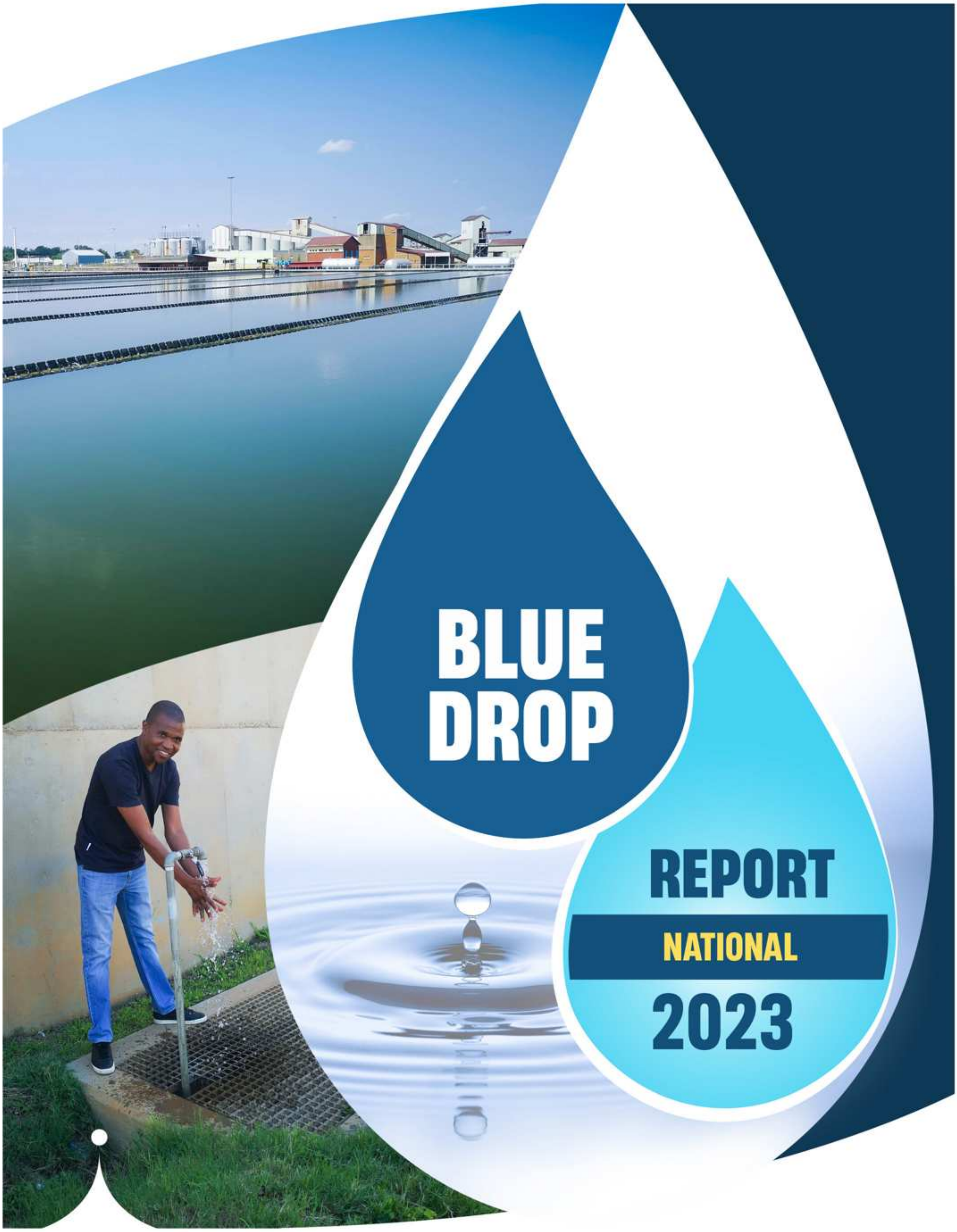


BLUE DROP

REPORT

NATIONAL

2023

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

" Water is Life, Sanitation is Dignity "

2030 NDP

FOREWORD by the HONOURABLE MINISTER

I am pleased to present this 2023 Blue Drop report. I committed the Department to making this the flagship program for the sector, when we relaunched in 2021, and I am glad to report that we have achieved this outcome. We have once again achieved a 100% Blue Drop Audit coverage of Water Services Authorities across South Africa. It was encouraging to see the support from municipalities, water boards and other participants.

We remain committed to ensuring that water service authorities provide our people with access to safe drinking water and to safeguard against the real risk of waterborne diseases. However, there is a concerning decline in the performance of the drinking water systems, and not necessarily in the state of infrastructure, but in the water quality performance since the last report released in 2014 across the country. To arrest and to reverse the decline in municipal water and sanitation services, we must therefore strive for excellence and ensure that we have professionally managed, capable, efficient, and financially viable institutions.

The Blue Drop Certification programme has been at the centre of much of the improvement over the years and has brought about change and reignited the passion and pride of our water sector specialists. At the same time, it embedded the culture of regulatory compliance. It sets the standard requirements and obligations for water services institutions and protects consumers from potentially unsustainable and unsafe services.

As part of this year's programme, we are once again strengthening our regulatory surveillance programme. Based on this, together with the findings of the Green Drop Report, we have developed an action plan to address issues in municipalities that have performed poorly. The plan covers 30 municipalities in 7 provinces that scored less than 10% in the Green Drop and/or Blue Drop assessments. We are working collaboratively with the Department of Cooperative Governance and Traditional Affairs, the Municipal Infrastructure Agency (MISA), and the National Treasury to support work in these and other municipalities with poor Blue and Green Drop results. There are however, limits to which national government support and intervention can address the decline in services. Municipalities, themselves, need to strengthen capacity, governance, and funding through the sale of water to ensure that these interventions have sustained outcomes. We have repeatedly seen services deteriorate rapidly after either technical or financial support ends.

We have also initiated legislative reforms towards strengthening the regulation of drinking water so that our institutions are efficient, financially viable and deliver services to the required standards. While that is the case, we also need a social compact with communities to ensure that water infrastructure is protected and that services are paid for. Together, we can not only slow the decline in services but start to reverse the trend.

The programme's historical success is also grounded in the water sector's support, and this year was no different. It was encouraging to see the support from municipalities, water boards, and other stakeholders who all heeded the call to action. I would like to express my sincere appreciation to all of them, including the researchers, service providers and sector partners, who have collectively taken ownership and made this an internationally recognised programme. We share in the success which forms the core of our endeavour to provide safe drinking water and sanitation.

We move forward knowing that we do not accept 'being good' as a norm in the South African water industry instead, we opt for excellence. The Blue Drop Certification programme has become more than just a subject field to its participants – it has become the accolade of water professionals, in and outside of this beautiful country. Let us continue being inspired by the results

Minister for Water and Sanitation: Mr Senzo Mchunu

Date: 22/11/2023

MESSAGE by the DIRECTOR-GENERAL

As a Department, we strive to make a positive impact on our country and its people as custodians of our water and sanitation resources. We undertook to being innovative and committed partners in our pursuit to ensure equitable and sustainable socio-economic development and universal access to water. The Blue, Green and No Drop Programmes have become embodiments of those principles.

This year's Blue Drop Audit cycle builds on the innovation from the previous cycle. Since inception, we have strived to make the reporting requirements seamless and simple for Water Services Institutions. This year we transitioned to an online Blue Drop scorecard, embedded within the IRIS system. IRIS is a truly world class online auditing and regulatory system and our WSIs continue to gain confidence in using it. We have further built on the "Very Rough Order of Measurement" (VROOM) model developed as part of the Blue Drop Technical Site Assessments. It provides insights on the state of the key elements of the water treatment infrastructure and provides an order of magnitude estimate of cost to return the infrastructure to a functional condition. It is this kind of valuable insight gained from the Blue Drop certification programme that can inform a coordinated response by DWS and other sector players.

Addressing the challenges in the water sector will require all hands-on deck and the Drop programmes has provided the impetus for that. We are now working collaboratively with the Department of Cooperative Governance and Traditional Affairs, MISA, and the National Treasury to implement an action plan to support 30 municipalities with poor Blue and Green Drop results.

We continue to build capacity and share knowledge through the audit process. The consultative auditing approach has received positive responses. Interaction with water treatment specialists has been beneficial to both municipalities and for that matter, our own internal team. As a department, we have continued to build internal regulatory capacity and a diverse pool of lead and assistant assessors. This bodes well for sustainability of the Drop programmes.

I would also like to express my appreciation to all the WSI leaders and their officials who participated in the process. It is only through our combined efforts that we can ensure provision of safe, reliable and affordable water services to our people.

Director-General for Water and Sanitation: Dr Sean Douglas Phillips

Date: 22/11/2023

BLUE DROP REPORT 2023 INDEX

1. EXECUTIVE SUMMARY

Blue Drop Certification

Incentive based regulation is an innovative and uniquely South African response to challenges in the water sector. The Blue Drop Certification programme seeks to induce changes in behaviour of individuals and institutions to facilitate continuous improvement and adoption of best practice management of the delivery and distribution networks from abstraction to the water treatment works to the points of use. Consequently, progressive improvement and excellent performance is recognised and rewarded. The 2023 Blue Drop report provides comparative analyses and diagnostics to assist Water Services Institutions (WSIs) to focus on specific areas for improvement and restoring functionality of their water supply systems. The publication of this regulatory report has the additional objective of ensuring that the responsible WSIs are held accountable.

The main outputs from the Blue Drop 2021-22 audit cycle, as published in the 2023 Blue Drop report, are:

- A Blue Drop score for each water supply system (WSS) assessed, which is aggregated into an overall Blue Drop score, expressed as a percentage (%)
- A Blue Drop Risk Rating (BDRR) for each water treatment works, expressed as a percentage (%BDRR/$BDRR_{max}$)
- Technical Site Assessment score for selected water treatment works and water supply network inspected, expressed as a percentage (%)
- A singular VROOM cost for all water treatment works where TSAs were conducted, expressed in Rand (R).

Blue Drop Audit Process and Procedure

The Blue Drop audits were conducted during 2022 by 26 audit panels comprising of 2-3 qualified water professionals. Inspectors qualified after attending a Blue Drop short course and achieving the required minimum threshold examination score. The scorecard was designed to consider evidence against 5 Key Performance Areas (KPAs): 1: Capacity Management; 2: Drinking Water Quality Risk Management; 3: Financial Management; 4: Technical Management; and 5: Drinking Water Quality Compliance. Each KPA and its respective sub-criteria carry different weights based on national regulatory priorities. The audit period under review was 1 July 2021 to 30 June 2022, resulting in a Blue Drop score issued in 2023.

A water supply system that achieves ≥95% Blue Drop score, is regarded as excellent and is then allocated the prestigious Blue Drop Certification status. A system that achieved <31% is regarded as dysfunctional and would trigger appropriate regulatory interventions.

A physical Technical Site Assessment is done at 1 to 2 systems to confirm the findings of the desktop audit. The TSA score reflects the physical condition of the raw water handling system (abstraction facility, pumps, and pipelines), the water treatment plant (inlet works to disinfection and sludge treatment), and distribution system (command reservoir, towers, pumpstations and bulk pipelines) [Note: More detailed information on the TSAs can be found in the Blue Drop Watch Report published earlier this year].

Audit coverage

The Blue Drop audit attendance records confirms that 100% of the 144 WSAs participated, covering 958 water supply systems across the country inclusive of 7 bulk water service providers (Water Boards) (9 during the audit period but currently 7 with the merging of Umgeni Water and Mhlathuze Water and disestablishment of Sedibeng Water) and 23 Water Service Providers. These statistics bodes well to affirm commitment to the Blue Drop national incentive-based regulatory programme.

The Blue Drop audit covers the delivery, treatment, and distribution networks to the end user/ consumer, specifically 958 water supply systems, 1,015 water treatment works (including boreholes and springs), 2,693 pump stations, 37,644 km bulk water supply lines, 136,645 km reticulation pipe lines, and 7,159 reservoirs. The data excludes systems where municipalities were unable to provide data. The audit confirmed a total installed design capacity of 17,373,844 kl/d and a total available design capacity of 16,811,479 kl/d with most of this capacity residing in the macro-sized treatment facilities (>25,000 kl/day).

Collectively, the treatment plants produce 12,217,270 kl/d and distributes 12,289,011 kl/d across the water networks, leaving a spare treatment capacity of 4,594,208 kl/d (27%) to meet additional future demands. However, the Regulator is concerned about the poor water use efficiency (ave. 256 l/p/d) compared to the international benchmark of 180 l/p/d. Going forward, water services institutions have to commit significant resources to curb water losses and address non-revenue water.

Summary of Results

The overall performance trend indicates a regression from 2014 to 2023. The Regulator found that 26 water supply systems achieved a Blue Drop score of >95% and thus qualified for the prestigious Blue Drop Certification.

In 2014, 44 water supply systems were awarded Blue Drop status. A total of 277 of 958 (29%) water supply systems were identified to be in a critical state in the country compared with 174 systems in 2014. This negative trajectory reinforces the need for regular audits to ensure timely turnaround and continued improvement.

From a risk perspective, the national Blue Drop Risk Rating (BDRR) improved from 52.3% in 2022 (BD PAT) to 47.15% in 2023. A total of 577 (of 958) water supply systems are situated in the low risk category, 184 WSSs in the medium risk category, 102 WSSs in the high risk category, and 95 WSSs in the critical risk category. The BDRR is however, only a snapshot of specific risk indicators, whilst the BD scores reflect the overall water services business.

The most prominent risks pointed to systems that are vandalised and not operational, boreholes not operational, dysfunctional pumping and treatment infrastructure, equipment failures due to lack of maintenance, lack of flow monitoring, drinking water non-compliance and failure to notify water users of non-compliant water quality. The Blue Drop audit does not verify statistics around interrupted water supply and will need to include the monitoring and quantification of ‘’water shedding’’ and ‘’dry taps’’ going forward.

Observations of significance from the Blue Drop audits and technical site inspections are:

- Several institutions have invested in infrastructure upgrades, extensions, and refurbishments via capital funding. However, many of systems were still found to fail the regulatory standards, fail to meet SANS water quality standards, and/or fail acceptable engineering and workmanship standards.
- Non-payment of contractors, laboratories and service providers is widely found, leading to services not being rendered, delayed, or discontinued.
- Vandalism and theft of electrical cables, equipment and civil structures results in systems being inoperable for extended periods, with few WSIs having effective anti-vandalism strategies or contingency plans in place.
- The most vulnerable and concerning area is the overall sub-standard quality of drinking water to the receiving population.
- The majority of municipalities (57%) do not notify water users in the event of water quality being compromised or not monitored, implying low confidence by water users in the quality of water in their taps.
- Technical and management capacity and competency remains a critical driver of performance, with varying reports on access to qualified Managers, Superintendents, Process Controllers, Engineers, Technicians, Technologists, Scientists, and contracted maintenance and laboratory services.
- Several water supply systems are operating close to or beyond their design capacity, whilst a high number of WSIs are unable to verify their SIV, design capacity or operational flow to or from the WTWs. WSIs are thereby limited in their ability to plan to meet medium-term demand projections, or to confirm if spare capacity is available.
- Many municipalities do not have water abstraction authorisation in place, or does not measure its abstraction, or over-abstract the allowed quota. The lack of water abstraction management has a significant impact on water resources planning and preservation for the country as a whole.
- Severe deficiencies were found in the monitoring of operational and compliance parameters.
- The Technical Site Assessments (TSAs) show a highly variable result with respect to process and asset functionality for WTWs across the country. While some water supply systems were excellent, others failed in all respects, with several plants (and boreholes) being abandoned due to vandalism and other challenges.

Summary of Cases of Decline

Water systems which failed to achieve the minimum Blue Drop target of 31%, are placed under regulatory focus, which triggers a number of interventions, as discussed in detail under Chapter 15 of this report.

The Regulator requires these WSAs with <31% Blue Drop score, to submit a detailed corrective action plan (CAP) within 20 working days from publishing of this report. A total of 277 of 958 (29%) WSSs received Blue Drop scores below 31% and are placed under regulatory surveillance, in accordance with the Water Services Act (108 0f 1997).

Way Forward

The Department of Water and Sanitation is the regulatory authority and custodian of national water resources, and works in collaboration with government partners, to correct cases of failing water supply and water quality. The Blue Drop findings are instrumental to verify drinking water quality compliance and water supply by each municipality and its water service providers, and to identify strengths and failures along with their associated root causes. This report informs future action by implementing appropriate regulatory, financial, capacity building, support and governance interventions by various government departments. The findings of this report is of sufficient concern that water services become a primary focus point on the national water agenda, commanding collaborative action by various sector players.

Moving forward, *infrastructure action* will include the implementation of an action plan developed by DWS together with COGTA and NT which covers municipalities which have drinking water systems which scored less than 10% in Blue Drop assessments (i.e. worst performers). DWS and COGTA are allowing municipalities to use their MIG and WSIG funding for repairs and refurbishment. However, routine maintenance must be funded from municipal revenues, which requires interventions to improve municipal billing and revenue collection and prioritisation of maintenance budgets by municipal leadership.

Budget needs to be coupled with competent people to plan and implement infrastructure projects, and to monitor expenditure and workmanship quality. Therefore, *capacity building actions* takes the form of MISA support through technical skills recruitment and assistance in project management, contract management, asset management practices and funding applications for infrastructure. DWS support will involve Councilor induction programmes, in collaboration with SALGA, and support with water services development plans, five-year reliability plans and water safety plans.

Financial unsustainability will be addressed through focused interventions by National Treasury and the appointment of technical/financial advisors to ensure tariffs are cost reflective, improving revenue collection, reconciling the General Valuation Roll to the billing system for completeness of revenue, so that all customers that appear on the General Valuation Roll also appear on the billing system and assist with financial planning and operational procedures. A transversal tender for smart prepaid meters for electricity and water to enable prepayment for water services will be advertised early 2024.

Legislative amendments to the Water Services Act with the aim to improve WSA-WSP powers, arrangements and accountability to strengthen the WSA role in municipalities by reviewing operating license systems for WSPs, amending S63 of the Act to enable the Minister, as a last resort, to force separation of the water services function from the municipal administration where there is persistent failure to meet license conditions, and require the WSA to contract a licensed WSP through a S78 Systems Act process.

Furthermore, DWS is in the process of strengthening its regulation function and improving the consistency of its regulatory actions. This includes revising the norms and standards for water services, developing standardised regulatory protocols, publishing a public dashboard of municipal performance against a range of measures of water performance, and linking support and regulatory action to the contents of the dashboard.

Water Services Institutions are hereby encouraged to commence immediately with the preparation for the next Blue Drop audit process, which will be conducted in 2025, following the Green Drop audits in 2024.


Swartland clarifiers in pristine condition

Greatness is not a function of circumstance. Greatness, it turns out, is largely a matter of conscious choice, and discipline. Jim Collins


Overstrand: Preekstoel WTW cascading inlet works

2. INTRODUCTION

The history of water will be measured not by its quantity but its quality...
Lucas van Vuuren
Institute for Water Quality Management, 1970's

Purpose and Intent of Blue Drop Certification

The Blue Drop Certification programme seeks to identify and develop the core competencies required for the sector that, if strengthened, will gradually and sustainably improve the level of drinking water management in South Africa. It is a form of regulation that holds the intent to synergise the current goodwill exhibited by municipalities, business, Department of Public Works, as well as existing government support programmes to give the focus, commitment and planning needed to achieve excellence in drinking water management.

The Blue Drop audit is the tool whereby incentive- and risk-based regulation is conducted in South Africa. Regulation is important to ensure effective and efficient delivery of sustainable water services and has been commended by South African authorities and accoladed by international peers. A good regulation approach is characterised by its ability to clarify the requirements and obligations placed on water service institutions, thereby protecting consumers from a potentially unsustainable and unsafe service.

The Blue Drop process has been developed against the philosophy that, if DWS as Regulator can inspire a path whereby disciplined people, disciplined thought, and disciplined action can be measured and reported, that the South African drinking water industry will be building greatness to last.

To achieve the South Africa we want will demand an extraordinary feat of human endeavour. The road ahead will be difficult. We will have to use our courage, wisdom and perseverance to achieve the South Africa we want. It will require an ambition that is rare.
President Ramaphosa

This report acknowledges those institutions with ambition that strives towards greatness ...and rewards those that achieve it.

Understanding Incentive-based Regulation in South Africa: Blue Drop Certification

Incentive-based regulation has gained significant momentum and support in the South African Water Sector, since its inception on 11 September 2008 (Minister of Water Affairs, National Municipal Indaba, Johannesburg). The concept was initially defined by two programmes: *Blue Drop Certification* for Drinking Water Quality Management Regulation; and *Green Drop Certification* for Wastewater Quality Management Regulation. This was expanded on with the third programme: ***No Drop Certification*** for water conservation and demand management in the water services sector.

The Blue Drop process measures and compares the results of the performance of water service institutions, and subsequently rewards (or penalises) the institution upon evidence of their excellence (or failures) according to the minimum standards or requirements that has been defined. Awareness of this performance is obtained by pressure via consumers, the media, politicians, business and NGOs. The strategy revolves around the identification of mediocre performing water service institutions who consequently correct the identified shortcomings, as well as the introduction of competitiveness amongst the water service institutions and using benchmarking in a market where competition is difficult to implement.

Each Blue Drop audit cycle is marked by incremental change in the audit criteria, guided by the status and priorities of the water services sector. It is therefore important for water service institutions to note that merely maintaining the previous cycle's Blue Drop evidence and performance will not warrant the same Blue Drop score.

Risk-based Regulation in South Africa: BDRR Profiles

The ***Blue Drop audit*** focuses on the entire value chain (abstraction, treatment, distribution) of the drinking water business within the water service institutions, whilst the ***Blue Drop Risk Rating (BDRR)*** assessment focuses on critical risk areas within water services provision.

The latter approach is a form of risk-based regulation which allows the water service institution to identify and prioritise the critical risk areas within its drinking water treatment process and to take corrective measures to abate these. Risk analysis is used by the Department of Water and Sanitation to identify, quantify, and manage the corresponding risks according to their potential impact on human health and to ensure a prioritised and targeted regulation of water service institutions with high-risk water supply systems.

The ***Blue Drop*** score reflects the status of the *whole water business* over a period of 12 months based on a comprehensive assessment of all Blue Drop performance areas, whereas the ***BDRR*** focuses on *specific risk indictors* at a specific moment in time (i.e. snapshot view), or over a more prolonged period in time (i.e., the Blue Drop 12-month period). The BDRR:

- Is a concise and focussed benchmarking exercise which extracts some of the key risk areas that would individually and collectively, give a snapshot view of the status of water quality
- Is an indicator of 'progress or digress' which can be run efficiently and accurately, annually or at any given time, without having to go through a comprehensive assessment process
- Enables the Water Services Authority to identify, quantify and manage the risks associated with drinking water services provision thereby empowering them to take relevant strategic management and operational decisions to support and improve sustainable water services provision.

The Department of Water and Sanitation integrates risk analysis as part of the audit process with the aim of quantifying, prioritising, and managing the risks to ensure targeted regulation of high-risk water service institutions. The Water Safety Plan (WaSP) is the tool whereby risks are identified and corrected.

Blue Drop Scores

The main outputs from the Blue Drop 2021-22 audit cycle are:

- A Blue Drop score for each water supply system assessed, which is aggregated into an overall municipal score, expressed as a percentage (%). The BD score will incorporate the performance of water services providers or bulk water providers (water boards), where such arrangements are in place
- A Blue Drop Risk Rating for each water supply system, expressed as a percentage (%)
- Technical Site Assessment score for selected water treatment works and water supply network inspected, expressed as a percentage (%)
- A singular VROOM cost for all water treatment works where TSAs were conducted, expressed in Rand (R).

Each indicator and its reference elements, can be described as follows:

- ***Blue Drop Score***: The Blue Drop IRIS scorecard is a web-enabled audit tool used to collect data and calculate the Blue Drop Scores. This data is collated into the Blue Drop Report outlining the WSIs performance against 5 Key Performance Areas for the water supply systems and water treatment works in South Africa. A Blue Drop % is awarded to an individual water supply system based on the results from the audit process which measures performance against 5 Key Performance Areas (KPA), plus a suite of bonuses and penalties. The individual scores aggregate as a single (weighted) institutional Blue Drop score. The score is weighted against the System Input Volume (SIV) towards the water supply system. This score serves as a Performance Indicator of the capacity, compliance, and good practice that the institution attains against the Blue Drop audit requirements, which again have been derived from national and international standards. A water supply system that achieves ≥95% Blue Drop score, is regarded as excellent. A system that achieved <31% is regarded as a dysfunctional system which would require appropriate interventions. [Note: The audit covers the abstraction, treatment, and distribution network to point of use].

  Institutions that achieve ≥95%, are Blue Drop Certified in acknowledgement of excellence

  The Blue Drop Scores for each water supply system is categorised as following:

	≥95-100%	Excellent situation, need to maintain via continued improvement
	≥80-<95%	Good performance, some room for improvement
	≥50-<80%	Average performance, ample room for improvement
	≥31-<50%	Very poor performance, need targeted intervention towards gradual sustainable improvement
	0-<31%	Critical state, need urgent intervention for all aspects of the water services business

- ***Blue Drop Certified***: A water supply system that achieves an overall ≥95% Blue Drop score and "Excellent" microbiological and chemical compliance, is thereby ''Blue Drop Certified".

- ***Blue Drop PAT:*** The Blue Drop Progress Assessment Tool (BDPAT) is a web-enabled assessment tool used to collect risk-associated data and calculate %BDRR. This data is collated into the Blue Drop Progress Report outlining the risk status of water treatment works across South Africa. In order to streamline the process of conducting BDRR assessments, both now and in the future, the BDRR formular was incorporated into the IRIS system. This facilitated capturing of information directly from the IRIS with links to supporting data provided by the WSI for purposes of verification. The BDPAT on the IRIS system has the following functionality:

  - ✓ Input value for each risk indictor with separate section for comments.
  - ✓ Resource pack with supporting information for each WSI as submitted on IRIS.
  - ✓ Some input values are transferred directly from IRIS into the BDPAT: population served, plant design capacity, plant classification, process controller and supervisor classification, water quality compliance and monitoring compliance results.
  - ✓ Option to create and export results, per supply system or institution with a number of systems.

- ***Blue Drop Risk Rating:*** The updated BDRR formular has an added risk indicator, E: Water Safety Planning, to address the risk assessment requirements outlined in SANS 241. The updated BDRR formular is:

BDRR = (A x B) + C + D + E

Where the weighting factor is based on the following five risk indicators

- ✓ A - Design Capacity: Larger plants present a higher risk as they supply water to a larger population
- ✓ B - Operational Capacity: Plants operating above its installed capacity present a higher risk as its capability is compromised to deliver safe drinking water
- ✓ C - Water Quality Compliance: C1 Microbiological (70%) + C2 Chemical (30%)
- ✓ D - Technical Skills: Poor technical, management and maintenance skills base present a collective and individual high risk.
- ✓ E - Water Safety Plan: The absence of a WaSP, risk-defined monitoring programme based on full SANS 241 assessment and implementation of actions to reduce risk, would represent a high risk due to non-compliance with SANS 241 requirements and lack of risk-management procedures.

The proportional risk allocation between the components is 35: 35: 20: 10 for A/B: C: D: E.

Therefore, full BDRR formular = **(35% (A*B)) + [35% C (70% C1 (Micro compliance X monitoring compliance) + 30% C2 (Chemical compliance x monitoring compliance)] + 20% D + 10% E.**

A ***BDRR value*** is calculated for each water supply system in South Africa, as provided in this Blue Drop Report. The BDRR profiles are usually sent to the respective Executive Mayors from the Minister's office, to inform the political principals of the facilities that reside in the high and critical risk space.

A ***BDRR %deviation*** is used throughout the Report and calculated using the following formular:

BDRR% deviation = BDRR / BDRRmax x 100

Where ***BDRRmax*** = Maximum BDRR of the water supply system

The ***BDRR %deviation*** is a calculated unit of measurement of risk which indicate the variance of a BDRR value before it reaches its maximum BDRR value. This unit of measurement allows the Department to compare all sized and types of water treatment plants equally. All water supply systems are categorised according to their risk rating placing them in one of four categories as reflected below.

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

Annexure A provides the history and alignment of the BDRR formular, the updated BDRR formular, and its application for multiple water supply systems.

- ***Technical Site Assessment Score***: A physical inspection is done at 1 to 2 sites to confirm the findings of the desktop audit. These sites are chosen based on their size, technology, and audit findings to best represent the potential state of the remainder of the delivery network, the treatment works and the initial part of the distribution system. The TSA score (%) reflects the physical condition of the raw water handling system (abstraction facility, pumps, and pipelines), the water treatment plant (inlet works to disinfection and sludge treatment), and distribution systems (command reservoir/s, water tower/s including pumpstations and bulk pipelines). The intention of the TSA is to verify the evidence presented and findings of the Blue Drop audit by undertaking a physical inspection of the selected site/s. Such inspections consider the:

SCORING GUIDE (%)

1.00	:	Ideal performance and fully functional
0.75	:	Fully functional, but with minor corrections to be made
0.50	:	Partially functional and average performance
0.25	:	Partial performance with major corrections to be made
0	:	Failure and poor performance
NA	:	In case of a unit process absent / not part of the plant design, assign NA = Not applicable

  - General aspects and the physical appearance of the plant terrain and buildings
  - Raw water handling pump stations, pipelines, inlet works and flow splitting
  - Chemical dosing and storage
  - Functionality and condition of the respective process units – flocculation, phase separation (clarification/settling, dissolved air flotation, sand filtration, membrane filtration, granular activated carbon), and disinfection
  - Functionality and condition of the high lift pumpstation, bulk pipelines from plant to command reservoir/s, command reservoir, and booster pumpstation
  - Sludge treatment and disposal.

  The scoring guide (%) depicted to the top right outlines the scoring criteria used for each TSA assessment element.

- ***VROOM costing:*** The Very Rough Order of Magnitude (VROOM) is an estimation of the funding required to restore existing infrastructure to its original design capacity and operations, by addressing civil, mechanical, and electrical defects. The cost is derived through an algorithm that uses the Blue Drop Inspector's impression of the condition of the hardware to a singular score for each water supply system inspected. **NOTE: The VROOM cost does not constitute a specification, schedule of quantities or a definite refurbishment figure, but rather an indicative amount to inform future budget and hardware requirements.**

Further terminologies that support the above concepts are as follows:

- ***WSI:*** A Water Services Institution is defined as "...an entity, utility, or authority that provides water services to consumers or to another water services institution, and thereby is subject to compliance with the water laws of South Africa. WSI also means a Water Services Authority, a Water Services Provider, a Water Board, and a Water Services Committee Entity..."

- ***WSA*:** A Water Services Authority is any District, Metropolitan or Local Municipality that is responsible for providing water services to end users.

- ***WaSP***: A Water Safety Plan is a plan to ensure the safety of drinking water through the use of a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer. Risk management processes to manage water supply systems effectively were introduced by the World Health Organisation (WHO) in 2004 and described as Water Safety Planning. More than 93 countries have adopted Water Safety Planning as a method for drinking water quality management with more than 70 countries having policies and regulations requiring Water Safety Plans. In South Africa, the WaSP is a requirement for Blue Drop Certification and is also a critical component of drinking water management and forms part of the BDRR calculation.

- ***WSP:*** A Water Services Provider is a public or private entity that support or provide a service to a WSA. Such service may include operations and maintenance of the water network, treatment, and/or distribution system and depends on the agreement between the WSA and WSP. Waterboards are regarded as WSPs, also known as a Bulk Water Supplier or Provider, and their performance contributes to the overall municipal Blue Drop score. In several instances the WSAs themselves act as water service providers in their own areas and may also be WSPs for other WSAs.

- ***Water Delivery Network:*** This is where an independent Bulk Water Supplier and/or the WSA abstracts and delivers raw water (via pumps or gravity flow) from various water resources (dams, rivers, boreholes, springs) via pipeline/s to the water treatment works.

- ***Water Treatment Works:*** A water treatment facility that receives raw water at the inlet works and treats the raw water through a series of process units (flocculation, phase separation, and disinfection), stores and distributes the treated potable water for use by the populations it supplies water to. The treatment technologies available are categorised as conventional technologies, advanced technologies or other.

- ***Water Distribution Network:*** The distribution of treated potable water from command reservoir/s or tower/s via a network of pipelines to and within towns, cities, or water supply areas (industrial, commercial, and residential) for consumption or use.

- ***Water Use Efficiency:*** The national scale development and promotion of water conservation and water demand management aimed at the efficient use of the nation's limited water resources. The National Water Act, 36 of 1998, provides the legal framework for the effective and sustainable management of the country's water resources and it requires that the nation's water resources are used efficiently and equitably in a sustainable manner for the benefit of all South Africans. Section 22 states that a person who uses water, may not waste that water. Similarly, the objective of the Water Services Act, 108 of 1997 is to promote water conservation in the provision of water services and requires WSAs to outline measures to conserve water resources and to conserve water as a WSI. The Act and its Regulations enables the implementation of Water Conservation and Water Demand Management (WC/WDM) for the municipal sector, by encouraging the sector to develop Bylaws, WC/WDM plans, WSDPs, etc. WUE is monitored as part of the Blue Drop and No Drop assessments. The international WUE benchmark is 180 l/p/d.

WUE (l/p/d) performance categories

Colour	WUE Range	Performance
	>300	Extremely high per capita water use
	>250-300	Poor per capita water use
	>200-250	Average per capita water use with potential for marked improvement
	>150-200	Good per capita water use but some improvement may be possible subject to economic benefits
	<150	Excellent per capita water use management

- ***IRIS***: The Integrated Regulatory Information System (IRIS) is a web-based application used by the Department of Water and Sanitation to facilitate the relationship between Regulation and Management of water supply and wastewater systems, while also keeping relevant stakeholders informed on compliance trends of registered supply systems. Information is uploaded by the Water Services Institution onto IRIS to allow the Inspector to assess evidence before, during and after the audit event. IRIS contains an inventory of information on all registered water supply systems, tracks historic system performance, and provides the platform to register water treatment works and operations staff.

- ***Diagnostic:*** A suite of key diagnostic themes in the Blue Drop report that cover a number of strategic areas of importance to the South African water industry. Diagnostics allows deeper examination of the data and a better understanding of the causes of behaviours and patterns, in answering pressing questions of "why did it happen? "and guide recommendations on "what corrections or interventions are needed?".

- ***DWQ:*** The drinking water quality is currently reported in accordance with the SANS 241:2015 drinking water quality standards and reflects the Institutional Water Quality Compliance (% Microbiological and % Chemical Qualities) for all the water supply systems assessed as part of the Blue Drop Audit. Systems with no monitoring information are marked with NI (No Information) and a zero compliance allocated. The quality of drinking water drop definitions reflected in the Regulatory Tables per water supply system are indicated in the schematic below (under Blue Drop 2022 standard - Understanding the drop representation for each supply system).

- ***Chemical Compliance:*** The chemical acute health and chronic health quality is measured against the requirements of SANS 241:2015 and must comply as per the excellent requirements set by the Blue Drop Programme. Acute health determinands pose an immediate unacceptable health risk if present at concentration values exceeding the numerical limits specified in SANS 241. Acute chronic determinands pose an unacceptable health risk if ingested over an extended period if present at concentration values exceeding the numerical limits specified in SANS 241 and is associated with population metrics.

CHEM Acute Health: Population <100,000		
Colour	Status	Percentage
	Excellent	≥97%
	Good	≥95 - <97%
	Unacceptable	<95%

CHEM Acute Health: Population >100,000		
Colour	Status	Percentage
	Excellent	≥99%
	Good	≥97 - <99%
	Unacceptable	<97%

CHEM Chronic Health: Population <100,000		
Colour	Status	Percentage
	Excellent	≥95%
	Good	≥93 - <95%
	Unacceptable	<93%

CHEM Chronic Health: Population >100,000		
Colour	Status	Percentage
	Excellent	≥97%
	Good	≥95 - <97%
	Unacceptable	<95%

- ***Microbiological compliance:*** The acute health microbiological quality is measured against the requirements of SANS 241:2015 and is associated with population metrics. Acute health microbiological determinands pose an immediate unacceptable health risk if present at counts or values exceeding the numerical limits specified in SANS 241. Therefore, the WSI has a regulatory obligation to ensure that quality of water supplied to consumers meet requirements as prescribed by SANS 241.

MICRO: Population <100,000		
Colour	**Status**	**Percentage**
	Excellent	≥97%
	Good	≥96 - <97%
	Unacceptable	<96%

MICRO: Population >100,000		
Colour	**Status**	**Percentage**
	Excellent	≥99%
	Good	≥98 - <99%
	Unacceptable	<98%

- ***Regulations 2834 and 3630:*** The Blue Drop KPA 1 considered compliance of supervisory, process control and maintenance staff against Regulation 2834 and draft Regulation 813. These regulations have now been formally promulgated as Regulation 3630, in the Government Gazette No. 48865 of 30 June 2023. These regulations are called the Regulations relating to Compulsory National Standards for Process Controller and Water Services Works. R3630 will be implemented in phases over a period of 18 months, whereafter the sector will have 6 months to update their details on IRIS to be aligned with R3630:

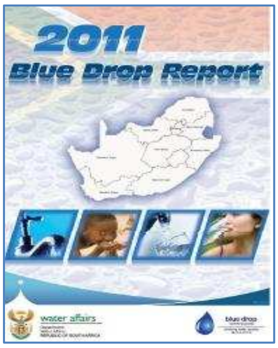
    - Phase 1 - Comparison study by DWS on the impact of the R3630 on the IRIS profiles and amendment of application/ registration/ classification forms
    - Phase 2 - Sector provincial workshops to communicate the content of the R3630, the findings of the impact study, and how it will affect the IRIS profiles of Water Care Works and Process Controllers
    - Phase 3 - Implementation of the R3630 on IRIS
    - Phase 4 - Monitoring of compliance (2 years after promulgation).

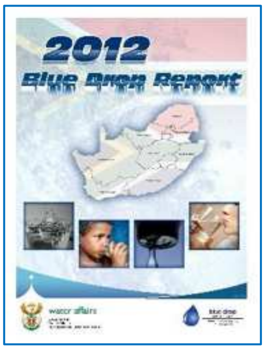
Note: R3630 will not have an impact on the 2023 Blue Drop scores. Any queries may be directed via e-mail to Mr Lodevikus Nel at nell@dws.gov.za and the IRIS Helpdesk at niemandm@dws.gov.za and mashigoi@dws.gov.za.

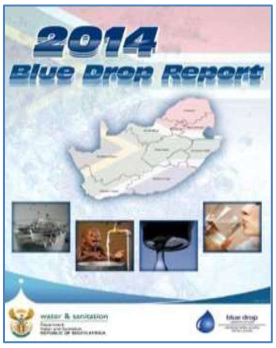
Blue Drop Reporting

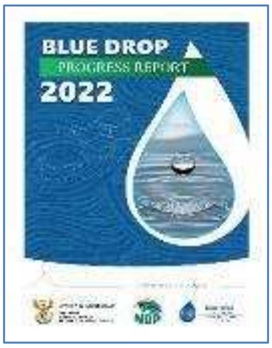
This 2023 Blue Drop Report upholds the Minister's commitment to provide the water sector and its stakeholders with **ongoing, current, accurate, verified,** and **relevant** information on the status of water services in South Africa. It follows on a series of Blue Drop Reports from 2009 to 2023, by providing feedback and progress pertaining to the current status of municipal, water boards (bulk suppliers), and DFFE water supply systems and water treatment works.











The 2023 Blue Drop Report provides information on three different levels:

1. ***System specific*** data and information pertaining to the performance of each drinking water supply system at WSI level.
2. ***Province specific*** data and information that highlight the strengths, weaknesses, and historic trends for the respective WSIs within a Province
3. ***National overview*** that collates the findings from a provincial level to give an aggregated national perspective of water service performance. Historic trends are provided to gain insight into the success of provincial and national strategies to improve water management and to inform future strategies and interventions.

> ***The final proof of greatness lies in being able to endure criticism without resentment.***
>
> *Elbert Hubbard*

Saldanha Bay: Withoogte filter gallery – excellent operation and maintenance

JB Marks: Settling tanks in immaculate condition, cleared of solids, delivering SANS241 compliant water

3. BLUE DROP STANDARDS 2022

The Stockdale paradox:
Confront the brutal truth of the situation, yet at the same time, never give up hope

Blue Drop Audit Process and Procedure

Blue Drop Audits were conducted by 26 audit panels comprising of 2-3 qualified water professionals. Inspectors qualified after achieving a threshold examination score. Annexure B provides a flow chart of the 2023 Blue Drop Audit Process and Procedure leading into the publication of 2023 Blue Drop results. WSIs were supported and capacitated through the audit process, as part of the Department's commitment to a 'consultative audit process'. Provincial symposia, attended by WSIs from that province, were held prior to the audit to share information on the audit process and criteria. Information was also shared on the role of IRIS and introduction to the IRIS Helpdesk. WSIs were also notified in advance of the audit date, audit criteria and the required portfolio of evidence (PoE) for the audit to assist with their preparation.

