this regard, section 3.2.1 showed that the absolute number of households enjoying piped water access increased significantly between 2018-2022. Those with no access to piped water has declined marginally over the period, reflecting improved access overall. Therefore, in addition to observed GDP growth over the period (Stats SA, 2022a), it is evident that the efficiency of water consumption improved significantly both in per capita terms and as a function of GDP output.

Subsequently, in the period under review, consumption efficiencies appear to be in decline with consumption per capita increasing by approximately 20% since the low of 2018, the height of the drought. It is expected that there would be a bounce back from these lows and it is promising that consumption is still significantly below pre-drought consumption patterns indicating a long-term adjustment has taken place. Further, the Province still has the lowest consumption per capita in the country despite having amongst the highest access rates. However, it is critical that such efficiencies are maintained in the future.

Water Balance

Minimising losses through reducing non-revenue water system losses during the drought was also key to reducing consumption and maintaining this level of losses is key to continued water use efficiency. In this regard, the Western Cape is the best performing Province in South Africa with the lowest percent non-revenue water (NRW) and best Infrastructure Leakage Index (ILI) (Department of Water and Sanitation, 2023b). Although the system input volume (SIV) and NRW have increased since 2018, the trend remains well below the projected demand due to water demand management (WDM). Despite this, water losses have increased significantly since 2018, increasing from 13% to 25% of SIV. Partially, this is attributable to rising demand post drought but worryingly losses are now significantly above the pre-drought average, which was 17% of SIV (Department of Water and Sanitation, 2023b). As can be seen in Figure 15, the increasing losses are driven predominantly by physical losses, and this is reflected in the ILI worsening since 2018. This needs to be addressed urgently.

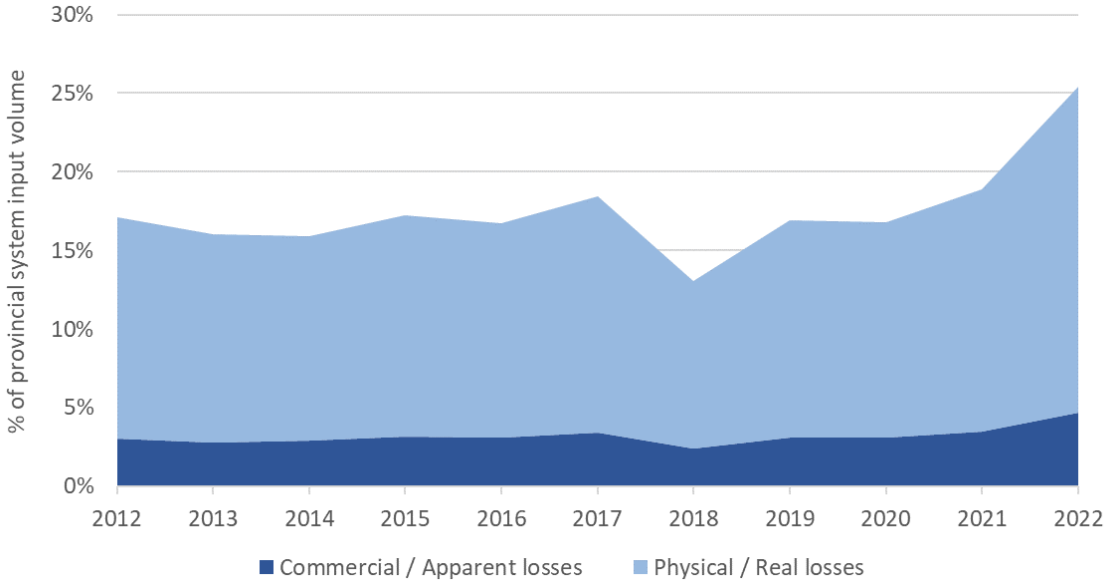


Figure 15: Apparent and real water losses in Western Cape, 2012 - 2022
 Source: Authors own analysis of data in DWS No Drop Report, 2023

The reduction in consumption efficiency, coupled with economic and population growth in the Province, has resulted in the system input volume increasing by approximately 30% since 2018. The City of Cape Town, Drakenstein, Stellenbosch, Breede Valley, and George municipalities, account for approximately 79% of this demand (Department of Water and Sanitation, 2023b). Therefore, although the SIV and consumption are still good compared to other provinces in the country, the performance trend is negative in terms of these indicators.

Overuse of water resources can have devastating consequences for the natural environment by imperiling the ecological reserve, altering water ways and wetlands, and threatening the adequate recharge of aquifers.

3.2.4. Sanitation

Inadequate sanitation⁸ access can have detrimental health and environmental impacts. A lack of access to sanitation and poorly managed systems can have major environmental consequences; excreta pollute human settlements, groundwater, and surface water. Inadequate sanitation access in South Africa results in unnecessary child deaths each year,

⁸ Adequate sanitation is defined in this chapter as flush toilets, chemical toilets, and pit latrines with ventilation (VIP). All other types per Census 2022 are classified as inadequate.

countless lost days from school and work, an enormous and avoidable burden on curative health care services, and a significant burden on the national economy.

The Western Cape has been relatively successful in improving access to adequate sanitation. As can be seen Figure 16, household access to flush toilets has increased from 89% to 94% in the past decade. However, the majority of this improvement occurred in the first half of the decade and the rate of proportional improvement has declined during the review period. As a result, while the proportion of households with inadequate access, in terms of type of toilet, declined marginally from 5.4% to 4.8% between 2016 and 2022, the absolute number of households with inadequate access increased slightly to 108 500 households.

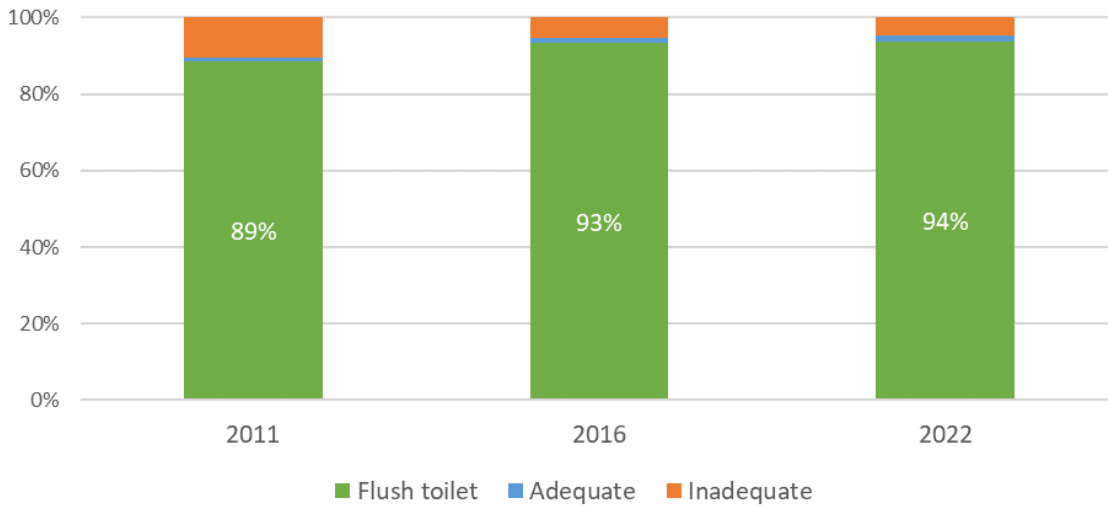


Figure 16: Access to sanitation in the Western Cape, by type, 2011-2022

Source: Authors analysis of Stats SA Census 2011, 2022 and General Household Survey 2016

According to Census 2022 data, demographic changes in the Overberg District are the largest single contributor to this trend. As shown in Figure 17, the Overberg was the only District that recorded a proportional decline of households with adequate sanitation access since 2016.