The IRIS Scorecard was designed to consider evidence against 5 Key Performance Areas (KPAs):

1. Capacity Management
2. Drinking Water Quality Risk Management
3. Financial Management
4. Technical Management
5. Drinking Water Quality Compliance.

Each KPA and sub-criteria carry a different weighting based on the regulatory priorities. The Blue Drop KPAs, weights, and audit requirements (standards) are summarised in the section below. Each KPA and sub-criteria carry a different weighting and are based on the relative regulatory priorities. Annexure C provides guidance on the format and interpretation of the Report Card.

Blue Drop Audit Period: 1 July 2021 – 30 June 2022

Blue Drop Audit Requirements (Standards)

KPAs and Sub-KPAs	Sub-weight	Blue Drop Requirement
KPA 1: CAPACITY MANAGEMENT (15%)		
1.a) Registration of Water Treatment Plant	20%	The water treatment facility is registered as per the requirements of Regulation 2834 or as per Blue Drop Standard (Draft Regulation 813)
1.b) Registration of Process Controllers and Supervisor	20%	Process controllers and Supervisors are classified as per Regulation 2834 or Draft Regulation 813. This Requirements will apply for all shifts of a specific WTW. i) Classification certificates of all process controllers and supervisors/superintendents must be available in the IRIS. ii) Compliance with Regulation 2834 coupled with shift details; WSI must indicate shift patterns or measures in place when a shift does not comply with Regulatory Process Control requirements. iii) WSI must indicate process controllers and/or supervisors that are 'shared' across different plants/sites.
1.c) Maintenance Capacity	20%	The Water Treatment and Network must be served by a competent maintenance team (internal or outsourced), executing the maintenance work according to an acceptable maintenance plan/schedule. Evidence of the Maintenance Team as determined by technology used for general maintenance work at the relevant WTWs & distribution network - mechanical, civil and electrical - (Internal or evidence if Outsourced): i) Term Contract (Outsourced) or Organisational Structure (Internal) ii) Proof of team competency (Qualification & Experience & Trade-test) iii) Provide a site specific operation and maintenance schedule) iv) Logbook with maintenance entries as per maintenance plan.
1.d) Engineering Management Capacity	20%	The WSI must ensure that a competent engineering specialist oversee water treatment and supply operations, maintenance, and general asset management. Number of Engineering Staff available in the WSI taking responsibility for Maintenance Planning and General Asset Management: i) 1 X Engineering Technician, ii) 1 X Engineering Technologist iii) 1 X Engineer, or iv) MISA Appointee: temporary engineering staff

KPAs and Sub-KPAs	Sub-weight	Blue Drop Requirement
1.e) Scientific Capacity	20%	The WSI must ensure that a suitably qualified professional scientist oversee the implementation of the Operational and Compliance monitoring programme (sampling and analyses) Number of Scientific Staff appointed for the management of drinking water quality management, incl. implementation of the water safety planning process, and monitoring programme, sampling, and analyses: i) 1 X Candidate Scientist ii) 1 X Professional Scientist
KPA 2: DRINKING WATER QUALITY RISK MANAGEMENT (20%)		
2.a) Water Safety Planning	40%	The WSI must provide a drinking water risk management plan, which adheres to an internationally recognised standard/best practice such as the WHO/IWA water safety plan framework: (i)Team Assembled, (ii) System detailed in the Plan, (iii) Plan was reviewed in past 3 years. (iv) Detailing System-specific Hazard/Risk Assessment, & (v) Adequate Control measures identified. *i) signature from Technical director/MM* *ii) Risk prioritisation method* *iii) Risk assessment of catchment* *iv) Risk assessment of plant* *v) Risk Assessment of network* *vi) Final risk rating* *vii) Mitigating measures for all high and medium risks* *viii) Full SANS 241 analysis of raw and final water* *ix) Identification of risk determinands* *x) additional risk determinands to monthly compliance monitoring as per SANS 241 -frequency based on category of risk (acute/chronic/aesthetic)* *xi) proof that >25% of mitigating measures have been implemented – proof in form of purchase order, pictures, water quality results, tender document, etc.*
2.b) Operational Monitoring	10%	Each WTW will have an operational monitoring programme in place which informs the operational treatment efficacy (as per the required frequency) of the treatment facility as per the SANS 241. Details of Operational Monitoring: i) Proof of Operational Monitoring sites, determinands and frequency ii) Samples must include: i) inflow (raw), (ii) pre-filtration, iii) post filtration; (between each unit process clarification, filtration) vi) final iii) Determinands monitored; must at least incl. pH, Turbidity, Free Chlorine (Final) iv) As per Authorisation measure / daily abstraction rates (kl/d)
2.c) Compliance Monitoring	20%	Each Water Supply System will have a compliance monitoring programme in place (implemented), informed by the Water Safety Planning process, and SANS 241 requirements, as per the required frequency, determinands and sampling points. Details of Compliance Monitoring Programme: i) Compliance Monitoring informed by water safety planning process, inclusion of identified risk determinants (WSI to provide list of problem determinants, sample points and frequency of monitoring) ii) Required sites monitored: WTW final & distribution network (monitoring programme covering 80% of the supply system) + Frequency of analyses: Final: Weekly for acute health (micro, chemical), Monthly: final and distribution network for all other risk determinants as per SANS 241.
2.d) Laboratory Credibility	20%	All compliance monitoring samples must be analysed at a credible laboratory (either accredited according to SANAS requirements or participating in a Proficiency Testing scheme with acceptable z-scores) for the required determinands, with an acceptable turnaround time. i) Certified Data > 80% = 40% ii.a) SANAS Certificate of Accreditation Methods or Z-scores results (z-scores must be > –2 & < +2 are acceptable) in a recognised Proficiency Testing Scheme = 60%; OR ii.b) Proof of intra- and Inter-laboratory proficiency (quality assurance as prescribed in Standard Methods) = 40%
2.e) Incident Management Protocol	10%	As part of the DWQ Risk Management preparedness the WSI should have an Incident Management Protocol in place and an Incident Register detailing incidents, causes, rectification, and timeframes. The Treatment works will have a WTW Logbook to record all treatment process related incidents. (Feedback to WaSP update!!) i) WSI must have an Incident Management Protocol to guide reaction should there be a failure in DWQ: alert levels, response times, required actions, roles and responsibilities, communication vehicles. ii) A DWQ Incident Register detailing 1) details of Incidents (date, locations, description) 2) Causative factors, 3) Rectification (actions taken) & 4) Timeframes (date of resolution) iii) A WTW Logbook detailing all treatment process related incidents.
KPA 3: FINANCIAL MANAGEMENT: 15%		
Water Treatment Operations and Maintenance Cost Determination done: i) Determined for the whole Water Supply System; or ii) Determined for part of the system; or iii) Not system specific (Global only); or iv) Not Done at all		

KPAs and Sub-KPAs	Sub-weight	Blue Drop Requirement
3.a) Water Supply Operations Cost Determination	35%	The WSI must determine the actual operations and maintenance cost of water treatment and supply (reticulation) per water supply scheme and express this in R/m3. (This determination should include energy use for treatment and pumping) *Note: This will exclude capital cost for upgrades rehabilitation. i) Municipality / WSI must provide evidence of a proper O&M cost determination for the entire water supply system (treatment works, network, pumpstations) This must at least Incl: a) Energy Consumption b) Raw Water Cost c) Compensation of Employees d) Chemical cost e) Maintenance Cost ii) Provide an operational cost determination per m^3 treated. *Note: This will exclude capital cost for upgrades rehabilitation.*
3.b) Water Supply Operations & Maintenance Budget	10%	The WSI must have an annual O&M budget per water supply system, for water treatment and supply / reticulation. The WSI must provide proof of the water supply system Operations & Maintenance Budget per annum (for the audit period) -Including the water treatment works, bulk distribution and reticulation.
3.c) Water Supply Operations & Maintenance Expenditure	25%	WSI must provide evidence of the water treatment and supply O&M expenditure per annum (to be measured in relation to the original budget). O&M Expenditure Within Approved FY budget (88% <> 100%) O&M Expenditure That Overspent (>100%) Against Approved Budget O&M Expenditure That Underspent (<88%) Against Approved Budget No proof = 0%
3.d) Supply Chain Management of Services and Treatment Products	20%	There must be appropriate supply chain management process in place to ensure continuous availability of treatment chemicals (and related consumables), maintenance and spares. WSI must provide proof of approved contract for outsourced services that cover the BD audit year: i) technical services (i.e. maintenance, spares, calibration) and ii) supply of chemical, and treatment consumables. (Where applicable)
3.e) Capital Budget and Expenditure	10%	The WSI must provide current (and planned) capital budget (current FY and future) and expenditure for refurbishment and/or upgrades of the specific water treatment and supply system. In terms of Refurbishment or Upgrades, the WSI must provide: i) Capital budget for both WTW and network ii) Expenditure for both WTW and network No Proof
KPA 4: TECHNICAL MANAGEMENT (15%)		
4.a) WTW Design and Supply Capacity Management	20%	The WSI must be authorised for a Section 21(a) water use, measure operations (volumes treated per day) accordingly and record for planning and audit purposes. It is also required to have record of the available supply/pumping capacity to convey water to reservoir(s). The WSI must provide: i) Documented design capacity of the water treatment facility ii) Documented daily water treatment volumes (over 12 months of assessed period) in kl/d. iii) WSI is required to provide motivation/proof of accuracy of meter readings (calibration or verification)
4.b) Process Audit	30%	A water treatment facility must be subjected to an annual condition assessment and/or a Process Audit (conducted by a duly qualified professional person) to inform functionality of the infrastructure. Risk findings must be incorporated in the Water Safety Planning process. i-a) Condition Assessment report (conducted by a qualified engineering/technical/scientific internal resource). Evidence required of audit findings and recommendations on treatment facility status (Jul '19 - to Sep '22); **OR** i-b) Process Audit report (conducted by a duly qualified independent professional person) to include the (design) capability of the plant to meet compliance standards, as well as actual performance of unit processes (Period: Jul '15 to Sep '22). ii) Evidence/plan of implementation of a-1 or a-2 audit recommendations during year(s) following Audit Report *Note: Cross-check if findings (risks) and recommendations (corrective measures) have been incorporated in Water Safety Plan (WaSP)* 5% will be deducted if findings not incorporated in the WaSP or Risk Register under crit. (KPA 2a)
4.c) Water Reticulation Inspection	25%	The WSI shall ensure that the water supply system is subjected to at least an annual inspection to determine asset condition of pump-stations, reservoirs, and the network in general. The results of this inspection must inform the water safety planning process, especially the reservoirs. Provide evidence in form of capacity and condition assessment/audit description, findings, and recommendations of system. Report to include a water flow balance that provides an indication of Non-Revenue Water. *Note: Cross-check if findings (risks) and recommendations (corrective measures) of Reticulation Inspection Report have been incorporated in WaSP.* ***NB! Must report on condition of reservoirs.***
4.d) Water Treatment and Supply system Asset Management	25%	Water Infrastructure must be included in an updated WSI Asset Register (as per AGSA requirements), detailing: i) Proof of Asset Register, evidence to be submitted. ii) Asset register to include movable equipment & immovable infrastructure / assets with matching detail. The asset register must detail:

KPAs and Sub-KPAs	Sub-weight	Blue Drop Requirement
		a) relevant equipment and infrastructure b) asset description c) location d) condition e) remaining useful life f) replacement value iii). Proof that Asset Register is used to inform Maintenance Plan.
KPA 5: DRINKING WATER QUALITY COMPLIANCE (35%)		
5a) Monitoring Data Submission to DWS	10%	A WSI must ensure that all Compliance Monitoring data is submitted on a monthly basis to the Department of Water and Sanitation on the required Regulatory System (IRIS). (12 months). Compliance monitoring is adhering to the water safety planning informed monitoring programme. The WSI should ensure that all DWQ data (compliance incl. risk-based) is submitted to DWS: i) Data submitted for 12 months of the audit period ii) All sampling results submitted as per the WaSP monitoring programme
5b) Acute Health Microbiological Risk Compliance	30%	The **Acute Health Microbiological Quality** of water supply must comply with the South African National Standard (SANS241) as per the Excellent Requirements set by the Blue Drop Programme.
	10%	**Acute Health Microbiological Monitoring Compliance** (% as per IRIS)
5c) Chemical Compliance	20%	The **Chemical Quality** of water supply must comply with the South African National Standard (SANS241) for both Acute and Chronic health determinands, as per the Excellent Requirements set by the Blue Drop Programme. i) Chemical - Acute Health: - Excellent Comp. (97% for <100 000) & (99% for >100 000) - Good Compliance (95% for <100 000) & (97% for >100 000) ii) Chemical - Chronic Health: -Excellent Compliance (95% for <100 000) & (97% for 100 000) -Good Compliance (93% for <100 000) & (95% for 100 000)
	10%	**Chemical Monitoring Compliance** (% as per IRIS)
5d) Risk Defined Compliance	15%	The Compliance of all **Determinands identified** during the **Risk Assessment Process** to be included in the risk-defined monitoring programme, must comply with the requirements set in the SANS 241. i) Excellent Compliance (95% for <100 000 & 97% for >100 000) ii) Good Compliance (93% for <100 000 & 95% for >100 000)
5e) Treatment (Operational) Efficiency Index	5%	The compliance of **operational determinands** as monitored at the Final Water sampling point must comply with the SANS 241 Requirements. This is the Works operational determinands compliance and should be calculated manually. **Note**: this is not compliance data that has an operational risk. i) Excellent Compliance (93% for <100 000 & 95% for >100 000) ii) Good Compliance (90% for <100 000 & 93% for >100 000)
BONUSSES		
6a) Process Control Training	25%	i) Process controllers and supervisory staff must be subjected to relevant training over the past 24 months as from the date of audit. ii) Cross-pollination and in-house training will be acknowledged as non-accredited capacity building.
6b) Performance Agreements	25%	Workplans or Performance Agreements of process controllers and DWQ Management aligned to Water Treatment Operations Requirements and SANS 241 compliance targets.
6c) Publication of Drinking Water Quality Results	25%	The WSI takes responsibility to inform the public of quality of drinking water supplied.
6d) Water Demand Management	25%	WSI has a water balance of its water supply system in terms of Regulation 10 under Section 9 of the Water Services Act.
PENALTIES		
7a) Data variances and Discrepancies	50%	The penalty shall be applied if a selected sample of hardcopy records present differences to what was uploaded onto IRIS or reported to the public.
7.b) Non-notification of DWQ Failure	50%	Should the WSI fail to present evidence of an Adverse Water Quality Alert Notice (incl. Boil Water Notice) issued for significant (sustained) failures.

Understanding the drop representation for each supply system

Quality of Drinking Water Drop Definition	
Colour Drop	**Indication of Drop**
blue drop CERTIFICATION drinking water quality REGULATION	**Blue Drop Certified**
	**Water complied excellently with standard; safe to drink** **Micro >97%** **Chemical >95%**
	**Water safe to drink but some chemical parameter compliance required improvement** **Micro >97%** **Chemical <95% (or no information)**
	**Water generally safe to drink but with recorded some microbiological failures** **Micro <97%** **Chemical >95%**
	**Water did not comply according to expected standard targets** **Micro >90% but <95%** **Chemical >90% but <95%**
	**Compliance levels too low; there were extended periods when the water did not comply with standard / or no monitoring to confirm actual quality of tap water** **Micro <90%** **Chemical <90%**

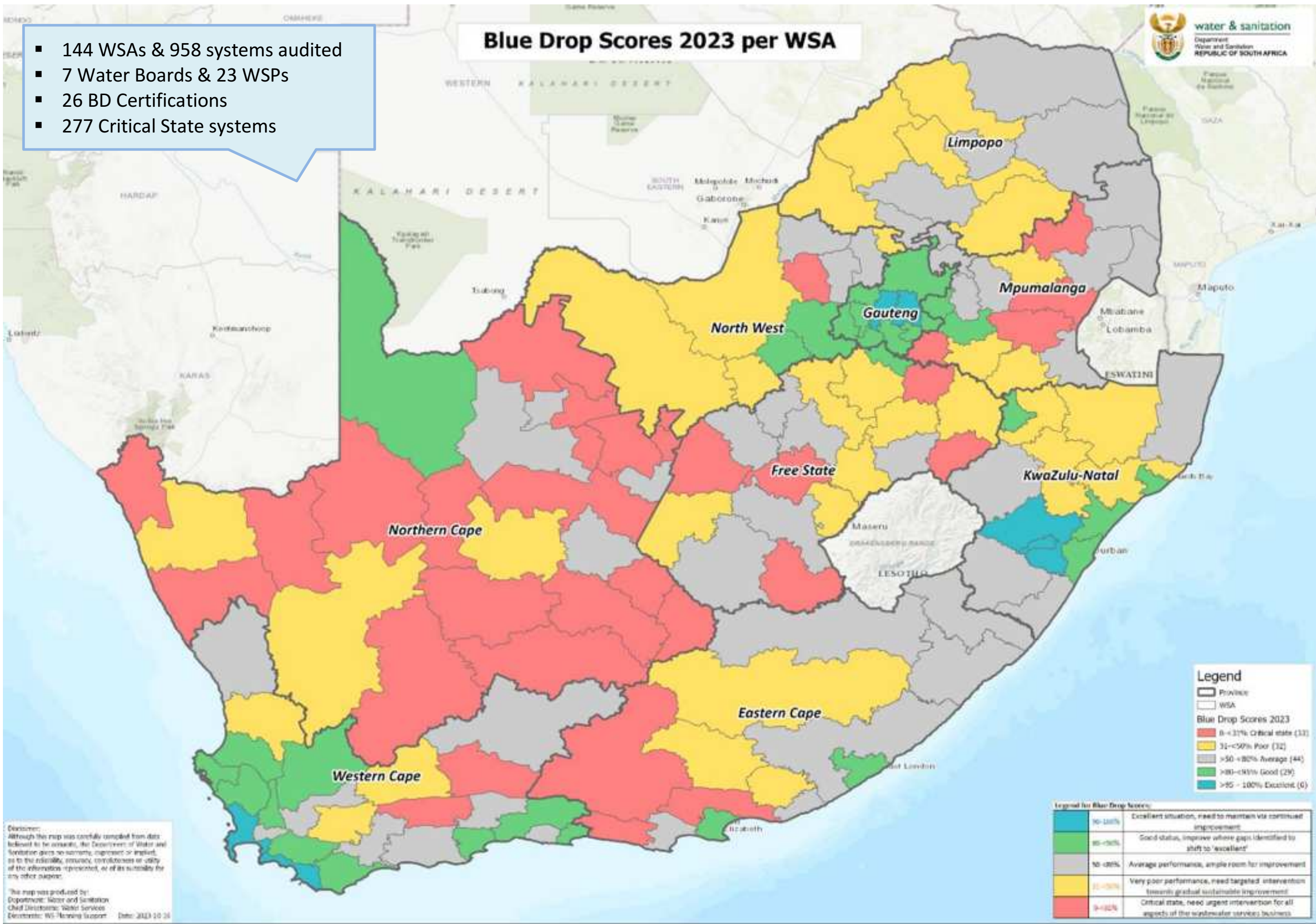
"If you are going to achieve excellence in big things, you develop the habit in little matters. Excellence is not an exception; it is a prevailing attitude."

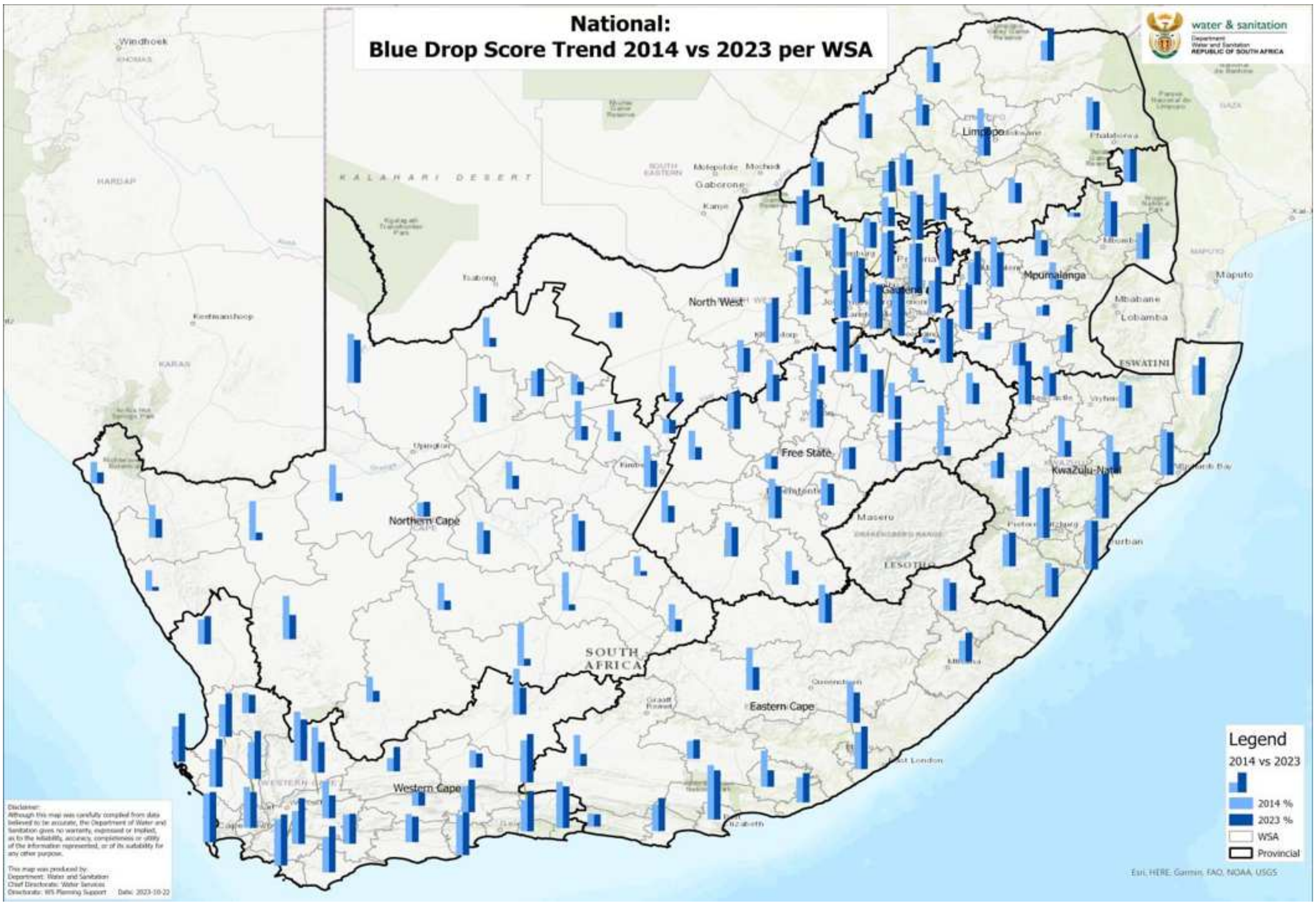
Colin Powell

Impedile Town: View from top of reservoir 2, good structural integrity

Mbombela/Umjindi: WRCW WTW raw water meter read daily, calibrated

4. NATIONAL PERFORMANCE OVERVIEW OF MUNICIPAL WATER MANAGEMENT





National Synopsis

The nine provinces provide drinking water to a total population of 48,486,567 persons in South Africa.

The Blue Drop audit attendance records confirms that 100% of the 144 WSAs participated, covering 958 water supply systems across the country inclusive of 7 Water Boards (9 during the audit period but now 7) and 23 Water Service Providers. These statistics bodes well to affirm commitment to the Blue Drop national incentive-based regulatory programme.

Table 1 - National Summary of Water Treatment Works, Water Supply Systems, Populations, Water Boards and Water Service Providers

Province	# WTWs	# WSSs	Populations	Water Boards (Current)	WSPs	# WBs/ WSPs
Eastern Cape	222	154	5,001,573	Amatola Water	Nelson Mandela Bay MM	2
Free State	75	80	3,028,741	Bloem Water now Central Vaal Water (CVW), Rand Water & Sedibeng Water now CVW	MaP Water	3
Gauteng	19	29	13,928,777	Rand Water & Magalies Water	Johannesburg Water	3
KwaZulu Natal	190	172	8,787,506	Umgeni Water & Mhlathuze Water with latter merge now uMngeni-uThukela Water	uThukela Water, WSSA now Zana Manzi, Novubu Construction & Siza Water	5
Limpopo	85	84	3,391,492	Lepelle Northern Water & Magalies Water	EXXARO, Eskom & Public Works LP	5
Mpumalanga	107	100	4,770,957	Rand Water	Sembcorp-Silulumanzi, Eskom, Glencore Operations (now DRA Global) & Anglo operations/ Nu Water systems	5
Northern Cape	158	176	1,129,644	Bloem Water now Central Vaal Water (CVW) & Sedibeng Water now CVW		1
North West	33	39	2,206,785	Rand Water, Magalies Water, Bloem Water now Central Vaal Water & Sedibeng Water now CVW	Midvaal Water & City of Tshwane MM, WSSA and Rustenburg Water Services Trust	7
Western Cape	126	124	6,241,092	Overberg Water	City of Cape Town MM, West Coast DM Bulk, Nu Water, IKUSASA, Veolia	6
Totals	**1015**	**958**	**48,486,567**	**7**	**23**	

The Regulator determined that 26 water supply systems scored more than 95% when measured against the Blue Drop standards and thus qualified for the prestigious Blue Drop Certification. In 2014, 44 water supply systems were awarded Blue Drop status. Using the 2014 audit results as comparative baseline, an overall decline in excellence is noted between 2014 and 2023. A total of 277 of 958 (29%) water supply systems were identified to be in a critical state in the country compared with 174 water supply systems in 2014.

The country's overall Blue Drop performance is characterised by particular strengths but also significant vulnerabilities, when measured against the KPAs. The results of the KPAs per province are reflected in the table below.

Table 2 - National Summary of the 2023 Blue Drop Audit key performance Areas

Province	KPA 1 Capacity Management	KPA 2 DWQ Risk Management	KPA 3 Financial Management	KPA 4 Technical Management	KPA 5 DWQ Compliance
Eastern Cape	67.5%	58.3%	62.6%	32.4%	41.5%
Free State	53.3%	37.6%	49.3%	28.1%	39.5%
Gauteng	75.8%	72.4%	78.5%	65.3%	80.4%
KwaZulu Natal	72.8%	63.7%	65.0%	37.4%	54.3%
Limpopo	55.3%	29.8%	44.5%	23.2%	53.1%
Mpumalanga	62.9%	51.6%	49.0%	35.3%	43.3%
Northern Cape	38.0%	19.9%	29.8%	14.2%	31.4%
North West	63.2%	52.2%	48.9%	30.1%	55.2%
Western Cape	70.9%	62.3%	70.7%	56.3%	73.7%
Totals	**62.2%**	**49.8%**	**55.4%**	**35.8%**	**52.5%**

The best performing KPA nationally is KPA 1 Capacity Management followed by KPA 3 Financial Management, and the worst performing KPA nationally is KPA 4 Technical Management followed by KPA 2 DWQ Risk Management. With the exception of the Water Boards, a concerning high number of metropolitan municipalities, district municipalities and local municipalities do not stand out for their compliance, with significant shortcomings in good management- and risk management practice in their water business. The KPAs that require focussed attention are those that that scored below <31% (critical) and between ≥31-<50% (poor).

The national Blue Drop Risk Rating (BDRR) improved from 52.3% in 2022 (BD PAT) to 47.15% in 2023. A total of 577 (of 958) water supply systems are situated in the low risk category, 184 WSSs in the medium risk category, 102 WSSs in the high risk category, and 95 WSSs in the critical risk category. The BDRR is however, only a snapshot of specific risk indicators, whilst the BD scores reflect the overall water services business.

The Regulator is confident that the 2023 Blue Drop report provides the true and verified status of water services in South Africa. Stakeholders will benefit from having an updated baseline to inform new plans and budgets to improve performance and ensure turnaround in municipalities where water services are failing or are following a failure trajectory. Municipalities and service providers are encouraged to start preparation for the next Blue Drop audit cycle, which is planned to cover the financial year 2023/24 and released in 2025. The National 2023 Blue Drop status is summarised in the table below.

Table 3 - National 2023 Blue Drop Summary

Province	2023 BD Certified ≥95%			2014 Critical State WSSs (<31%)	2023 Critical State WSSs (<31%)
	2014 BD Report	2023	Names of BD Certified Municipalities and Systems		
Eastern Cape	None	None		31	27
Free State	6	None		5	31
Gauteng	9	3	✓ City of Johannesburg MM (Rand Water) - Greater Johannesburg WSS ✓ City of Ekurhuleni MM (Rand Water) – Ekurhuleni ✓ Midvaal LM (Rand Water) - Meyerton	None	None
KwaZulu Natal	8	3	✓ Ilembe DM (Umgeni Water) – Dolphin Coast Ballito - Sembcorp Siza Water ✓ Msunduzi LM (Umgeni Water) – Umsunduzi ✓ uMgungundlovu DM (Umgeni Water) - UW-uMgungundlovu DM	18	21
Limpopo	1	None		22	26
Mpumalanga	9	4	✓ Mbombela-Umjindi LM – Karino; Matsulu; Nelspruit; Primkop	23	34
Northern Cape	2	None		34	123
North West	1	1	✓ JB Marks LM – Potchefstroom	32	7
Western Cape	8	15	✓ Berg Rivier LM (West Coast DM Bulk) – Velddrif ✓ City of Cape Town MM – Cape Town ✓ Drakenstein LM (City of Cape Town MM) – Hermon ✓ George LM – George ✓ Overstrand LM - Baardskeerdersbos; Buffeljags Bay; Buffelsrivier; Greater Gansbaai; Greater Hermanus; Kleinmond; Pearly Beach; Stanford ✓ Saldanha Bay LM (West Coast DM Bulk) - Hopefield ✓ Swartland LM (West Coast DM Bulk) - Withoogte ✓ Theewaterskloof LM – Botrivier	9	8
Totals	**44**	**26**		**174**	**277**

Background to Water Delivery and Distribution Infrastructure

The total volume of water treated nationally is 12,217,269 kl/d. 144 WSAs, 7 WBs (current) and 23 WSPs are responsible for water services through a water network comprising of:

- 1,015 WTWs, boreholes and springs and 958 WSSs of which the bulk of the potable water is provided by the respective Water Boards and other water service providers
- 2,693 pump stations, 37,644 km bulk water supply lines, 136,645 km reticulation pipe lines, and 7,159 reservoirs (excluding systems in the various WSAs per province that were unable to provide data).

Table 4 - National Summary of Capacities, Daily Production and SIV distribution according to plant sizes

	Micro Size Plants	Small Size Plants	Medium Size Plants	Large Size Plants	Macro Size Plants	Unknown (NI)*	Total
	<500 kl/day	500 - <2,000 kl/day	2,000 - <10,000 kl/day	10,000 - <25,000 kl/day	>25,000 kl/day		
No. of WTWs, Boreholes, Springs	220 (22%)	289 (28%)	316 (32%)	104 (10%)	86 (8%)		1,015
Total Design Capacity (kl/day)	50,641	281,417	1,378,656	1,580,530	14,082,600	None	17,373,844
Total Available Capacity (kl/day)	48,482	280,096	1,327,377	1,514,635	13,640,889	None	16,811,479

	Micro Size Plants	Small Size Plants	Medium Size Plants	Large Size Plants	Macro Size Plants	Unknown (NI)*	Total
	<500 kl/day	500 - <2,000 kl/day	2,000 - <10,000 kl/day	10,000 - <25,000 kl/day	>25,000 kl/day		
Average Daily Treatment Volume (kl/day)	27,685	142,134	746,302	861,890	10,439,258	237 NI	12,217,269
Total SIV (kl/day)	49,737	198,592	1,293,408	1,197,206	9,397,107		12,136,050
Design Capacity Utilisation (%)	55%	51%	54%	55%	74%		70%
Available Capacity Utilisation (%)	57%	51%	56%	57%	77%		73%

** "Unknown" means the number of WTWs with NI (No Information) on design capacity or available capacity or SIV*

The audit verified a total installed design capacity of 17,373,844 kl/d and a total available design capacity of 16,811,479 kl/d with most of this capacity residing in the macro-sized water treatment plants.

Collectively, the 1,015 WTWs produce 12,217,269 kl/d and distributes 12,136,050 kl/d across the water networks. By comparing the available treatment capacity with the treated water volume, a spare treatment capacity of 4,594,210 kl/d is available (27%) to meet additional future demands. However, the national WUE is fairly high (ave. 256 l/p/d) compared to the international WUE benchmark of 180 l/p/d, indicating a high ratio between effective water use and actual water abstraction. Going forward, the provinces will have to dedicate significant resources to curb water losses and NRW.

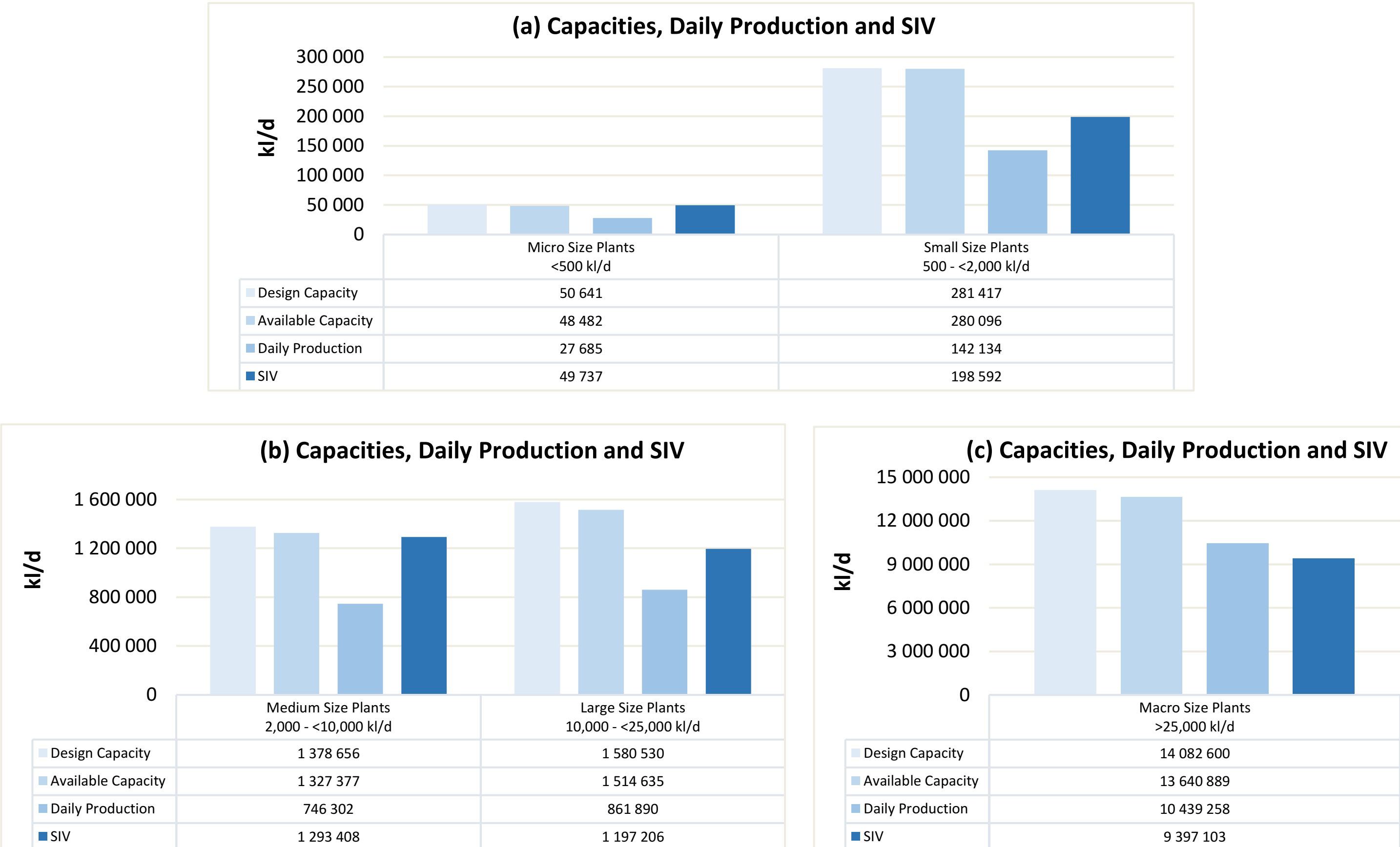


Figure 1 - Capacities, Daily Production and SIV Distribution - (a) micro to medium sized WTWs, (b) large WTWs, and (c) macro sized WTWs

In some cases, a Bulk Water Supplier supplies water across provincial borders and it is difficult to report accurately on design capacity and available capacity at provincial level, as the statistical data may become repetitive. Therefore, the reporting on the total system input volumes (SIV) would provide more accurate figures on the supply of treated water to the various water supply systems. The total SIV nationally 12,136,050 kl/d and the average daily treatment volume is 12,217,269 kl/d, this indicates that the treated volume is more than the total SIV (100.7%) despite the 237 WTWs/boreholes/springs/fountains that are not measuring their average daily treatment volumes. The largest contributors to the total SIV (55%) is Gauteng with 4,274,956 kl/d followed by KwaZulu Natal with 2,576,627 kl/d. Diagnostic no. 2 to follow herein will unpack these statistics in more detail.

The national water distribution infrastructure is summarised in the table below.

Table 5 - National Summary of Water Distribution Reticulation Infrastructure

Province	# WSS with no WSP/WB	# WSS with WSP/WB	National Water Distribution Infrastructure			
			# Pump Stations (#)	Bulk Water Supply Lines (km)	Reticulation pipe lines (km)	# Reservoirs/ Towers
Eastern Cape	136	18	375	3,094	6,357	826
Free State	57	23	228	1,480	6,172	335
Gauteng	9	20	211	5,084	38,418	538
KwaZulu Natal	82	90	816	4,763	37,188	1,975
Limpopo	55	29	116	3,568	30,105	1,154
Mpumalanga	85	15	272	2,705	9,088	640
Northern Cape	154	22	150	2,039	764	278
North West	27	12	177	825	1,989	311
Western Cape	106	18	348	14,087	6,563	1,102
Totals	**711**	**247**	**2,693**	**37,644**	**136,645**	**7,159**

National Blue Drop Analysis

The 100% response from the 144 WSAs audited demonstrates a firm commitment to progressive water services management in the country. 144 WSAs were audited in 2023 compared to the 152 WSAs in 2014.

Table 6 - National Blue Drop Comparative Analysis from 2012 to 2023

NATIONAL BLUE DROP COMPARATIVE ANALYSIS				
Performance Category	**2012**	**2014**	**2023**	**Performance trend 2014 and 2023**
Incentive-based indicators				
WSAs assessed (#)	153 (100%)	152 (100%)	144 (100%)	→
Water supply systems assessed (#)	931	1036	958	↓
Blue Drop scores ≥50% (#)	NA	617 (59%)	507 (53%)	↓
Blue Drop scores <50% (#)	NA	419 (41%)	451 (47%)	↓
Blue Drop Certifications (#)	**98**	**44**	**26**	↓
Lowest Technical Site Assessment Score (%)	NA	NA	39%	
Highest Technical Site Assessment Score (%)	NA	NA	93%	

NA = Not Applied NI = No Information *↑= improvement, ↓= regress, →= no change*

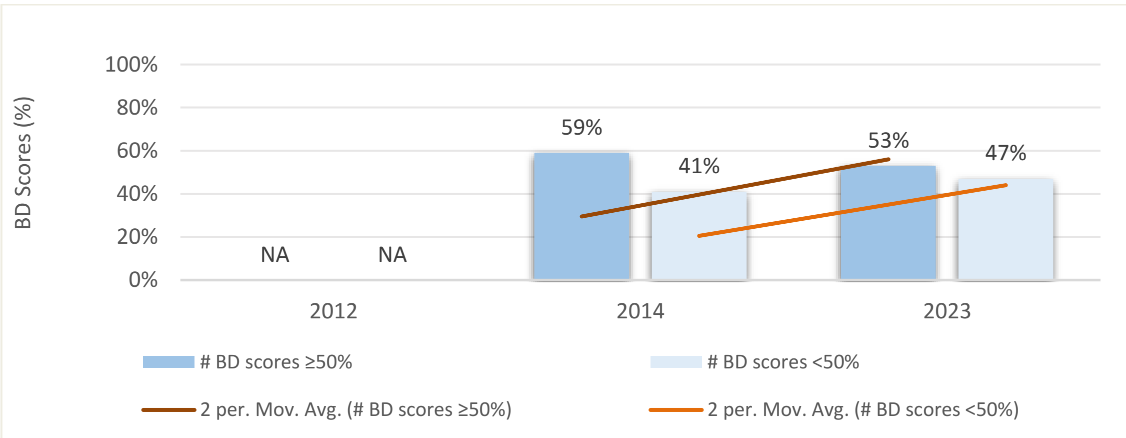


Figure 2 - Blue Drop trend analysis over the period 2012 to 2023, indicating the percentage BD scores above and below 50%

The trend analysis indicates that:

- The no. of systems audited has decreased from the last BD audit in 2014
- The no. of systems with BD scores of ≥50% decreased from 617 (59%) in 2014 to 507 (53%) in 2023
- This trend was reversed with no. of systems with a BD score of ≤50% increasing from 419 (41%) in 2014 to 451 (47%) in 2023
- Blue Drop Certifications decreased from 44 awards in 2014 to 26 awards in 2023
- The overall performance trend indicates a regression from 2014 to 2023
- This negative trajectory reinforces the need for regular audits to ensure timely turnaround and continued improvement
- The negative trend also implies that performance has declined in the absence of regulatory engagement of the BD audits between 2014 to 2023.