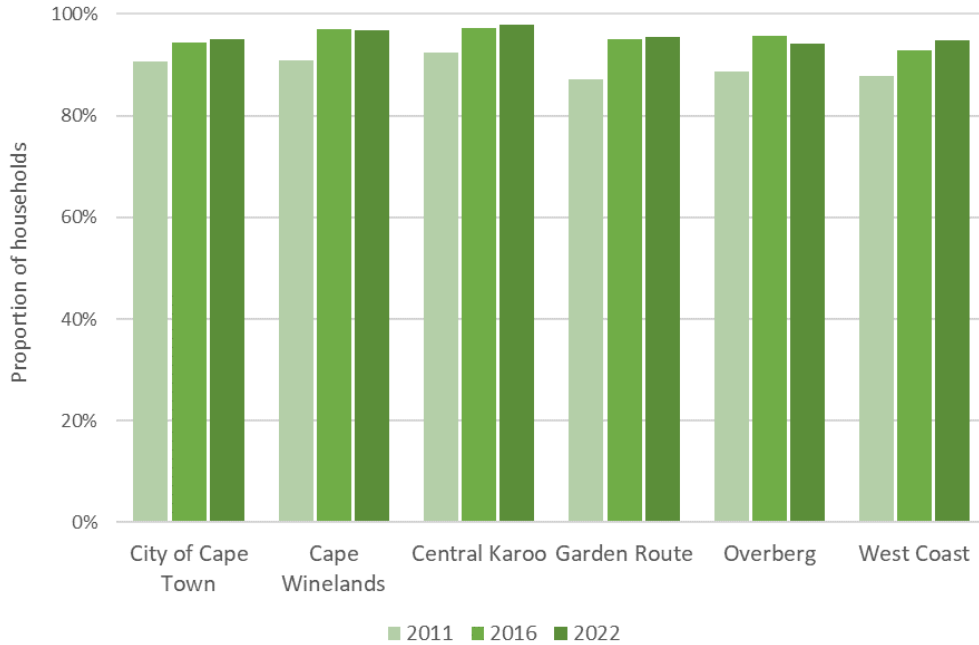


Figure 17 Access to adequate sanitation by District Municipality, 2011-2022

Source: Authors analysis of Stats SA Census 2011, 2022 and General Household Survey 2016

Access to a flush toilet is considered the benchmark service standard and, in this regard, the total number of households utilising flush toilets increased by 18% in the Western Cape between 2016 – 2022 (Stats SA, 2023d).

It is important to note that the toilet technology available to a household is not the only determinant of adequacy. Ideally, the number of households per toilet and distance to the facilities, where shared communal facilities are utilised, should also be considered. This analysis, however, requires local level data and enumeration profiling, which is monitored at the local municipal level and cannot be accurately assessed at the provincial level.

3.2.5. Quality of Treated Wastewater

The Green Drop audit score, expressed as a percentage, is a performance measure of each individual wastewater system. The score is an indication of the institution's level of capacity, compliance, and good practice in meeting the Green Drop national and international standards. The Green Drop percentage measures performance against 5 Key Performance Areas (KPA's): capacity; environmental; financial; technical management; and effluent and sludge compliance. The overall assessment score is based on the performance of individual wastewater treatment plants within a municipality or water service authority.

The Western Cape province was rated an average Green Drop score of 84% in 2021 which is a slight decrease from 84.5% in 2013. However, it was still the best performing province in the country. Of 26 wastewater systems in the province, 12 scored above 90%, which is considered an excellent score. Figure 18 shows the relative difference in Green Drop scores between 2013 and 2021. A Green Drop score of 90 percent and above (represented by the green line) is regarded as excellent, whereas a score of less than 31 percent (represented by the red line) is regarded as dysfunctional and in need of urgent intervention. As can be seen, in 2013 no municipal waste water systems were categorised as dysfunctional. However, in 2021, 4 municipalities were classified as dysfunctional.

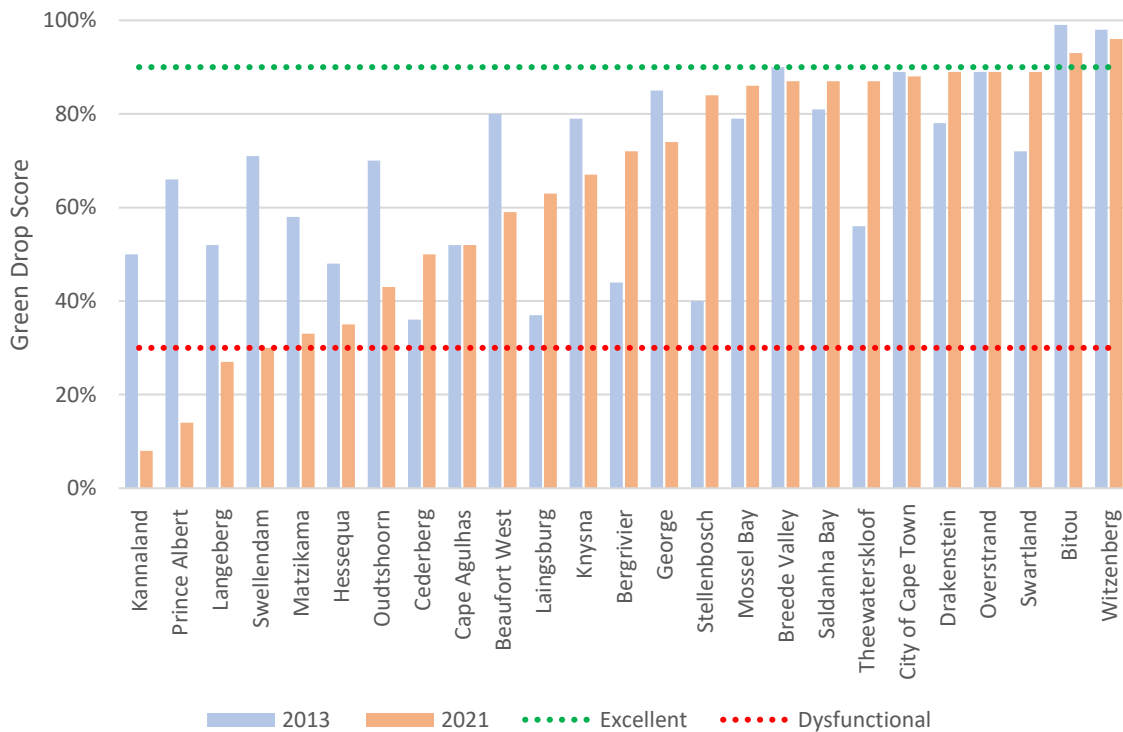


Figure 18: Municipal Green Drop Scores, 2013 - 2021
 Source: Adapted data from DWS Green Drop Reports, 2013 and 2021

Between 2013 and 2021, 9 out of 25 WSAs improved their Green Drop scores, whereas 14 declined, and 2 maintained their scores. Witzenberg and Bitou municipalities both maintained excellent scores 90% over the period. Stellenbosch (scored 84% in 2021, from 40% in 2013) and Theewaterskloof (scored 87% in 2021 from 56% in 2013), showed the best overall progress. The significant change in their scores is a result of factors such as bringing on board a qualified technical team, management’s financial and technical support to the staff, and the refurbishments and amendments to their Wastewater Treatment Plants.

Scores for Prince Albert, Kannaland and Swellendam municipalities declined significantly. The municipalities will therefore be subjected to regulatory oversight and will have to submit a comprehensive corrective action plan in accordance with the Water Services Act (108 of 1997). The Green Drop scores therefore show a sharp inequality in water treatment in the province. While many municipalities are shown to be outstanding, there has been an overall decline, largely driven by a few very poorly performing municipalities.