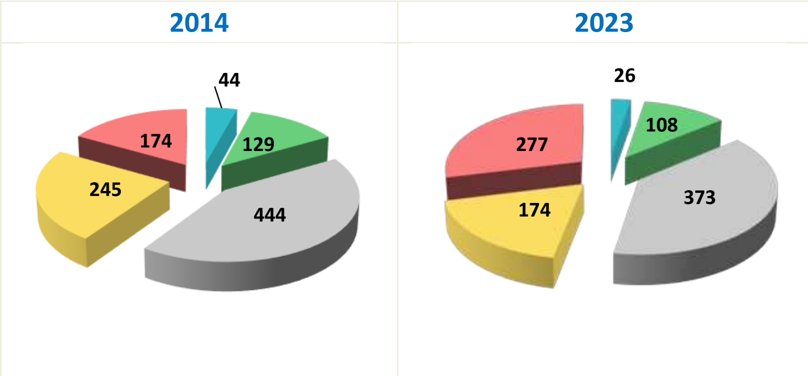


Figure 3 - No. WSSs in the Blue Drop score categories for 2014 and 2023 (graph legend to right)

≥95 – 100% Excellent	
≥80-<95% Good	
≥50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

Table 7 - National Blue Drop Scores Performance Categories from 2014 and 2023

	2014 BD Report Scores					**2023 BD Scores**				
Province	**>95–100% Excellent**	**>80-<95% Good**	**>50-<80% Average**	**31-<50% Poor**	**0-<31% Critical**	**>95–100% Excellent**	**>80-<95% Good**	**>50-<80% Average**	**31-<50% Poor**	**0-<31% Critical**
Eastern Cape	0	39	53	32	31	0	6	88	33	27
Free State	6	7	41	20	5	0	2	31	16	31
Gauteng	9	17	3	0	0	3	15	8	3	0
KwaZulu Natal	8	16	124	43	18	3	19	95	34	21
Limpopo	1	9	19	23	22	0	0	44	14	26
Mpumalanga	9	7	33	28	23	4	9	42	11	34
Northern Cape	2	13	76	48	34	0	5	18	30	123
North West	1	2	34	26	32	1	5	13	13	7
Western Cape	8	19	61	25	9	15	47	34	20	8
Totals	**44**	**129**	**444**	**245**	**174**	**26**	**108**	**373**	**174**	**277**

Comparative analysis of the 2014 and 2023 blue drop scores, indicates that most of the system scores are in the >50-<80% (*Average Performance*) category, with the <31% (*Critical State*) being the next largest category. It is concerning that 277 systems in 2023 reside in *Critical State* (<31%).

In summary, trend analysis since 2014 to 2023 indicate as follows:

- Systems in a 'critical state' increased from 174 systems to 277 systems
- Systems in a 'poor state' decreased from 245 systems to 174 systems
- Systems in an 'average state' decreased from 444 systems to 373 systems
- Systems in the 'good state' decreased from 129 systems to 108 systems
- Systems in the 'excellent state' decreased from 44 systems to 26 systems.

National BDRR Analysis

The Blue Drop Risk Rating (BDRR) analysis assesses the risk across the entire water supply network. The BDRR formular was updated in 2021 to include an added risk indicator, i.e. 'E: Water Safety Plans', to address the risk assessment requirements outlined in SANS 241 of 2015. The BDRR now contains 5 risk indicators, i.e. design capacity (A), operational capacity (B), water quality compliance (C), technical capacity (D), and water safety plans (E). The results from the BDRR analyses are summarised in the table and figure following.

Table 8 - National BDRR/BDRRmax Comparative Analysis from 2022 and 2023

NATIONAL BDRR/BDRR$_{max}$ COMPARATIVE ANALYSIS								
Province	**# WSSs**	**2022 BD PAT**	**2023 BD Audit**	**Performance Trend 2022 and 2023**	**BDRR Risk Category Split**			
					0-<50%	**50-<70%**	**70-<90%**	**90-100%**
Eastern Cape	154	51.60%	46.10%	↑	98	42	7	7
Free State	80	61.90%	57.10%	↑	34	22	13	11
Gauteng	29	40.60%	34.60%	↑	26	3	0	0
KwaZulu Natal	172	50.40%	45.54%	↑	113	34	15	10
Limpopo	84	61.60%	52.84%	↑	42	25	8	9
Mpumalanga	100	54.80%	53.99%	↑	52	16	23	9
Northern Cape	176	51.50%	62.83%	↓	71	28	29	48
North West	39	63.50%	43.93%	↑	26	6	6	1
Western Cape	124	34.80%	27.40%	↑	115	8	1	0
Totals	**958**	**52.30%**	**47.15%**	↑	**577**	**184**	**102**	**95**

↑= improvement, ↓= regress, →= no change

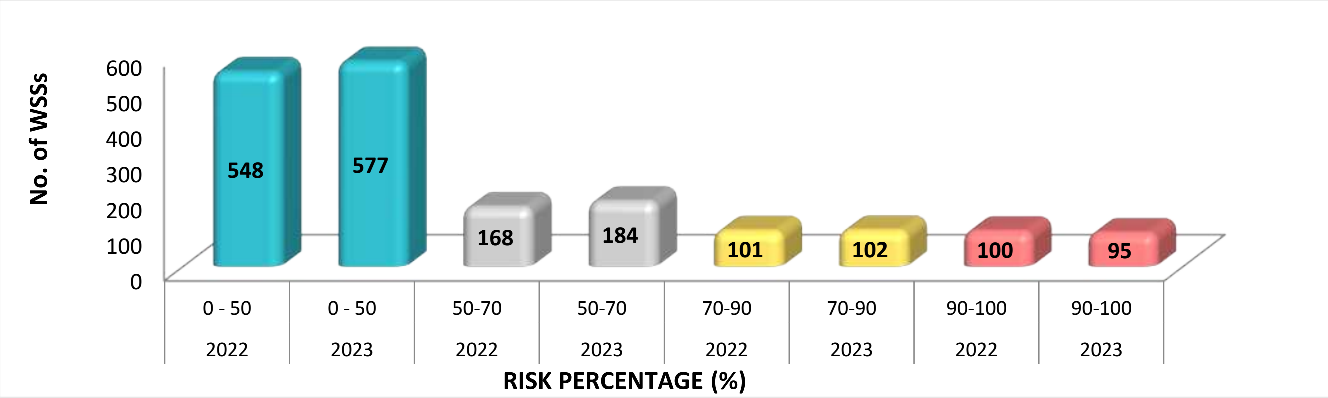


Figure 4 - a) WSS risk distribution and trends for 2022 and 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Trend analysis of the BDRR ratings for 2022 and 2023 indicates that:

- The 2023 audit cycle highlighted a slightly progressive shift with an increase in the no. of low risk WSSs (548 to 577), an increase in the medium risk WSSs (168 to 184), a marginal increase in the high risk WSSs (101 to 102), and a decrease in the critical risk WSSs (100 to 95).

Regulatory Enforcement

Water supply systems which fail to achieve the minimum Blue Drop target of 31%, are placed under regulatory focus. The Regulator requires these WSAs to submit a detailed corrective action plan (CAP) within 20 working days from publishing of this report. 277 of 958 (29%) WSSs received Blue Drop scores below 31%, and are hence placed under **regulatory surveillance**, in accordance with the Water Services Act (108 0f 1997). DWS together with COGTA will, through the grant allocation systems ensure priority is given to application of grants to rectify/restore the water services treatment and supply shortcomings identified in this report.

Table 9 - WSSs with <31% Blue Drop scores

			WSSs with <31% score	
Province	**WSA Name**	**2023 BD Score**	**# WSSs**	**WSS Names**
Eastern Cape	Alfred Nzo DM	54.80%	1	Kinira
	Chris Hani DM	45.30%	3	Farms & Rural, Hofmeyer and Tarkastad
	Dr Beyers Naude LM	24.20%	10	Aberdeen, Graaff-Reinet, Jansenville, Klipplaat, Nieu-Bethesda, Rietbron, Steytlerville, WaterFord, Willowmore and Wolwefontein
	Koukamma LM	24.10%	11	Blikkiesdorp, Clarkson, Coldstream, Joubetina, Kareedouw, Krakeel, Louterwater, Misgund, Sanddrif, Storms River and Woodlands
	Sundays River Valley LM	25.60%	2	Addo and Kirkwood
Free State	Mangaung	62.80%	1	Soutpan Krugersdrift Dam
	Setsoto LM	43.30%	2	Clocolan, Senekal
	Mantsopa LM	42.30%	3	Hobhouse, Thaba Phatchoa, Tweespruit
	Ngwathe LM	36.20%	4	Parys, Vredefort, Koppies, Edenville boreholes

			WSSs with <31% score	
Province	**WSA Name**	**2023 BD Score**	**# WSSs**	**WSS Names**
	Moqhaka LM	36.10%	1	Steynsrus
	Mohokare LM	27.60%	3	Rouxville, Smithfield, Zastron
	Masilonyana LM	25.50%	4	Brandfort, Theunissen, Verkeerdevlei, Winburg
	Tokologo LM	24.80%	2	Boshof, Dealesville
	Maluti-a-Phofung LM	17.70%	8	Bluegumbosch, Kestell, Harankopane, Mphatlalatsane, Greater Qwaqwa, Makwane, Harrismith, Tshiame
	Mafube LM	4.30%	3	Frankfort, Tweeling, Villiers
KwaZulu Natal	Harry Gwala DM	66.18%	2	Machunwini, Chibini
	Zululand DM	43.93%	5	Coronation, eMondlo, Hlobane, Louwsberg, Vryheid
	King Cetshwayo DM	40.70%	2	Khombe, Pikiliyeza
	Umzinyathi DM	31.59%	12	12 of 13 WSSs
Limpopo	Bela-Bela LM	60.30%	2	Radium, Rapotokwane
	Mopani DM	56.10%	1	Drakensig
	Modimolle/Mookgophong LM	51.10%	4	Mookgophong, Mabaleng, Mabatlane and Roedtan
	Thabazimbi LM	47.50%	2	Leeupoort and Rooiberg
	Greater Sekhukhune DM	39.60%	13	Flag Boshielo, Kutullo, Magukubjane, Mahlokoena, Mapodile, Marishane, Masemola, Ngwaabe, Nkosini, Penge, Steelpoort, Tsakane and Vergelegen
	Capricorn DM	38.10%	4	Alldays, Botlokwa, Mogwadi and Senwabarwana
Mpumalanga	Thembisile LM	75.30%	1	Langkloof
	Mbombela/Umjindi	69.30%	12	Elandshoek, Hazyview, White River, White River Country & Golf Estates, Mjindini Trust-Madakwa, Rimers-Suid Kaap, Sheba, Mjejane, Legogote, Nyongane River, Dwaleni, Mshadza
	Mkhondo LM	54.50%	1	Rural WSS
	Emakhazeni LM	31.20%	2	Belfast, Dullstroom
	Msukaligwa LM	21.60%	5	Breyten, Davel, Douglas dam, Lothair, South works (noitgedacht farm)
	Albert Luthuli LM	19.10%	8	All 8 WSSs
	Thaba Chweu LM	8.20%	4	Coromandel, Graskop, Lydenburg, Sabie
	Dipaleseng LM	7.00%	1	Greater Dipaleseng
Northern Cape	Tsantsabane LM	56.00%	1	Skeyfontein
	Gamagara LM	54.71%	1	Dibeng
	Siyathemba LM	46.26%	1	Marydale
	Nama Khoi LM	36.61%	6	Buffelsrivier, Carolusberg, Goodhouse, Kommagas, Rooiwal, Vioolsdrift
	!Kheis LM	29.31%	3	Gariep, Grootdrink, Wegdraai
	Kgatelopele LM	27.60%	1	Danielskuil
	Magareng LM	26.45%	1	Warrenton
	Siyancuma LM	26.38%	4	All 4 WSSs
	Ga-Segonyana LM	25.92%	23	23 of 24 WSSs
	Umsobomvu LM	24.17%	3	All 3 WSSs
	Richtersveld LM	21.94%	5	All 5 WSSs
	Karoo Hoogland LM	21.62%	3	All 3 WSSs
	Phokwane LM	19.85%	2	Hartswater, Jan Kempdorp
	Dikgatlong LM	18.73%	2	Barkley West, Windsorton
	Kareeberg LM	18.42%	3	All 3 WSSs
	Joe Morolong LM	17.57%	17	17 of 18 WSSs
	!Kai! Garib LM	16.20%	16	All 16 WSSs
	Khai-Ma LM	15.19%	4	All 4 WSSs
	Ubuntu LM	14.17%	5	All 5 WSSs
	Emthanjeni LM	11.94%	3	All 3 WSSs
	Renosterberg LM	9.20%	3	All 3 WSSs
	Kamiesberg LM	8.02%	16	All 16 WSSs
North West	Ngaka Modiri Molema DM	36.74%	1	Ratlou: Kraaipan Cluster B/H
	Dr. Ruth S Mompati DM	31.47%	4	Bogosing, Majeakgoro, Pudimoe, Schweizer Reneke
	Kgetlengrivier LM	21.60%	2	Koster, Swartruggens
Western Cape	Beaufort West LM	53.00%	2	Murraysburg, Nelspoort
	Hessequa LM	50.10%	1	Jongensfontein
	Kannaland LM	25.80%	3	Ladismith, Van Wyksdorp, Zoar
	Prince Albert LM	28.20%	2	Klaarstroom, Prince Albert
Totals			**277**	

The following WSAs and their associated water treatment systems are in high and/or critical BDRR risk positions, which means that some or all the risk indicators are in a precarious state, i.e. operational capacity, design capacity utilisation, water quality compliance, technical capacity, and water safety plans. WTWs in high risk and critical risk positions pose a serious risk to public health. The following WSAs will be required to assess their risk contributors and to provide corrective measures in the above mentioned action plans to mitigate these risks.

Table 10 - %BDRR/BDRR$_{max}$ scores and WSSs in critical and high-risk space

Province	WSA Name	2023 Average %BDRR/ BDRRmax	WSSs in critical and high-risk space			
			Critical Risk (90-100%)		High Risk (70-<90%)	
			# WSSs	WSS Names	# WSSs	WSS Names
Eastern Cape	Alfred Nzo DM	35.6%	1	Kinira		
	OR Tambo DM	46.5%			2	Mhlanga, Umzimvubu
	Dr Beyers Naude LM	47.6%	1	Waterford	1	Jansenville
	Amatole DM	53.5%			1	Xhora
	Makana LM	55.5%			1	Alicedale
	Koukamma LM	62.8%	5	Clarkson, Joubetina, Krakeel, Misgund, Storms River	1	Louterwater
	Sundays River Valley LM	64.3%			1	Kirkwood
Free State	Mangaung	36.4%			1	Soutpan (Krugersdrift Dam)
	Ngwathe LM	42.6%	2	Edenville (Boreholes), Koppies	2	Parys, Vredefort
	Setsoto LM	50.4%			1	Senekal
	Phumelela LM	61.0%			1	Memel
	Tokologo LM	64.6%			2	Boshof, Dealesville
	Masilonyana LM	79.5%	1	Brandfort	3	Theunissen, Winburg, Verkeerdevlei
	Maluti-a-Phofung LM	93.4%	5	Bluegumbosch, Greater Qwaqwa, Harrismith, Kestell, Tshiame	3	HaRankopane, Makwane, Mphatlalatsane
	Mafube LM	98.9%	3	Frankfort, Tweeling, Villiers		
KwaZulu Natal	iLembe DM	32.0%			2	Lambothi, Waterfall
	Umkhanyakude DM	36.3%			3	Hlabisa, Hluhluwe Ph 2, Manguzi
	Harry Gwala DM	36.7%	3	Chibini, Machunwini, Njunga	3	Mangwaneni, Mnqumeni, Rietvlei
	King Cetshwayo DM	55.7%	2	Khombe, Pikiliyeza		
	Umzinyathi DM	59.5%			7	Fabeni, Pomeroy, Sampofu, Isandlwana, Amakhabaleni, Greytown, Muden
	Zululand DM	65.3%	5	Coronation, eMondlo Town, Hlobane, Louwsberg, Vryheid		
Limpopo	Bela-Bela LM	34.1%			1	Rapotokwane
	Mopani DM	42.9%			1	The Oaks
	Lephalale LM	46.2%				
	Modimolle/Mookgophong LM	47.9%	4	Mookgophong, Mabaleng, Mabatlane and Roedtan		
	Greater Sekhukhune DM	49.8%	2	Mahlokoena, Steelpoort	3	Flag Boshielo, Kutullo, Marble Hall
	Capricorn DM	56.1%	1	Senwabarwana	2	Alldays, Mogwadi
	Thabazimbi LM	69.5%	2	Leeupoort and Rooiberg	1	Northam
Mpumalanga	Thembisile LM	42.5%			1	Langkloof
	Mbombela/Umjindi	47.4%	6	Mjejane, Legogote, Nyongane River Scheme, Dwaleni, Mshadza, Sheba	5	Elandshoek, New Hazyview, Mjindini Trust-Madakwa, White River, White River Country Estates
	Emakhazeni LM	54.6%			1	Dullstroom
	Pixley Ka Seme LM	56.8%			1	Amersfoort
	Msukaligwa LM	76.3%			4	Davel, Douglas dam, Lothair, South works (noitgedacht farm)
	Albert Luthuli LM	78.5%	1	Rudimentary Boreholes	7	All remaining 7 plants
	Lekwa LM	80.9%			1	Standerton
	Thaba Chweu LM	86.5%	1	Coromandel	3	Graskop, Lydenburg, Sabie
	Dipaleseng LM	100.0%	1	The Greater Dipaleseng LM		
Northern Cape	Gamagara LM	40.4%	1	Dibeng		
	Tsantsabane LM	41.4%	1	Skeyfontein		
	Dawid Kruiper LM	45.9%			1	Philandersbron
	Richtersveld LM	46.6%	2	Vanderkloof, Sanddrift		
	Ga-Segonyana LM	47.9%	2	Lokaleng, Thamoyanche	4	Bankhara-Bodulong, Mokalamosesane, Mothibistad, Sedibeng
	Nama Khoi LM	48.1%			1	Carolusberg
	Phokwane LM	51.4%			2	Hartswater, Jan Kempdorp
	!Kheis LM	51.7%			1	Wegdraai
	Karoo Hoogland LM	53.0%			1	Sutherland
	Siyancuma LM	56.6%			1	Schmidtsdrift
	!Kai! Garib LM	69.4%			10	Alheit, Bloemsmond, Cillie, Eendiun, Keimoes, Lennertsville, Lutzburg, Marchand, Riemvasmaak-Sending, Soverby
	Ubuntu LM	71.7%			2	Merriman, Victoria West
	Dikgatlong LM	72.6%	1	Windsorton	2	Barkley West, Koopmansfontein
	Magareng LM	75.7%			1	Warrenton

Province	WSA Name	2023 Average %BDRR/ BDRRmax	WSSs in critical and high-risk space			
			Critical Risk (90-100%)		High Risk (70-<90%)	
			# WSSs	WSS Names	# WSSs	WSS Names
	Joe Morolong LM	84.2%	17	Bothetheletsa, Bothithong, Churchill, Dithakong, Gasehunelo, Gasese, Heiso, Kikahela, Laxey, Maipeng, Mamatwan/ Hotazel, Manyeding, Manyeding Lower, Metsetswaneng, Tsineng, Van Zylsrus, Ward 1 Heuningvlei	1	Hotazel
	Khai-Ma LM	85.5%	3	Onseepkans (Melkbosrand), Onseepkans (RK), Witbank	1	Pofadder/Aggeneys (Pelladrift)
	Kamiesberg LM	94.6%	16	Garies, Hondeklipbaai, Kamassies, Kamieskroon, Kharkams, Kheis, Klipfontein, Koiingnaas, Leliefontein, Lepelfontein, Nourivier, Paulshoek, Rooifontein, Soebatsfontein, Spoegrivier, Tweerivier		
	Renosterberg LM	94.6%	2	Phillipstown, Vanderkloof	1	Petrusville (from Vanderkloof)
	Emthanjeni LM	99.4%	3	Britstown, De Aar, Hanover		
North West	Dr. Ruth S Mompati DM	48.1%			2	Bogosing, Schweizer Reneke
	Ngaka Modiri Molema DM	62.2%			3	Mafikeng, Ramotshere Moiloa: Motswedi + Gopane, Ratlou
	Kgetlengrivier LM	90.2%	1	Koster	1	Swartruggens
Western Cape	Kannaland LM	52.40%			1	Van Wyksdorp
Totals			**95**		**102**	

Good practice risk management requires that the Water Safety Plans (WaSPs) are informed by meaningful Process and Condition Audits, supported by zealous implementation of corrective measures and ongoing monitoring of risk movement. 95 water supply systems are in critical risk space and 102 water supply systems are in the high risk position – a total of 197 of 958 (21%) systems.

Performance Barometer

The **Blue Drop Performance Barometer** presents the provincial Blue Drop Score categories, which essentially reflects the level of mastery that each province has achieved in terms of its overall water services business. The bar chart below compares the 2023 BD scores against the scoring categories. The most BD certifications were achieved by 15 WSS in the Western Cape province whilst the Eastern Cape, Free State, Limpopo, and Northern Cape did not achieve any BD certifications in 2023. The Northern Cape have 123 of 277 (44%) systems in the critical state (<31%). The Gauteng, KwaZulu Natal, Mpumalanga, North West and Western Cape provinces are commended for achieving BD certifications in 2023.

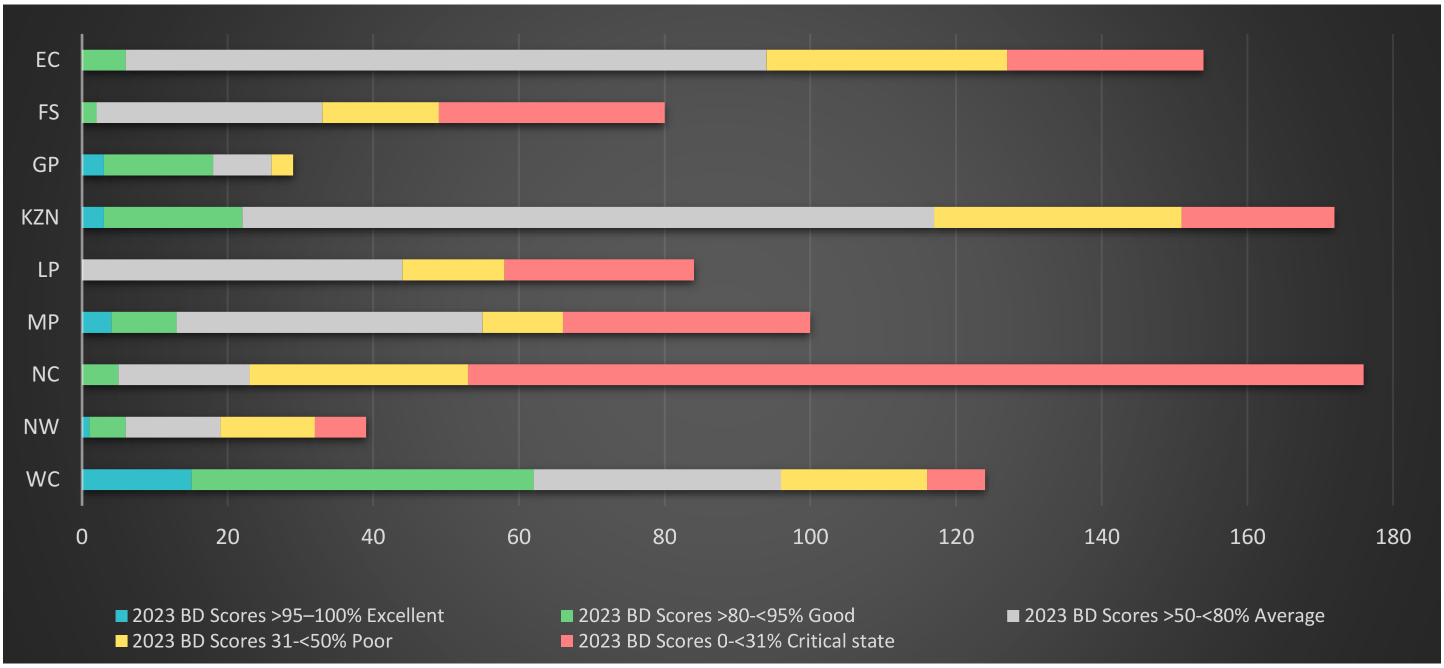


Figure 5 - 2023 Blue Drop score categories per Province

≥95 – 100% Excellent	
≥80-<95% Good	
≥50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

The BDRR Risk Barometer expresses the level of risk that a WSA poses in respect of its water supply system. The schematic below presents the provincial 2023 %BDRR/$BDRR_{max}$ risk categories. The analysis reveals that there are 381 medium, high, or critical risk WSSs nationally. 577 WSSs are situated in the low risk positions. The Western Cape province has the highest number of low risks WSSs (115) followed by the KwaZulu Natal province with 113 WSSs. Similarly, the Northern Cape province has the highest number of critical risks WSSs (48) followed by Free State with 11 WSSs. The Gauteng province has no WSSs in high or critical risk positions, and the Western Cape province has no critical risk WSSs and only 1 WSS in the high risk position.

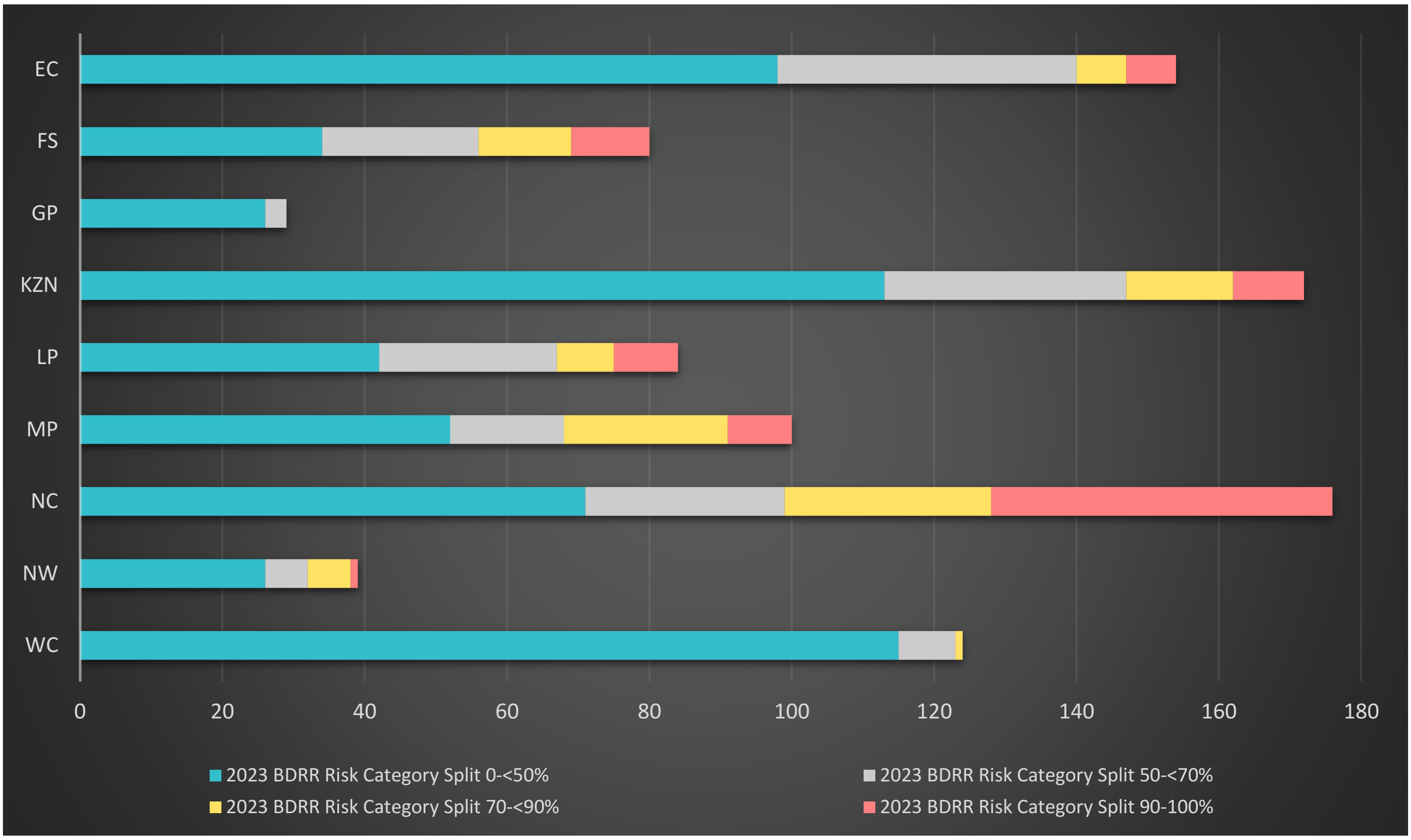


Figure 6 -2023 %BDRR/$BDRR_{max}$ Risk Performance Barometer per Province

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

KPA Diagnostics

The BD audit process collects a vast amount of data that yield valuable insight into the state of the water services delivery and water quality in each province. Five focus areas or 'diagnostics' have been configured from the 2021/22 audit data and are discussed below.

Table 11 - Summary of the key diagnostic themes and reference to the respective Blue Drop KPAs

Diagnostic #	Diagnostic Description	Diagnostic Reference
1	**Technical Competence**	KPA 1, 2 & Bonus
2	**Treatment Capacity and Flow Distribution**	KPA 4 & Generic Audit data set
3	**Drinking Water Quality (DWQ) Monitoring and Compliance**	KPA 2 & 4 & Bonus
4	**Technical Site Assessments**	TSA and 2023 Blue Drop Watch Report
5	**Operation, Maintenance and Refurbishment of Assets**	KPA 3 & 4

Diagnostic 1: Technical Competence

Aim: This focus area assesses the technical human resources capacity that is available to manage and operate water treatment processes and maintain the related water infrastructure. Theory advocates that a correlation exists between human resources capacity and capability (sufficient number of appropriately qualified staff) and a WSI's performance. Thus, it is hypothesised that high HR capacity would translate to compliant water treatment plants and functional water supply network. Blue Drop assesses technical compliance on two levels: i) WTW plant supervision and process control staff and ii) Technical, scientific and maintenance staff.

(i) Plant Supervisors and Process Controllers

Findings: According to regulations, water treatment plants are classified as Class A, B, C, D or E plants. Similarly, Process Controllers and Plant Supervisors are registered as Class I, II, III, IV, V or VI Process Controllers. Higher classed plants require a higher level of Process Controllers due to technology complexity and strict water quality standards. Technical compliance of PCs and Supervisors is determined against the Blue Drop standards, as defined by Reg. 2834 of the Water Act 1956 (Act 54 of 1956) for the erection, enlargement, operation, and registration of water care works and draft Reg. 813 of the Water Services Act (No 108 of 1997). Regulation 2834 has been replaced by Regulation 3630 in 2023 but will only come in effect during the next Blue Drop audit cycle.

Table 12 - National Summary of the no. compliant versus shortfall in Supervisor and Process Controller staff

Province	# WTWs	# WSSs	# Available Compliant Staff			Staff Shortfall	
			PCs	Supervisor	Total	PCs	Supervisor
Eastern Cape	222	154	293	265	506	407	11
Free State	75	80	154	58	172	122	14
Gauteng	19	29	128	42	170	26	0
KwaZulu Natal	190	172	294	143	437	321	11
Limpopo	85	84	235	35	270	114	11
Mpumalanga	107	100	319	143	462	132	12
Northern Cape	158	176	52	52	104	318	23
North West	33	39	79	29	108	31	4
Western Cape	126	124	272	230	484	143	17
Totals	**1,015**	**958**	**1,826**	**997**	**2,713**	**1,614**	**103**

NB: The Supervisor totals will be inflated as it is not possible to differentiate between which Supervisors are shared/ roaming with other Class C to E WTWs

Note: "Compliant staff" means qualified and registered staff that meets the BD standard for a particular Class Works. "Staff shortfall" means staff that do not meet the BD standard for a particular Class of works (+1 for a shift) and/or staffing gaps exist at the respective WTWs.

Competent human resources are vital enablers in ensuring efficient and sustainable management of water services and delivery of safe water quality to consumers.

Plant Supervisors: The pie charts on the following page indicate that 91% (997 of 1,100) of Plant Supervisors complies with the Blue Drop standard, with 103 shortfalls with the highest shortfalls in the Northern Cape, Free State and Western Cape provinces. There are no shortfalls in the Gauteng province.

Process Controllers: Similarly, 53% (1,826 of 3,440) of the PC staff complies with the required standards. There is a 47% (1,614 of 3,440) shortfall in Process Controllers with the highest shortfall in the Eastern Cape, KwaZulu Natal and Northern Cape provinces.

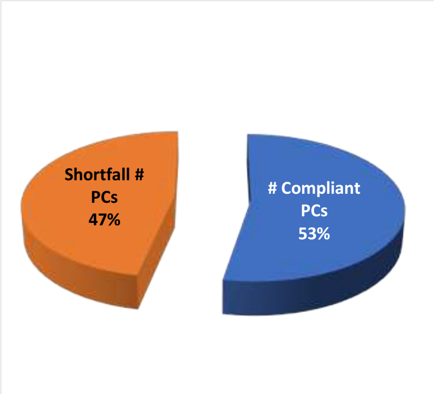


Figure 7 - Schematic illustration of compliant and shortfall of Supervisors (a) and Process Controllers (b)

Blue Drop standards require of Class A and B plants to employ dedicated Supervisors per WTW and Process Controllers per shift per works, whereas Class C to E plants may share Supervisory staff across works. Shifts have been introduced to ensure optimal operations while addressing security risks, particularly as it relates to theft and vandalism. Telemetry also reduces the requirement for on-site staff during night shifts, but these relaxations have to be done within the DWS regulatory guidelines.

(ii) Technical, Scientific and Maintenance staff

In addition to operational capacity (above), good management practice also requires access to qualified engineers, technicians, technologists, MISA appointees, scientists, and maintenance capability (below). Such competencies could reside in-house or accessible through term contracts and external specialists.

Table 13 - National Summary of the no. qualified and shortfall of Engineering, Technical and Scientific staff

Province	# WTWs	# WSSs	Qualified Technical Staff (#)					Technical Shortfall (#)	Qualified Scientists (#)	Scientists Shortfall (#)
			Technicians	Technologists	Engineers	MISA appointees	Total			
Eastern Cape	222	154	30	40	8	3	**81**	15	26	16
Free State	75	80	29	33	5	0	**67**	29	3	35
Gauteng	19	29	25	44	20	0	**89**	8	40	8
KwaZulu Natal	190	172	35	41	23	3	**102**	11	14	7
Limpopo	85	84	13	14	8	0	**35**	21	14	16
Mpumalanga	107	100	46	55	17	3	**121**	20	7	27
Northern Cape	158	176	14	34	7	0	**55**	62	5	49
North West	33	39	13	18	6	0	**37**	15	12	9
Western Cape	126	124	51	61	39	7	**158**	22	39	30
Totals	**1,015**	**958**	**256**	**340**	**133**	**16**	**745**	**203**	**160**	**197**

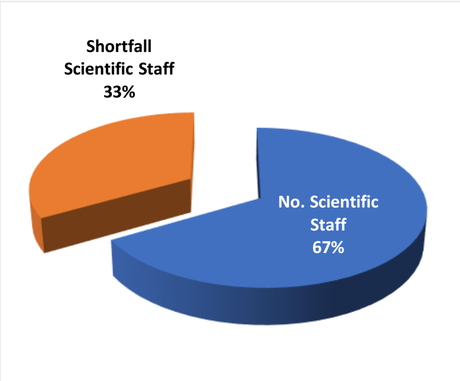
Note 1: "Qualified Technical Staff" means staff appointed in positions to support water services, and who has the required qualifications. "Technical Shortfall" is calculated based on a minimum requirement of at least 3 Engineers or more than 1 of each of Engineers, Technologists & Technicians; and at least one 1 Candidate Scientist and 1 Professional Scientist per WSI.

Note 2: "Qualified Scientists" means professional registered scientists (SACNASP) and candidate scientists appointed in positions to support water services. "Scientists shortfall" means that the WSA does not have at least one qualified SACNASP registered scientist and at least one 1 candidate scientist in their employ or contracted.

In general, the national summary of the qualified professional technical staff is as follows:

- A total of 745 qualified staff comprised of 133 Engineers, 340 Technologists, 256 Technicians, 16 MISA appointees (qualified); and 160 SACNASP registered scientists
- A total shortfall of 400 qualified persons is identified, consisting of 203 technical staff and 197 scientists
- The highest shortfall of qualified technical staff is in the Northern Cape, Free State, Western Cape and Limpopo provinces

- The Water Boards, WSPs and WSAs predominantly have access to credible laboratories that comply with the Blue Drop standards.



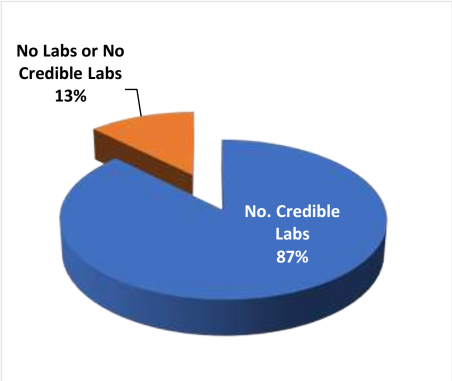


Figure 8 - Graphic illustration of the no. and %: a) qualified engineering/technical staff; b) professional scientists; c) access to credible laboratory services that complies with Blue Drop standards

Overall, the results highlight the inter-dependency between technical capacity and performance. One of the options to enhance operational capacity is through dedicated training programmes. The Blue Drop audit incentivises training of operational staff over the 2-year period prior to the audit date. The results are summarised as follows:

Table 14 - National Summary no. of WTWs with operational staff sent on training over the past 2 years and vice versa

Province	# WTWs	# WTW staff attending training	# WTW without training
Eastern Cape	222	66	156
Free State	75	19	56
Gauteng	19	4	15
KwaZulu Natal	190	71	119
Limpopo	85	21	64
Mpumalanga	107	45	62
Northern Cape	158	10	148
North West	33	16	17
Western Cape	126	78	48
Totals	**1,015**	**330 (33%)**	**685 (67%)**

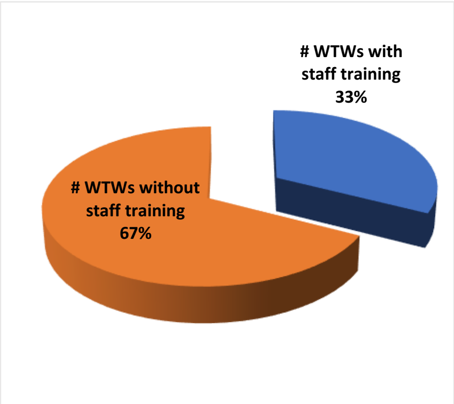


Figure 9 - %WTWs that have trained operational staff over the past two years

The results confirm that the Water Boards, WSPs and WSAs had their operational staff attend training over the past 2 years. 330 of 1,015 WTWs, springs, fountains and boreholes had their operational staff attend training over the past 2 years. Investment in human capital through technical skills development is likely to mitigate some of the water quality failures and lower performances noted, and municipalities and water boards should prioritise ongoing skills development of technical staff and appointment of qualified staff that are legible for registration.