Table 2 shows the Municipal Green Drop Cumulative Risk Ratios (CRR) which calculates the wastewater treatment function for each system. The table shows the CRR of the respective year comparative to the previous year. A CRR score of above 90% illustrates that the wastewater treatment facility is in critical risk, whereas a score of less than 50% is low risk. The average municipal score for the Western Cape’s wastewater treatment has been improving steadily as their CRR score decreased from 57.7% in 2014 to 53.1% in 2021 (the risk ratio for the province measures the proportion of non-compliance of the wastewater treatment plants to the total number of treatment plants assessed, and is expressed as percentage deviation) (DWS, 2022b).

Cederberg, Prince Albert, Matzikama and Kannaland’s wastewater treatment plants are at medium risk, meaning that their operational flow, technical capacity, and effluent quality will require intervention at some stage. This situation presents a significant threat to public health and the environment, and the concerned municipalities will need to put into place corrective measures. Although Cederberg has marginally improved their CRR rating since 2014, it still falls within the bottom of all municipalities.

Table 2: Municipal Green Drop Cumulative Risk ratios from 2011 to 2021.

District	Water Service Authorities	2011	2014	2021
Western Cape Province (Average)		61	58	53
City of Cape Town		49	49	50
Cape Winelands	Drakenstein	47	56	41
	Witzenberg	43	39	44
	Breede Valley	47	63	54
	Langeberg	57	65	54
	Stellenbosch	62	80	57
Central Karoo	Beaufort West	29	37	43
	Laingsburg	71	88	47
	Prince Albert	57	77	69
Garden Route	Bitou	20	20	28
	George	35	49	35
	Mossel Bay	43	48	42

	Knysna	55	47	42
	Hessequa	61	52	57
	Oudtshoorn	57	58	60
	Kannaland	61	78	79
Overberg	Swellendam	64	75	44
	Overstrand	39	41	49
	Theewaterskloof	56	50	54
	Cape Agulhas	49	72	62
West Coast	Bergrivier	54	55	47
	Swartland	47	64	50
	Saldanha Bay	47	58	50
	Cederberg	60	76	69
	Matzikama	53	75	76
Table legend				
Improving score				
Worsening score				

Source: Adapted data from DWS Green Drop Report, 2022

3.2.6. Solid waste

Population growth, urbanisation, employment levels and related consumption patterns pose a challenge for municipalities in how they collect, sort, dispose and manage solid waste. As the population continues to grow, so too does the amount of waste that is generated. As the proportionally fastest growing province in the country, municipalities in the province need to closely monitor their growth and ensure that sustainable waste practices and policies are adopted. Along with the rest of the country, the province still faces basic challenges such as illegal dumping, open-air burning, and inadequate access to services (DEA&DP, 2020a). The Western Cape generates approximately 3 million tonnes (T) of solid waste per annum (DEA&DP, 2020a), of which the CCT contributes an estimated 1.7 million tonnes (Green Cape, 2022). An estimated 92% of the waste that is generated within the province in 2020 was classified as general waste, while 8% was classified as hazardous waste.

The disposal of waste or inter-municipal waste disposal (where waste generated in one municipal area but disposed of in a different municipal area) is done through an agreed formal arrangement, be it at a public or private disposal site. Municipalities either manage waste at their own management facilities and landfills or via regional facilities, which due to the associated efficiency are becoming an increasingly effective option in the province. There are currently three operational regional waste management facilities (these are facilities that handle, store, process, and discard waste on a regional scale with various

waste treatment technologies available for processing waste and final disposal (Utility Regulatory Authority, 2023)). Four additional facilities are at an advanced stage of planning, while two facilities are still in the initiation phase. There is one operational facility located in the Overberg, and two in the West Coast District Municipality (DEA&DP, 2020a). According to (DEA&DP, 2020a), Stellenbosch Municipality has run out of landfill space and is currently transporting its waste to one of the landfills in the CCT.

The ability to manage the rapidly growing volume of waste effectively is often compounded by a lack of technical and financial capacity. Uncollected solid waste can have secondary impacts on the environment such as blocking drainage systems and thereby leading to direct health impact on residents. Further, in areas where waste is not collected, it is often burned instead, thereby impacting air quality.

Figure 19, shows the percentage of households with access to weekly refuse removal, by district. As can be seen, four districts improved access to weekly refuse removal from 2016 to 2022 figures. Overall, access to refuse removal for the province has improved from 87% in 2016 to 90% in 2022. Cape Winelands had the biggest improvement from 82% in 2016 to 88% in 2022. Central Karoo was the only district that did not improve, with access declining from 91% in 2016 to 82% in 2022. This is surprising given that Central Karoo had the highest percentage of households with access to weekly refuse removal in 2016.

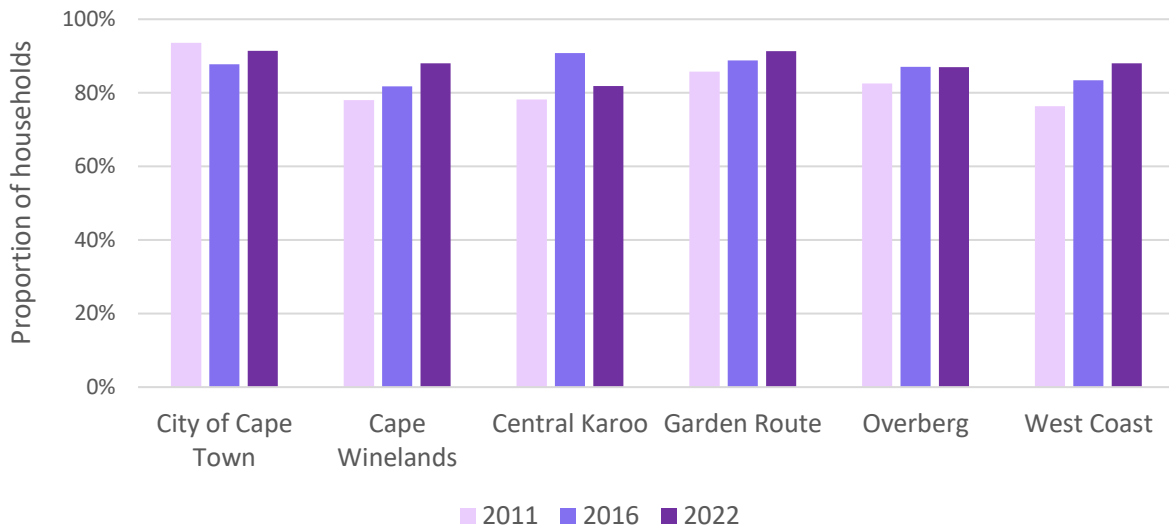


Figure 19 Percent of households with access to weekly refuse removal, 2011 – 2016
 Source: Authors analysis of Stats SA Census 2011, 2022 and General Household Survey 2016

3.2.7. Access to Electricity

Similarly to other basic services, the level of electricity access in the Western Cape has increased substantially since 2011. Approximately 600 000 additional households have been connected to the grid for lighting, increasing access from 93% in 2011 to 96% in 2022. However, as with other services, the proportional access gains were primarily achieved in the first half of the decade, with the number of households accessing electricity from the grid remaining constant between 2016 and 2022. Although the proportion of serviced households was static over the review period, it is estimated an additional 315 000 households have gained access since 2015 in the Western Cape. However, this was only sufficient to just keep up with population growth.

As shown in Figure 20, electricity access in all Districts has improved dramatically since 2011. However, while access improved in three Districts between 2016-2022, it remained static in the Garden Route and marginally declined in the City of Cape Town with the unserved increasing from 2.8% of households to 3.7% in 2022.

It is important to note that not all of the households reflected as accessing electricity from the mains necessarily have legal connections. Furthermore, it is important to note that some informal settlements are geographically located in areas not considered serviceable, such as wetlands or floodplains, and therefore cannot be electrified.

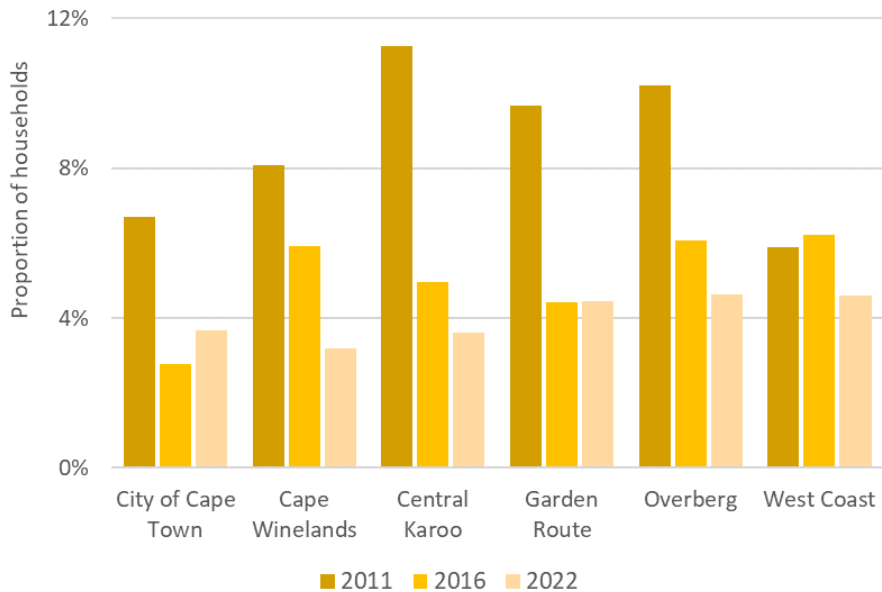


Figure 20: Percent of households without access to electricity mains for lighting, 2011 – 2016
 Source: Authors analysis of Stats SA Census 2011, 2022 and General Household Survey 2016

Given the high levels of fossil fuels comprising South Africa's electricity generation mix, it is important to note that the number of households mainly using solar energy for lighting has more than doubled since 2016. However, at approximately 8 000 households, it still represents a fraction of the population.

3.3. Access to Transportation

The transport sector is estimated to account for around 29% of global energy consumption and 65% of oil consumption (Ntuli, 2023). It is estimated that the transport sector contributes approximately 11% of carbon dioxide emissions in South Africa, and from that, road transportation accounts for over 90% of carbon dioxide emissions (Department of Transport, 2018). Data for the Western Cape shows that the transport sector consumes 51% of overall energy and is responsible for approximately 28% of Greenhouse Gas (GHG) emissions (DEA&DP, 2022). Nationwide, the land transport sector consists of passenger, rail, and freight transport, and there is a heavy reliance on road transport which is still largely dependent on non-renewable fossil fuel resources such as petrol and/or diesel. The Western Cape province has a passenger rail network that is far more energy efficient than passenger vehicles. However, this has been increasingly underutilised as a result of poor infrastructure condition, safety concerns by users and unlawful occupation of some railway lines.

Overall, the province has an extensively developed transportation system and a network of accessible (national and provincial) routes, and rail networks that include municipal roads, a passenger rail system in the Cape Metropolitan area, and an international airport (Western Cape Department of Transport and Public Works, 2011). According to the Western Cape Infrastructure Framework (Department on Infrastructure, 2023), the paved road network in the Western Cape Province covers a total length of 7 438 km's, while unpaved roads total 24 885 km's. An estimated 65% of the national, trunk, and main roads were rated as being in good or very good condition.

However, the province's operating public transport systems are expensive for the majority of the population as the spatial structure of the cities and towns remains dispersed. This has been compounded by the decline in passenger rail in the metro.

Figure 21 highlights the changes in modal share in the province between 2013 and 2020. What stands out in the figures is the shift in the proportion of people who used trains as their primary transport mode in 2013, compared to the 2020 figures. As Figure 21 shows, 13% of transport users relied on trains in 2013 and which has declined drastically in 2020 to a mere 2% of transport users.

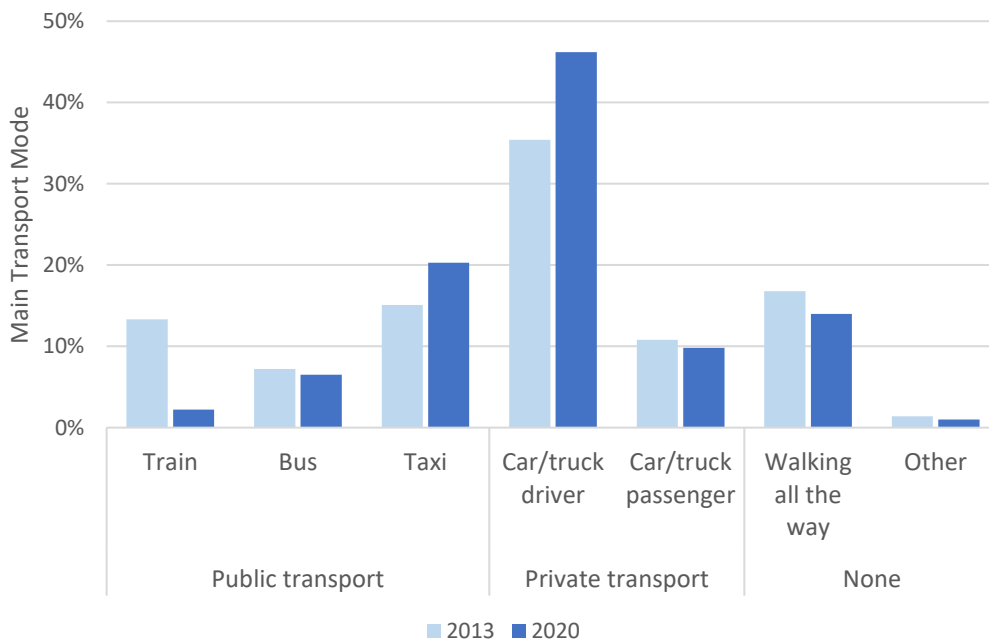


Figure 21: Percentage of Main Transport Mode between 2012 and 2020
 Source: Adapted data from the National Household Travel Survey (NHTS) Provincial Report Western Cape Profile 2014 and 2022.

This shift is further detailed in Figure 22, which shows that in 2018, there were approximately 263 000 rail passenger trips per day in the Western Cape, which has decreased dramatically to approximately 32 000 in 2022 (Stats SA, 2022c). This represents a decline of 88% of trips. It is also clear from the figure that this decline reflects an ongoing trend since 2014.