Diagnostic 2: Treatment Capacity and Flow Distribution

Aim: Diagnostic 2 deals with design and flow related dynamics, comprising of: i) design capacity and operational flow, ii) raw water abstraction, and iii) WUE and SIV.

(i) Design Capacity and Operational Flow

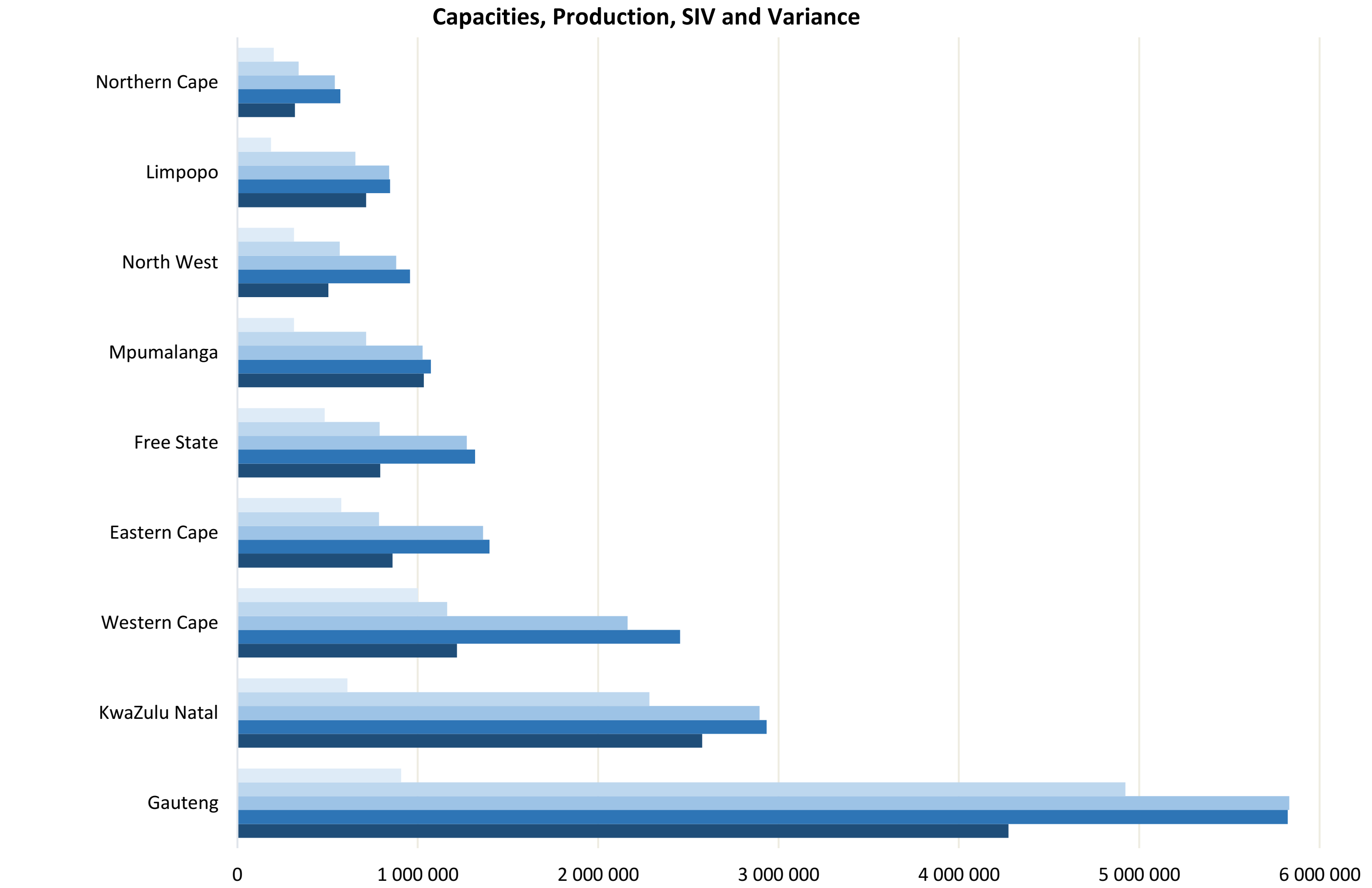
This diagnostic assesses the status of plant design capacity and daily water production at the WTWs, as well as SIVs as measured at the outflow from the WTW or inflow to the water distribution network. A capable WTW requires adequate installed design capacity and functional equipment to operate optimally. If the WTW design capacity is exceeded by the average daily production (treatment) volume, the WTW will not be able to deliver SANS compliant water quality. The available design capacity is typically exceeded when the water demand exceeds the installed design capacity, or when unit processes or equipment are dysfunctional, or when electrical supply problems render treatment and pumping of water defective. Typically, the production volume and SIV is the same if 1 WTW supplies 1 WSS, but different if multiple supply systems are feeding from a singular WTW.

Findings: Analysis of the design capacity and average daily production/ treatment volume indicate a total design capacity of 17,373,844 kl/d for the country, with a total average daily treatment (operational) volume of 12,217,270 kl/d. Theoretically, this implies that 70% of the design capacity is used with 30% available to meet additional water demand. However, the full 17,373,844 kl/d is not available as some infrastructure is dysfunctional, leaving 16,811,479 kl/d available. The reduced capacity means that the country is closer to its total available capacity (73%) with a 27% surplus available. The capacity differential (difference between the installed and available capacity) will not constrain or impede any further social and economic development in the drainage areas.

Table 15 - National Summary of WTWs design & available capacities, average daily production, % available capacity & total SIV

Province	# WTWs	# WSSs	Design Capacity (kl/d)	Available Design Capacity (kl/d)	Average Daily Production (kl/d)	Available Variance* (kl/d)	% Use Available Capacity	Total SIV towards the WSS (kl/d)
Eastern Cape	222	154	1,397,705	1,361,225	785,210	576,015	58%	859,852
Free State	75	80	1,318,086	1,272,308	788,990	483,318	62%	791,643
Gauteng	19	29	5,823,906	5,831,157	4,923,288	907,869	84%	4,274,956
KwaZulu Natal	190	172	2,933,898	2,894,541	2,284,424	610,117	79%	2,576,627
Limpopo	85	84	846,081	840,841	654,176	186,665	78%	713,694
Mpumalanga	107	100	1,072,939	1,027,176	713,159	314,017	69%	1,033,257
Northern Cape	158	176	570,646	539,520	338,721	200,799	63%	318,060
North West	33	39	956,151	881,167	566,880	314,287	64%	504,171
Western Cape	126	124	2,454,432	2,163,544	1,162,422	1,001,122	54%	1,216,751
Totals	**1,015**	**958**	**17,373,844**	**16,811,479**	**12,217,270**	**4,594,208**	**73%**	**12,289,011**

* Difference between the available design capacity and the average daily production



	Gauteng	KwaZulu Natal	Western Cape	Eastern Cape	Free State	Mpumalanga	North West	Limpopo	Northern Cape
Available Variance (kl/d)	907 869	610 117	1 001 122	576 015	483 318	314 017	31428700%	186 665	200 799
Ave. Daily Production (kl/d)	4 923 288	2 284 424	1 162 422	785 210	788 990	713 159	56688000%	654 176	338 721
Available Design Capacity (kl/d)	5 831 157	2 894 541	2 163 544	1 361 225	1 272 308	1 027 176	88116700%	840 841	539 520
Design Capacity (kl/d)	5 823 906	2 933 898	2 454 432	1 397 705	1 318 086	1 072 939	95615100%	846 081	570 646
Total SIV (kl/d)	4 274 956	2 576 627	1 216 751	859 852	791 643	1 033 257	50417100%	713 694	318 060

Figure 10 - Design and available capacity, average daily production, available variance and total SIV for the WTWs

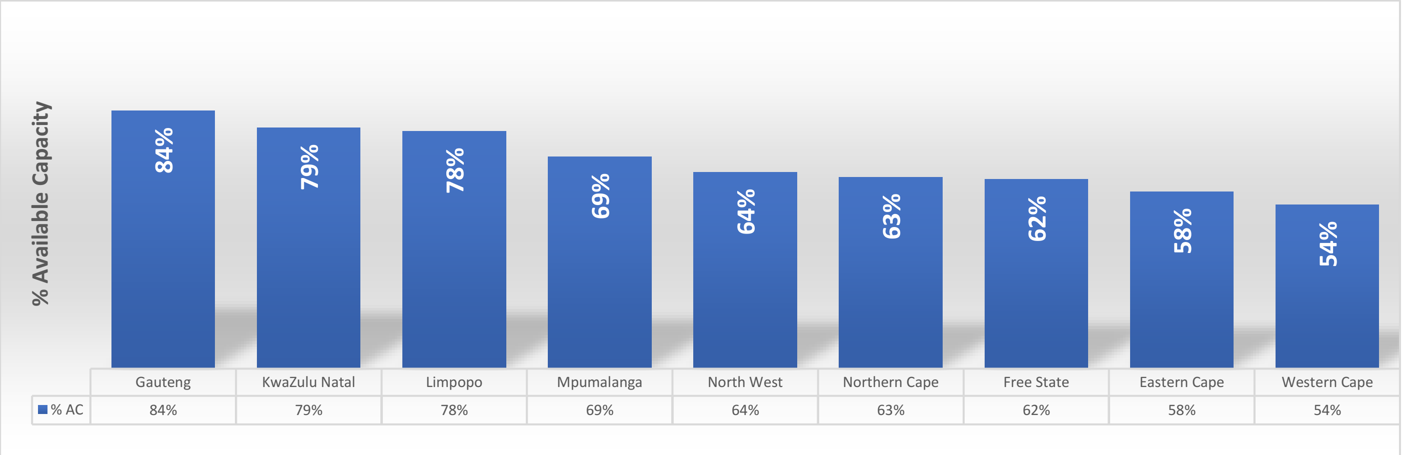


Figure 11 - % available capacity

(ii) Raw Water Abstraction

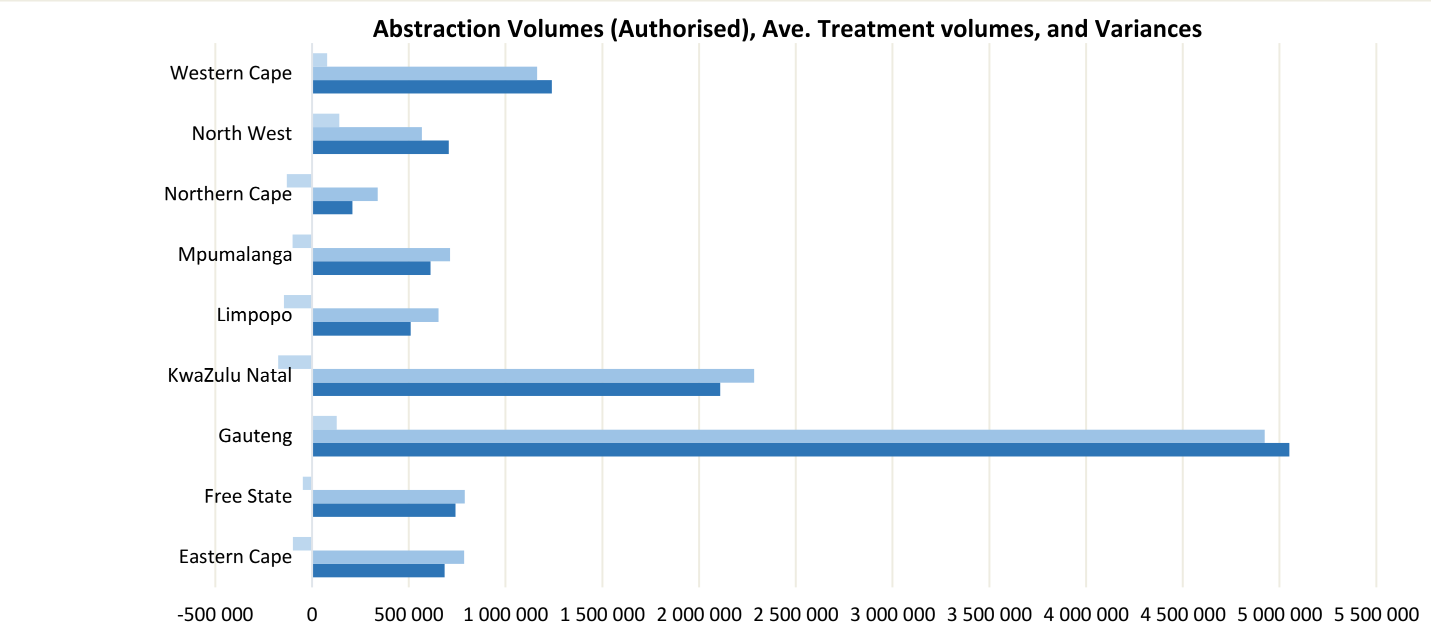
This diagnostic takes a snapshot view of the status of water abstraction authorisations from natural water resources across the country. As per the National Water Act (Act no 36 of 1998), Water Use Authorisation (WUA) mandate the maximum abstraction volumes of raw water, and the installation and monitoring of abstraction, inflow, and outflow meters, whilst the BD audit requires WSAs to report the flows on IRIS and to calibrate meters annually. Any defects in terms of abstracting water from a resource without an authorisation, or exceeding the authorised volume, or reporting inaccurate volumes, or not monitoring abstraction against authorised volumes, are considered to be a regulatory risk and contravention of the law.

Findings: Data pertaining to the daily abstraction volumes (kl/d) (Authorised), average daily treatment volumes (kl/d), the names of the WTWs exceeding/with no Daily Abstraction Volumes (Authorised) and Average Daily Treatment Volumes (Authorised) is captured in the tables below.

Table 16 - National Summary: Abstraction Volumes (Authorised), Ave. Daily Treatment Volumes, Variances & WTWs listed for Enforcement Action

Province	# WTWs	# WSSs	Daily Abstraction Volumes (Authorised) (kl/d)	Average Daily Treatment Volume (kl/d)	Average Variance (kl/d) [+ or Minus]
Eastern Cape	222	154	685,227	785,210	-99,983
Free State	75	80	740,748	788,990	-48,242
Gauteng	19	29	5,050,036	4,923,288	126,748
KwaZulu Natal	190	172	2,108,866	2,284,424	-175,558
Limpopo	85	84	509,047	654,176	-145,129
Mpumalanga	107	100	612,188	713,159	-100,971
Northern Cape	158	176	208,033	338,721	-130,688
North West	33	39	707,041	566,880	140,161
Western Cape	126	124	1,239,829	1,162,422	77,407
Totals	**1,015**	**958**	**11,861,015**	**12,217,270**	**-356,255**

Province	WTW exceeding the Daily Abstraction Volumes (Authorised)	WTW with no Daily Abstraction Volumes (Authorised)
Eastern Cape	12	168
Free State	5	33
Gauteng	None	2
KwaZulu Natal	14	129
Limpopo	4	61
Mpumalanga	15	50
Northern Cape	7	143
North West	5	15
Western Cape	12	54
Totals	**74**	**655**



	Eastern Cape	Free State	Gauteng	KwaZulu Natal	Limpopo	Mpumalanga	Northern Cape	North West	Western Cape
Ave. Variance (kl/d)	-99 983	-48 242	126 748	-175 558	-145 129	-100 971	-130 688	140 161	77 407
Ave. Daily Treatment (kl/d)	785 210	788 990	4 923 288	2 284 424	654 176	713 159	338 721	566 880	1 162 422
Daily Abstraction (kl/d)	685 227	740 748	5 050 036	2 108 866	509 047	612 188	208 033	707 041	1 239 829

Figure 12 - Abstraction Volumes (Authorised), Average Daily Treatment Volumes, and Variances

WTWs that exceed the Daily Abstraction Volumes (Authorised) and WTWs with no Daily Abstraction Volumes (Authorised) are reflected in the 2nd table above. WTWs that are not complying with the regulations will be required to show correction in the next Blue Drop audit cycle. The results conclude that 74 WTWs are exceeding the permitted abstraction limits and 311 WTWs provided authorised water use abstraction volumes. The Daily Abstraction Volumes (Authorised) are not known for 655 water treatment systems resulting in negative average variances that skew the data sets, and this can also be attributed to over abstraction. For future BD audits, WSA/WSPs will be required to provide 'actual' abstraction volumes so that a comparative analysis can be undertaken of the 'actual' abstraction volume versus the authorised water use abstraction volumes (maximum). This would require that the WSAs and WSPs/WBs monitor and record all critical path flows (abstraction, raw and final).

(iii) Water Use Efficiency and System Input Value

The Department is committed to consider issues related to water scarcity and security, aiming to ensure there is sufficient water for the population, the economy, and the environment by increasing water use efficiency across all sectors. Water use for services sectors is specifically dealing with the quantity of water used directly by the consumer through the public distribution network and industries connected to the network. This diagnostic assesses the water use efficiency (i.e., the average daily consumption in litres per person per day) and the individual and collective performance of the water supply systems. WUE indicates how effective water is used by consumers, i.e. the process between effective water use and actual water abstraction. This concept is closely related to the Department's No Drop Certification assessment, whereby WUE, NRW and water losses are targeted as part of Water Conservation and Water Demand Management strategies by municipalities.

Findings: Both the Blue Drop audit and No Drop audit requires an IWA water balance to determine the SIV into each water supply system, and to identify and quantify possible losses from abstraction to the end-of-use point. 295 systems have full water balances in place. 320 WSSs have partial water balances in place, and 343 WSSs do not have water balances in place.

WUE is calculated based on the SIV contributions, population served, and the average daily consumption, as summarised in the following table.

Table 17 - National Summary of total SIV, total population served, average daily consumption, WUE status and performance trend

Province	# WSSs	Total Population	Total SIV (kl/d)	2023 WUE (l/p/d)	2023 Blue Drop WUE Range and Performance	
Eastern Cape	154	5,001,573	859,852	172	>150-200	Good
Free State	80	3,028,741	791,643	261	>250-300	Poor
Gauteng	29	13,928,777	4,274,956	316	>300	Extremely High
KwaZulu Natal	172	8,787,506	2,576,627	253	>250-300	Poor
Limpopo	84	3,391,492	713,694	210	>200-250	Average
Mpumalanga	100	4,770,957	1,033,257	231	>200-250	Average
Northern Cape	176	1,129,644	318,060	392	>300	Extremely High

Province	# WSSs	Total Population	Total SIV (kl/d)	2023 WUE (l/p/d)	2023 Blue Drop WUE Range and Performance	
North West	39	2,206,785	504,171	228	>200-250	Average
Western Cape	124	6,241,092	1,063,791	243	>200-250	Average
Totals	**958**	**48,486,567**	**12,136,050**	**256**	**>250-300**	**Poor**

WUE (l/cap/day) performance categories

Colour	WUE Range	Performance
	>300	Extremely high per capita water use
	>250-300	Poor per capita water use
	>200-250	Average per capita water use with potential for marked improvement
	>150-200	Good per capita water use but some improvement may be possible subject to economic benefits
	<150	Excellent per capita water use management

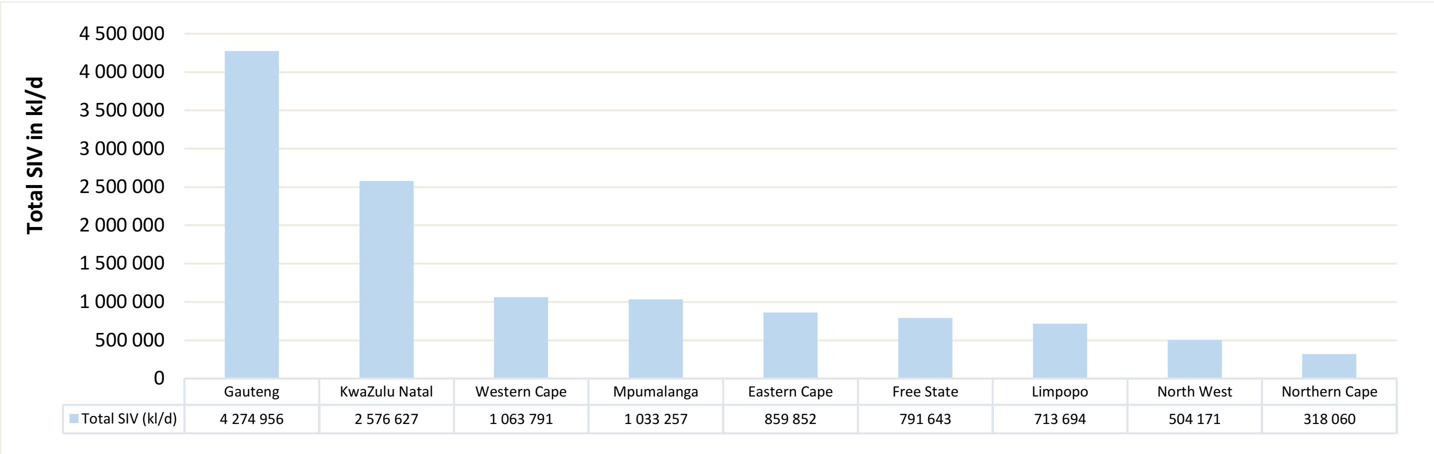


Figure 13 - Total SIV towards the WSSs

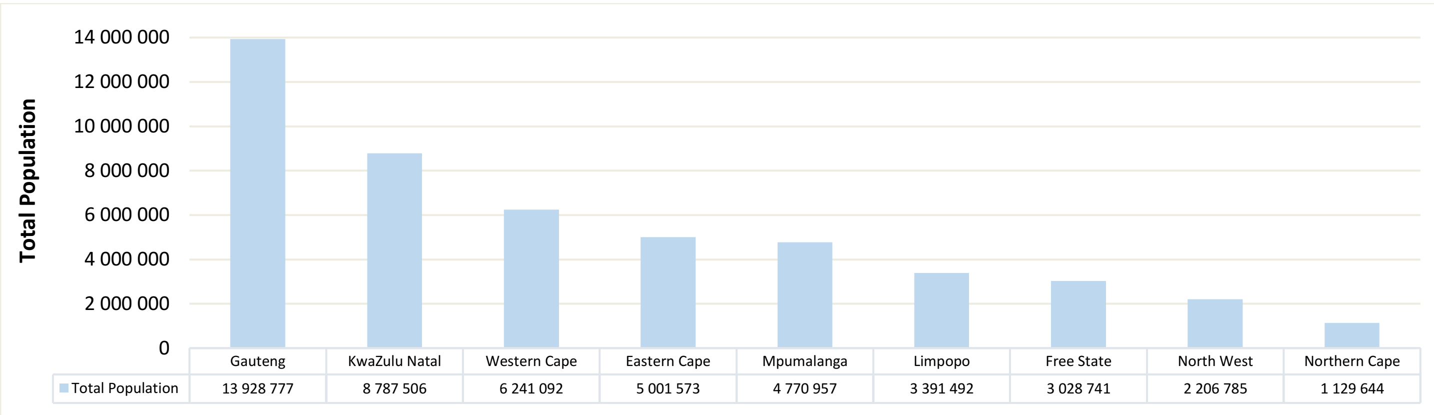


Figure 14 - Total Population served

For the country, 12,136,050 kl/d water is supplied to 48,486,567 consumers. Comparatively, the Gauteng and KwaZulu Natal provinces distribute 56% of the total SIV with 6,851,583 kl/d. An average 256 litre of water is used per person per day, which implies a poor per capita water use. Results from the diagnostic data show that the Gauteng and Northern Cape provinces has WUEs of more than 300 l/c/d, which is regarded as extremely high according to national benchmarks. 2 provinces have a WUE between 250–300 l/c/d, which is regarded as poor. No Drop Certification is specifically tasked with plans to curb water losses and improve NRW through water accounting assessments and water conservation and demand management.

Diagnostic 3: Drinking Water Quality (DWQ) Monitoring and Compliance

Aim: Blue Drop audits values the principles of “To measure is to know” and “To know is to manage”. The primary objective of a water treatment plant is to produce final water quality that is safe for human consumption at the end of the distribution network. This standard can only be measured and achieved if operational and compliance monitoring and DWQ compliance is executed at the correct frequency, sample point, and determinand type. This diagnostic assesses the i) operational and compliance monitoring status, ii) drinking water quality compliance, and iii) risk defined compliance and laboratory credibility.

(i) Drinking water operational and compliance monitoring

Findings: A minimum level of 90% operational monitoring compliance is applied as benchmark, to give weight to the importance of sampling and monitoring of the raw water, process unit water, and final water across the treatment stream. Compliance monitoring is also informed by SANS 241:2015 and the requirement for risk-informed monitoring through the WaSP process at both the WTW final and distribution network. DWQ compliance is calculated against the population size and the mandatory limits set by SANS 241:2015 and the Blue Drop standards, as calculated and reported from data loaded in the IRIS.

Table 18 - National Summary of the KPA 2 WTW operational and WSS compliance monitoring status

Province	# WTWs	# WSSs	WTW Operational monitoring [KPA 2 sub-KPA 2.b)]		WSS Compliance monitoring [KPA 2 sub-KPA 2.c)]	
			Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]	Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]
Eastern Cape	222	154	99	123	61	93
Free State	75	80	26	49	2	78
Gauteng	19	29	10	9	16	13
KwaZulu Natal	190	172	104	86	97	75
Limpopo	85	84	35	50	2	82
Mpumalanga	107	100	59	48	38	62
Northern Cape	158	176	21	137	10	166
North West	33	39	13	20	7	32
Western Cape	126	124	62	64	47	77
Totals	**1,015**	**958**	**429 (42%)**	**586 (58%)**	**280 (29%)**	**678 (71%)**

The performance recorded in the table above stems from performance data as measured against the Blue Drop Standard expressed in KPA 2 and sub-KPAs 2.b) and 2.c). Overall, an unsatisfactory sampling and analysis regime is observed for both operational (58%) and compliance (71%) monitoring.

The data indicates that 429 of 1,015 WTWs (42%) are on par with good practice for operational monitoring of the raw and final water and the respective process units at the WTW. In terms of compliance monitoring, 280 WSSs (29%) are on par with good compliance monitoring practices, and 678 WSSs (71%) are failing the Blue Drop standard.

The latter observation is noted with deepening concern. Compliance monitoring is a legal requirement and the only means to measure the DWQ performance of a water supply system. Operational monitoring is the cornerstone of day-to-day process adjustments and optimisation to ensure that the water treatment is efficient and delivers quality final water. The results indicate that 586 WTWs and 678 WSSs are not achieving regulatory and industry standards.

(ii) Drinking water quality compliance

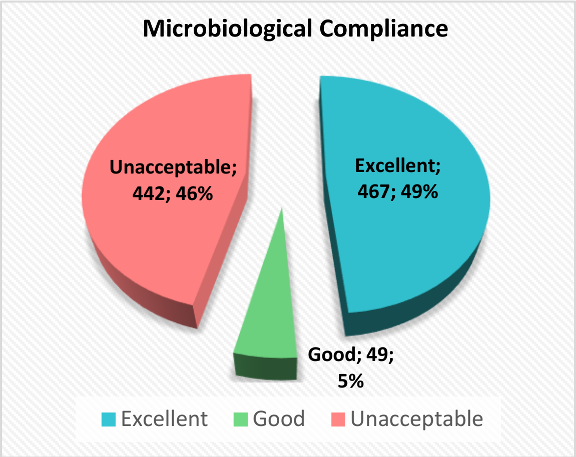
Findings: DWQ compliance is measured against the requirements of SANS 241:2015 under KPA 5 of the Blue Drop audit. The tables following summarises the provincial results of the DWQ status for Microbiological and Chemical Compliance, which also carries the highest Blue Drop score weighting of 35%.

Table 19 - National Summary of the DWQ Status for Microbiological Compliance

Province	# WSSs	Population	% Ave. Micro Compliance	DWQ Microbiological Compliance [Delivery and Distribution Networks]					
				# Excellent	% Excellent	# Good	% Good	# Unacceptable*	% Unacceptable*
Eastern Cape	154	5,001,573	86.49%	55	36%	8	5%	91	59%
Free State	80	3,028,741	76.52%	32	40%	3	4%	45	56%
Gauteng	29	13,928,777	98.70%	23	79%	0	0%	6	21%
KwaZulu Natal	172	8,787,506	92.65%	93	54%	9	5%	70	41%
Limpopo	84	3,391,492	81.62%	59	70%	7	8%	18	21%
Mpumalanga	100	4,770,957	71.08%	35	35%	1	1%	64	64%
Northern Cape	176	1,129,644	72.26%	62	35%	10	6%	104	59%
North West	39	2,206,785	88.13%	18	46%	4	10%	17	44%
Western Cape	124	6,241,092	96.89%	90	73%	7	6%	27	22%
Totals	**958**	**48,486,567**	**84.93%**	**467**	**49%**	**49**	**5%**	**442**	**46%**

Province	# WSSs	Population	% Ave. Micro Compliance	DWQ Microbiological Compliance [Delivery and Distribution Networks]					
				# Excellent	% Excellent	# Good	% Good	# Unacceptable*	% Unacceptable*

*** Note:** A number of factors impact on the microbiological compliance numbers and percentages above:
1) Reflects drinking water quality monitoring at both the delivery and distribution networks;
2) Based on microbiological failures, as well as where no monitoring is taking place or where limited/insufficient monitoring has been undertaken (predominantly in the distribution network as per the requirements of SANS 241:2015);
3) Where monitoring results have not been uploaded on IRIS (DWS issues notices on a bi-weekly basis through an auto reminder to remind WSAs to upload data on IRIS);
4) Reflects only results submitting before the critical close-out date of the BD audit, i.e. one week after the Confirmation Audit; and finally
5) DWS is aware of the shortage in Chlorine supply in South Africa for intermittent periods, and remind WSAs to plan and make provision for such risks in the WaSP and through supply chain management.



MICRO: Population <100,000		
Colour	Status	Percentage
	Excellent	>97%
	Good	>96 - <97%
	Unacceptable	<96%

MICRO: Population >100,000		
Colour	Status	Percentage
	Excellent	>99%
	Good	>98 - <99%
	Unacceptable	<98%

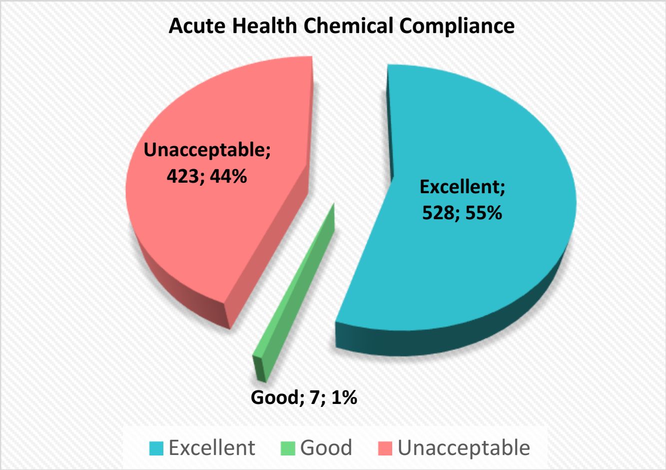
Figure 15 - National Microbiological Drinking Water Quality Status

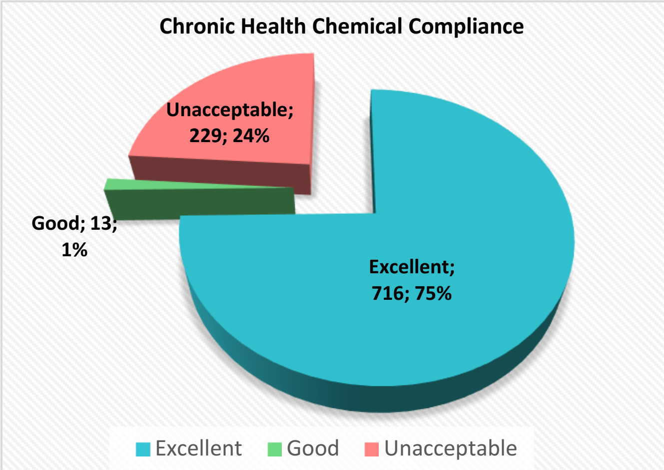
Out of the 958 WSSs, 467 (49%) systems achieved excellent microbiological quality, 49 (5%) systems have good microbiological quality, whilst 442 (46%) systems have an unacceptable microbiological water quality status. The water in these systems pose a serious acute health risk to the community. Failure to produce water that meets microbiological compliance standards can be linked back to poor operations, defective infrastructure, inadequate dosing rates, absence of disinfection chemicals, lack of monitoring, lack of operating and chemistry knowledge, and several other root causes. WSIs that are not monitoring the final water quality at the outlet of the treatment plant or at specific end use points are required to develop a monitoring programme and resume with compliance monitoring as a matter of urgency.

Table 20 - National Summary of the DWQ Status for Chemical Acute Health and Chronic Health Compliance

Province	# WSSs	Population	% Ave. Chem Acute Health Compliance	DWQ Acute Health Chemical Compliance						% Ave. Chem Chronic Health Compliance	DWQ Chronic Health Chemical Compliance					
				Excellent		Good		Unacceptable*			Excellent		Good		Unacceptable*	
				#	%	#	%	#	%		#	%	#	%	#	%
Eastern Cape	154	5,001,573	48.5%	69	45%	0	0%	85	55%	73.4%	122	79%	5	3%	27	18%
Free State	80	3,028,741	54.5%	26	33%	0	0%	54	68%	72.8%	46	58%	0	0%	34	43%
Gauteng	29	13,928,777	96.1%	26	90%	1	3%	2	7%	95.7%	25	86%	1	3%	3	10%
KwaZulu Natal	172	8,787,506	78.8%	110	64%	1	1%	61	35%	95.8%	156	91%	0	0%	16	9%
Limpopo	84	3,391,492	63.5%	40	48%	2	2%	42	50%	80.6%	62	74%	0	0%	22	26%
Mpumalanga	100	4,770,957	67.8%	64	64%	1	1%	35	35%	75.3%	69	69%	3	3%	28	28%
Northern Cape	176	1,129,644	47.6%	63	36%	1	1%	112	64%	57.7%	89	51%	2	1%	85	48%
North West	39	2,206,785	80.5%	31	79%	0	0%	8	21%	89.6%	29	74%	1	3%	9	23%
Western Cape	124	6,241,092	83.6%	99	80%	1	1%	24	19%	94.6%	118	95%	1	1%	5	4%
Totals	**958**	**48,486,567**	**68.98%**	**528**	**55%**	**7**	**1%**	**423**	**44%**	**81.72%**	**716**	**75%**	**13**	**1%**	**229**	**24%**

*** Note:** A number of factors impact on the acute health and chronic health chemical compliance numbers and percentages above:
1) Reflects drinking water quality monitoring at both the delivery and distribution networks;
2) Based on acute health and chronic health chemical failures, as well as where no monitoring is taking place or where limited/insufficient monitoring has been undertaken (predominantly in the distribution network as per the requirements of SANS 241:2015);
3) Where monitoring results have not been uploaded on IRIS (DWS issues notices on a bi-weekly basis through an auto reminder to remind WSAs to upload data on IRIS); and
4) Reflects only results submitting before the critical close-out date of the BD audit, i.e. one week after the Confirmation Audit





CHEM Acute Health: Population <100,000			CHEM Acute Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	≥97%		Excellent	≥99%
	Good	≥95 - <97%		Good	≥97 - <99%
	Unacceptable	<95%		Unacceptable	<97%

CHEM Chronic Health: Population <100,000			CHEM Chronic Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	≥95%		Excellent	≥97%
	Good	≥93 - <95%		Good	≥95 - <97%
	Unacceptable	<93%		Unacceptable	<95%

Figure 16 - National Chemical Acute Health and Chronic Health Drinking Water Quality Status

Chemical acute health compliance shows that 528 (55%) systems have excellent, and 7 (1%) systems have good water quality, whilst 423 (44%) systems have an unacceptable chemical acute health compliance. Chemical chronic health compliance shows that 716 (75%) systems have excellent, and 13 (1%) systems have good water quality, whilst 229 (24%) systems have an unacceptable chemical chronic health compliance.

The Water Services Act upholds standards regarding the monitoring and reporting on drinking water quality and issuance of advisory notices to the public when significant DWQ failures are observed. The audit process applies a penalty when DWQ failures are noticed without issuing such Water Quality Alert Notices to forewarn consumers of the status of (unsafe) water quality and to advise communities to source alternative water sources or methods to disinfect water used for drinking water purposes.

The following table reflects the compliance status of the WSAs as regards the issuing of these notices for DWQ failures.

Table 21 - National Summary of Penalties Applied to WSSs for not Issuing Advisory Notices

Province	# WSS	# WSS No Penalty Applied	# WSS Partial Penalty Applied	# WSS Full Penalty Applied
Eastern Cape	154	31	99	24
Free State	80	26	22	32
Gauteng	29	24	4	1
KwaZulu Natal	172	79	76	17
Limpopo	84	56	16	12
Mpumalanga	100	33	45	22
Northern Cape	176	50	68	58
North West	39	21	14	4
Western Cape	124	96	21	7
Totals	**958**	**416**	**365**	**177**

No penalties were applied to 416 (43%) WSSs. Partial penalties were applied to 365 (38%) WSSs and full penalties were applied to 177 (18%) WSSs.

(iii) Risk defined compliance and laboratory credibility

Findings: Risk-defined compliance standards aim to determine the compliance (to SANS 241) of those parameters that have been found to pose a risk in a specific WSS and need to be included in the routine monitoring programme or frequency as prescribed by SANS 241. The country achieved an average Annual Risk Defined Compliance of 80.1%. Excellent risk defined compliance was achieved by 240 (25%) systems, good compliance for 70 (7%) systems and bad compliance for 648 (68%) systems with most of these systems residing in the Eastern Cape, KwaZulu Natal and Northern Cape provinces.

Table 22 - National Summary of the DWQ Compliance for Risk Defined Compliance

Province	# WSSs	Population	Ave. % Risk Defined Compliance	# WSS Performance Status		
				Excellent	Good	Bad
Eastern Cape	154	5,371,573	81.09%	24	8	122
Free State	80	3,028,741	71.68%	15	10	55
Gauteng	29	13,928,777	97.17%	21	3	5
KwaZulu Natal	172	8,787,506	85.64%	33	9	130
Limpopo	84	3,391,492	70.73%	25	4	55
Mpumalanga	100	4,770,957	70.95%	22	3	75
Northern Cape	176	1,129,644	70.30%	39	8	129
North West	39	2,206,785	81.67%	7	7	25
Western Cape	124	6,241,092	91.6%	54	18	52
Totals	**958**	**48,856,567**	**80.10%**	**240**	**70**	**648**

The aim of operational determinand compliance is to determine the efficiency of the water treatment process, by monitoring those parameters which are used to control the treatment process. Although not necessarily a health risk, these parameters provide good information on the integrity of the WTW. The country achieved an average % Actual Operational Determinand Compliance of 47.3%. Excellent operational determinand compliance was achieved by 198 (20%) WTWs, good compliance for 76 (7%) WTWs and bad compliance for 741 (73%) WTWs with most of these systems residing in the Eastern Cape, KwaZulu Natal and Northern Cape provinces.

Table 23 - National Summary of the Treatment (Operational) Efficiency Index

Province	# WTWs	Population	Ave. % Actual Operational Determinand Compliance	# WTW Performance Status		
				Excellent	Good	Bad
Eastern Cape	222	5,001,573	47%	27	19	176
Free State	75	3,028,741	43%	15	0	60
Gauteng	19	13,928,777	82%	7	0	12
KwaZulu Natal	190	8,787,506	65%	39	0	151
Limpopo	85	3,391,492	25%	23	3	59
Mpumalanga	107	4,770,957	51%	35	18	54
Northern Cape	158	1,129,644	10.2%	3	12	143
North West	33	2,206,785	51%	5	1	27
Western Cape	126	6,241,092	51%	44	23	59
Totals	**1,015**	**48,486,567**	**47.34%**	**198**	**76**	**741**

The data confirms that all of the Water Boards and WSPs and most of WSAs in the country have access to credible laboratories for compliance and operational analysis. These in-house or contracted laboratories are accredited with SANAS or have Proficiency Testing Schemes with SABS or have inter-laboratory quality checks in place to ensure that suitable analytical methods are applied and that quality assurance processes are followed to ensure credible water quality results. The country is predominantly meeting the regulatory expectation for the WSIs having access to credible analytical services for compliance and operational monitoring.

Diagnostic 4: Technical Site Assessments

Aim: The Blue Drop process makes provision for a Technical Site Assessment (TSA) in order to verify the desktop evidence through field-based inspections. This assessment includes a physical inspection of the entire water treatment plant with all its process units, as well as the reservoir and spot checks of a pumpstation and pipelines. The technical assessment is coupled with an asset condition check to determine an approximate cost (VROOM) to restore existing infrastructure to functional status for the treatment facility (only).