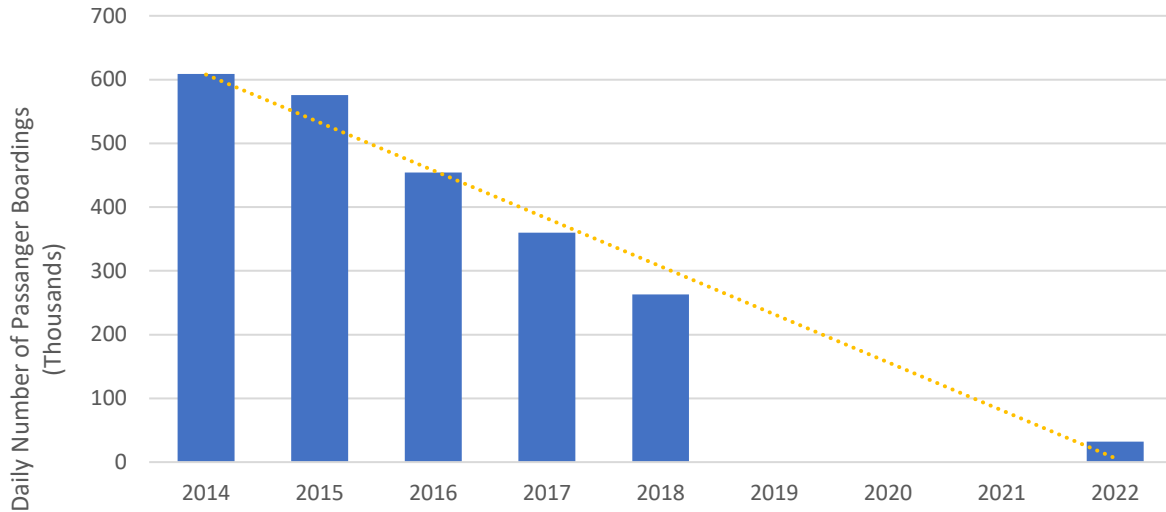


Figure 22: Metrorail daily passenger boardings.

Source: Adapted taken from the National Household Travel Survey (NHTS) Provincial Report Western Cape Profile 2022.

The decline in the number of daily train users can be attributed to the following occurrences: destruction of the rail network over time, which was worsened by the Covid-19 lockdowns when the trains were not operational (Hirsch, 2023). The significant deterioration of the network, massive theft of infrastructure, and vandalism of the passenger rail infrastructure accelerated during lockdown. Since then, PRASA and its partners have initiated a programme that seeks to recover, rebuild and reopen the rail lines (Hirsch, 2023).

3.4. Open Space Provision

Open spaces are important features of sustainable human settlements, and are recognised in the Cape Town's State of the Environment report (City of Cape Town, 2022) as water infiltration and urban cooling spaces. Below is an example of such spaces:

- Recreational parks;
- Hosting of public events;
- Improved urban environment visually;
- Provision of buffers along roads;
- Acting as ecological corridors; and

- Acting as sites for conservation of fauna and flora

Healthy natural ecosystems support not only biodiversity, but deliver numerous ecosystem services. These often serve as natural open spaces and as such, are essential components of sustainable development and human settlements, and contribute to community upliftment and quality of life, as well as ecological processes. Adequate provision of green spaces also provide vital health services: reducing socioeconomic health inequalities, facilitating activity and promoting better mental health and well-being (Barton & Rogerson , 2017).

Open space provision has become even more critical as a key tool in mitigating the impacts of urban heat islands, resulting from the combination of rapid urbanisation and global warming. "Urban heat islands" occur when cities replace natural land cover with dense concentrations of pavement, buildings, and other surfaces that absorb and retain heat. This effect increases energy costs (e.g., for air conditioning), air pollution levels, and heat-related illness and mortality (US Environmental Protection Agency, 2023). Public open spaces as well as trees and green roofs are key to helping reduce urban heat island effects by shading building surfaces, deflecting radiation from the sun, and releasing moisture into the atmosphere (US Environmental Protection Agency, 2023).

While the importance of quality public open space is clear, there is poor data regarding open spaces (and protected and conservation areas) in the province, particularly outside of the Metro. The CCT states in its 2022 State of Environment Report that it monitors the average distance to travel to a natural public green space. However, the data is not included. Potentially, in future WCG SOER, this could be included and extended to other municipalities which have the requisite geographic data, capacity and appetite to undertake such an analysis.

Qualitatively, according to the Western Cape Provincial Spatial Development Framework Amendment (WCG, 2020) report, the quality of public open spaces is generally poor in most urban centres in the province. That being said, the importance of having and maintaining ecological systems is proven as essential for promoting physical activity, mental health and overall well-being (City of Cape Town, 2022).

4. Impacts

4.1. Changes in Human Living Conditions

On the most basic level, the interaction of human settlements on the environment is that they extract non-renewable natural resources on the one hand and, on the other, produce waste products and pollution. As the population grows, urbanises and consumes more, the impact of human settlements on the natural environment increases.

Urban and rural sprawl, housing demand, modes and character of transportation and basic service infrastructure, are the physical elements of human settlements that have the most noticeable impact on the natural environment. The challenge is even greater in South Africa where the Apartheid legacy of distorted settlements is highly unsustainable. Addressing these issues of form through spatial restructuring remains one of the most important and challenging issues facing the government.

4.2. Pollution and Waste

Improperly managed waste has significant repercussions on the environment, resulting in contamination and degradation that adversely impact health, well-being and productivity. The brunt of these consequences is disproportionately borne by vulnerable communities, particularly evident in informal settlements where air and water quality often reach alarming levels of deterioration. The lack of access to fundamental services, such as piped water and refuse removal, forces these communities to rely entirely on natural systems and ecosystem services to meet their essential needs. Activities such as illegal dumping, waste incineration, and the excessive harvesting and burning of wood for fuel further exacerbate environmental degradation. They contribute to a decline in air and water quality in informal settlements situated in proximity to coastal areas, rivers, estuaries, wetlands. Open spaces pose an even greater threat to natural systems, as they are more likely to be sources of pollution and contamination.

In certain instances, ecosystems have been pushed to a state of degradation beyond functionality, rendering them incapable of providing essential ecosystem services. This alarming trend underscores the urgent need for comprehensive waste management and environmental conservation measures to mitigate the adverse impacts on both human communities and natural ecosystems.

4.3. Increased Resource Use and Consumption

Human settlements significantly strain natural resources due to their expansive ecological footprint and long-term impact. This is evident in the Western Cape's water crisis, where limited resources are challenged by drought, population growth and rising water demand. Climate change and excessive consumption further threaten the region's water security. Without effective management and monitoring, water depletion and scarcity will worsen, particularly impacting vulnerable communities with limited piped water access. Land use changes associated with human settlements, such as deforestation and agriculture, have additional resource implications.

4.4. Biodiversity Loss and Compromised Ecosystem Services

The Western Cape's rich biodiversity provides essential services like clean water, fertile land and tourism opportunities. However, human activities, including development, agriculture, and infrastructure expansion, are driving its decline. This loss threatens not only the environment but also the province's economic well-being.

- Coastal development degrades tourism assets, a key economic driver.
- Unsustainable resource use by growing settlements puts further pressure on ecosystems.
- Limited public awareness of ecosystem services hinders responsible utilisation.

Investing in public education and sustainable practices is crucial to protect biodiversity and ensure long-term prosperity for the Western Cape.

5. Responses

5.1. Sustainable Infrastructure and Human Settlements

Water

Much of the Western Cape faced a severe 1 in 400-year drought during the previous SOER review period. In response to the rising scarcity and risks posed by the combination of climate change and rapidly growing population, there has been a significant renewed effort towards expanding water supply capacity. With limited options for traditional water storage methods from new catchment areas, new innovative solutions are being sought.

The Western Cape Government has developed the 15-year Western Cape Water Resilience Plan (WCG, 2022) which consists of 24 individual but linked deliverables, which ultimately contributes to a costed, prioritised sequence action plan. These deliverables can be grouped as follows:

- Analysis, of existing sources, demand management and infrastructure, e.g., Growth outlook, municipal conditional assessments, NRW;
- Development of interactive municipal planning tools that facilitate the decision making in terms of the proposed interventions;
- Technical and policy interventions to ensure water resilience in the Province;
- Additional Implementation Support, which includes draft bylaws, and water restrictions and tariff model among others.

The City of Cape Town has also committed to an ambitious capital programme towards increasing its water supply resilience, called the New Water Programme. This programme aims to add 300 million litres of water a day from new sources by 2030, mainly from seawater desalination, groundwater extraction from two major aquifers and water reuse (City of Cape Town, 2019).