Findings: The national results of the country's TSAs are summarised in the table below. A deviation of 10% between the BD and TSA score indicate a misalignment between the administrative aspects and the work on the ground. The Regulator regards a WTW with a TSA score of >80% to have an acceptable level of process control and functional equipment, and a TSA score of 90% as an excellent system that complies with most of the Blue Drop TSA standards. A TSA score of <30% indicates that the treatment facility and network fails in most regards, and is evident of dysfunctional infrastructure, failed process control, absence of record keeping and monitoring, and poor water quality.

The VROOM cost presents a ''Very Rough Order of Measurement "cost to return a WTWs functionality to its original design. More detail can be found in the Blue Drop Watch Report 2023.

Table 24 - National Summary of VROOM cost estimates total and split for civil, mechanical, and electrical

Province	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Eastern Cape	R53,650,290	R77,712,876	R11,150,794	R142,513,960
Free State	R177,892,073	R256,908,025	R97,458,645	R532,258,741
Gauteng	R18,743,213	R30,624,323	R5,062,415	R54,429,950
KwaZulu Natal	R111,864,440	R213,185,865	R61,034,495	R386,084,800
Limpopo	R37,934,070	R92,350,970	R20,499,960	R150,785,000
Mpumalanga	R53,165,450	R43,145,900	R13,087,150	R109,398,500
Northern Cape	R70,896,243	R105,446,649	R32,921,250	R209,264,141
North West	R39,405,040	R23,363,595	R6,814,465	R69,583,100
Western Cape	R47,473,694	R59,663,651	R19,959,053	R127,096,399
Totals	**R611,024,513**	**R902,401,854**	**R267,988,227**	**R1,781,414,591**
	34%	**51%**	**15%**	

For the individual WTWs assessed in the country, a total budget of R1.781b is estimated, with the bulk of the work (85%) going towards restoration of mechanical equipment (51%) and civil infrastructure (34%).

Diagnostic 5: Operation, Maintenance and Refurbishment of Assets

Aim: Insufficient financial resources are often cited as a root cause to dysfunctional or non-compliant water treatment works and water networks. Knowledge and monitoring of fiscal spending are therefore a critical part of water services management and municipal governance of public assets. This diagnostic investigates the status of financial information as pertaining to O&M budgets and expenditure, asset figures, and capital funding.

Findings: A substantial amount of financial information was presented during the audit process. Unfortunately, the evidence was presented in different formats, levels of detail, or absent for some WSAs. It was observed that WSA teams with financial officials that were present during the audits performed better and had a better understanding of the water services challenges experienced by their technical peers.

Discrepancies observed included amongst others - generic or non-ringfenced budgets, contract lump sums for service providers presented as budgets, outdated or incomplete asset registers, and some cost drivers which were lacking. As data credibility presents a significant challenge, the Regulator grouped data into different certainty levels, as summarised at the end of this Diagnostic.

The result of each financial portfolio is discussed hereunder.

NOTE: The Regulator regards the financial and asset information with <u>low confidence</u>. Not all WSAs submitted verifiable information or complete financial data sets for the audit year in question**.**

Capital, O&M Budget and Actual, and Asset Value

The capital budgets, O&M budgets, O&M actual expenditure, and current asset values are summarised below.

Table 25 - National Summary of the capital budgets, O&M budgets, O&M actual expenditure, and current asset values

Province	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
Eastern Cape	R804,176,520	R3,196,598,632	R2,037,975,049	64%	R15,970,603,048
Free State	R1,303,269,737	R2,484,550,302	R3,006,156,655	121%	R8,398,685,321
Gauteng	R4,915,672,139	R22,009,084,001	R21,927,384,803	100%	R95,440,360,730
KwaZulu Natal	R2,055,616,027	R9,342,698,273	R9,186,348,546	98%	R33,032,215,222
Limpopo	R1,433,958,976	R809,513,999	R719,410,880	89%	R11,952,268,344
Mpumalanga	R707,256,169	R2,303,939,872	R2,090,957,148	91%	R23,933,935,871
Northern Cape	R140,108,460	R711,831,973	R685,269,386	96%	R3,768,919,880
North West	R603,251,101	R3,532,061,302	R2,873,738,524	81%	R7,076,863,608
Western Cape	R1,258,393,555	R3,794,544,112	R3,659,893,775	96%	R17,763,315,836
Totals	**R13,221,702,684**	**R48,184,822,466**	**R46,187,134,766**	**96%**	**R217,337,167,861**

The Regulatory Comments following in this Chapter list the capital projects with secured funding for each province. The capital lists are deemed to be a definitive means to address water service inadequacies and ensuring water infrastructure investment. A total capital budget of R13.2b has been reported for the refurbishment and upgrades of water supply system infrastructure in the country.

The largest capital budgets are observed for Gauteng (R4.9b), KwaZulu Natal (R2.06b), Limpopo (R1.43b), Free State (R1.3b) and Western Cape (R1.26b).

For the 2021/22 fiscal year, the total O&M budget reported for the country was R48.185b, of which R46.187b (96%) has been expended. The highest over-expenditure of 126% by the Free State province and the lowest under expenditure by the Eastern Cape (64%) was observed. The national figures exclude the WSAs who had no and partial financial information.

The total current asset value for water infrastructure (networks, pump stations, treatment plants) is reportedly R217.34b (excluding those WSAs that submitted no information). The highest asset values are observed for KwaZulu Natal (R33.03b), followed by Mpumalanga (R23.93b), Western Cape (R17.76b) and Eastern Cape (R15.97b).

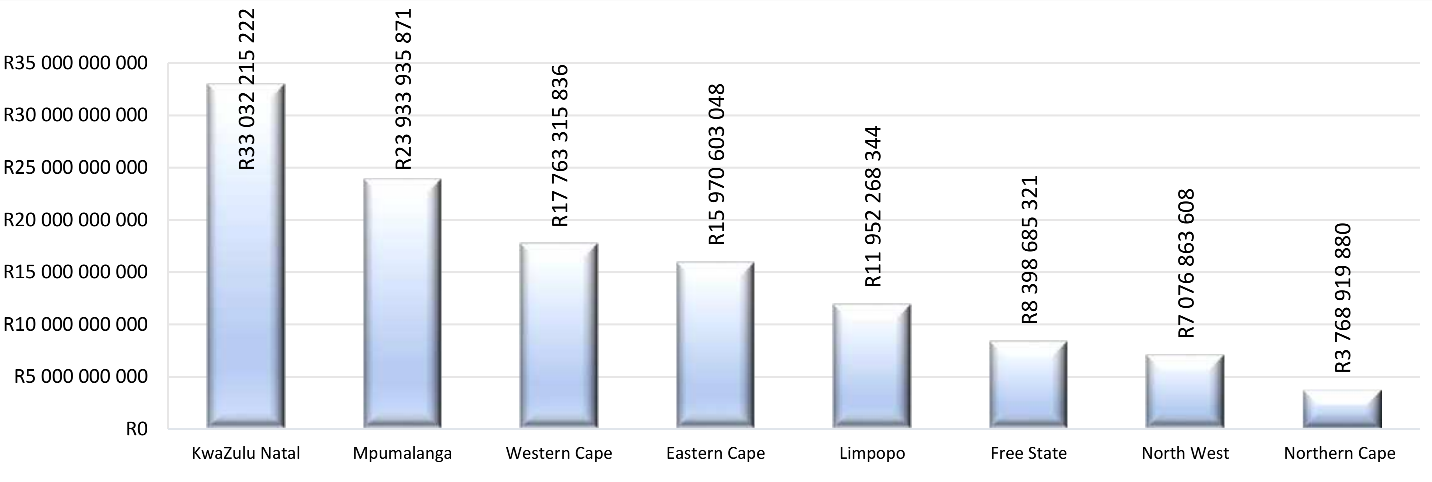


Figure 17 - Total current asset value reported

O&M Cost Benchmarking

By combining the SALGA and WRC WATCOST models, an estimation of the maintenance cost required per asset type can be done, i.e. civil, buildings, pipelines, mechanical, electrical, and instrumentation.

Table 26 - National SALGA-WRC annual maintenance budget guideline and cost estimation

Description	% of Current Asset Value	Asset Value Estimate	Modified SALGA Maintenance Guideline	Annual Maintenance Budget Guideline
Current Asset Value estimate	**100%**	**R217,337,167,861**	**15.75%**	**R4,694,482,826**
Broken down into:				
1. Civil Structures	46%	R99,975,097,216	0.50%	R499,875,486
2. Buildings	3%	R6,520,115,036	1.50%	R97,801,726
3. Pipelines	6%	R13,040,230,072	0.75%	R97,801,726
4. Mechanical Equipment	30%	R65,201,150,358	4.00%	R2,608,046,014
5. Electrical Equipment	11%	R23,907,088,465	4.00%	R956,283,539
6. Instrumentation	4%	R8,693,486,714	5.00%	R434,674,336
Totals	**100%**	**R217,337,167,861**	**15.75%**	**R4,694,482,826**
			Minus 20% P&Gs and 10% Installation	**R1,408,344,848**
			Total	**R3,286,137,978**

The model estimates that R4.694b (2.16%) is required per year to maintain the assets valued at R217.34b. Notably, this maintenance estimate assumes that all assets are functional. In cases where Blue Drop Certification is not being achieved, it can be assumed that some form of inefficiency or constraint is being experienced, and national benchmarks closer to 7% of the asset value is advocated (R15.21b).

The table below indicates the SALGA maintenance cost estimation in relation to the O&M budget, and O&M actual expended.

Table 27 - National O&M cost estimates by the SALGA versus actual budget and expenditure figures

Cost Reference	O&M Cost Estimate	Period	% of Asset Value
Modified SALGA	R4,694,482,826	Annually, estimation	2.16%
O&M Budget	R48,184,822,466	Actual for 2021/22	22.2%
O&M Spend	R46,187,134,766	Actual for 2021/22	21.3%

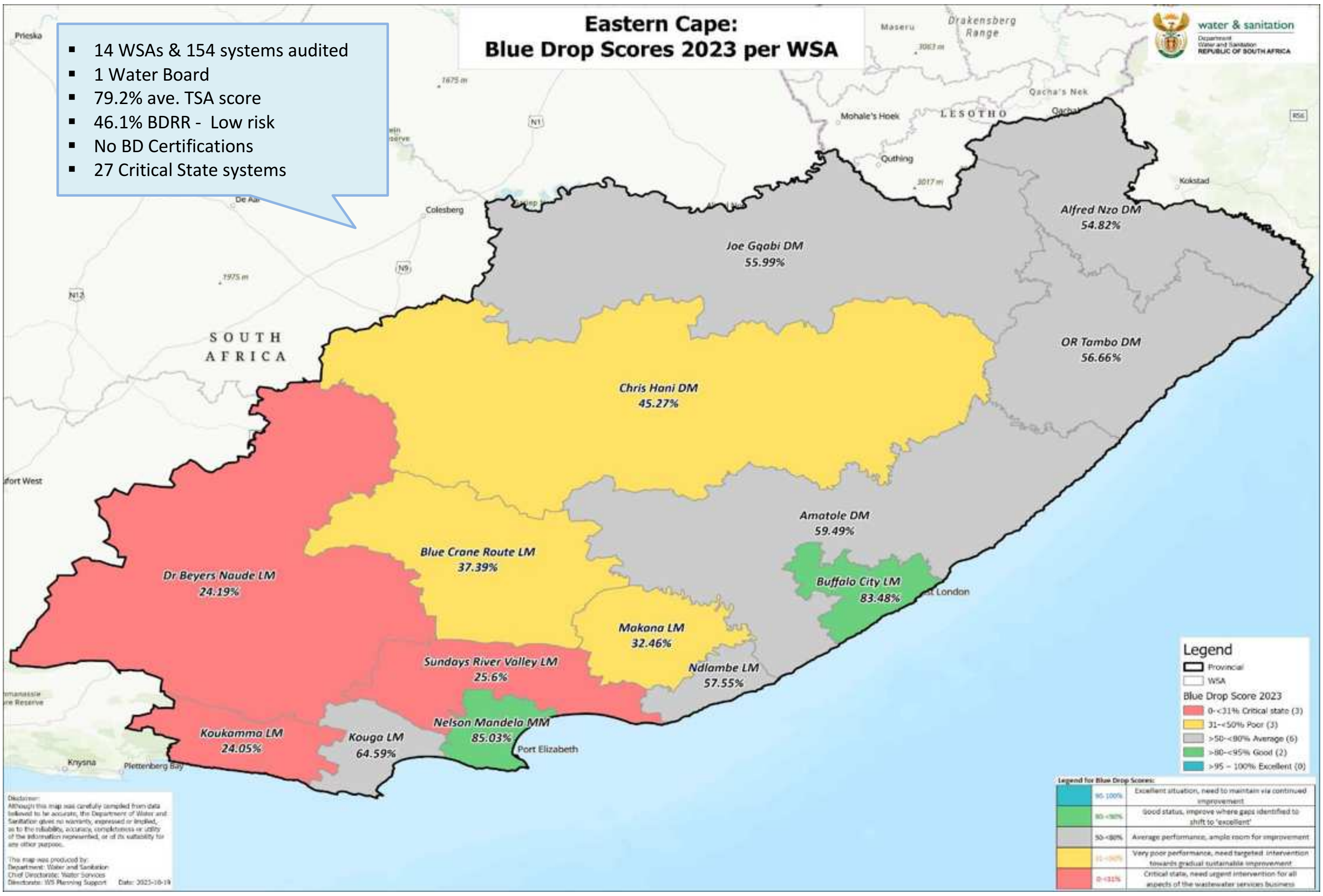
From the tables above, the cost dynamics can be summarised as follows:

- The SALGA estimations for maintenance budgets is about 9.7% (Modified SALGA divided by O&M Budget) of the actual reported budgets for the 2021/22 fiscal year
- The actual O&M budget (22.2%) appears to be more than adequate when compared with the SALGA guideline (2.16%) or with the government benchmark (7%)
- These figures were impacted by many WSAs who did not provide budget and expenditure figures, and by some inaccurate asset values and where no asset values were provided for
- Lastly, the WSAs in each province presented budget and expenditure data at different levels (see tables in the respective provincial chapters) i.e. financial figures are not always ringfenced per water supply system – thus rendering the provincial and national summaries to be indicative).

Piketberg reservoir secured with routine inspection regime

Impala reservoir secured, sign posted, neat terrain

5. EASTERN CAPE PROVINCE: MUNICIPAL WATER MANAGEMENT PERFORMANCE



Provincial Synopsis

The Eastern Cape province provides drinking water to a total population of 5,001,573 persons in South Africa.

An audit attendance record of 100% of the 14 WSAs, with 154 water supply systems across the province and 1 Water Board Amatola Water affirms the province's commitment to the Blue Drop national incentive-based regulatory programme. The main Bulk Water Suppliers are Amatola Water who supplies potable water via nine water treatment works to 12 water supply systems in Amathole DM, Buffalo City LM and Ndlambe LM, and Nelson Mandela Bay MM also supplies potable water via 3 water treatment systems to 5 water supply systems in Kouga LM.

The Regulator determined that no water supply system scored more than 95% when measured against the Blue Drop standards and thus do not qualify for the prestigious Blue Drop Certification. In 2014, no water supply systems were awarded Blue Drop status. Using the 2014 audit results as comparative baseline, the province shows no achievement of excellence in 2023. Six (6) of 14 WSAs improved on their 2014 scores, namely Blue Crane Route LM, Buffalo City LM, Kouga LM, Ndlambe LM, Nelson Mandela MM and OR Tambo DM. The remaining 8 WSAs regressed to lower Blue Drop scores compared to their 2014 baselines. The Nelson Mandela MM, Buffalo City LM, and Kouga LM are the best performing WSAs in the province. The Blue Drop scores of these top WSA performers were supported by excellent technical site assessment scores of 92% for the Cannon Rocks/Bokwe WTW, followed by the Jeffreys Bay WTW with a TSA score of 91%. 27 water supply systems were identified to be in a critical state in the province compared with 31 water supply systems in 2014.

The province's overall Blue Drop performance is characterised by particular strengths when measured against the KPAs. Nelson Mandela MM and Buffalo City LM stand out for its compliance, good practice and risk management practices that are well embedded in the water supply business. The KPAs that require attention and are reflecting scores below 50% are KPA 4 Technical Management (32.4%) and KPA 5 Drinking Water Quality Compliance (41.5%).

The provincial Blue Drop Risk Rating (BDRR) improved from 51.6% in 2022 (BD PAT) to 46.1% in 2023. 98 (of 154) water supply systems are situated in the low risk category, 42 WSSs in the medium risk category, 7 WSSs in the high risk category, and 7 WSSs in the critical risk category.

The Regulator is optimistic that the 2023 Blue Drop report provides an updated residual basis from where a positive trajectory for water services delivery and improved performance will follow in the next BD audit. Municipalities and their service providers are encouraged to start preparation for the next Blue Drop audit cycle, which is planned to cover the financial year 2023/24 and released in 2025. The 2023 Blue Drop status for WSAs in the province are summarised in the table below.

Table 28 - 2023 Blue Drop Summary

WSA Name	2014 BD Score (%)	2023 BD Score (%)	2023 BD Certified ≥95%	2023 Critical State (<31%)
Alfred Nzo DM	62.9%	54.8%↓		Kinira
Amatole DM	80.2%	59.5%↓		
Blue Crane Route LM	35.1%	37.4%↑		
Buffalo City LM	72.8%	83.5%↑		
Chris Hani DM	83.4%	45.3%↓		Farms & Rural, Hofmeyer and Tarkastad
Dr Beyers Naude LM	61.1%	24.2%↓		Aberdeen, Graaff-Reinet, Jansenville, Klipplaat, Nieu-Bethesda, Rietbron, Steytlerville, WaterFord, Willowmore and Wolwefontein
Joe Gqabi DM	74.7%	56.0%↓		
Kouga LM	51.8%	64.6%↑		
Koukamma LM	25.8%	24.1%↓		Blikkiesdorp, Clarkson, Coldstream, Joubetina, Kareedouw, Krakeel, Louterwater, Misgund, Sanddrif, Storms River and Woodlands
Makana LM	70.8%	32.5%↓		
Ndlambe LM	49.5%	57.6%↑		
Nelson Mandela MM	72.4%	85.0%↑		
OR Tambo DM	41.2%	56.7%↑		
Sundays River Valley LM	36.0%	25.6%↓		Addo and Kirkwood
Totals	-	-	0	27

↑= improvement, ↓= regress, →= no change

The Department of Water and Sanitation acknowledges the excellence in water services management achieved for the Blue Drop Audit year of 2021-22. No Blue Drop Certificates are awarded in the Eastern Cape Province.

Background to Water Delivery and Distribution Infrastructure

The total volume of water treated in the province is 785,210 kl/d. Fourteen (14) WSAs, 1 Water Board and one bulk water supplier in the Nelson Mandela MM are responsible for water services through a water network comprising of:

- 222 WTWs and boreholes with the bulk of the water treated and supplied by the 22 WTWs of Nelson Mandela MM, Buffalo City LM and Amatola Water with a total Average Daily Production of 496,289 kl/d
- 154 WSSs of which 23 WSSs in 5 WSAs are provided with potable water from Nelson Mandela MM, Buffalo City LM and Amatola Water
- 375 pump stations, 3,094 km bulk water supply lines, 6,357 km reticulation pipe lines, and 826 reservoirs/ towers (excluding many systems that were unable to provide data).

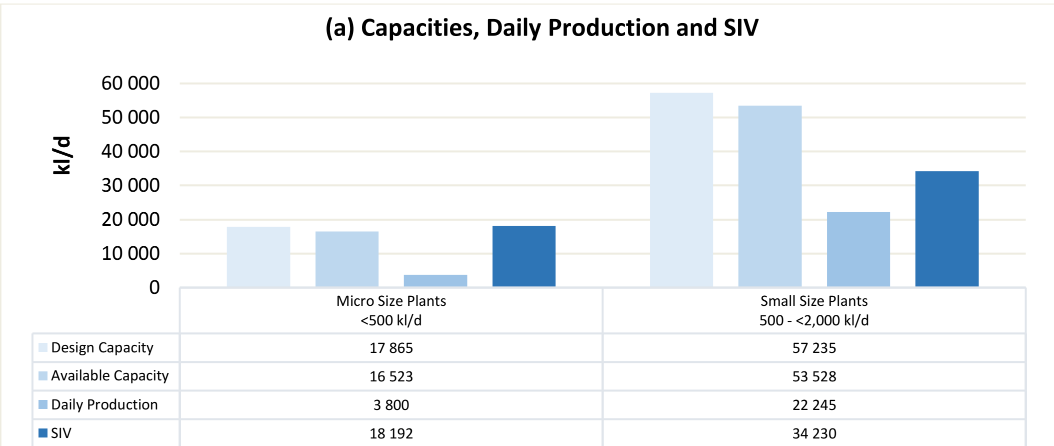
Table 29 - Summary of Capacities, Daily Production and SIV distribution according to plant sizes

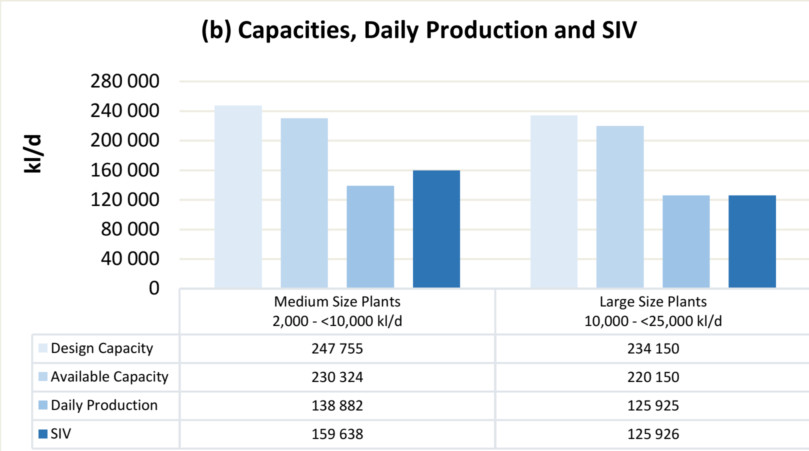
	Micro Size Plants	Small Size Plants	Medium Size Plants	Large Size Plants	Macro Size Plants	Unknown (NI)*	Total
	<500 kl/day	500 - <2,000 kl/day	2,000 - <10,000 kl/day	10,000 - <25,000 kl/day	>25,000 kl/day		
No. of WTWs, Boreholes, Springs	81 (36%)	55 (25%)	62 (28%)	14 (6%)	10 (5%)		222
Total Design Capacity (kl/day)	17,865	57,235	247,755	234,150	840,700	None	1,397,705
Total Available Capacity (kl/day)	16,523	53,528	230,324	220,150	840,700	None	1,361,225
Average Daily Treatment Volume (kl/day)	3,800	22,245	138,882	125,925	494,358	81 NI	785,210
Total SIV (kl/day)	18,192	34,230	159,638	125,926	521,866		859,852
Design Capacity Utilisation (%)	21%	39%	56%	54%	59%		56%
Available Capacity Utilisation (%)	23%	42%	60%	57%	59%		58%

** "Unknown" means the number of WTWs with NI (No Information) on design capacity or available capacity or SIV*

The audit verified a total installed design capacity of 1,397,705 kl/d and a total available design capacity of 1,361,225 kl/d with most of this capacity residing in the medium to macro-sized water treatment plants.

Collectively, the 222 WTWs produce 785,210 kl/d and distributes 859,852 kl/d across the water networks. By comparing the available treatment capacity with the treated water volume, a spare treatment capacity of 576,015 kl/d is available (42%) to meet additional future demands. The WUE for the province is good (ave. 172 l/p/d) compared to the international WUE benchmark of 180 l/p/d, indicating a good ratio between effective water use and actual water abstraction.





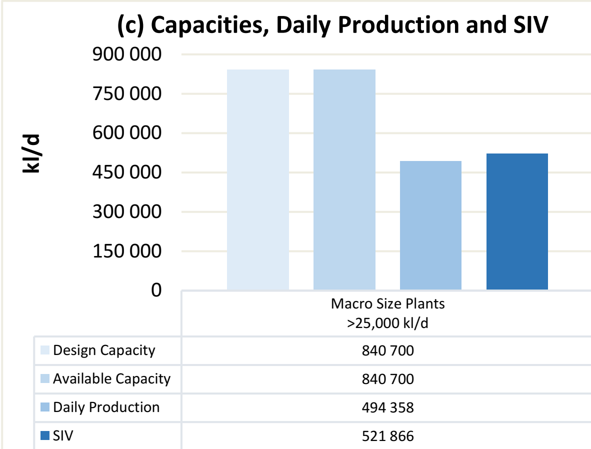


Figure 18 - Capacities, Daily Production and SIV Distribution - (a) micro to medium sized WTWs, (b) large WTWs, and (c) macro sized WTWs

In some cases, a Bulk Water Supplier supplies water across provincial borders and it is difficult to report accurately on design capacity and available capacity at provincial level, as the statistical data may become repetitive. Therefore, the reporting on the total system input volumes (SIV) would provide more accurate figures on the supply of treated water to the various water supply systems. The total SIV in the province is 859,852 kl/d and the average daily treatment volume is 785,210 kl/d and this indicates that the treated volume is less than the total SIV (91%) as 81 WTWs/boreholes are not measuring their average daily treatment volumes. The largest contributors to the total SIV for 23 WSSs from Nelson Mandela MM, Buffalo City LM and Amatola Water with a total SIV contribution of 496,289 kl/d (58%). Diagnostic no. 2 to follow herein will unpack these statistics in more detail.

The data shows that 8 WTWs daily average treatment volume exceeds the available design capacity. 10 WTWs have daily production volumes that exceed the authorised daily abstraction volumes.

The water distribution infrastructure is summarised in the table below.

Table 30 - Summary of Water Distribution Reticulation Infrastructure

WSA Name	# WSS with no WSP/WB	# WSS with WSP/WB	Water Distribution Infrastructure			
			# Pump Stations (#)	Bulk Water Supply Lines (km)	Reticulation pipe lines (km)	# Reservoirs/ Towers
Amatola Water		12	16	711	NI	164
Alfred Nzo DM	7		18	13	NI	46
Amatole DM	30	7	2	NI	NI	6
Blue Crane Route LM	3		8	NI	NI	12
Buffalo City LM	5	5	8	609	NI	-8
Chris Hani DM	22		47	36	NI	113
Dr Beyers Naude LM	10		NI	NI	NI	3
Joe Gqabi DM	14		17	190	401	93
Kouga LM	3	5	108	281	204	92
Koukamma LM	11		71	NI	NI	8
Makana LM	3		NI	NI	NI	NI
Ndlambe LM	4	1	6	4	NI	2
Nelson Mandela MM	1		54	462	3,999	72
OR Tambo DM	20		17	788	1,753	209
Sundays River Valley LM	3		3	NI	NI	14
Totals	**136**	**18**	**375**	**3,094**	**6,357**	**826**

Provincial Blue Drop Analysis

The 100% response from the 14 WSAs audited demonstrates a firm commitment to progressive water services management in the province. Local Government reforms resulted in the merging of Baviaans LM, Camdeboo LM and Ikwezi LM into Dr Beyers Naude LM. Therefore, 14 WSAs were audited in 2023 compared to the 16 WSAs in 2014.

Table 31 - Blue Drop Comparative Analysis from 2012 to 2023

BLUE DROP COMPARATIVE ANALYSIS				
Performance Category	**2012**	**2014**	**2023**	**Performance trend 2014 and 2023**
Incentive-based indicators				
WSAs assessed (#)	16 (100%)	16 (100%)	14 (100%)	→
Water supply systems assessed (#)	158	155	154	→
Blue Drop scores ≥50% (#)	96 (61%)	92 (59%)	94 (61%)	↑
Blue Drop scores <50% (#)	62 (39%)	63 (41%)	60 (39%)	↑
Blue Drop Certifications (#)	9	0	0	→
Lowest Technical Site Assessment Score (%)	23%	32%	50%	↑
Highest Technical Site Assessment Score (%)	93%	92%	92%	→

NA = Not Applied NI = No Information *↑= improvement, ↓= regress, →= no change*

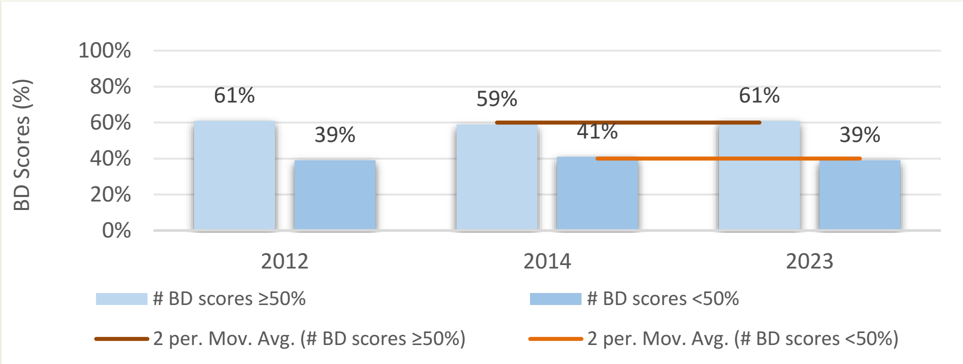


Figure 19 - Blue Drop trend analysis over the period 2012 to 2023, indicating the percentage BD scores above and below 50%

The trend analysis indicates that:

- The no. of systems audited has increased from the last BD audit in 2014
- The no. of systems with BD scores of ≥50% increased from 92 (59%) in 2014 to 94 (61%) in 2023
- This trend was reversed with no. of systems with a BD score of ≤50% decreasing from 63 (41%) in 2014 to 60 (39%) in 2023
- Blue Drop Certifications remained unchanged with no awards in 2014 and in 2023
- The lowest TSA score increased from 32% in 2014 to 50% in 2023, with the highest TSA score remaining the same with 92% in 2014 and 2023
- The overall performance trend indicates some progression from 2014 to 2023
- Despite this the trajectory still reinforces the need for regular audits to ensure timely turnaround and continued improvement
- The trend also implies that the performance has not shown significant improvement in the absence of regulatory engagement of the BD audits between 2014 to 2023.

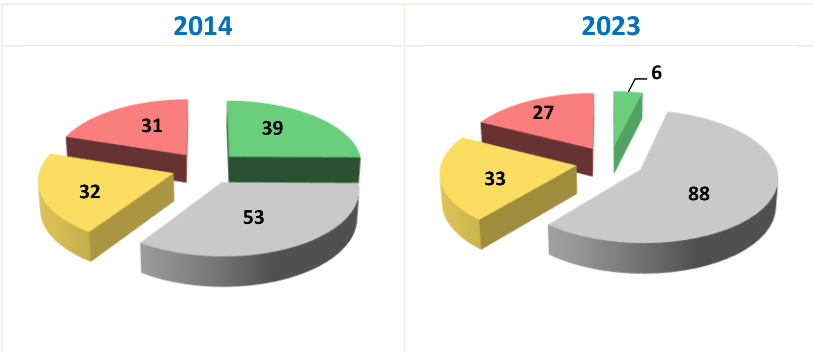


Figure 20 - No. WSSs in the Blue Drop score categories for 2014 and 2023 (graph legend to right)

≥95 – 100% Excellent	
≥80-<95% Good	
≥50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

Comparative analysis of the 2014 and 2023 blue drop scores, indicates that most of the system scores are in the >50-<80% (*Average Performance*) category, with the >31-<50% (*Poor Performance*) being the next largest category. It is concerning that 27 systems in 2023 reside in *Critical State* (<31%).

In summary, trend analysis since 2014 to 2023 indicate as follows:

- Systems in a ‘critical state’ decreased from 31 systems to 27 systems
- Systems in a ‘poor state’ increased slightly from 32 systems to 33 systems
- Systems in an ‘average state’ increased from 53 systems to 88 systems
- Systems in the ‘good state’ decreased from 39 systems to 6 systems
- Systems in the ‘excellent’ remained the same with zero systems.

Provincial BDRR Analysis

The Blue Drop Risk Rating (BDRR) analysis assesses the risk across the entire water supply network. The BDRR formular was updated in 2021 to include an added risk indicator, i.e. 'E: Water Safety Plans', to address the risk assessment requirements outlined in SANS 241 of 2015. The BDRR now contains 5 risk indicators, i.e. design capacity (A), operational capacity (B), water quality compliance (C), technical capacity (D), and water safety plans (E). The results from the BDRR analyses are summarised in the table and figure following.

Table 32 - Municipal BDRR/BDRRmax Comparative Analysis from 2022 and 2023

BDRR/BDRR$_{max}$ COMPARATIVE ANALYSIS									
WSA Name	# WSSs	# WBs/ WSPs	2022 (BD PAT)	2023 (BD Audit)	Performance Trend 2022 and 2023	BDRR Risk Category Split			
						0-<50%	50-<70%	70-<90%	90-100%
Alfred Nzo DM	7		47.1%	35.6%	↑	5	1		1
Amatole DM	37	7	53.2%	53.5%	↓	25	11	1	
Blue Crane Route LM	3		54.3%	53.0%	↑	1	2		
Buffalo City LM	10	5	31.6%	41.7%	↓	7	3		
Chris Hani DM	22		35.6%	39.0%	↓	14	8		
Dr Beyers Naude LM	10		59.2%	47.6%	↑	5	3	1	1
Joe Gqabi DM	14		35.0%	35.9%	↓	12	2		
Kouga LM	8	5	39.9%	28.5%	↑	8			
Koukamma LM	11		65.7%	62.8%	↑	5		1	5
Makana LM	3		89.1%	55.5%	↑	1	1	1	
Ndlambe LM	5	1	57.0%	34.9%	↑	4	1		
Nelson Mandela MM	1		31.9%	45.9%	↓	1			
OR Tambo DM	20		52.6%	46.5%	↑	9	9	2	
Sundays River Valley LM	3		67.8%	64.3%	↑	1	1	1	
Totals & %BDRR/BDRR$_{max}$	**154**	**18**	**51.6%**	**46.1%**	↑	**98**	**42**	**7**	**7**

↑= improvement, ↓= regress, →= no change

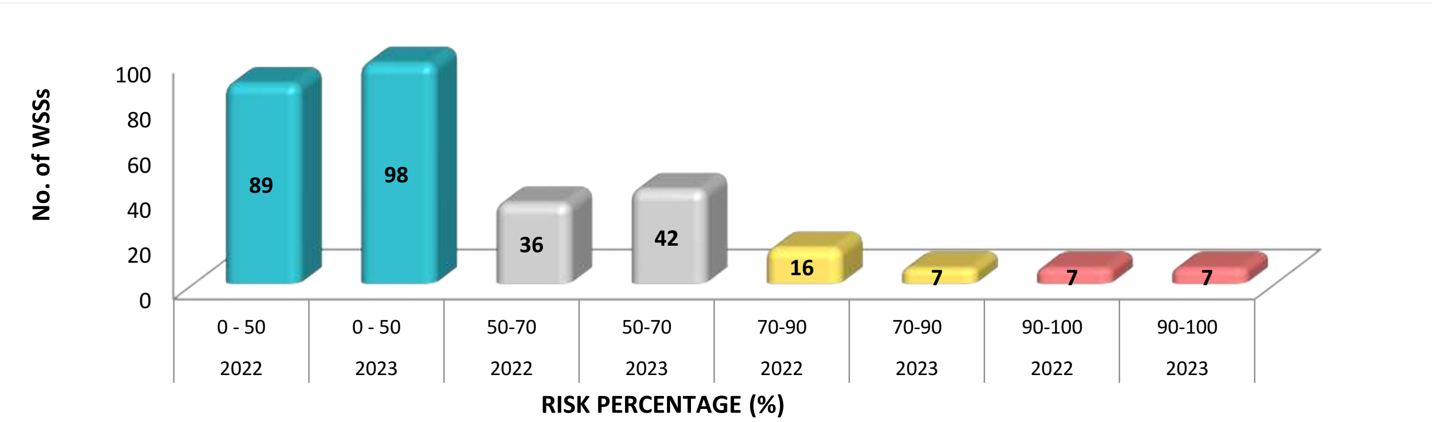


Figure 21 - a) WSS risk distribution and trends for 2022 and 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Trend analysis of the BDRR ratings for 2022 and 2023 indicates that:

- The 2023 audit cycle highlighted a slightly progressive shift with an increase in the no. of low risk WSSs (89 to 98), an increase in the medium risk WSSs (36 to 42), a decrease in the high risk WSSs (16 to 7), and the critical risks WSSs remained the same (7 each).

Regulatory Enforcement

Water supply systems which fail to achieve the minimum Blue Drop target of 31%, are placed under regulatory focus. The Regulator requires these WSAs to submit a detailed corrective action plan (CAP) within 20 working days from publishing of this report. 27 WSSs received Blue Drop scores below 31%, and hence are placed under **regulatory surveillance**, in accordance with the Water Services Act (108 0f 1997). DWS together with COGTA will, through the grant allocation systems ensure priority is given to application of grants to rectify/restore the water services treatment and supply shortcomings identified in this report.

Table 33 - WSSs with <31% Blue Drop scores

WSA Name	2023 BD Score	WSSs with <31% score
Alfred Nzo DM	**54.8%**	Kinira
Chris Hani DM	**45.3%**	Farms & Rural, Hofmeyer and Tarkastad
Dr Beyers Naude LM	**24.2%**	Aberdeen, Graaff-Reinet, Jansenville, Klipplaat, Nieu-Bethesda, Rietbron, Steytlerville, WaterFord, Willowmore and Wolwefontein
Koukamma LM	**24.1%**	Blikkiesdorp, Clarkson, Coldstream, Joubetina, Kareedouw, Krakeel, Louterwater, Misgund, Sanddrif, Storms River and Woodlands
Sundays River Valley LM	**25.6%**	Addo and Kirkwood

The following WSAs and their associated water treatment systems are in high and/or critical BDRR risk positions, which means that some or all the risk indicators are in a precarious state, i.e. operational capacity, design capacity utilisation, water quality compliance, technical capacity, and water safety plans. WTWs in high risk and critical risk positions pose a serious risk to public health. The following WSAs will be required to assess their risk contributors and to provide corrective measures in the above mentioned action plans to mitigate these risks.

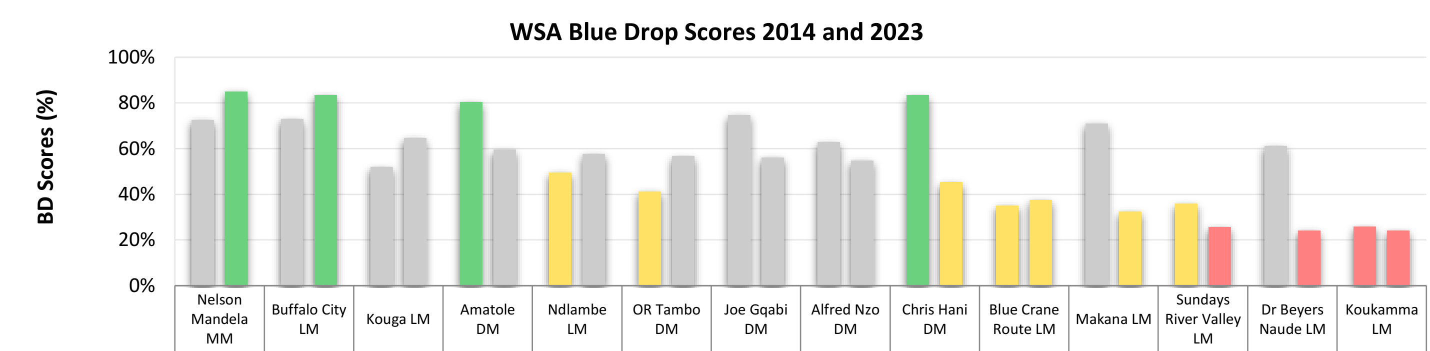
Table 34 - %BDRR/BDRR$_{max}$ scores and WSSs in critical and high-risk space

WSA Name	2023 Average %BDRR/BDRRmax	WSSs in critical and high-risk space	
		Critical Risk (90-100%)	**High Risk (70-<90%)**
Alfred Nzo DM	35.6%	Kinira	
Amatole DM	53.5%		Xhora
Dr Beyers Naude LM	47.6%	Waterford	Jansenville
Koukamma LM	62.8%	Clarkson, Joubetina, Krakeel, Misgund, Storms River	Louterwater
Makana LM	55.5%		Alicedale
OR Tambo DM	46.5%		Mhlanga, Umzimvubu
Sundays River Valley LM	64.3%		Kirkwood
Totals		**7 of 154 (5%)**	**7 of 154 (5%)**

Good practice risk management requires that the Water Safety Plans (WaSPs) are informed by meaningful Process and Condition Audits, supported by zealous implementation of corrective measures and ongoing monitoring of risk movement. With the exception of 14 water supply systems in the 7 WSAs above, the remaining water supply systems are in the low and medium risk positions.

Performance Barometer

The **Blue Drop Performance Barometer** presents the individual WSA Blue Drop Scores, which essentially reflects the level of mastery that a WSA has achieved in terms of its overall water services business. The bar chart below compares the 2014 and 2023 BD scores, ranked from highest to lowest performing WSA in 2023. The Nelson Mandela MM and Buffalo City LM are commended moving from an average performance in 2014 to a good performance in 2023 whilst the reverse is the case for Amatole DM and Chris Hani DM. The remaining 8 WSAs regressed to lower Blue Drop scores compared to their 2014 baselines.



	Nelson Mandela MM	Buffalo City LM	Kouga LM	Amatole DM	Ndlambe LM	OR Tambo DM	Joe Gqabi DM	Alfred Nzo DM	Chris Hani DM	Blue Crane Route LM	Makana LM	Sundays River Valley LM	Dr Beyers Naude LM	Koukamma LM
2014 BD Score (%)	72,4%	72,8%	51,8%	80,2%	49,5%	41,2%	74,7%	62,9%	83,4%	35,1%	70,8%	36,0%	61,1%	25,8%
2023 BD Score (%)	85,0%	83,5%	64,6%	59,5%	57,6%	56,7%	56,0%	54,8%	45,3%	37,4%	32,5%	25,6%	24,2%	24,1%

Figure 22 - a) Blue Drop scores 2014 (bar left) and 2023 (bar right; b) Colour legend

>95 – 100% Excellent	
>80-<95% Good	
>50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

The BDRR Risk Barometer expresses the level of risk that a WSA poses in respect of its water supply system. The schematic below presents the BDRR in ascending order – with the low-risk WSAs on the left and higher risk WSAs to the far right. The analysis reveals that there are 5 medium risk WSAs in the province. 9 WSAs are situated in the low risk positions.

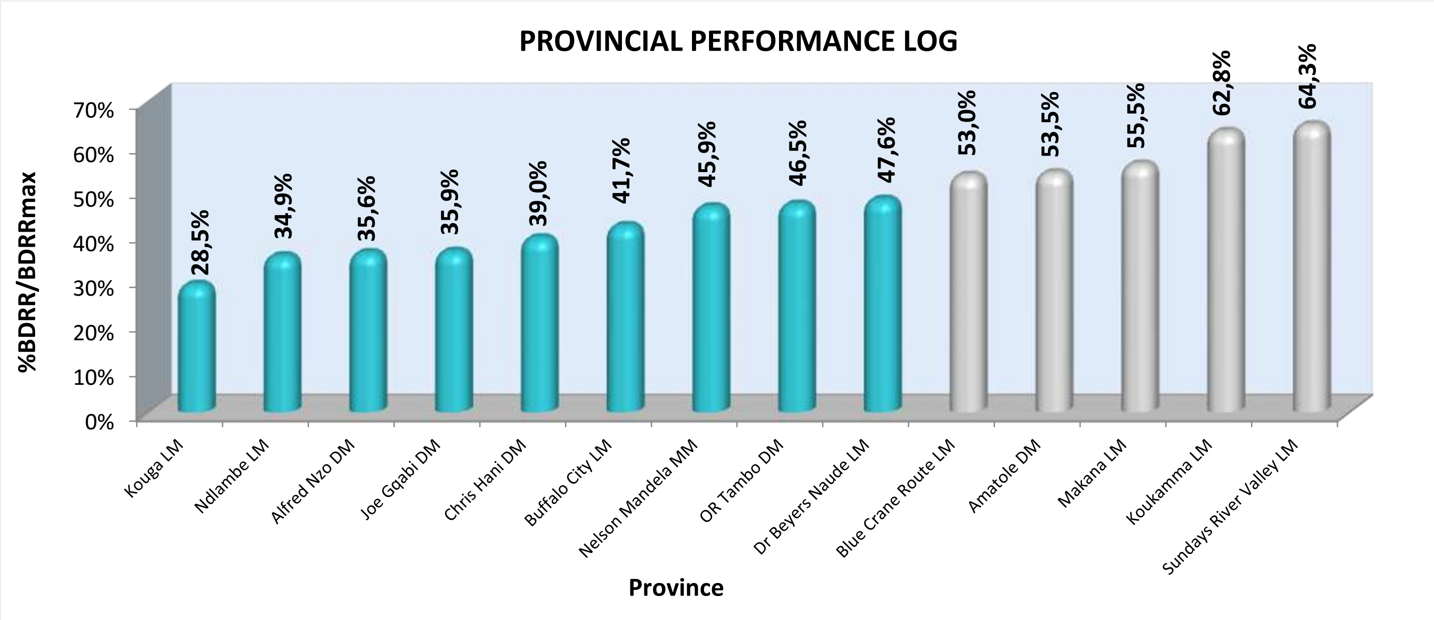


Figure 23 - a) %BDRR/BDRR$_{max}$ Risk Performance Profile/Log 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Provincial Best Performers

The **Nelson Mandela Bay Metropoltan Municipality** is the **BEST PERFORMING WSA** in the province, based on the following record of excellence:

- ✓ 2023 Blue Drop Score of 85.0%
- ✓ 2014 Blue Drop Score of 72.4%
- ✓ No improvement on the BDRR from 31.9% in 2022 to 45.9% in 2023
- ✓ 1 system (100%) in the low risk position
- ✓ TSA score of 87% for Linton WTW

The **Buffalo City Local Municipality (Amatola Water)** is the second-best scoring WSA:

- ✓ 2023 Blue Drop Score of 83.5%
- ✓ 2014 Blue Drop Score of 72.8%
- ✓ No improvement on the BDRR from 31.6% in 2022 to 41.7% in 2023
- ✓ 7 systems (70%) in low risk position
- ✓ TSA score of 85% for Umzonyana WTW

The **Kouga Local Municipality (NMB MM)** is the third-best scoring WSA:

- ✓ 2023 Blue Drop Score of 64.6%
- ✓ 2014 Blue Drop Score of 51.8%
- ✓ Improvement on the BDRR from 39.9% in 2022 to 28.5% in 2023
- ✓ 8 systems (100%) in low risk positions
- ✓ TSA score 91% for Jeffreys Bay WTW

KPA Diagnostics

The BD audit process collects a vast amount of data that yield valuable insight into the state of the water services delivery and water quality in each province. Five focus areas or 'diagnostics' have been configured from the 2021/22 audit data and are discussed below.

Table 35 - Summary of the key diagnostic themes and reference to the respective Blue Drop KPAs

Diagnostic #	Diagnostic Description	Diagnostic Reference
1	**Technical Competence**	KPA 1, 2 & Bonus
2	**Treatment Capacity and Flow Distribution**	KPA 4 & Generic Audit data set
3	**Drinking Water Quality (DWQ) Monitoring and Compliance**	KPA 2 & 4 & Bonus
4	**Technical Site Assessments**	TSA and 2023 Blue Drop Watch Report
5	**Operation, Maintenance and Refurbishment of Assets**	KPA 3 & 4

Diagnostic 1: Technical Competence

Aim: This focus area assesses the technical human resources capacity that is available to manage and operate water treatment processes and maintain the related water infrastructure. Theory advocates that a correlation exists between human resources capacity and capability (sufficient number of appropriately qualified staff) and a WSI's performance. Thus, it is hypothesised that high HR capacity would translate to compliant water treatment plants and functional water supply network. Blue Drop assesses technical compliance on two levels: i) WTW plant supervision and process control staff and ii) Technical, scientific and maintenance staff.

(i) Plant Supervisors and Process Controllers

Findings: According to regulations, water treatment plants are classified as Class A, B, C, D or E plants. Similarly, Process Controllers and Plant Supervisors are registered as Class I, II, III, IV, V or VI Process Controllers. Higher classed plants require a higher level of Process Controllers due to technology complexity and strict water quality standards. Technical compliance of PCs and Supervisors is determined against the Blue Drop standards, as defined by Reg. 2834 of the Water Act 1956 (Act 54 of 1956) for the erection, enlargement, operation, and registration of water care works and draft Reg. 813 of the Water Services Act (No 108 of 1997). Regulation 2834 has been replaced by Regulation 3630 in 2023 but will only come in effect during the next Blue Drop audit cycle.

Table 36 - No. compliant versus shortfall in Supervisor and Process Controller staff

WSA & WB Name	# WTWs	# WSSs	# Available Compliant Staff			Staff Shortfall		Ratio*	2023 BD Score (%)
			PCs	Supervisor**	Total	PCs	Supervisor		
Amatola Water	9	12	38	14	52	3	0	5.8	**63.76% ave**
Alfred Nzo DM	7	7	9	4	13	13	4	1.9	**54.8%**
Amatole DM	30	37	94	44	138	8	0	4.6	**59.5%**
Blue Crane Route LM	4	3	9	3	12	4	0	3.0	**37.4%**
Buffalo City LM	5	10	10	6	16	4	0	3.2	**83.5%**
Chris Hani DM	84	22	31	72	103	221	1	1.2	**45.3%**
Dr Beyers Naude LM	11	10	2	3	5	26	1	0.5	**24.2%**
Joe Gqabi DM	16	14	26	55	81	23	0	5.1	**56.0%**
Kouga LM	5	8	2	0	2	14	2	0.4	**64.6%**
Koukamma LM	11	11	21	9	30	4	0	2.7	**24.1%**
Makana LM	4	3	13	4	17	0	0	4.3	**32.5%**
Ndlambe LM	5	5	8	8	16	7	0	3.2	**57.6%**
Nelson Mandela MM	8	1	14	34	48	14	0	6.0	**85.0%**
OR Tambo DM	20	20	15	9	24	56	0	1.2	**56.7%**
Sundays River Valley LM	3	3	1	0	1	10	3	0.3	**25.6%**
Totals	**222**	**154**	**293**	**265**	**506**	**407**	**11**		

** Ratio depicts the no. of qualified staff divided by the no. of WTWs operated by this no. of staff. E.g., Alfred Nzo DM has 13 compliant Sups + PCs, divided by 7 WTWs = 1.9 qualified staff per WTW*

** NB: The Supervisor totals will be inflated as it is not possible to differentiate between which Supervisors are shared/ roaming with other Class C to E WTWs

Note: "Compliant staff" means qualified and registered staff that meets the BD standard for a particular Class Works. "Staff shortfall" means staff that do not meet the BD standard for a particular Class of works (+1 for a shift) and/or staffing gaps exist at the respective WTWs.

Competent human resources are vital enablers in ensuring efficient and sustainable management of water services and delivery of safe water quality to consumers. For the province in general, the operational competencies are found to be excellent for the Supervisory staff of Amatola Water and 9 of the 14 WSAs but the same cannot be said for the PC staff with the exception for Makana LM, as illustrated in the table above.

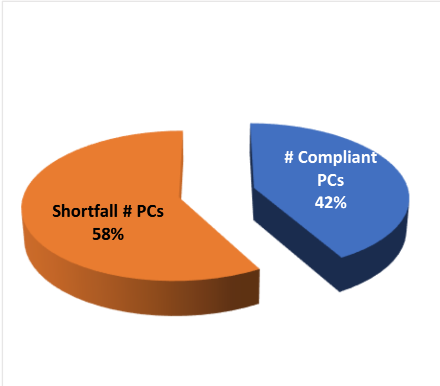


Figure 24 - Schematic illustration of compliant and shortfall of Supervisors (a) and Process Controllers (b)

Plant Supervisors: The pie charts indicate that 96% (265 of 276) of Plant Supervisors complies with the Blue Drop standard, with 11 shortfalls.

Process Controllers: Similarly, 42% (293 of 700) of the PC staff complies with the required standards, noting a zero shortfall for Makana LM only. There is a 58% (407 of 700) shortfall in Process Controllers with the highest shortfall in the Chris Hani DM and OR Tambo DM, Joe Gqabi DM, and Dr Beyers Naude LM.

Blue Drop standards require of Class A and B plants to employ dedicated Supervisors per WTW and Process Controllers per shift per works, whereas Class C to E plants may share Supervisory staff only across works. Shifts have been introduced to ensure optimal operations while addressing security risks, particularly as it relates to theft and vandalism. Telemetry also reduces the requirement for on-site staff during night shifts, but these relaxations have to be done within the DWS regulatory guidelines.

The Regulator expects correlation between the competence of an operational team and the performance of a WTW, as measured by the BD score. The data indicates as follows:

- All the WSAs have qualified PCs in place. However, Amatola Water and all the WSAs have shortfalls with the exception of Makana LM.
- All the WSAs have qualified Supervisors in place with the exception of Kouga LM and Sundays River Valley LM. It must be noted that the Supervisor totals are inflated as it is not possible to differentiate between which Supervisors are shared/ roaming with other Class C to E WTWs

It is expected that a correlation would exist between the competence of an operational team and the performance of a water treatment works, as measured by the BD score. The results from the ratio analysis indicate high ratios ($\geq$3.0) for Amatola Water and 7 WSAs with WTWs.

Overall, the comparative bar chart on the following page confirms a reasonably close correlation between Amatola Water and the WSAs from Nelson Mandela MM to Ndlambe LM with high ratios (ranging from 3.2 to 6.0) and average to high BD scores (ranging from 56% to 85%) with the anomaly being Makana LM who had no qualified Supervisor and PC staff shortages. Other variations are noted for Alfred Nzo DM, OR Tambo DM and Kouga LM when comparing the ratios against the BD scores respectively.

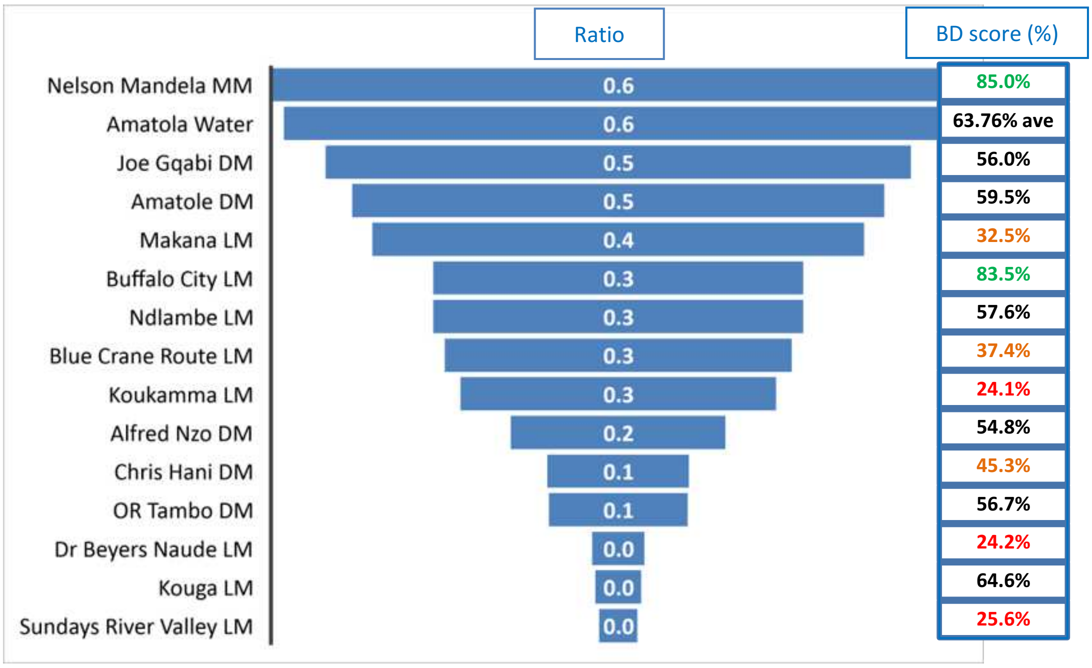


Figure 25 - Ratio of compliant operational staff to no. of WTWs and Comparison of Ratios with BD scores

(ii) Technical, Scientific and Maintenance staff

In addition to operational capacity (above), good management practice also requires access to qualified engineers, technicians, technologists, MISA appointees, scientists, and maintenance capability (below). Such competencies could reside in-house or accessible through term contracts and external specialists.

Table 37 - Summary of the maintenance capacity and no. of qualified and shortfall of Engineering, Technical and Scientific staff

WSA & WB Name	# WTWs	# WSSs	Maintenance Arrangement
Amatola Water	9	12	Internal+Specific Outsourcing
Alfred Nzo DM	7	7	Internal+Term Contract, Internal Team (Only)
Amatole DM	30	37	Internal+Specific Outsourcing
Blue Crane Route LM	4	3	Internal+Term Contract, Internal Team (Only), Internal+Specific Outsourcing
Buffalo City LM	5	10	Internal Team (Only), Internal+Specific Outsourcing
Chris Hani DM	84	22	Partially Capacitated, Internal+Term Contract, Internal Team (Only), Internal+Specific Outsourcing
Dr Beyers Naude LM	11	10	Internal+Term Contract, Internal Team (Only)
Joe Gqabi DM	16	14	Internal+Specific Outsourcing
Kouga LM	5	8	Internal+Term Contract, Internal+Specific Outsourcing
Koukamma LM	11	11	Internal+Term Contract
Makana LM	4	3	Internal Team (Only)
Ndlambe LM	5	5	Internal+Term Contract, Internal+Specific Outsourcing
Nelson Mandela MM	8	1	Internal+Specific Outsourcing
OR Tambo DM	20	20	Internal+Term Contract, Internal+Specific Outsourcing
Sundays River Valley LM	3	3	Internal+Specific Outsourcing
Totals	**222**	**154**	

WSA & WB Name	# WTWs	# WSSs	Qualified Technical Staff (#)					Technical Shortfall (#)	Qualified Scientists (#)	Scientists Shortfall (#)	Ratio *	2023 BD Score (%)
			Technicians	Technologists	Engineers	MISA appointees	Total					
Amatola Water	9	12	1	3	1	0	**5**	0	2	0	0.4	**63.76% ave**
Alfred Nzo DM	7	7	2	1	0	1	**4**	1	0	2	0.6	**54.8%**
Amatole DM	30	37	1	1	1	0	**3**	1	1	1	0.1	**59.5%**
Blue Crane Route LM	4	3	1	1	0	0	**2**	2	0	2	0.7	**37.4%**
Buffalo City LM	5	10	3	9	1	0	**13**	0	4	0	1.3	**83.5%**
Chris Hani DM	84	22	8	7	0	0	**15**	1	3	0	0.7	**45.3%**

WSA & WB Name	# WTWs	# WSSs	Qualified Technical Staff (#)					Technical Shortfall (#)	Qualified Scientists (#)	Scientists Shortfall (#)	Ratio *	2023 BD Score (%)
			Technicians	Technologists	Engineers	MISA appointees	Total					
Dr Beyers Naude LM	11	10	4	0	0	0	**4**	1	0	2	0.4	**24.2%**
Joe Gqabi DM	16	14	1	1	0	0	**2**	2	1	1	0.1	**56.0%**
Kouga LM	5	8	2	4	1	1	**8**	0	6	0	1.0	**64.6%**
Koukamma LM	11	11	1	0	0	1	**2**	3	0	2	0.2	**24.1%**
Makana LM	4	3	3	0	1	0	**4**	0	0	2	1.3	**32.5%**
Ndlambe LM	5	5	0	2	1	0	**3**	1	0	2	0.6	**57.6%**
Nelson Mandela MM	8	9	1	7	1	0	**9**	0	6	0	9.0	**85.0%**
OR Tambo DM	20	20	1	4	0	0	**5**	1	3	0	0.3	**56.7%**
Sundays River Valley LM	3	3	1	0	1	0	**2**	2	0	2	0.7	**25.6%**
Totals	**222**	**154**	**30**	**40**	**8**	**3**	**81**	**15**	**26**	**16**		

* The single number ratio depicts the no. of qualified technical staff divided by the no. of WSSs that have access to the staff. E.g., Buffalo City LM has 13 qualified staff, divided by 10 WSSs = 1.3 qualified staff per WSS

Note 1: "Qualified Technical Staff" means staff appointed in positions to support water services, and who has the required qualifications. "Technical Shortfall" is calculated based on a minimum requirement of at least 3 Engineers or more than 1 of each of Engineers, Technologists & Technicians; and at least one 1 Candidate Scientist and 1 Professional Scientist per WSI.

Note 2: "Qualified Scientists" means professional registered scientists (SACNASP) and candidate scientists appointed in positions to support water services. "Scientists shortfall" means that the WSA does not have at least one qualified SACNASP registered scientist and at least one 1 candidate scientist in their employ or contracted.

In terms of maintenance capacity, all the municipalities in the province have a reasonable contingent of qualified technical and maintenance staff. The maintenance staff comprises of a collective of in-house, contracted, or outsourced personnel. The data indicates that:

- Amatola Water has internal maintenance teams supplement with specific outsourced services
- 6 of 14 (43%) WSAs have in-house maintenance teams
- 8 of 14 (57%) WSAs have internal maintenance teams supplemented with term contracts
- 10 of 14 (71%) WSAs have internal maintenance teams supplement with specific outsourced services.

In general, the province presents a strong case for qualified professional technical staff as follows:

- A total of 81 qualified staff comprised of 8 Engineers, 40 Technologists, 30 Technicians, 3 MISA appointees (qualified); and 26 SACNASP registered scientists are assigned to Amatola Water and 7 WSAs
- A total shortfall of 31 persons is identified, consisting of 15 technical staff and 16 scientists
- 10 WSAs have a total shortfall of 15 qualified technical staff with the highest indicated for Koukamma LM (3), and Blue Crane LM, Joe Gqabi DM, and Sundays River Valley LM (2 each)
- Amatola Water and all 14 WSAs have access to credible laboratories that comply with the Blue Drop standards, but 2 non-accredited laboratories are operating in 2 WSAs for some of their systems.

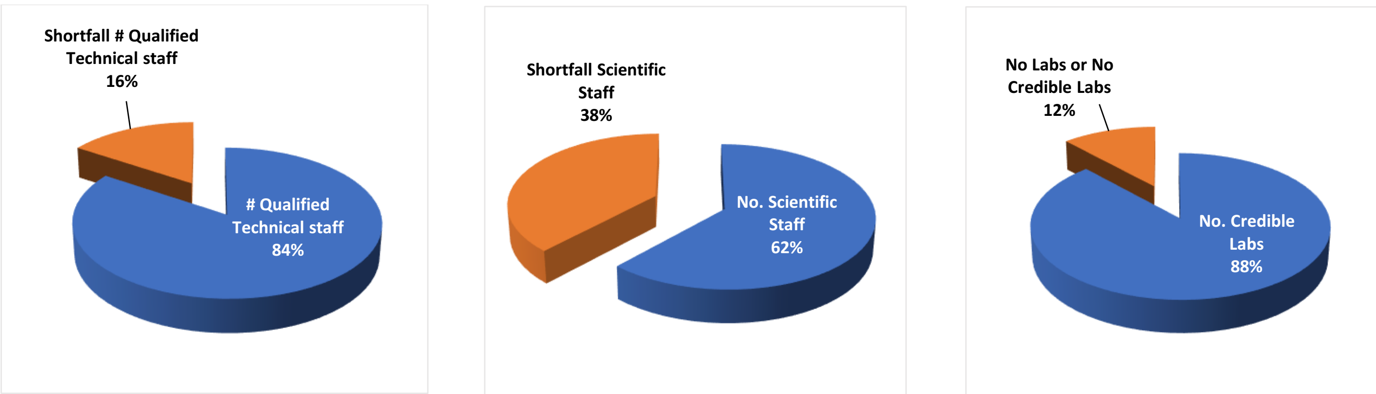


Figure 26 - Graphic illustration of the number and %: a) qualified engineering/technical staff; b) professional scientists; c) access to credible laboratory services that complies with Blue Drop standards

Ratio analysis has been done to determine the number of qualified technical and scientific staff assigned per WSS. It is expected that a higher ratio would correspond with well-performing and maintained water supply systems, as represented by the BD score.

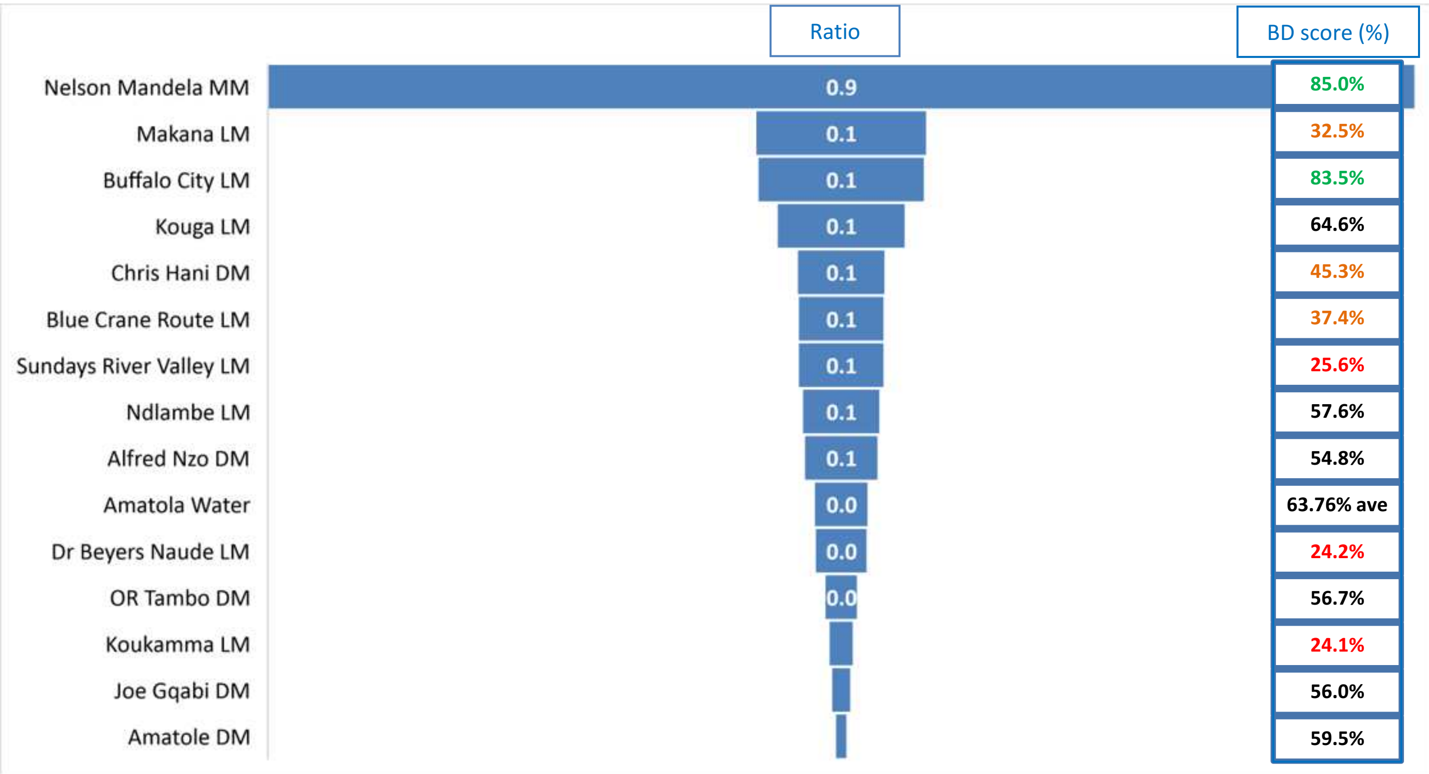


Figure 27 - Ratio of compliant technical staff to no. of WSSs and Comparison of Ratios with BD scores

The schematic above does show a strong correlation between high ratios (≥1.0) and average to high BD scores for Kouga LM to Nelson Mandela MM (ranging from 65% to 80%) with the anomaly being Makana LM. With some exceptions, no firm correlation can be drawn between technical capacity and water supply performance, mostly as result of the complexity of the WSA/Bulk Water Provider arrangement.

Overall, the results highlight the inter-dependency between technical capacity and performance. One of the options to enhance operational capacity is through dedicated training programmes. The Blue Drop audit incentivises training of operational staff over the 2-year period prior to the audit date. The results are summarised as follows:

Table 38 - No. of WTWs with operational staff sent on training over the past 2 years and vice versa

WSA & WB Name	# WTWs	# WTW staff attending training	# WTW without training
Amatola Water	9	5	4
Alfred Nzo DM	7	2	5
Amatole DM	30	23	7
Blue Crane Route LM	4		4
Buffalo City LM	5	4	1
Chris Hani DM	84	5	79
Dr Beyers Naude LM	11	2	9
Joe Gqabi DM	16	2	14
Kouga LM	5		5
Koukamma LM	11		11
Makana LM	4		4
Ndlambe LM	5	2	3
Nelson Mandela MM	8	7	1
OR Tambo DM	20	14	6
Sundays River Valley LM	3		3
Totals	**222**	**66 (30%)**	**156 (70%)**

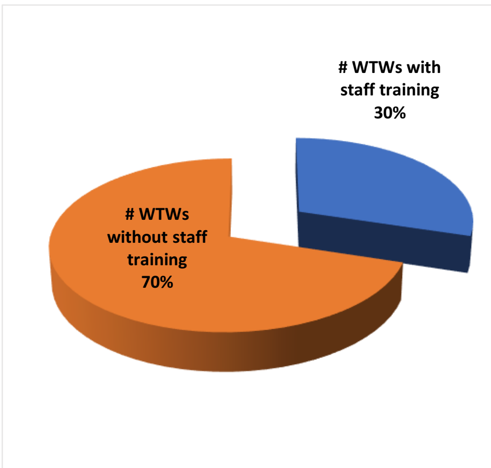


Figure 28 - %WTWs that have trained operational staff over the past two years

The results confirm that Amatola Water and 9 WSAs had their operational staff attend training over the past 2 years. 66 of 222 WTWs and boreholes had their operational staff attend training over the past 2 years. Investment in human capital through technical skills development is likely to mitigate some of the water quality failures and lower performances noted, and municipalities and water boards should prioritise ongoing skills development of technical staff and appointment of qualified staff that are legible for registration.

Diagnostic 2: Treatment Capacity and Flow Distribution

Aim: Diagnostic 2 deals with design and flow related dynamics, comprising of: i) design capacity and operational flow, ii) raw water abstraction, and iii) WUE and SIV.

(i) Design Capacity and Operational Flow

This diagnostic assesses the status of plant design capacity and daily water production at the WTWs, as well as SIVs as measured at the outflow from the WTW or inflow to the water distribution network. A capable WTW requires adequate installed design capacity and functional equipment to operate optimally. If the WTW design capacity is exceeded by the average daily production (treatment) volume, the WTW will not be able to deliver SANS compliant water quality. The available design capacity is typically exceeded when the water demand exceeds the installed design capacity, or when unit processes or equipment are dysfunctional, or when electrical supply problems render treatment and pumping of water defective. Typically, the production volume and SIV is the same if 1 WTW supplies 1 WSS, but different if multiple supply systems are feeding from a singular WTW.

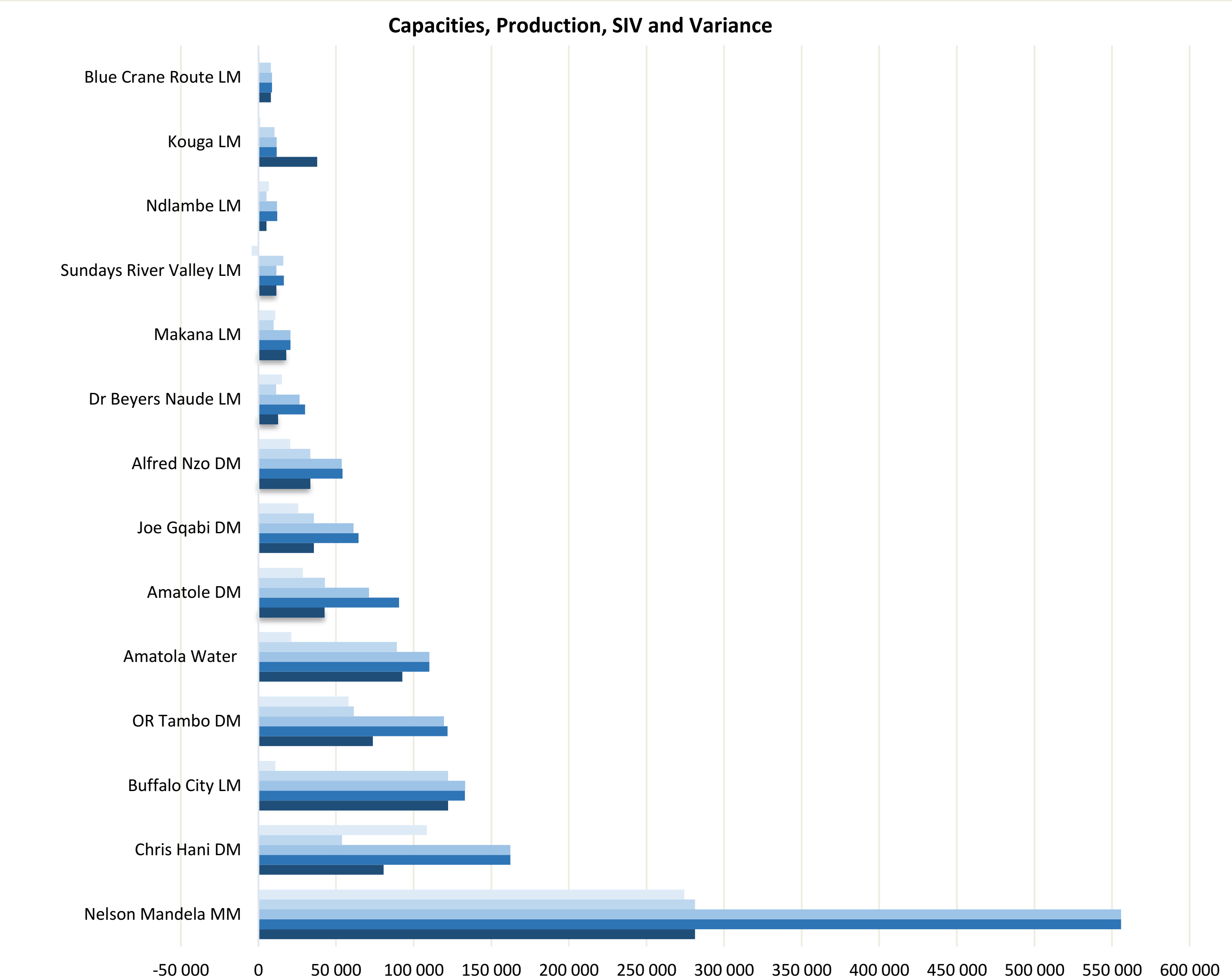
Findings: Analysis of the design capacity and average daily production/ treatment volume indicate a total design capacity of 1,397,705 kl/d for the province, with a total average daily treatment (operational) volume of 785,210 kl/d. Theoretically, this implies that 56% of the design capacity is used with 44% available to meet additional water demand. However, the full 1,397,705 kl/d is not available as some infrastructure is dysfunctional, leaving 1,361,225 kl/d available. The reduced capacity means that the province is closer to its total available capacity (58%) with a 42% surplus available. The capacity differential (difference between the installed and available capacity) will not constrain or impede any further social and economic development in the drainage areas. WSAs do report and have knowledge of their installed and available capacities, and a higher figure than 42% surplus available cannot be expected.

Most of the WSAs have their full installed capacity available. For the province in general, 214 WTWs are operating within their design capacities with the exception of 8 WTWs that exceeds their total design capacity (4%). This risk is currently mitigated through operational optimisation and preventative maintenance regimes.

Table 39 - Summary of WTWs design and available capacities, average daily production, % available capacity, and total SIV towards the WSSs

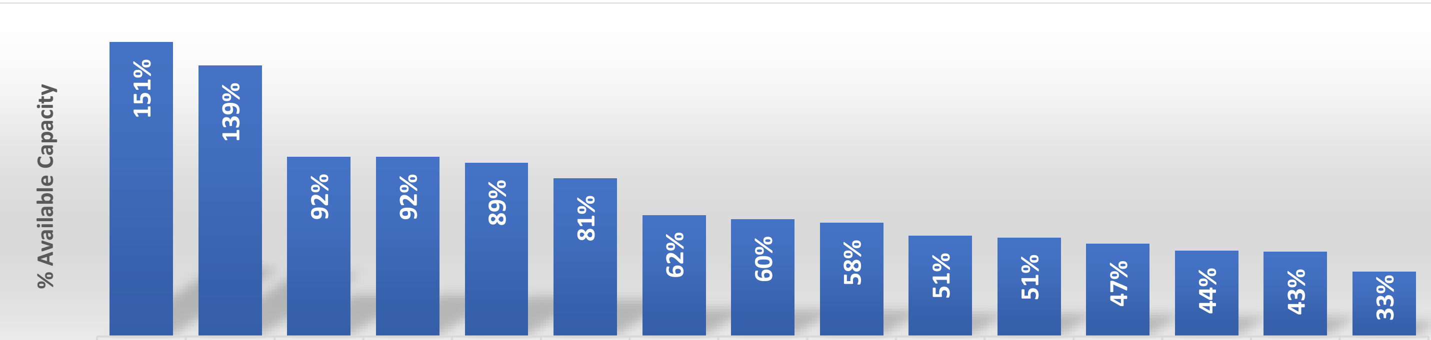
WSA & WB Name	# WTWs	# WSSs	Design Capacity (kl/d)	Available Design Capacity (kl/d)	Average Daily Production (kl/d)	Available Variance* (kl/d)	% Use Available Capacity	Total SIV towards the WSS (kl/d)
Amatola Water	9	12	110,200	110,200	89,140	21,060	81%	92,679
Alfred Nzo DM	7	7	54,120	53,720	33,361	20,359	62%	33,361
Amatole DM	30	37	90,504	71,276	42,758	28,518	60%	42,680
Blue Crane Route LM	4	3	8,700	8,700	7,996	704	92%	7,996
Buffalo City LM	5	10	133,021	133,122	122,252	10,870	92%	122,252
Chris Hani DM	84	22	162,293	162,295	53,809	108,486	33%	80,564
Dr Beyers Naude LM	11	10	29,990	26,480	11,446	15,034	43%	12,493
Joe Gqabi DM	16	14	64,405	61,323	35,650	25,673	58%	35,694
Kouga LM	5	8	11,700	11,700	10,400	1,300	89%	37,900
Koukamma LM	11	11	6,013	3,029	4,565	-1,536	151%	4,642
Makana LM	4	3	20,600	20,600	9,780	10,820	47%	17,780
Ndlambe LM	5	5	12,150	11,930	5,222	6,708	44%	5,221
Nelson Mandela MM	8	1	555,750	555,750	281,350	274,400	51%	281,358
OR Tambo DM	20	20	121,900	119,600	61,532	58,068	51%	73,732
Sundays River Valley LM	3	3	16,359	11,500	15,949	-4,449	139%	11,500
Totals	**222**	**154**	**1,397,705**	**1,361,225**	**785,210**	**576,015**	**58%**	**859,852**

* Difference between the available design capacity and the average daily production



	Nelson Mandela MM	Chris Hani DM	Buffalo City LM	OR Tambo DM	Amatola Water	Amatole DM	Joe Gqabi DM	Alfred Nzo DM	Dr Beyers Naude LM	Makana LM	Sundays River Valley LM	Ndlambe LM	Kouga LM	Blue Crane Route LM
Available Variance (kl/d)	274 400	108 486	10 870	58 068	21 060	28 518	25 673	20 359	15 034	10 820	-4 449	6 708	1 300	704
Ave. Daily Production (kl/d)	281 350	53 809	122 252	61 532	89 140	42 758	35 650	33 361	11 446	9 780	15 949	5 222	10 400	7 996
Available Design Capacity (kl/d)	555 750	162 295	133 122	119 600	110 200	71 276	61 323	53 720	26 480	20 600	11 500	11 930	11 700	8 700
Design Capacity (kl/d)	555 750	162 293	133 021	121 900	110 200	90 504	64 405	54 120	29 990	20 600	16 359	12 150	11 700	8 700
Total SIV (kl/d)	281 358	80 564	122 252	73 732	92 679	42 680	35 694	33 361	12 493	17 780	11 500	5 221	37 900	7 996

Figure 29 - Design and available capacity, average daily production, available variance and total SIV for the WTWs



	Koukamma LM	Sundays River Valley LM	Blue Crane Route LM	Buffalo City LM	Kouga LM	Amatola Water	Alfred Nzo DM	Amatole DM	Joe Gqabi DM	OR Tambo DM	Nelson Mandela MM	Makana LM	Ndlambe LM	Dr Beyers Naude LM	Chris Hani DM
% AC	151%	139%	92%	92%	89%	81%	62%	60%	58%	51%	51%	47%	44%	43%	33%

Figure 30 - % available capacity

(ii) Raw Water Abstraction

This diagnostic takes a snapshot view of the status of water abstraction authorisations from natural water resources across the province. As per the National Water Act (Act no 36 of 1998), Water Use Authorisation (WUA) mandate the maximum abstraction volumes of raw water, and the installation and monitoring of abstraction, inflow, and outflow meters, whilst the BD audit requires WSAs to report the flows on IRIS and to calibrate meters annually. Any defects in terms of abstracting water from a resource without an authorisation, or exceeding the authorised volume, or reporting inaccurate volumes, or not monitoring abstraction against authorised volumes, are considered to be a regulatory risk and contravention of the law.