The clearing of invasive alien species in water catchments in the Western Cape has also become a key intervention in improving sustainability of water supply and regenerating natural indigenous ecosystems . The Greater Cape Town Water Fund, a partnership between the Nature Conservancy, CapeNature, the City of Cape Town, WWF-South Africa and Working on Fire has been an innovative model of success in this initiative. The initial

business case showed that removing invasive alien species is the most cost-effective option to improve water security in Cape Town (DEA&DP, 2024).

Sanitation and Wastewater

The Western Cape has experienced relative success in enhancing access to sanitation facilities, as discussed in section 3.2.4. As illustrated by the Green Drop (GD) score, the Western Cape province achieved a score of 84% in the 2021 GD report. This is the highest score achieved nationally with Gauteng and KwaZulu Natal (KZN) both only scoring 68%. Twelve of the province's wastewater systems were certified with a score of 90% and above therefore qualifying for the prestigious Green Drop Certification. The high score points to strengths in technical capacity.

The City of Cape town is the largest flow contributor to the flow of wastewater in the province and manages the majority of sewer infrastructure. In response to the growing population pressures facing Cape Town in 2023, the CCT announced construction of a R5,2 billion upgrade project of Potsdam Wastewater Treatment Works (PWWTW) which is hailed as the second largest infrastructure project in the country. The upgrade will restore the Milnerton Lagoon by removing accumulated pollution in the sediment. Other similar projects include the Montague Gardens bulk sewer rehabilitation, the Koeberg Pump Station upgrade, and other pump station and pipe replacement initiatives (Daniels, 2023). An additional project is the R715 million Cape Flats Bulk Sewer upgrade which will see the refurbishment of over 28kms of pipeline, therefore making it the largest sewer upgrade project in the country. The technology employed by the City known as “innovative trenchless technology” eliminates the need for lengthy and disruptive excavations during project execution. These projects are part of the City's plan to replace sewer pipes, upgrade bulk sewer, clean sewer lines and bring a digital system on board for early warnings on sewer spills (Cape Business News, 2023).

Electricity

In response to the worsening energy crisis in South Africa and the impact this is having on the economy and service delivery, as well as the climate change contribution due to the Western Cape Government has initiated a response programme called the Western Cape Energy Resilience Programme (WC ERP). The WC ERP comprises interventions that are categorised into six categories:

- Disaster mitigation and management (load shedding relief programme) to minimise the impacts of load shedding;

- Provincial Integrated Resource Plan to provide an evidence-based and cost-optimal plan of energy options to enable planning and investment;
- Demand side management programme to enable right sizing and reduced cost of alternative energy systems;
- New energy generation programme to enable the generation, procurement and trading of low-carbon energy,
- Network development programme providing for the maintenance and expansion of the required grid infrastructure,
- Increased investment in the energy sector to attract financing for the implementation of the programme and to enable financing mechanism.

A key development since the last SOER review in this sector, is the finalisation of a framework for municipalities to procure electricity directly from Independent Power Producers (IPP's) as opposed to Eskom. As a result, several municipalities have issued tenders for IPP's to provide renewable energy directly to the municipality. Notable examples include the City of Cape Town, Stellenbosch Municipality and Saldanha Bay Municipality.

The private sector and households have also contributed significantly to improving the sustainability of the energy mix through significant private investment in rooftop photovoltaic (PV) systems. Analysis of Eskom data by Professor Anton Eberhard estimates installed rooftop solar PV capacity increased from 983MW in March 2022 to 4 412MW in June 2023, reflecting a 349% increase in just over one year (Energy Monitor, 2023). Although this is positive for environmental sustainability it raises issues about future revenue generation streams for municipalities which will increasingly struggle to cross-subsidise indigent households as higher income customers increasingly generate their own energy supply.

All of the above projects in the Western Cape will contribute towards improved energy resilience, sustainability and economic growth.

Solid Waste

The province faces numerous challenges that impact its ability to effectively manage solid waste while dealing with urban sprawl and developments that continue to put pressure on the environment. The more complex the waste stream is, in terms of when hazardous waste is mixed with general waste, the more it directly affects the management thereof. However, this can be counteracted by national and provincial legislation and regulations such as Norms and Standards for Separation at Source, Draft National Waste Management

Strategy, or National Health Care Risk Waste Regulations which are poised to unlock several critical waste streams, particularly organics, plastics and e-waste.

In a major move towards more sustainable solid waste practices, the Western Cape Government has instituted a policy decision to implement a 50% restriction on organic waste disposal in landfills by the end of 2022, and a complete prohibition on organic waste disposal by the end of 2027. This decision comes after the Province sought to focus its approach on organic waste diversion management plans that complement municipal integrated waste management plans, which will ultimately support municipalities in reducing landfill airspace. Many municipalities are grappling to deliver basic waste management services amid rising waste volumes due to urbanisation trends.

Regional cooperative initiatives are important for municipalities to collaborate on sharing infrastructure and waste services. This approach reduces the individual municipalities' responsibility for complying with waste management licenses. The province has therefore conceptualised regional waste disposal facilities (WDFs), some of which are at various stages of establishment, contingent on the availability of financial resources. The following districts have proposed regional facilities: Cape Winelands District in Breede Valley, Garden Route District in Mossel Bay, and West Coast District in Matzikama are still to be established. Central Karoo District is in the process of conducting a feasibility study to ascertain the viability of regional cooperation.

Human Settlements

The 2020 National Directive issued by the National Department of Human Settlements (NDHS) recognised that the housing delivery model status quo was unsustainable and therefore called for a shift away from top structure provision to serviced sites as the main product to be provided on the supply side, with the exception of priority groups. Although greenfield serviced site projects have not been implemented at scale, there has been a shift in emphasis towards informal settlements upgrading, with a significant portion of the Human Settlements Development Grant (HSDG) being top sliced to introduce a dedicated grant for upgrading. While this may slow the rate of top structure delivery, the other basic service indicators should improve at an increased rate as basic service delivery will be prioritised.

The NDHS has also determined in 2023 that going forward, all fully subsidised houses provided by the state must include a PV energy system to minimise the impacts of loadshedding. The specifications of this are however still being determined and the impact on the human settlements programme, as scarce funding is diverted, is yet to be seen.

The NDHS gazetted a new White Paper in 2023 which is intended to address some of the key policy gaps and position the sector for the future through informing a new Act to govern the delivery of subsidised human settlements. This White Paper acknowledges the impact human settlements have on the environment including contributing to climate change. In turn, it pledges that Human Settlements will endeavour to integrate climate resilience and sustainable development approaches into the planning, design, construction and operation of human settlements. To achieve this, it commits to the development of a Human Settlements Climate Change Response Strategy and Implementation Plan.

In 2021, the then Western Cape Department of Human Settlements published the Guideline for the use of Sustainable Building Technologies (SBTs) in Human Settlements, which made recommendations for the application of SBTs for the use in subsidised housing developments. The guideline explored a wide range of SBTs that can be implemented in the various stages of building subsidised housing developments. Furthermore, In the 2022/23 financial year, the Policy Guidelines on Including Sustainable Building Technologies (SBTs) in the Planning and Development of Enhanced Serviced Site projects (ESS) was signed and approved. The SBTs for ESS Guidelines too, is aligned with climate-related goals in the province and aims to aid practitioners, particularly municipalities, in making informed decisions and choices towards the development cycle of ESS projects, therefore, minimising environmental and ecological risks. The SBTs for ESS Guidelines comprehensively address both bulk infrastructure and site-level interventions structured along the five stages of the development cycle i.e. Planning, Design, Construction, Operations and Maintenance and Deconstruction.