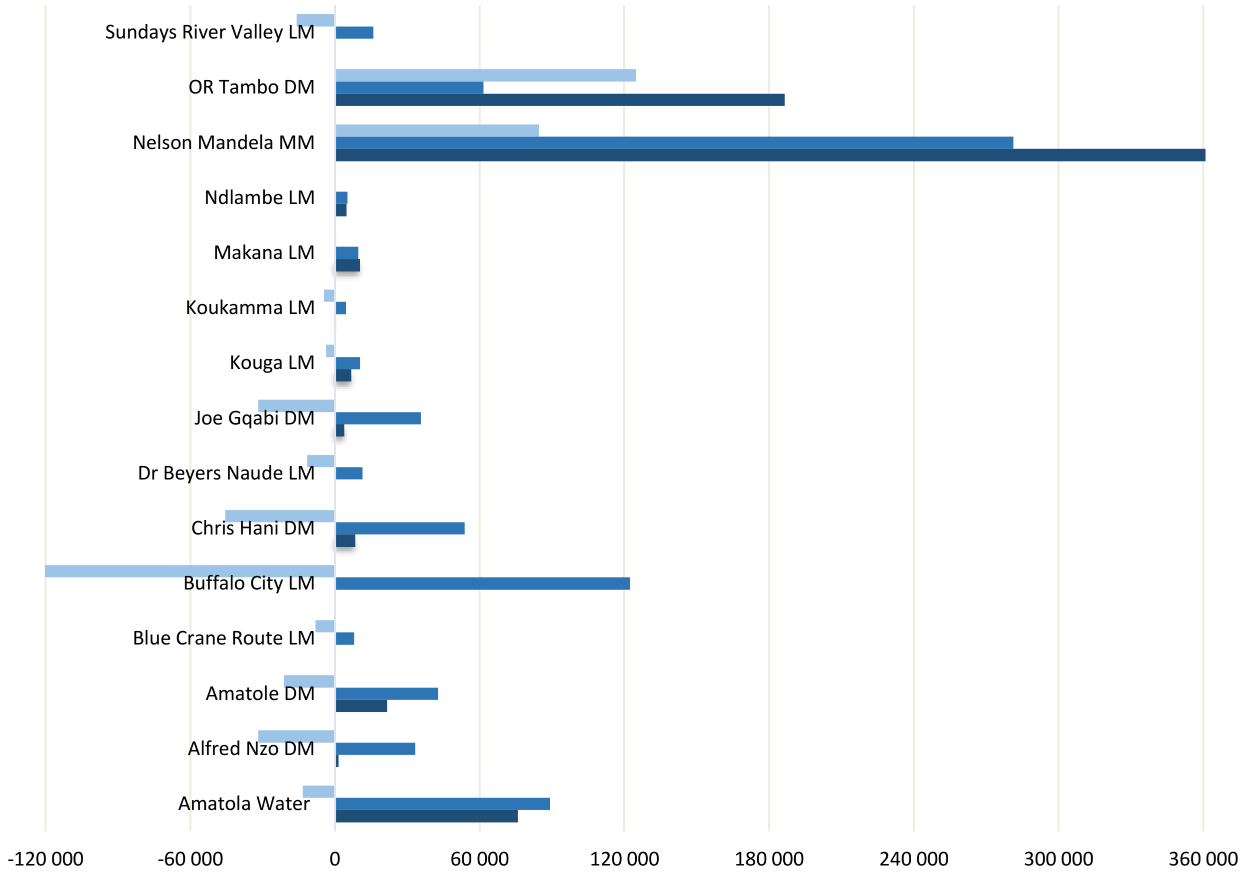
Findings: Data pertaining to the daily abstraction volumes (kl/d) (Authorised), average daily treatment volumes (kl/d), the names of the WTWs exceeding/with no Daily Abstraction Volumes (Authorised) and Average Daily Treatment Volumes (Authorised) is captured in the tables below.

Table 40 - Summary of Abstraction Volumes (Authorised), Average Daily Treatment Volumes, Variances & WTWs listed For Enforcement Action

WSA & WB Name	# WTWs	# WSSs	Daily Abstraction Volumes (Authorised) (kl/d)	Average Daily Treatment Volume (kl/d)	Average Variance (kl/d) [+ or Minus]
Amatola Water	9	12	75,807	89,140	-13,333
Alfred Nzo DM	7	7	1,522	33,361	-31,839
Amatole DM	30	37	21,606	42,758	-21,153
Blue Crane Route LM	4	3	0	7,996	-7,996
Buffalo City LM	5	10	0	122,252	-122,252
Chris Hani DM	84	22	8,350	53,809	-45,459
Dr Beyers Naude LM	11	10	0	11,446	-11,446
Joe Gqabi DM	16	14	3,836	35,650	-31,815
Kouga LM	5	8	6,659	10,400	-3,741
Koukamma LM	11	11	0	4,565	-4,565
Makana LM	4	3	10,200	9,780	420
Ndlambe LM	5	5	4,870	5,222	-352
Nelson Mandela MM	8	1	365,975	281,350	84,625
OR Tambo DM	20	20	186,403	61,532	124,871
Sundays River Valley LM	3	3	0	15,949	-15,949
Amatola Water	9	12	75,807	89,140	-13,333
Totals	**222**	**154**	**685,227**	**785,210**	**-99,983**

WSA Name	WTW exceeding the Daily Abstraction Volumes (Authorised)	WTW with no Daily Abstraction Volumes (Authorised)
Alfred Nzo DM	1 WTW	4 WTW
Amatole DM	4 WTWs	19 WTWs
Blue Crane Route LM		4 WTWs
Buffalo City LM	2 WTWs	6 WTWs
Chris Hani DM	1 WTW	82 WTWs
Dr Beyers Naude LM		11 WTWs
Joe Gqabi DM	2 WTWs	11 WTWs
Kouga LM	2 WTWs	2 WTWs
Koukamma LM		11 WTWs
Makana LM		3 WTWs
Ndlambe LM		3 WTWs
OR Tambo DM		9 WTWs
Sundays River Valley LM		3 WTWs
Totals	**12**	**168**

Abstraction Volumes (Authorised), Ave. Treatment volumes, and Variances



	Amatola Water	Alfred Nzo DM	Amatole DM	Blue Crane Route LM	Buffalo City LM	Chris Hani DM	Dr Beyers Naude LM	Joe Gqabi DM	Kouga LM	Koukamma LM	Makana LM	Ndlambe LM	Nelson Mandela MM	OR Tambo DM	Sundays River Valley LM
Ave. Variance (kl/d)	-13 333	-31 839	-21 153	-7 996	-122 252	-45 459	-11 446	-31 815	-3 741	-4 565	420	-352	84 625	124 871	-15 949
Ave. Daily Treatment (kl/d)	89 140	33 361	42 758	7 996	122 252	53 809	11 446	35 650	10 400	4 565	9 780	5 222	281 350	61 532	15 949
Daily Abstraction (kl/d)	75 807	1 522	21 606	0	0	8 350	0	3 836	6 659	0	10 200	4 870	365 975	186 403	0

Figure 31 - Abstraction Volumes (Authorised), Average Daily Treatment Volumes, and Variances

WTWs that exceed the Daily Abstraction Volumes (Authorised) and WTWs with no Daily Abstraction Volumes (Authorised) are reflected in the 2nd table above. WTWs that are not complying with the regulations will be required to show correction in the next Blue Drop audit cycle. The results conclude that 12 WTWs are exceeding the permitted abstraction limits and 54 WTWs provided authorised water use abstraction volumes. The Daily Abstraction Volumes (Authorised) are not known for 168 water treatment systems resulting in negative average variances that skew the data sets. Negative average variances could also be attributed to over abstraction.

For future BD audits, WSA/WSPs will be required to provide 'actual' abstraction volumes so that a comparative analysis can be undertaken of the 'actual' abstraction volume versus the authorised water use abstraction volumes (maximum). This would require that the WSAs and WSPs/WBs monitor and record all critical path flows (abstraction, raw and final).

(iii) Water Use Efficiency and System Input Value

The Department is committed to consider issues related to water scarcity and security, aiming to ensure there is sufficient water for the population, the economy, and the environment by increasing water use efficiency across all sectors. Water use for services sectors is specifically dealing with the quantity of water used directly by the consumer through the public distribution network and industries connected to the network.

This diagnostic assesses the water use efficiency (i.e., the average daily consumption in litres per person per day) and the individual and collective performance of the water supply systems. WUE indicates how effective water is used by consumers, i.e. the process between effective water use and actual water abstraction. This concept is closely related to the Department's No Drop Certification assessment, whereby WUE, NRW and water losses are targeted as part of Water Conservation and Water Demand Management strategies by municipalities.

Findings: Both the Blue Drop audit and No Drop audit requires an IWA water balance to determine the SIV into each water supply system, and to identify and quantify possible losses from abstraction to the end-of-use point. Amatola Water and 7 WSAs have full water balances in place for 62 WSSs in total. 54 WSSs in 5 WSAs have partial water balances in place, and 8 WSAs with a total of 38 WSSs do not have water balances in place.

WUE is calculated based on the SIV contributions, population served, and the average daily consumption, as summarised in the following table.

Table 41 - Summary of total SIV, total population served, average daily consumption, WUE status and performance trend

WSA & WB Name	# WSSs	Total Population	Total SIV (kl/d)	2023 WUE (l/p/d)	2023 Blue Drop WUE Range and Performance	
Alfred Nzo DM	7	286,714	33,361	116	<150	Excellent
Amatole DM	37	896,207	66,793	75	<150	Excellent
Blue Crane Route LM	3	33,600	7,996	238	>200-250	Average
Buffalo City LM	10	857,000	186,884	218	>200-250	Average
Chris Hani DM	22	475,610	80,564	169	>150-200	Good
Dr Beyers Naude LM	10	70,578	12,493	177	>150-200	Good
Joe Gqabi DM	14	320,917	35,694	111	<150	Excellent
Kouga LM	8	97,596	37,900	388	>300	Extremely High
Koukamma LM	11	28,582	6,202	217	>150-200	Good
Makana LM	3	139,600	17,780	127	<150	Excellent
Ndlambe LM	5	60,517	6,667	110	<150	Excellent
Nelson Mandela MM	1	1,100,000	281,358	256	>250-300	Poor
OR Tambo DM	20	568,688	73,768	130	<150	Excellent
Sundays River Valley LM	3	65,964	11,500	174	>150-200	Good
Totals	**154**	**5,001,573**	**858,960**	**172**		

WUE (l/cap/day) performance categories

Colour	WUE Range	Performance
	>300	Extremely high per capita water use
	>250-300	Poor per capita water use
	>200-250	Average per capita water use with potential for marked improvement
	>150-200	Good per capita water use but some improvement may be possible subject to economic benefits
	<150	Excellent per capita water use management

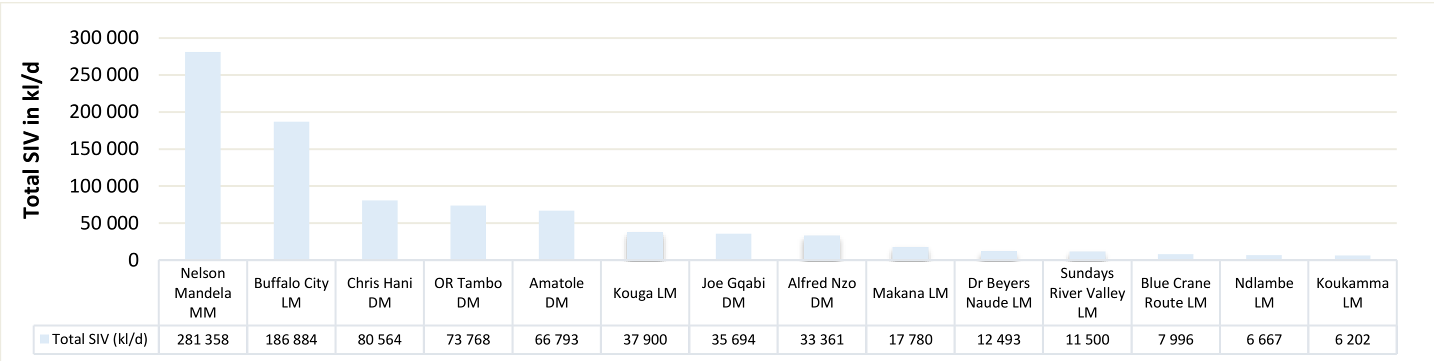


Figure 32 - Total SIV towards the WSSs

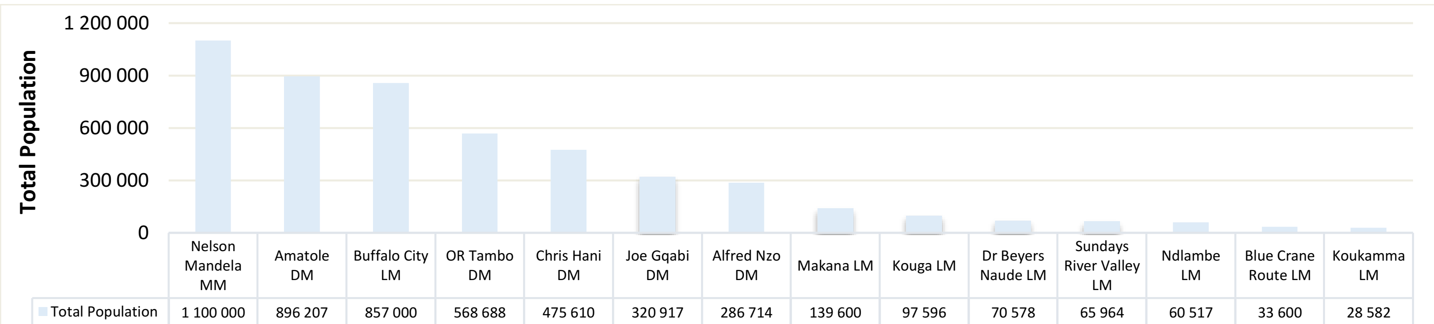


Figure 33 - Total Population served

For the province, 858,960 kl/d water is supplied to 5,001,573 consumers. Comparatively, Nelson Mandela MM distributes 33% of the total provincial SIV, followed by Buffalo City LM (22%). An average 172 litre of water is used per person per day, which implies a good per capita water use. Results from the diagnostic data show that the Kouga LM has a WUE of more than 300 l/c/d, which is regarded as extremely high according to national benchmarks. Only Nelson Mandela MM has a WUE between 250–300 l/c/d, which is regarded as poor. No Drop Certification is specifically tasked with plans to curb water losses and improve NRW through water accounting assessments and water conservation and demand management.

Diagnostic 3: Drinking Water Quality (DWQ) Monitoring and Compliance

Aim: Blue Drop audits values the principles of "To measure is to know" and "To know is to manage". The primary objective of a water treatment plant is to produce final water quality that is safe for human consumption at the end of the distribution network. This standard can only be measured and achieved if operational and compliance monitoring and DWQ compliance is executed at the correct frequency, sample point, and determinand type. This diagnostic assesses the i) operational and compliance monitoring status, ii) drinking water quality compliance, and iii) risk defined compliance and laboratory credibility.

(i) Drinking water operational and compliance monitoring

Findings: A minimum level of 90% operational monitoring compliance is applied as benchmark, to give weight to the importance of sampling and monitoring of the raw water, process unit water, and final water across the treatment stream. Compliance monitoring is also informed by SANS 241:2015 and the requirement for risk-informed monitoring through the WaSP process at both the WTW final and distribution network. DWQ compliance is calculated against the population size and the mandatory limits set by SANS 241:2015 and the Blue Drop standards, as calculated and reported from data loaded in the IRIS.

Table 42 - Summary of the KPA 2 WTW operational and WSS compliance monitoring status

WSA & WB Name	# WTWs	# WSSs	WTW Operational monitoring [KPA 2 sub-KPA 2.b)]		WSS Compliance monitoring [KPA 2 sub-KPA 2.c)]	
			Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]	Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]
Amatola Water	9	12	9			12
Alfred Nzo DM	7	7	6	1		7
Amatole DM	30	37	30		27	10
Blue Crane Route LM	4	3	1	3	3	
Buffalo City LM	5	10	3	2	5	5
Chris Hani DM	84	22	9	75	1	21
Dr Beyers Naude LM	11	10		11		10
Joe Gqabi DM	16	14	13	3		14
Kouga LM	5	8	2	3	5	3
Koukamma LM	11	11		11		11
Makana LM	4	3	3	1		3
Ndlambe LM	5	5	4	1		5
Nelson Mandela MM	8	1	6	2	1	
OR Tambo DM	20	20	13	7	19	1
Sundays River Valley LM	3	3		3		3
Totals	**222**	**154**	**99 (45%)**	**123 (55%)**	**61 (40%)**	**93 (60%)**

The performance recorded in the table above stems from performance data as measured against the Blue Drop Standard expressed in KPA 2 and sub-KPAs 2.b) and 2.c). Overall, an unsatisfactory sampling and analysis regime is observed for both operational (55%) and compliance (60%) monitoring.

The data indicates that 99 of 222 WTWs (45%) are on par with good practice for operational monitoring of the raw and final water and the respective process units at the WTW. Amatola Water, Alfred Nzo DM and Amathole DM are doing exceptionally well, whilst the remaining WSAs fail to meet the Blue Drop standard. In terms of compliance monitoring, 61 WSSs (40%) are on par with good compliance monitoring practices, and 93 WSSs (60%) are failing the Blue Drop standard.

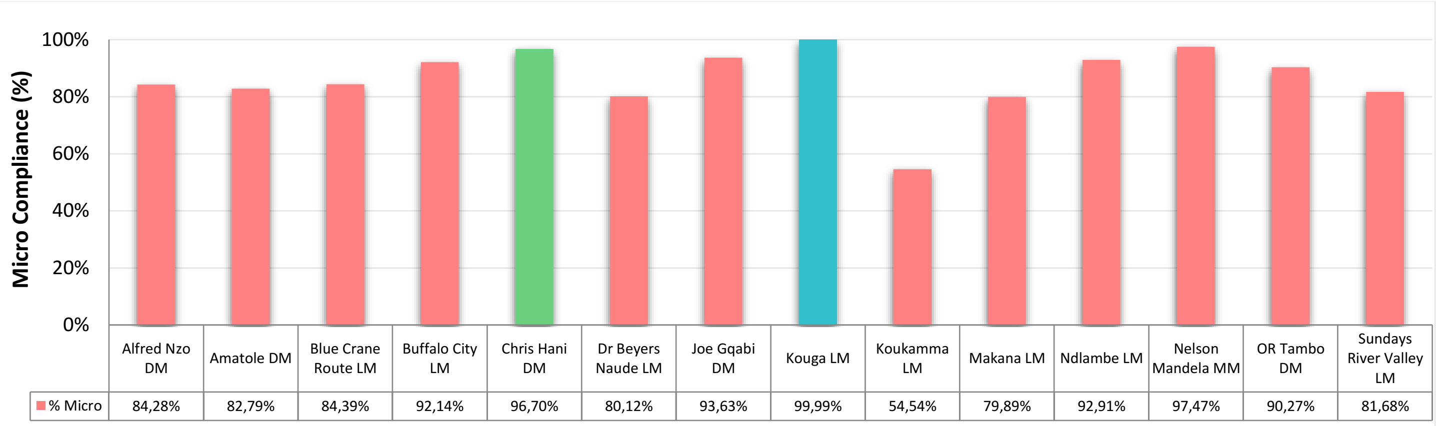
The latter observation is noted with deepening concern. Compliance monitoring is a legal requirement and the only means to measure the DWQ performance of a water supply system. Operational monitoring is the cornerstone of day-to-day process adjustments and optimisation to ensure that the water treatment is efficient and delivers quality final water. The results indicate that 123 WTWs and 93 WSSs are not achieving regulatory and industry standards.

(ii) Drinking water quality compliance

Findings: DWQ compliance is measured against the requirements of SANS 241:2015 under KPA 5 of the Blue Drop audit. The tables following summarises the results of the DWQ status for Microbiological and Chemical Compliance, which also carries the highest Blue Drop score weighting of 35%.

Table 43 - Provincial Summary of the DWQ Status for Microbiological Compliance

WSA Name	# WSSs	Population	% Ave. Micro Compliance	# WSS Micro Performance Status		
				Excellent	Good	Unacceptable
Alfred Nzo DM	7	286,714	84.28%	4		3
Amatole DM	37	896,207	82.79%	3	2	32
Blue Crane Route LM	3	33,600	84.39%	1		2
Buffalo City LM	10	857,000	92.14%	1	2	7
Chris Hani DM	22	475,610	96.70%	16		6
Dr Beyers Naude LM	10	70,578	80.12%	4		6
Joe Gqabi DM	14	320,917	93.63%	4	1	9
Kouga LM	8	97,596	99.99%	8		
Koukamma LM	11	28,582	54.54%	5		6
Makana LM	3	139,600	79.89%	1		2
Ndlambe LM	5	60,517	92.91%	2	1	2
Nelson Mandela MM	1	1,100,000	97.47%			1
OR Tambo DM	20	568,688	90.27%	5	2	13
Sundays River Valley LM	3	65,964	81.68%	1		2
Totals	**154**	**5,001,573**	**86.49%**	**55**	**8**	**91**



MICRO: Population <100,000		
Colour	Status	Percentage
	Excellent	>97%
	Good	>96 - <97%
	Unacceptable	<96%

MICRO: Population >100,000		
Colour	Status	Percentage
	Excellent	>99%
	Good	>98 - <99%
	Unacceptable	<98%

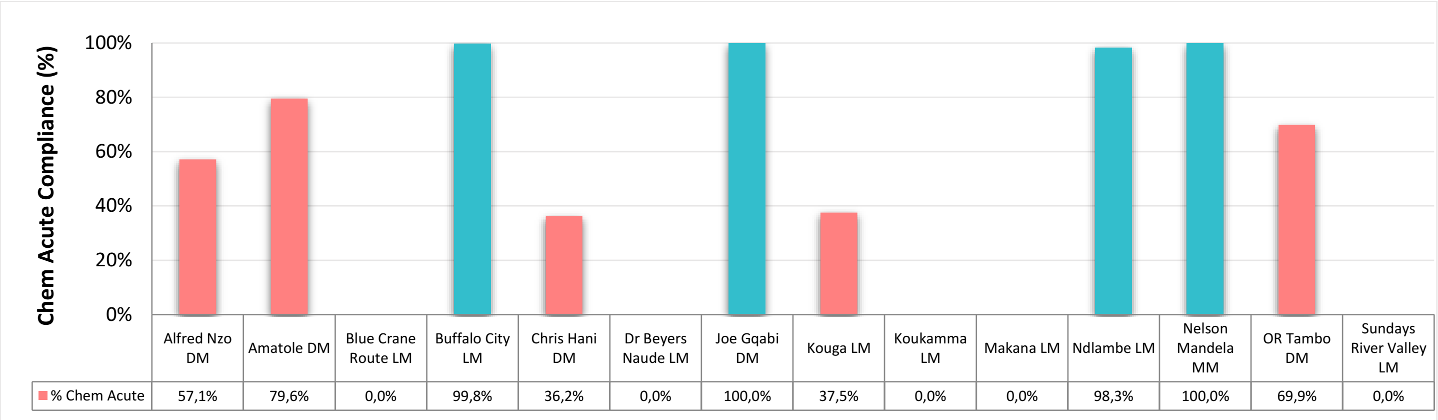
Figure 34 - Provincial Microbiological Drinking Water Quality Status

Out of the 154 WSSs, 63 (41%) systems achieved excellent and good microbiological quality, whilst 91 (59%) systems have an unacceptable microbiological water quality status. The water in these systems pose a serious acute health risk to the community. Failure to produce water that meets microbiological compliance standards can be linked back to poor operations, defective infrastructure, inadequate dosing rates, absence of disinfection chemicals, lack of monitoring, lack of operating and chemistry knowledge, and several other root causes. WSIs that are not monitoring the final water quality at the outlet of the treatment plant or at specific end use points are required to develop a monitoring programme and resume with compliance monitoring as a matter of urgency.

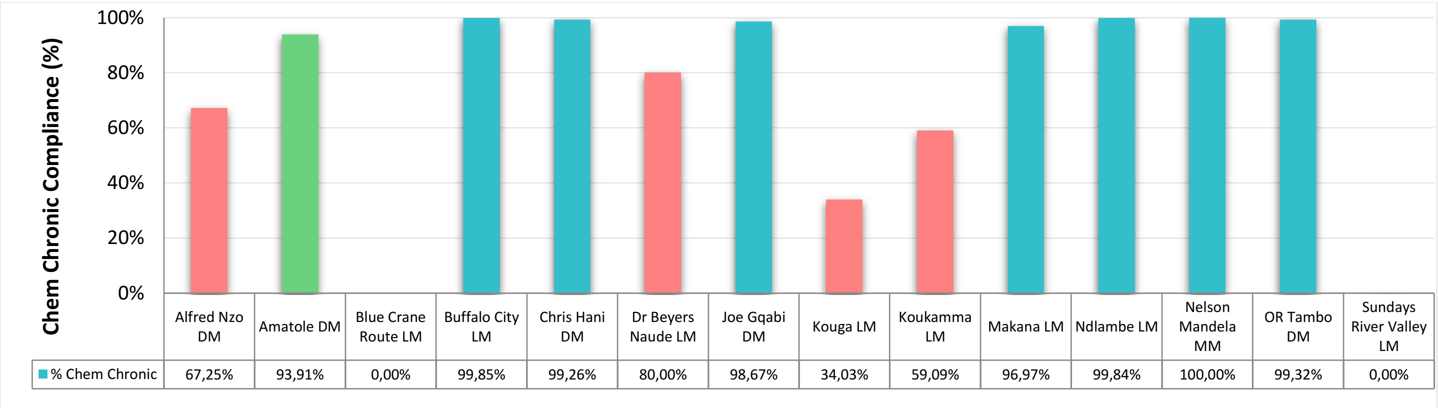
Table 44 - Provincial Summary of the DWQ Status for Chemical Acute Health and Chronic Health Compliance

WSA Name	# WSSs	Population	% Ave. Chem Acute Health Compliance	# WSS Chem Acute Health Performance Status			% Ave. Chem Chronic Health Compliance	# WSS Chem Chronic Health Performance Status		
				Excellent	Good	Unacceptable		Excellent	Good	Unacceptable
Alfred Nzo DM	7	286,714	57.1%	4		3	67.3%	4	2	1
Amatole DM	37	896,207	79.6%	14		23	93.9%	34		3
Blue Crane Route LM	3	33,600	0.0%			3	0.0%			3

WSA Name	# WSSs	Population	% Ave. Chem Acute Health Compliance	# WSS Chem Acute Health Performance Status			% Ave. Chem Chronic Health Compliance	# WSS Chem Chronic Health Performance Status		
				Excellent	Good	Unacceptable		Excellent	Good	Unacceptable
Buffalo City LM	10	857,000	99.8%	10			99.8%	10		
Chris Hani DM	22	475,610	36.2%	8		14	99.3%	21	1	
Dr Beyers Naude LM	10	70,578	0.0%			10	80.0%	8		2
Joe Gqabi DM	14	320,917	100.0%	14			98.7%	13	1	
Kouga LM	8	97,596	37.5%			8	34.0%			8
Koukamma LM	11	28,582	0.0%			11	59.1%	5		6
Makana LM	3	139,600	0.0%			3	97.0%	2		1
Ndlambe LM	5	60,517	98.3%	4		1	99.8%	5		
Nelson Mandela MM	1	1,100,000	100.0%	1			100.0%	1*		
OR Tambo DM	20	568,688	69.9%	14		6	99.3%	19	1	
Sundays River Valley LM	3	65,964	0.0%			3	0.0%			3
Totals	**154**	**5,001,573**	**48.5%**	**69**	**0**	**85**	**73.4%**	**122**	**5**	**27**



CHEM Acute Health: Population <100,000			CHEM Acute Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	>97%		Excellent	>99%
	Good	>95 - <97%		Good	>97 - <99%
	Unacceptable	<95%		Unacceptable	<97%



CHEM Chronic Health: Population <100,000			CHEM Chronic Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	>95%		Excellent	>97%
	Good	>93 - <95%		Good	>95 - <97%
	Unacceptable	<93%		Unacceptable	<95%

Figure 35 - Provincial Chemical Acute Health and Chronic Health Drinking Water Quality Status

Chemical acute health compliance shows that 69 (45%) systems have excellent water quality, whilst 85 (55%) systems have an unacceptable chemical acute health compliance. Chemical chronic health compliance shows that 122 (79%) systems have excellent and 5 (3%) systems have good water quality, whilst 27 (18%) systems have an unacceptable chemical chronic health compliance. The Water Services Act upholds standards regarding the monitoring and reporting on drinking water quality and issuance of advisory notices to the public when significant DWQ failures are observed.

The audit process applies a penalty when DWQ failures are noticed without issuing such Water Quality Alert Notices to forewarn consumers of the status of (unsafe) water quality and to advise communities to source alternative water sources or methods to disinfect water used for drinking water purposes. The following table reflects the compliance status of the WSAs as regards the issuing of these notices for DWQ failures.

Table 45 - Summary of Penalties Applied to WSSs for not Issuing Advisory Notices

WSA Name	# WSS	# WSS No Penalty Applied	# WSS Partial Penalty Applied	WSS Names Partial Penalty	# WSS Full Penalty Applied	WSS Names Full Penalty
Alfred Nzo DM	7		2	Nomlacu, Ntabankulu	5	5 of 7 WSSs
Amatole DM	37	1	35	35 of 37 WSSs	1	Xhora
Blue Crane Route LM	3	3				
Buffalo City LM	10	2	8	8 of 10 WSSs		
Chris Hani DM	22	14	8	8 of 22 WSSs		
Dr Beyers Naude LM	10		9	9 of 10 WSSs	1	Waterford
Joe Gqabi DM	14	4	9	9 of 14 WSSs	1	Ugie
Kouga LM	8	1	5	5 of 8 WSSs	2	Oyster Bay, Patensie
Koukamma LM	11				11	11 of 11 WSSs
Makana LM	3		2	Grahamstown, Riebeeck East	1	Alicedale
Ndlambe LM	5		5	5 of 5 WSSs		
Nelson Mandela MM	1	1				
OR Tambo DM	20	4	14	12 0f 20 WSSs	2	Thornhill, Upper Chulunca
Sundays River Valley LM	3	1	2	Enon/Bersheba, Kirkwood		
Totals	**154**	**31**	**99**		**24**	

No penalties were applied to 31 (20%) WSSs in 9 WSAs. 99 partial penalties and 24 full penalties were applied to 123 (80%) WSSs in 11 WSAs and 8 WSAs respectively.

(iii) Risk defined compliance and laboratory credibility

Findings: Risk-defined compliance standards aim to determine the compliance (to SANS 241) of those parameters that have been found to pose a risk in a specific WSS and need to be included in the routine monitoring programme or frequency as prescribed by SANS 241. The province achieved an average Annual Risk Defined Compliance of 81.21, with the best performances coming from Alfred Nzo DM, and the worst performances coming from Amatole DM, Chris Hani DM, Joe Gqabi DM, Koukamma LM and OR Tambo DM. Excellent risk defined compliance was achieved by 24 (16%) systems, good compliance for 8 (5%) systems and bad compliance for 122 (79%) systems.

Table 46 - Summary of the DWQ Compliance for Risk Defined Compliance

WSA Name	# WSSs	Population	Ave. % Risk Defined Compliance	# WSS Performance Status		
				Excellent	Good	Bad
Alfred Nzo DM	7	286,714	84.94%	6		1
Amatole DM	37	896,207	84.69%	2	1	34
Blue Crane Route LM	3	33,600	83.46%	1		2
Buffalo City LM	10	857,000	89.40%	1	2	7
Chris Hani DM	22	475,610	89.69%	5	1	16
Dr Beyers Naude LM	10	70,578	77.82%	2		8
Joe Gqabi DM	14	320,917	87.33%		3	11
Kouga LM	8	97,596	95.18%	5		3
Koukamma LM	11	28,582	39.90%			11
Makana LM	3	139,600	76.10%			3
Ndlambe LM	5	60,517	86.38%	1		4
Nelson Mandela MM	1	1,100,000	86.18%			1
OR Tambo DM	20	568,688	73.25%	1		19
Sundays River Valley LM	3	65,964	80.98%		1	2
Totals	**154**	**5,001,573**	**81.09%**	**24**	**8**	**122**

The aim of operational determinand compliance is to determine the efficiency of the water treatment process, by monitoring those parameters which are used to control the treatment process. Although not necessarily a health risk, these parameters provide good information on the integrity of the WTW. The province achieved an average % Actual Operational Determinand Compliance of 47%. Excellent operational determinand compliance was achieved by 27 (12%) WTWs, good compliance for 19 (9%) WTWs and bad compliance for 176 (79%) WTWs with most of these WTWs residing in Amatole DM, Chris Hani DM, Koukamma LM & OR Tambo DM.

Table 47 - Summary of the Treatment (Operational) Efficiency Index

WSA & WB Name	# WTWs	Population	Ave. % Actual Operational Determinand Compliance	# WTW Performance Status		
				Excellent	Good	Bad
Amatola Water	9	658,320	76%	2		7
Alfred Nzo DM	7	286,714	77%		5	2
Amatole DM	30	896,207	84%	9		21
Blue Crane Route LM	4	33,600	0%			4
Buffalo City LM	5	857,000	71%	1		4
Chris Hani DM	84	475,610	4%	4		80
Dr Beyers Naude LM	11	70,578	13%			11
Joe Gqabi DM	16	320,917	78%	2	10	4
Kouga LM	5	97,596	19%	1		4
Koukamma LM	11	28,582	0%			11
Makana LM	4	139,600	75%			4
Ndlambe LM	5	60,517	70%	2		3
Nelson Mandela MM	8	1,100,000	88%	3		5
OR Tambo DM	20	568,688	54%	3	4	13
Sundays River Valley LM	3	65,964	0%			3
Totals	**222**	**5,001,573**	**47%**	**27**	**19**	**176**

The data confirms that all the 14 (100%) WSAs in the province have access to credible laboratories for compliance and operational analysis with exception of some systems in 2 WSAs that are monitored by non-accredited laboratories. These in-house or contracted laboratories are accredited with SANAS or have Proficiency Testing Schemes with SABS or have inter-laboratory quality checks in place to ensure that suitable analytical methods are applied and that quality assurance processes are followed to ensure credible water quality results. The province is meeting the regulatory expectation for the WSIs having access to credible analytical services for compliance and operational monitoring.

Diagnostic 4: Technical Site Assessments

Aim: The BD process makes provision for a Technical Site Assessment (TSA) in order to verify the desktop evidence through field-based inspections. This assessment includes a physical inspection of the entire water treatment plant with all its process units, as well as the reservoir and spot checks of a pumpstation and pipelines. The technical assessment is coupled with an asset condition check to determine an approximate cost (VROOM) to restore existing infrastructure to functional status for the treatment facility (only).

Findings: The results of the province's TSAs are summarised in the table below. A deviation of 10% between the BD and TSA score indicate a misalignment between the administrative aspects and the work on the ground. The Regulator regards a WTW with a TSA score of >80% to have an acceptable level of process control and functional equipment, and a TSA score of 90% as an excellent system that complies with most of the Blue Drop TSA standards. A TSA score of <30% indicates that the treatment facility and network fails in most regards, and is evident of dysfunctional infrastructure, failed process control, absence of record keeping and monitoring, and poor water quality. The VROOM cost presents a ''Very Rough Order of Measurement"cost to return a WTWs functionality to its original design. More detail can be found in the Blue Drop Watch Report 2023.

Table 48 - %TSA and %BD score, and VROOM cost estimates total and split for civil, mechanical, and electrical

WSA & WB Name	TSA Name	%TSA	2023 BD Score (%)	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Amatola Water (BC LM)	Nahoon	86.0%	**83.5%**	674,000	539,200	134,800	1,348,000
Alfred Nzo DM	Mount Ayliff	79.0%	**54.8%**	19,800,000	55,440,000	3,960,000	79,200,000
Amatole DM	Morgan Bay	79.0%	**59.5%**	1,125,600	750,400	0	1,876,000
Blue Crane Route LM	Orange Fish	64.0%	**37.4%**	1,892,800	582,400	436,800	2,912,000
Buffalo City LM	Umzonyana	85.0%	**83.5%**	5,952,000	1,488,000	0	7,440,000
Chris Hani DM	Tsomo	85.0%	**45.3%**	16,742,000	2,092,750	2,092,750	20,927,500
Dr Beyers Naude LM	Graaff Reinet	80.0%	**24.2%**	160,000	160,000	1,280,000	1,600,000
Joe Gqabi DM	Barkly East	83.0%	**56.0%**	436,800	3,494,400	436,800	4,368,000
Kouga LM	Jeffreys Bay	91.0%	**64.6%**	922,500	645,750	276,750	1,845,000
Koukamma LM	Kareedouw	50.0%	**24.1%**	1,296,000	907,200	388,800	2,592,000
Makana LM	Grahamstown	68%	**32.5%**	6,380	51,040	6,380	63,800
Ndlambe LM	Cannon Rocks/Boknes	92.0%	**57.6%**	72,930	97,240	72,930	243,100
Nelson Mandela MM	Linton	87.0%	**85.0%**	300,000	300,000	0	600,000
OR Tambo DM	Thornhill	86.0%	**56.7%**	1,120,000	8,960,000	1,120,000	11,200,000
Sundays River Valley LM	Addo	63.0%	**25.6%**	3,149,280	2,204,496	944,784	6,298,560
			Totals	**R53,650,290**	**R77,712,876**	**R11,150,794**	**R142,513,960**
			% Split of Cost Items	**38%**	**54%**	**8%**	**100%**

A deviation of >10% between the BD and TSA score is noted for 12 WSAS with the exception of Amatola Water, Buffalo City LM and Nelson Mandela MM. A deviation of >20% between the BD and TSA score is noted for 11 WSAs. For the individual WTWs assessed in the province, a total budget of R142.5m is estimated, with the bulk of the work (92%) going towards restoration of mechanical equipment (54%) and civil infrastructure (38%).

Diagnostic 5: Operation, Maintenance and Refurbishment of Assets

Aim: Insufficient financial resources are often cited as a root cause to dysfunctional or non-compliant water treatment works and water networks. Knowledge and monitoring of fiscal spending are therefore a critical part of water services management and municipal governance of public assets. This diagnostic investigates the status of financial information as pertaining to O&M budgets and expenditure, asset figures, and capital funding.

Findings: A substantial amount of financial information was presented during the audit process. Unfortunately, the evidence was presented in different formats, levels of detail, or absent for some WSAs. It was observed that WSA teams with financial officials that were present during the audits performed better and had a better understanding of the water services challenges experienced by their technical peers.

Discrepancies observed included amongst others - generic or non-ringfenced budgets, contract lump sums for service providers presented as budgets, outdated or incomplete asset registers, and some cost drivers which were lacking. As data credibility presents a significant challenge, the Regulator grouped data into different certainty levels, as summarised at the end of this Diagnostic.

The result of each financial portfolio is discussed hereunder.

NOTE: The Regulator regards the financial and asset information with low confidence. Not all WSAs submitted verifiable information or complete financial data sets for the audit year in question.

Capital, O&M Budget and Actual, and Asset Value

The capital budgets, O&M budgets, O&M actual expenditure, and current asset values are summarised below.