Transport

There has been a concerted push by the national and provincial government to transition towards more sustainable transport patterns. This can be seen in the move towards developing strategies, such as the National Transport Master Plan 2050 Synopsis Report or the Provincial Land Transport Framework, that encourage accessibility through fostering reliable and safe access to economic opportunities while promoting a low-carbon economy.

The amendment to Chapter 4 of the Provincial Spatial Development Framework acknowledges the need to transform neighbourhoods towards public transport-oriented and pedestrian-friendly spaces (DEA&DP, 2020b). Ensuring adequate location and density of new human settlements is key to achieving this.

In efforts to transition to a low carbon emission footprint, Golden Arrow Bus Services are currently piloting two electric buses in the metro and had plans to expand to 60 buses (Gierdien, 2023). The buses use a mixture of renewable solar power and electricity from the grid. The company plans to partner with renewable energy providers.

The CCT is currently constructing the dedicated routes for Phase 2A of its MyCiti bus rapid transport (BRT) network. Phase 2A seeks to provide direct, scheduled, safe, affordable public transport to more than 30 communities along the city's busiest transport corridors - extending from Khayelitsha and Mitchells Plain to Wynberg and Claremont. Improved travel times and increased vehicle sizes will result in a more sustainable transport network.

The CCT Fleet Management Department also launched an electric passenger vehicle pilot project over a period of three years from 2020 to 2022 in efforts to also reduce carbon emissions (GreenCape, 2023). The City has a total fleet size of 9 386, therefore the electrification of vehicle fleets offers a compelling case for environmental benefits.

5.2. Climate change: Mitigation and adaptation

In its **Provincial Strategic Plan 2019-2024**, the Western Cape government commits to advancing economic development through identifying climate change impacts and resource pressures as one of the key problem areas that hinders the province's economic growth potential. The Plan recognises that, to ensure that the province can position itself as a competitive region, it needs to proactively manage uncertainty and risk. This vision ultimately calls for the optimisation of resources, and for the energy sector this translates to transitioning from coal-fired power to green energy in areas of renewable energy, smart grids, large-scale rooftop PV systems and Liquefied Natural Gas. It further entails promoting sustainable waste management through the construction of landfills and diverting waste from landfill sites, investing in alternative waste facilities that support waste diversion and waste minimisation remain key priorities of focus as well.

The **Growth for Jobs Strategy** was adopted in 2023 as the guiding economic strategy for the Western Cape Government. It places energy resilience and the transition to net zero carbon by reducing reliance on Eskom for energy through increased generation, procurement and trading of low carbon energy. The strategy also has key focus areas on water security and improved access through housing and transport as priority focus areas of the strategy. Simultaneously, these efforts aim to stimulate the circular and green economies.

The **Western Cape Recovery Plan 2021** aimed to recognise and respond to the dual challenges (i.e. unemployment, hunger and poverty) emanating from COVID-19, and come up with a whole of society response. The pandemic has also laid bare the inequalities in accessing water and sanitation, especially for households living in informal settlements. The Recovery Plan called for the promotion of the wellbeing of all the residents, and a focus on the provision of basic services.

The **2050 Western Cape Infrastructure Framework** is the strategic framework for the Department of Infrastructure within the Western Cape. As one of its focus areas, the framework aims to lay down the foundation for a more sustainable and climate conscious infrastructure base that positively contributes towards climate change mitigation and adaptation. The framework aims to do so by focusing on three key areas concerned with infrastructure delivery: management and operation; incorporating resilience strategies into the design; and unlocking the green economy.

The Department's focus on **alternative technologies** in the construction process to reduce its carbon footprint, has been implemented in several initiatives including the following:

- The development of Guidelines for the Implementation of Green Procurement in State-Subsidised Housing.
- Aligned to the Green Procurement Implementation Guidelines a guideline has been developed to promote innovative outcomes in the construction of state-subsidized housing through the Sustainable Building Technologies (SBT) policy.
- As a response to the water crisis, the department requires all successful bidders for all managed and contracted projects to submit a Water Demand Management Plan which focuses on interventions to make water use in human settlements more sustainable.

6. Conclusion

As the province with the highest population growth rate in the country, the Western Cape faces significant demands for new infrastructure and housing. Such growth leads to increased resource consumption and waste generation. In turn, natural resources face growing pressure. However, despite such growth, Census 2022, if taken at face value, shows that the Western Cape has managed to improve access to basic services across the board, with enormous societal and environmental benefits. This can be seen in Figure 23, reflecting a summary comparison of access to basic services and adequate housing in the Western Cape between 2016 and 2022.

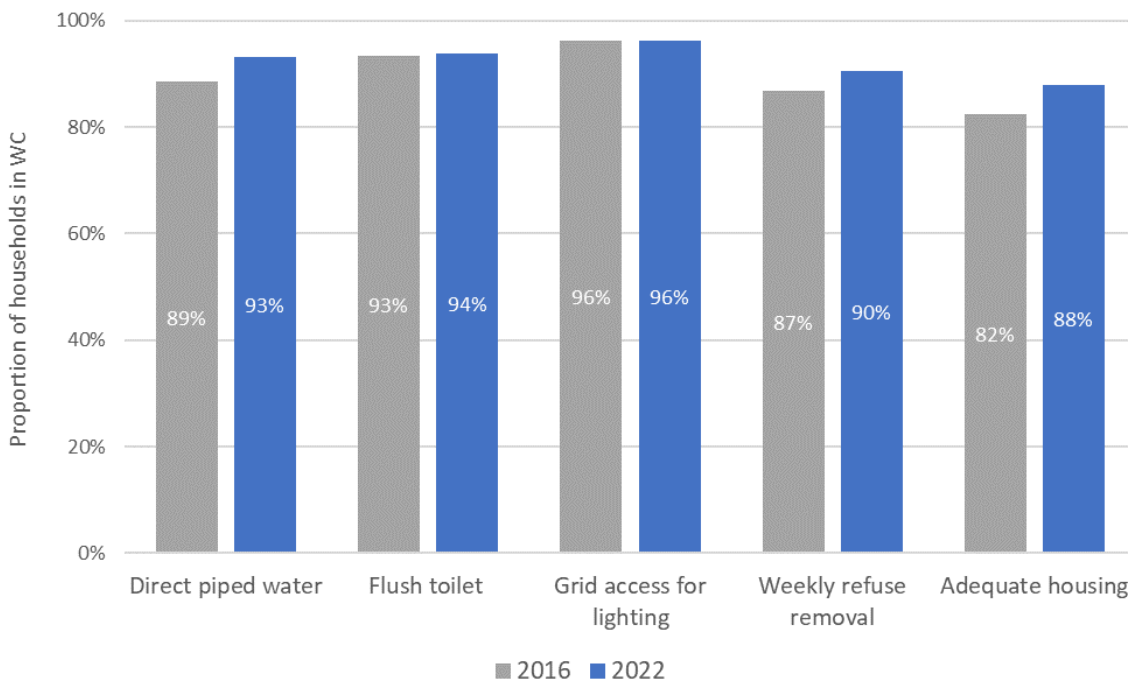


Figure 23: Comparison of access to basic services and adequate housing, 2016 – 2022

Source: Analysis of Community Survey 2016 and Census

However, there have been some areas of decline in the review period, most notably electricity supply and the decimation of passenger rail. However these are both systemic national issues, driven by poorly performing national parastatal entities. Water losses and infrastructure condition are also a cause for concern in the Western Cape and have declined over the review period.

Formal housing delivery has not been able to remotely match household growth, meaning more households are residing in dwellings which are not formalised. However, initial results from Census 2022, if correct, indicate that the building materials and quality of such

dwelling has improved at a massive scale as can be seen in Figure 23. The delivery of public subsidised housing declined over the review period, due to declining budgets in real terms and the varied impacts of Covid-19, including lockdowns and building cost escalation. In response, there has been a growing policy shift away from the provision of top structures and towards the provision of basic services and serviced sites. This will therefore reflect as a decline in formal housing delivery. However, it equally may result in increased access to services for those currently in informal dwellings. The SEOR may need to take cognisance of this shift in indicators in future.

The national fiscal outlook is poor, with projected economic growth unlikely to match population growth in the medium term and therefore economic activity per capita will continue to decline. This in turn, places greater demand on the state to provide social and infrastructure services while simultaneously diminishing the budget envelope. In such an environment, available funding for delivery of new capital infrastructure projects as well as renewal and adequate maintenance of existing assets, is unlikely to improve. This is a significant risk to the medium-term outlook for delivery of human settlements and adequate infrastructure systems.

During the review period, the Western Cape emerged from a one in four-hundred-year drought that pushed water resources to the brink. The drought was stark evidence of risks that increasing severe weather and climate related events in the Province will pose. This has placed a renewed emphasis on securing additional and diversified supply streams to increase the resilience of water supply in the province. Although the drought also resulted in greater water efficiencies throughout the province, demand and losses have been increasing and more work must be done to prevent the erosion of these gains.

Great strides towards improving sustainability were also made in the solid waste sector, with the 50% ban on organic waste to landfill implemented by the Western Cape Government. However, this is in response to the very significant challenge of inadequate landfills and unsustainable consumption patterns.

Evidence shows that there has been a significant shift towards higher density housing typologies in the Western Cape, a positive sign for improving urban form, which is crucial to improving sustainability of urban settlements and infrastructure services in the province.

Ultimately, while the Western Cape faces considerable challenges, particularly resource pressures, declining infrastructure and economic limitations, it also demonstrates noteworthy progress. Improved access to basic services, advancements in housing materials and increased sustainability efforts in sectors like water and waste offer hope. Moving forward, it

is crucial to address funding constraints, adapt to climate change and embrace innovative solutions to ensure the Province's human settlements and infrastructure remain resilient and equitable for future generations.

7. Summary of performance and outlook

Sector	Indicator	Performance	Outlook	Performance Trend
Housing	Housing adequacy	<p>Number of households residing in overcrowded conditions has declined by 13% since 2016 (Census 2022).</p> <p>The number of adequate dwellings – defined as formal or built from brick/concrete and not overcrowded – has increased proportionally from 74% - 82% of households since 2016.</p>	<p>The budget for public sector housing delivery appears to be continuing to decline in real terms and the cost of delivery increasing above inflation. Therefore, the rate of delivery of new subsidised houses is not expected to increase significantly in the medium term.</p>	Improving however rate of formal housing delivery has declined
	Informal housing	<p>Census 2022 reports a significant decrease in the proportion of households residing in informal, shack, dwellings from 17% in 2016 to 11% in 2022.</p> <p>While the quality of dwellings appears to be improving – formal delivery statistics for private and public sector have declined during the</p>	<p>Formal completions by the private sector may improve as the interest rates enter a declining cycle.</p> <p>The already high and increasing rate of population and household growth in the province poses significant challenges to meet housing needs</p>	Improving quality of materials used in housing construction however likely these are still 'informal' dwellings.

Sector	Indicator	Performance	Outlook	Performance Trend
		review period, strongly inferring that these dwellings are still informal despite the use of improved building materials.	and address the backlog. Given the decline in fiscal resources and policy shifts there will likely be a greater role for private contributions in improving housing adequacy – as suggested by trends revealed in Census 2022.	
Access and quality of basic services	Water access	Direct piped water access has increased from 89% to 93% of households between 2016 – 2022 however despite this the number of households with no access to piped water (direct or communal) has remained static at 20 000 households.	The Western Cape is naturally a water-scarce region, and climate change is expected to increase the frequency and severity of droughts. Currently dam levels are sufficient however surety of supply is still not sufficient. It is imperative that new and diverse sources of water supply are realised, as is currently under development.	Improving
	Water system	Per capita consumption has increased during the review period since the lows of the 2018 drought however they still remain well below historic averages and the lowest	While the current outlook is better than in recent years, WDM and	Declining

Sector	Indicator	Performance	Outlook	Performance Trend
		<p>consumption per capita in the country despite relatively high access rates.</p> <p>Real losses have increased dramatically over the review period and are at historic highs due to deteriorating infrastructure condition and resulting leaks (Department of Water and Sanitation, 2023b)</p>	<p>managing system losses remain crucial. Both of these aspects have regressed during the review period and the challenge over the next four years will be reigning these in.</p>	
	Water quality	<p>The province has improved in the number of water systems that scored above 50% in their blue score rating. This shows that Water Services Authorities in municipalities are serious about improving their supply systems.</p>		Improving
	Sanitation access	<p>The proportion of households relying on inadequate sanitation declined marginally from 5.3% - 4.8% since 2016 however the total number of inadequately served</p>		Unchanged

Sector	Indicator	Performance	Outlook	Performance Trend
		increased slightly in absolute terms.	are positive for access expansion.	
	Wastewater treatment	<p>While the province remains the top performing in terms of its green drop score, there was a slight drop in scores from 84.5% in 2013 to 84% in 2021.</p> <p>The municipalities that improved in their green drop score did so by bringing on board a qualified technical team, management's financial and technical support to the staff, and the refurbishments and amendments to their Wastewater Treatment Plants.</p>	The changing climate and the impact thereof has heightened pressure on the finite availability of resources, and the urgent need for preventative measures to be put into place, such as water consumption restrictions.	Unchanged
	Refuse Removal	The percentage of households with access to weekly refuse removal has overall improved from the 2016 figures to 2022 figures, with four districts showing an overall improvement in access.	<p>There is a need for the province to monitor its growth and ensure that sustainable waste practices and policies are adopted.</p> <p>Local municipalities need to plan for sustainable waste disposal sites and ramp up their recycling efforts.</p>	Improving

Sector	Indicator	Performance	Outlook	Performance Trend
	Electricity access and supply	<p>The proportion of households connected to the grid, for lighting, has remained static since 2016 at approximately 96%.</p> <p>Loadshedding worsened over the review period with 2023 being by far the worst years in terms of load shedding hours and total energy availability.</p>	<p>A large proportion of households that have not been connected are located in unserviceable informal settlements so alternative energy solutions may be needed. There is growing momentum in this regard which could mean a more positive outlook.</p> <p>The significant renewable energy pipeline is positive for future sustainability of electricity but bulk transmission remains a key challenge of bringing it to market.</p>	Declining overall, with stagnant access and significantly declining electricity supply and availability
Transport	Modal split	<p>With the exception of rail, much of transportation system in the province is relatively well maintained.</p> <p>Rail infrastructure has been decimated following Covid-19 lockdowns resulting in the number of daily train users</p>	<p>There has been concerted policy efforts to transition towards more sustainable transport patterns. There are also early efforts in place to transition to a low carbon emission through moving to</p>	Declining

Sector	Indicator	Performance	Outlook	Performance Trend
		<p>declining from 13% of transport users in 2013 compared to a mere 2% in 2020.</p> <p>The subsequent increase in taxi and private car usage means increased transport costs and the growth of significantly less sustainable transport modes.</p>	<p>electric buses for economic and environmental benefits. Despite these, the decimation of the rail system in the metro has meant a significant decline in transport sustainability. The partial reopening of key routes and introduction of some new train sets offer some hope for improvement in the medium term.</p>	
Open space	No indicator	<p>The lack of open space provision in rapidly developing areas makes it more likely for the development of "Urban heat islands" which in turn increase energy usage.</p>	<p>There are guidelines for new developments in place (for example in the CCT) to assist in evaluating access to open spaces in efforts to enhance wellbeing.</p>	Insufficient Data

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