Table 49 - Summary of the capital budgets, O&M budgets, O&M actual expenditure, and current asset values

WSA & WB Name	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
Amatola Water	NI	R67,695,098	R58,120,136	86%	R1,689,523,428
Alfred Nzo DM	20,270,187	R48,685,324	R34,278,987	70%	R2,673,154,323
Amatole DM	22,000,000	R300,392,758	R294,340,523	98%	R141,411,000
Blue Crane Route LM	NI	NI	NI	NI	NI
Buffalo City LM	129,837,677	R65,637,904	R61,382,839	94%	NI
Chris Hani DM	NI	R1,308,257,000	R870,763,000	67%	R8,985,000
Dr Beyers Naude LM	NI	NI	NI	NI	NI
Joe Gqabi DM	124,117,464	R8,184,764	R6,043,299	74%	R492,072,658
Kouga LM	NI	R10,963,000	R9,189,000	84%	R3,097,876,752
Koukamma LM	NI	R2,279,000	NI	NI	NI
Makana LM	NI	R172,875,000	R76,621,000	44%	NI
Ndlambe LM	128,593,405	R78,989,682	R89,798,650	114%	NI
Nelson Mandela MM	300,000,000	R587,069,000	R535,317,000	NI	R3,096,788,850
OR Tambo DM	79,357,787	R544,270,102	NI	NI	R4,770,791,037
Sundays River Valley LM	NI	R1,300,000	R2,120,615	163%	NI
Totals	**804,176,520**	**3,196,598,632**	**2,037,975,049**	**63.8%**	**R15,970,603,048**

The Regulatory Comments following in this Chapter list the capital projects with secured funding for each municipality and/or its bulk water provider (WSP). The capital lists are deemed to be a definitive means to address water service inadequacies and ensuring water infrastructure investment. A total capital budget of R804m has been reported for the refurbishment and upgrades of water supply system infrastructure for most of the WSAs. The largest capital budgets are observed for Nelson Mandela MM (R300m), Buffalo City LM (R130m), Ndlambe LM (R129m), and Joe Gqabi DM (R124m).

For the 2021/22 fiscal year, the total O&M budget reported for the province was R3.2b, of which R2.04b (64%) has been expended. The highest over-expenditure of 163% by Sundays River Valley LM and the lowest under expenditure by Makana LM (44%) was observed. The provincial figures exclude 9 WSAs who had no and partial financial information.

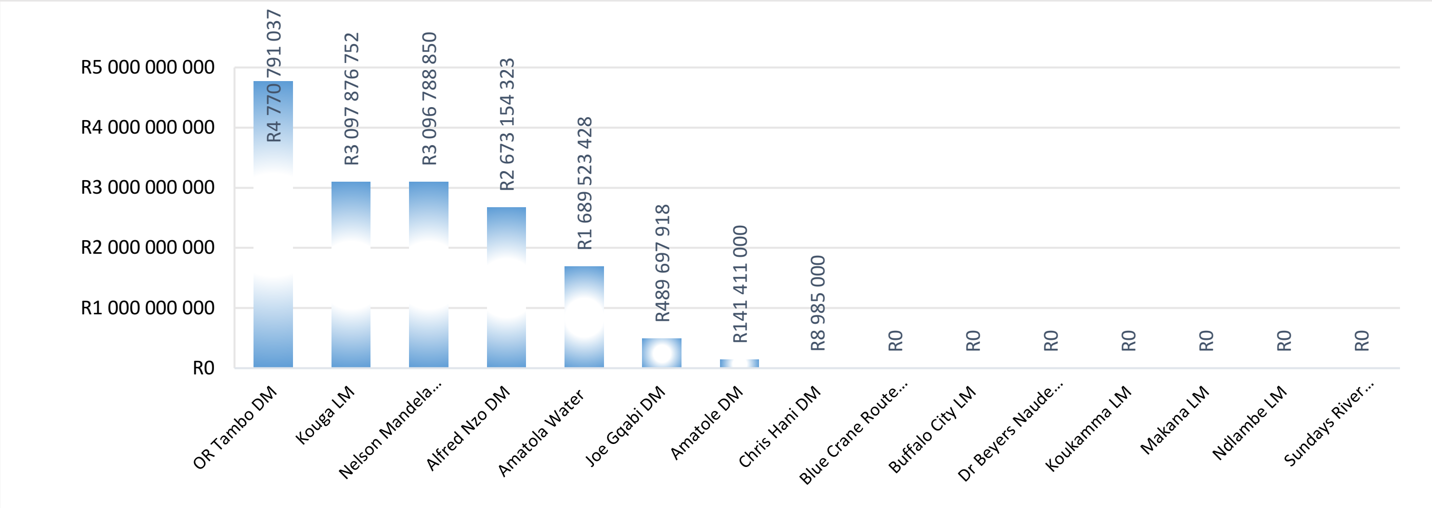


Figure 36 - Total current asset value reported

The total current asset value for water infrastructure (networks, pump stations, treatment plants) is reportedly R15.97b (excluding 7 WSAs with no information). The highest asset values are observed for OR Tambo DM (R4.77b), followed by Kouga LM (R3.1b), Nelson Mandela MM (R3.1b) and Alfred Nzo DM (R2.67b).

O&M Cost Benchmarking

By combining the SALGA and WRC WATCOST models, an estimation of the maintenance cost required per asset type can be done, i.e. civil, buildings, pipelines, mechanical, electrical, and instrumentation.

Table 50 - SALGA-WRC annual maintenance budget guideline and cost estimation

Description	% of Current Asset Value	Asset Value Estimate	Modified SALGA Maintenance Guideline	Annual Maintenance Budget Guideline
Current Asset Value estimate	**100%**	**R15,970,603,048**	**15.75%**	**R344,965,026**
Broken down into:				
1. Civil Structures	46%	R7,346,477,402	0.50%	R36,732,387
2. Buildings	3%	R479,118,091	1.50%	R7,186,771
3. Pipelines	6%	R958,236,183	0.75%	R7,186,771
4. Mechanical Equipment	30%	R4,791,180,914	4.00%	R191,647,237
5. Electrical Equipment	11%	R1,756,766,335	4.00%	R70,270,653
6. Instrumentation	4%	R638,824,122	5.00%	R31,941,206
Totals	**100%**	**R15,970,603,048**	**15.75%**	**R344,965,026**
			Minus 20% P&Gs and 10% Installation	**R103,489,508**
			Total	**R241,475,518**

The model estimates that R345m (2.16%) is required per year to maintain the assets valued at R15.97b. Notably, this maintenance estimate assumes that all assets are functional. In cases where Blue Drop Certification is not being achieved, it can be assumed that some form of inefficiency or constraint is being experienced, and national benchmarks closer to 7% of the asset value is advocated (R1.12b).

The table below indicates the SALGA maintenance cost estimation in relation to the O&M budget, and O&M actual expended.

Table 51 - O&M cost estimates by the SALGA versus actual budget and expenditure figures

Cost Reference	O&M Cost Estimate	Period	% of Asset Value
Modified SALGA	344,965,026	Annually, estimation	2.16%
O&M Budget	3,196,598,632	Actual for 2021/22	20.0%
O&M Spend	2,037,975,049	Actual for 2021/22	12.8%

In addition, the table below indicates the Blue Drop audit findings on the water supply operations cost determination and water supply O&M budget status.

Table 52 - BD Audit Water Supply Operations Cost Determination and Water Supply O&M Budget status

WSA & WB Name	Water Supply Operations Cost Determination	Water Supply O&M Budget status
Amatola Water	DETERMINED OF THE WHOLE SYSTEM, DETERMINED FOR PART OF SYSTEM, NOT SYSTEM SPECIFIC (GLOBAL)	SYSTEM SPECIFIC BUDGET, WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Alfred Nzo DM	NO PROOF (0% SCORE); DETERMINED OF THE WHOLE SYSTEM	NO PROOF; SYSTEM SPECIFIC BUDGET
Amatole DM	NO PROOF (0% SCORE); DETERMINED OF THE WHOLE SYSTEM	NO PROOF; SYSTEM SPECIFIC BUDGET
Blue Crane Route LM	NO PROOF (0% SCORE)	NO PROOF
Buffalo City LM	DETERMINED OF THE WHOLE SYSTEM; DETERMINED FOR PART OF SYSTEM	SYSTEM SPECIFIC BUDGET
Chris Hani DM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY; BUDGET IS NOT RINGFENCED FOR WATER ONLY
Dr Beyers Naude LM	NO PROOF (0% SCORE)	NO PROOF
Joe Gqabi DM	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET; WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Kouga LM	NOT SYSTEM SPECIFIC (GLOBAL); DETERMINED OF THE WHOLE SYSTEM	BUDGET IS NOT RINGFENCED FOR WATER ONLY; SYSTEM SPECIFIC BUDGET
Koukamma LM	NOT SYSTEM SPECIFIC BUDGET; NO PROOF (0% SCORE)	BUDGET IS NOT RINGFENCED FOR WATER ONLY; NO PROOF
Makana LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Ndlambe LM	NOT SYSTEM SPECIFIC (GLOBAL); DETERMINED OF THE WHOLE SYSTEM; DETERMINED FOR PART OF SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY; SYSTEM SPECIFIC BUDGET
Nelson Mandela MM	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
OR Tambo DM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Sundays River Valley LM	NOT SYSTEM SPECIFIC (GLOBAL)	NO PROOF

From the tables above, the cost dynamics can be summarised as follows:

- The SALGA estimations for maintenance budgets is about 10.8% (Modified SALGA divided by O&M Budget) of the actual reported budgets for the 2021/22 fiscal year
- The actual O&M budget (20%) appears to be more than adequate when compared with the SALGA guideline (2.16%) or with the government benchmark (7%)
- These figures are impacted by some of the WSAs who did not provide budget and expenditure figures, and by some inaccurate asset values and where no asset values were provided for
- Lastly, the municipalities presents budget and expenditure data at different levels (table above) i.e. financial figures are not always ringfenced per water supply system – thus rendering provincial summaries to be indicative).

5.1 Amatola Water

Introduction

Amatola Water is an essential services utility operating in the water sector in the Eastern Cape providing water services as mandated by government. The utility serves the following municipalities

1. Amathole District Municipality
2. Buffalo City Metropolitan Municipality
3. Ndlambe Local Municipality

Amatola Water has an Operation and Maintenance agreement with the Department of Water and Sanitation (DWS) to manage the 21 dams under the custodianship of the department and acts in the role of implementing agent for infrastructure construction projects or where emergency interventions were required due to drought, floods, or gross water quality negligence.

Amathole District Municipality

Amatola Water provides bulk raw and potable water services to the Amathole District Municipality (ADM) through a negotiated three-year bulk supply agreement that was further extended by two years to 2022.

Buffalo City Metropolitan Municipality

Amatola Water has a 30-year bulk supply contract with the Buffalo City Metropolitan Municipality which is valid until 30 May 2028.

Ndlambe Local Municipality

Amatola Water has a 20 year bulk water supply agreement with the Ndlambe Local Municipality to supply the Kenton-on-Sea and Bushmans River areas with potable water which runs until July 2030.

Amatola Water plants are all supplied from dams within the Amathole and Keiskamma Water Supply Systems apart from the Albany Coast RO plant that treats sea water from the Boesmansriviermond.

The water abstracted from various sources is treated at individual water treatment plants and distributed from command reservoirs.

Regulatory comment

The AWB was comprehensively represented at the site audit by the officials ranging from plant supervisors to executive directors. Interaction with the audit team during and after the site visit was excellent and every attempt was made to provide all necessary information.

The AWB WaSP presented was significantly outdated (Last reviewed 2011) and no evidence of adoption was provided. A detailed risk assessment was carried out using assessment forms, but this appeared to be a desktop study. No photographic or other evidence of site inspections was provided. The WaSP refers to critical control monitoring, but no analysis data (hazard risk assessment) was incorporated. The WaSP was well constructed and the AWB is encouraged to review and update this plan.

An internal process audit report was presented which provided a graph of the calculated performance of each of process units in Ml/d vs design capacity, however no detail of the basis of these calculations or design was provided. The AWB is encouraged to perform detailed process audits for each of their treatment plants.

The following capital projects were implemented:

- Upgrade of the Debe Water Supply Scheme including plant, storage, and distribution system.
- Upgrade of the Binfield Water Supply Scheme including plant, storage, and distribution system.
- Upgrade of the Masincedane Water Supply Scheme including plant, storage, and distribution system.
- Construction of reservoirs for the Sandile Water Supply Scheme.

Blue Drop Findings

All the systems owned and operated by Amatola Water Board achieved scores in the region of 60%.

1. Treatment plants were well operated and capacitated in accordance with regulatory requirements.

2. The Water Safety Plan was outdated, but well-structured, and provides a good framework for future updates.
3. Inadequate compliance monitoring was implemented, and the drinking water quality (DWQ) compliance was generally poor.
4. Maintenance is well managed and effective. Asset management is good and there is a maintenance programme in place which is adequately implemented and linked to the asset register.
5. Financials are appropriately managed and operational and maintenance costs are known and understood.

Some recommendations for improvement include:

- The WaSP needs to be updated and implemented.
- Detailed process audits and network inspection reports are required.
- Full SANS analysis data needs to be interpreted and used to develop a risk informed monitoring programme which then needs to be actively implemented in conjunction with the incident management protocol to ensure the ongoing provision of quality drinking water.

Technical Site Inspection

The Nahoon water supply system is well maintained, with functional treatment processes and competent staff and achieved a TSA score of 86%. Operational monitoring is taking place and abstraction, and production flows are recorded. Chlorine stock on site was low at the time of inspection due to a nationwide shortage of chlorine gas. Provision should be made for an alternative disinfectant. Concrete structures are in good condition (except for some leakages at the command reservoir) and mechanical equipment is well maintained.


Flocculation Channel


Filter Valves


Chlorine Cylinders


The Team

5.2 Alfred Nzo District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	54.82%
Blue Drop Score 2014	%	62.87%
Blue Drop Score 2012	%	64.38%
Blue Drop Score 2011	%	52.54%

Key Performance Area	Weight	Kinira	Belfort	Matatiele	Nomlacu
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	11.60%	52.43%	63.21%	55.48%
Blue Drop Score 2014	%	NI	63.90%	61.16%	72.74%
Blue Drop Score 2012	%	NI	67.08%	65.31%	NI
Blue Drop Score 2011	%	NI	49.92%	52.89%	NI
System Design Capacity	kL/d	2 000	20 000	3 000	20 000
System Available Capacity	kL/d	2 000	20 000	3 000	20 000
System Input Value	kL/d	2 000	1 123	1 800	22 176
Capacity Utilisation	%	100.00%	5.62%	60.00%	110.88%
Resource Abstracted From		Kinira	Belford dam	Mountain view dam	Ludeke
BDRR 2023	%	92.05%	18.54%	23.39%	50.05%
BDRR 2022	%	NI	29.30%	27.50%	42.90%

Key Performance Area	Weight	Ntabankulu	Kwabhaca	Mount Ayliff
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	55.22%	66.14%	65.59%
Blue Drop Score 2014	%	47.80%	57.31%	60.97%
Blue Drop Score 2012	%	NI	64.41%	62.94%
Blue Drop Score 2011	%	NI	56.94%	47.98%
System Design Capacity	kL/d	720	6 000	2 400
System Available Capacity	kL/d	720	6 000	2 000
System Input Value	kL/d	962	3 456	1 844
Capacity Utilisation	%	133.61%	57.60%	92.20%
Resource Abstracted From		Ntabankulu Dam	Ntenetyana Dam	Mzintlava River; Nkanji River and Sgidini River
BDRR 2023	%	37.07%	34.78%	27.55%
BDRR 2022	%	68.30%	54.20%	56.40%

Technical Site Assessment: Mount Ayliff WTW - 79%

The Regulator notes the dire state of management and drinking water quality in the Kinira water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

5.3 Amathole District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	59.49%
Blue Drop Score 2014	%	80.24%
Blue Drop Score 2012	%	74.62%
Blue Drop Score 2011	%	65.21%

Key Performance Area	Weight	Binfield	Debe Nek	Glenmore	Masincedane
Bulk/WSP		Amatola Water	Amatola Water	Amatola Water	Amatola Water
Blue Drop Score 2023	%	59.39%	59.65%	69.91%	50.33%
Blue Drop Score 2014	%	88.62%	72.46%	77.61%	82.34%
Blue Drop Score 2012	%	73.92%	77.50%	73.70%	81.85%
Blue Drop Score 2011	%	83.80%	75.20%	68.54%	85.33%
System Design Capacity	kL/d	4 800	5 000	1 000	6 400
System Available Capacity	kL/d	4 800	5 000	1 000	6 400
System Input Value	kL/d	4 724	969	615	3 489
Capacity Utilisation	%	98.42%	19.38%	61.50%	54.52%
Resource Abstracted From		Binfield Park Dan (Tyume River)	Debe Dam (Debe River)	Boyd Dam (Great Fish River)	Mnyameni Dam (Keiskamma)
BDRR 2023	%	53.42%	69.01%	29.93%	52.34%
BDRR 2022	%	82.10%	67.10%	100.00%	91.00%

Key Performance Area	Weight	Peddie	Sandile	Upper Mnyameni	Amahlathi LM - Cathcart
Bulk/WSP		Amatola Water	Amatola Water	Amatola Water	-
Blue Drop Score 2023	%	64.96%	60.62%	54.23%	61.74%
Blue Drop Score 2014	%	78.30%	81.69%	73.19%	84.70%
Blue Drop Score 2012	%	62.89%	50.01%	81.71%	70.72%
Blue Drop Score 2011	%	69.16%	84.56%	82.64%	66.85%
System Design Capacity	kL/d	6 500	18 000	6 400	2 450
System Available Capacity	kL/d	6 500	18 000	6 400	1 440
System Input Value	kL/d	2 575	8 252	3 489	559
Capacity Utilisation	%	109.58%	110.11%	54.52%	38.82%
Resource Abstracted From		Craighead Weir (Keiskamma River). Released from Sandile Dam	Sandile Dam (Keiskamma)	Mnyameni Dam (Keiskamma)	Sam Meyer Dam
BDRR 2023	%	55.01%	67.43%	51.64%	33.89%
BDRR 2022	%	82.10%	91.00%	66.10%	46.30%

Key Performance Area	Weight	Amahlahti LM - Kei Road	Amahlathi LM - Stutterheim	Great Kei LM - Cinsta East	Great Kei LM - Haga-Haga
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	64.69%	63.52%	64.57%	60.39%
Blue Drop Score 2014	%	72.90%	78.41%	86.20%	81.54%
Blue Drop Score 2012	%	73.95%	63.78%	83.71%	66.05%
Blue Drop Score 2011	%	61.62%	50.79%	70.11%	65.90%
System Design Capacity	kL/d	4 700	5 800	700	300
System Available Capacity	kL/d	3 400	4 704	717	250
System Input Value	kL/d	2 605	5 772	396	86
Capacity Utilisation	%	78.91%	122.70%	55.23%	34.40%
Resource Abstracted From		Wriggleswade Dam (Kubusi River)	Anderson, Scotchmans, Kubusie river	Chintsa East Dam	Haga River, Mastrand Borehole
BDRR 2023	%	44.20%	39.32%	37.26%	39.88%
BDRR 2022	%	40.80%	40.30%	65.20%	35.60%

Key Performance Area	Weight	Great Kei LM - Kei Bridge	Great Kei LM - Kei Mouth	Great Kei LM - Morgans Bay	Mbhashe LM - Cwebe
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	61.42%	77.94%	62.97%	62.97%
Blue Drop Score 2014	%	66.72%	85.87%	85.55%	75.46%
Blue Drop Score 2012	%	70.18%	80.74%	83.80%	82.16%
Blue Drop Score 2011	%	61.00%	76.68%	74.65%	65.45%
System Design Capacity	kL/d	1 000	1 900	700	500
System Available Capacity	kL/d	734	1 000	700	408
System Input Value	kL/d	638	485	178	92
Capacity Utilisation	%	86.92%	48.50%	25.43%	22.55%
Resource Abstracted From		Great Kei River, Boreholes and Spring	Morgan Bay Dam, Centenary Dam, Spring	Morgan Bay Dam (Borehole as back-up)	Mbhanyana River
BDRR 2023	%	42.63%	24.93%	33.28%	32.54%
BDRR 2022	%	43.50%	24.70%	28.90%	48.90%

Key Performance Area	Weight	Mbhashe LM - Dutywa	Mbhashe LM - Dwesa	Mbhashe LM - Elliotdale	Mbhashe LM - Mbhashe North
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	63.69%	54.30%	58.72%	62.64%
Blue Drop Score 2014	%	63.43%	85.41%	75.12%	87.11%
Blue Drop Score 2012	%	68.08%	78.33%	68.27%	NI
Blue Drop Score 2011	%	66.59%	58.48%	64.59%	20.17%

Key Performance Area	Weight	Mbhashe LM - Dutywa	Mbhashe LM - Dwesa	Mbhashe LM - Elliotdale	Mbhashe LM - Mbhashe North
System Design Capacity	kL/d	2 600	600	700	3 800
System Available Capacity	kL/d	1 322	600	576	3 800
System Input Value	kL/d	634	114	209	276
Capacity Utilisation	%	47.96%	19.00%	36.28%	7.26%
Resource Abstracted From		Mgwali River	Mgwali River	Xhora River	Mgwali River
BDRR 2023	%	33.89%	33.28%	43.42%	28.46%
BDRR 2022	%	86.80%	72.60%	22.60%	21.20%

Key Performance Area	Weight	Mbhashe LM - Mendu	Mbhashe LM - Mncwasa	Mbhashe LM - Nqadu	Mbhashe LM - Qwaninga
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**76.17%**	**53.72%**	**56.52%**	**69.02%**
Blue Drop Score 2014	%	84.51%	NI	83.18%	68.90%
Blue Drop Score 2012	%	82.38%	NI	45.26%	52.90%
Blue Drop Score 2011	%	61.41%	NI	41.41%	76.06%
System Design Capacity	kL/d	300	2 500	720	864
System Available Capacity	kL/d	300	806	720	860
System Input Value	kL/d	87	239	102	0
Capacity Utilisation	%	29.00%	29.65%	14.17%	NI
Resource Abstracted From		Nqabarha River	Mndwaka Dam	Qwaninga River	Qwaninga River
BDRR 2023	%	22.98%	63.68%	45.81%	29.90%
BDRR 2022	%	52.90%	74.30%	51.10%	42.90%

Key Performance Area	Weight	Mbhashe LM - Willowvale	Mbhashe LM - Xhora	Mnquma LM - Butterworth	Mnquma LM – Kotana Ehlobo
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**59.67%**	**48.65%**	**55.87%**	**59.79%**
Blue Drop Score 2014	%	83.42%	NI	77.17%	80.27%
Blue Drop Score 2012	%	67.37%	NI	61.93%	72.33%
Blue Drop Score 2011	%	61.02%	NI	64.18%	63.77%
System Design Capacity	kL/d	720	7 200	24 000	4 500
System Available Capacity	kL/d	720	7 200	14 000	4 500
System Input Value	kL/d	186	1 032	12 487	958
Capacity Utilisation	%	25.83%	14.33%	89.19%	21.29%
Resource Abstracted From		Nqadu River	Xora River	Xilinxa Dam, Toluene Dam	Xilinxa Dam
BDRR 2023	%	58.34%	78.88%	60.44%	45.28%
BDRR 2022	%	27.80%	NI	56.60%	24.40%

Key Performance Area	Weight	Mnquma LM - Nqamakwe	Mnquma LM - Qolorha	Mnquma LM - Tholeni	Nkonkobe LM - Alice
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**62.42%**	**61.09%**	**59.67%**	**62.57%**
Blue Drop Score 2014	%	80.92%	76.96%	64.80%	82.35%
Blue Drop Score 2012	%	67.40%	62.69%	67.49%	68.45%
Blue Drop Score 2011	%	74.48%	58.76%	57.40%	75.79%
System Design Capacity	kL/d	100	300	2 800	6 500
System Available Capacity	kL/d	100	300	1 680	6 500
System Input Value	kL/d	96	155	438	6 093
Capacity Utilisation	%	96.00%	51.67%	26.07%	93.74%
Resource Abstracted From		Ngculu Dam	Borehole	Qolora River	Hogsback Springs, Binfield Dam
BDRR 2023	%	34.75%	40.71%	56.68%	39.32%
BDRR 2022	%	37.70%	38.30%	68.10%	52.60%

Key Performance Area	Weight	Nkonkobe LM - Fort Beaufort	Nkonkobe LM - Hogsback	Nkonkobe LM - Seymor	Nxuba LM - Adelaide
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**58.14%**	**66.37%**	**60.47%**	**67.14%**
Blue Drop Score 2014	%	87.71%	83.29%	71.51%	87.95%
Blue Drop Score 2012	%	75.02%	75.54%	78.78%	68.24%
Blue Drop Score 2011	%	61.78%	62.43%	63.96%	58.72%
System Design Capacity	kL/d	8 200	780	640	2 750
System Available Capacity	kL/d	8 200	780	640	2 159
System Input Value	kL/d	5 728	195	448	1 340
Capacity Utilisation	%	69.85%	25.00%	70.00%	62.07%
Resource Abstracted From		Kat River Barrage (Burls Dam - holding dam)	Plaatjieskraal Dam	Kat River Dam (Lei Dam - Balancing)	Koonap River (Adelaide Dam), Fish River, Borehole
BDRR 2023	%	50.71%	35.67%	38.39%	45.28%
BDRR 2022	%	52.60%	58.60%	40.70%	63.90%

Key Performance Area	Weight	Nxuba LM - Bedford
Bulk/WSP		-
Blue Drop Score 2023	%	**58.59%**
Blue Drop Score 2014	%	84.17%
Blue Drop Score 2012	%	71.55%
Blue Drop Score 2011	%	58.09%
System Design Capacity	kL/d	1 880

Key Performance Area	Weight	Nxuba LM - Bedford
System Available Capacity	kL/d	2 160
System Input Value	kL/d	1 052
Capacity Utilisation	%	48.70%
Resource Abstracted From		Fish River & Bedford Dam
BDRR 2023	%	48.00%
BDRR 2022	%	39.00%

Technical Site Assessment: Morgans Bay WTW - 80%

5.4 Blue Crane Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	37.39%
Blue Drop Score 2014	%	35.10%
Blue Drop Score 2012	%	59.05%
Blue Drop Score 2011	%	39.51%

Key Performance Area	Weight	Cookhouse	Pearston	Sommerset East
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	31.90%	47.05%	36.61%
Blue Drop Score 2014	%	39.68%	30.16%	35.21%
Blue Drop Score 2012	%	61.24%	42.63%	61.16%
Blue Drop Score 2011	%	46.13%	28.94%	38.84%
System Design Capacity	kL/d	2 000	1 500	5 200
System Available Capacity	kL/d	2 000	1 500	5 200
System Input Value	kL/d	2 000	1 500	4 496
Capacity Utilisation	%	100.00%	100.00%	89.85%
Resource Abstracted From		Klein - Vis	5 Boreholes	Klein - Vis
BDRR 2023	%	62.90%	39.24%	53.11%
BDRR 2022	%	61.10%	44.50%	53.20%

Technical Site Assessment: Orange Fish WTW (Somerset East) – 64%

5.5 Buffalo City Metropolitan Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	83.48%
Blue Drop Score 2014	%	72.79%
Blue Drop Score 2012	%	92.55%
Blue Drop Score 2011	%	91.28%

Key Performance Area	Weight	Laing	Peddie	Sandile	Mdantsane
Bulk/WSP		Amatola Water	Amatola Water	Amatola Water	Amatola Water
Blue Drop Score 2023	%	68.96%	78.14%	73.48%	68.21%
Blue Drop Score 2014	%	71.34%	67.58%	77.99%	83.37%
Blue Drop Score 2012	%	95.13%	NI	76.42%	95.38%
Blue Drop Score 2011	%	92.44%	NI	89.34%	81.97%
System Design Capacity	kL/d	33 000	6 500	18 000	66 700
System Available Capacity	kL/d	33 000	6 500	18 000	66 700
System Input Value	kL/d	22 665	4 598	11 567	28 290
Capacity Utilisation	%	73.60%	109.58%	110.11%	78.81%
Resource Abstracted From		Laing Dam, Buffalo River	Craighead Weir (Keiskamma River). Released from Sandile Dam	Sandile Dam	Nahoon Dam & River
BDRR 2023	%	49.61%	49.47%	56.59%	53.52%
BDRR 2022	%	49.70%	50.70%	52.40%	52.80%

Key Performance Area	Weight	Kei Road	King Williams Town	Umzonyana (East London)	Kidds Beach
Bulk/WSP		Amatole DM	-	-	-
Blue Drop Score 2023	%	75.31%	91.56%	91.03%	81.66%
Blue Drop Score 2014	%	19.53%	82.82%	70.30%	45.07%
Blue Drop Score 2012	%	7.43%	95.00%	95.06%	61.16%
Blue Drop Score 2011	%	64.58%	96.57%	95.29%	56.06%
System Design Capacity	kL/d	4 700	12 500	120 000	259
System Available Capacity	kL/d	3 400	12 500	120 000	260
System Input Value	kL/d	195	9 000	110 000	180
Capacity Utilisation	%	78.91%	72.00%	91.67%	69.23%
Resource Abstracted From		Wriggleswade Dam (Kumasi River)	Rooikrantz Dam (Buffalo River)	Briddle Drift, Buffalo River	Boreholes
BDRR 2023	%	50.88%	25.09%	31.75%	25.17%
BDRR 2022	%	49.70%	28.90%	31.00%	29.80%

Key Performance Area	Weight	Majali	Siyathemba
Bulk/WSP		-	-
Blue Drop Score 2023	%	**82.00%**	**83.84%**
Blue Drop Score 2014	%	48.82%	NI
Blue Drop Score 2012	%	NI	NI
Blue Drop Score 2011	%	20.25%	NI
System Design Capacity	kL/d	224	38
System Available Capacity	kL/d	324	38
System Input Value	kL/d	359	30
Capacity Utilisation	%	110.80%	78.95%
Resource Abstracted From		Boreholes	Boreholes
BDRR 2023	%	27.67%	19.51%
BDRR 2022	%	25.50%	37.40%

Technical Site Assessment: Umzonyana WTW - 85%

5.6 Chris Hani District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	45.27%
Blue Drop Score 2014	%	83.42%
Blue Drop Score 2012	%	75.23%
Blue Drop Score 2011	%	73.47%

Key Performance Area	Weight	EMALAHLENI - Indwe Supply System	EMALAHLENI - Machubeni Supply System	EMALAHLENI-Dordrecht Supply System	ENGCOBO - Engcobo Town Supply System
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	33.85%	48.40%	35.90%	66.15%
Blue Drop Score 2014	%	86.50%	88.35%	86.08%	89.47%
Blue Drop Score 2012	%	84.35%	87.84%	84.49%	90.77%
Blue Drop Score 2011	%	79.35%	83.08%	68.46%	54.09%
System Design Capacity	kL/d	12 000	3 400	2 000	1 800
System Available Capacity	kL/d	12 000	3 400	2 000	1 800
System Input Value	kL/d	1 137	1 770	1 343	1 008
Capacity Utilisation	%	9.48%	52.06%	67.15%	56.00%
Resource Abstracted From		Doring River	Machubeni Dam	Munnik Dam, Anderson Dam	Xuka River, Cefane River, Ngcotyana Stream
BDRR 2023	%	39.70%	42.21%	37.26%	18.42%
BDRR 2022	%	18.20%	28.50%	22.70%	25.70%

Key Performance Area	Weight	ENGCOBO-Nkobongo Supply System	INKWANCA - Molteno supply system	INKWANCA - Sterkstroom supply system	INTSIKA YETHU - Ncora Water Supply
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	54.63%	47.10%	42.45%	43.88%
Blue Drop Score 2014	%	84.88%	86.04%	87.42%	N/A
Blue Drop Score 2012	%	88.47%	95.20%	71.75%	N/A
Blue Drop Score 2011	%	56.12%	60.85%	59.86%	N/A
System Design Capacity	kL/d	720	2 856	2 388	5 000
System Available Capacity	kL/d	720	2 856	2 388	5 000
System Input Value	kL/d	270	1 435	2 073	5 000
Capacity Utilisation	%	NI	50.21%	59.10%	NI
Resource Abstracted From		Nkonbongo River	Stormbergspruit	Canvin Estates	Norca Dam
VROOM	Rand	-	-	-	-
BDRR 2023	%	32.54%	49.08%	53.04%	57.22%
BDRR 2022	%	33.00%	29.30%	30.90%	19.70%

Key Performance Area	Weight	INTSIKA YETHU - Tsojana Supply System	INTSIKA YETHU - Tsomo Service System	INXUBA YETHEMBA - Cradock Supply System	INXUBA YETHEMBA - Middelburg supply system-treated
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**52.43%**	**56.05%**	**48.33%**	**44.92%**
Blue Drop Score 2014	%	81.64%	83.34%	88.80%	74.96%
Blue Drop Score 2012	%	92.82%	N/A	71.14%	66.39%
Blue Drop Score 2011	%	82.80%	68.03%	82.34%	56.22%
System Design Capacity	kL/d	5 000	25 000	24 000	8 928
System Available Capacity	kL/d	5 000	25 000	24 000	8 930
System Input Value	kL/d	3 204	341	13 168	8 928
Capacity Utilisation	%	64.06%	1.36%	54.87%	0.00%
Resource Abstracted From		Tsojana	Tsomo	Groot - Vis	Grootfontein Boreholes
BDRR 2023	%	41.17%	29.41%	27.76%	51.05%
BDRR 2022	%	33.00%	20.90%	27.50%	39.90%

Key Performance Area	Weight	LUKHANJI - Queenstown Supply System	LUKHANJI - Whittlesea Supply System	SAKHISIZWE - Cala Supply System	SAKHISIZWE - (Farms & Rural - Treated)
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**49.00%**	**49.15%**	**44.20%**	**29.05%**
Blue Drop Score 2014	%	92.80%	56.89%	81.71%	35.71%
Blue Drop Score 2012	%	87.23%	90.95%	83.89%	2.10%
Blue Drop Score 2011	%	84.49%	73.29%	55.67%	42.83%
System Design Capacity	kL/d	40 000	11 250	4 716	422
System Available Capacity	kL/d	40 000	11 250	4 716	422
System Input Value	kL/d	20 835	4 796	2 441	422
Capacity Utilisation	%	52.09%	42.63%	1.66%	0.00%
Resource Abstracted From		Bonkolo, Xonxa	Water Down Dam located on the Klipplaat River	Tsomo River, Zindlwana spring	Borehole
BDRR 2023	%	45.44%	35.15%	30.56%	67.13%
BDRR 2022	%	40.30%	24.20%	62.90%	54.50%

Key Performance Area	Weight	SAKHISIZWE - Elliot Supply System	SAKHISIZWE-Xhalanga Supply System	SAKHISIZWE-Cala Package System	TSOLWANA: Hofmeyer supply system
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**47.34%**	**42.43%**	**34.85%**	**28.82%**
Blue Drop Score 2014	%	81.51%	N/A	N/A	74.38%
Blue Drop Score 2012	%	81.89%	N/A	N/A	73.97%

Key Performance Area	Weight	SAKHISIZWE - Elliot Supply System	SAKHISIZWE-Xhalanga Supply System	SAKHISIZWE-Cala Package System	TSOLWANA: Hofmeyer supply system
Blue Drop Score 2011	%	51.24%	N/A	N/A	N/A
System Design Capacity	kL/d	4 049	1	242	1 379
System Available Capacity	kL/d	4 049	1	242	1 379
System Input Value	kL/d	2 845	1	37	1 379
Capacity Utilisation	%	63.60%	NI	NI	0.00%
Resource Abstracted From		Thomson dam	Cala, Tsomo	Tsomo river	Borehole
BDRR 2023	%	48.63%	22.18%	45.79%	57.17%
BDRR 2022	%	25.70%	19.10%	62.90%	22.10%

Key Performance Area	Weight	TSOLWANA: Ntabathemba supply system	TSOLWANA: Tarkastad Supply System
Bulk/WSP		-	-
Blue Drop Score 2023	%	**32.20%**	**21.02%**
Blue Drop Score 2014	%	68.81%	72.71%
Blue Drop Score 2012	%	71.38%	76.22%
Blue Drop Score 2011	%	N/A	N/A
System Design Capacity	kL/d	5 328	1 814
System Available Capacity	kL/d	5 328	1 814
System Input Value	kL/d	6 317	1 814
Capacity Utilisation	%	5.19%	0.00%
Resource Abstracted From		Borehole	Game Reserve Borehole
BDRR 2023	%	20.04%	62.58%
BDRR 2022	%	52.60%	59.20%

Technical Site Assessment: Tsomo WTW - 85%

The Regulator notes the dire state of management and drinking water quality in the Farms & Rural, Hofmeyer and Tarkastad water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

5.7 Dr Beyers Naude Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	**24.19%**
Blue Drop Score 2014	%	**61.05%**
Blue Drop Score 2012	%	**51.65%**
Blue Drop Score 2011	%	**32.95%**

Key Performance Area	Weight	Aberdeen	Graaff-Reinet	Jansenville	Klipplaat
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**29.78%**	**29.60%**	**12.48%**	**22.98%**
Blue Drop Score 2014	%	42.08%	68.20%	13.59%	21.90%
Blue Drop Score 2012	%	42.11%	53.49%	6.11%	19.39%
Blue Drop Score 2011	%	33.38%	32.81%	33.98%	38.61%
System Design Capacity	kL/d	3 400	16 000	2 000	2 000
System Available Capacity	kL/d	3 400	12 000	2 000	2 000
System Input Value	kL/d	1 829	5 777	1 500	400
Capacity Utilisation	%	53.79%	48.14%	75.00%	20.00%
Resource Abstracted From		Aberdeen boreholes	Nqweba Dam of Sundays River, Northern Groundwater, Southwestern Newfare, Momes Groundwater	Jansenville Borehole scheme	Heeningklip river at Klipfontein dam
BDRR 2023	%	46.10%	42.94%	79.52%	43.52%
BDRR 2022	%	45.00%	55.20%	88.50%	39.90%

Key Performance Area	Weight	Nieu-Bethesda	Rietbron	Steytlerville	WaterFord
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**14.85%**	**15.73%**	**16.78%**	**5.50%**
Blue Drop Score 2014	%	34.93%	24.90%	25.37%	7.08%
Blue Drop Score 2012	%	42.86%	NI	33.04%	2.55%
Blue Drop Score 2011	%	43.28%	NI	14.13%	4.10%
System Design Capacity	kL/d	830	250	1 700	10
System Available Capacity	kL/d	830	250	1 700	500
System Input Value	kL/d	220	226	695	260
Capacity Utilisation	%	26.51%	90.40%	40.88%	NI
Resource Abstracted From		Nieu-Bethesda Fountain and groundwater	Rietbron Borehole Scheme	Erasmuskloof Rivier and Steytlerville borehole scheme	Groundwater
BDRR 2023	%	63.01%	65.24%	48.21%	100.00%
BDRR 2022	%	72.50%	24.30%	87.10%	96.90%

Key Performance Area	Weight	Willowmore	Wolwefontein
Bulk/WSP		-	-
Blue Drop Score 2023	%	**17.98%**	**22.20%**
Blue Drop Score 2014	%	27.64%	9.65%
Blue Drop Score 2012	%	36.46%	3.85%
Blue Drop Score 2011	%	37.33%	14.55%
System Design Capacity	kL/d	3 700	100
System Available Capacity	kL/d	3 700	100
System Input Value	kL/d	1 486	100
Capacity Utilisation	%	23.50%	NI
Resource Abstracted From		Groundwater and Wanhoop fountain	1 Borehole
BDRR 2023	%	48.50%	50.54%
BDRR 2022	%	29.90%	96.60%

Technical Site Assessment: Graaf Reinet WTW - 80%

The Regulator notes the dire state of management and drinking water quality in the Aberdeen, Graaff-Reinet, Jansenville, Klipplaat, Nieu-Bethesda, Rietbron, Steytlerville, WaterFord, Willowmore and Wolwefontein water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

5.8 Joe Gqabi District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	55.99%
Blue Drop Score 2014	%	74.69%
Blue Drop Score 2012	%	85.18%
Blue Drop Score 2011	%	83.49%

Key Performance Area	Weight	Maclear	Ugie	Mount Fletcher	Barkly East
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	50.97%	50.69%	55.74%	63.63%
Blue Drop Score 2014	%	63.70%	86.08%	65.56%	78.62%
Blue Drop Score 2012	%	63.47%	97.10%	NI	84.95%
Blue Drop Score 2011	%	78.81%	95.05%	NI	85.95%
System Design Capacity	kL/d	1 750	6 000	6 500	4 800
System Available Capacity	kL/d	1 720	6 000	6 500	4 800
System Input Value	kL/d	2 011	2 862	3 300	3 283
Capacity Utilisation	%	165.76%	47.70%	55.00%	68.40%
Resource Abstracted From		Mooi River, Mountain springs feeding Maclear dam, groundwater (baseflows) feeding Aucamp dam	Wildebeest River	Tina River	Langkloofspruit River
BDRR 2023	%	60.77%	33.85%	41.22%	27.86%
BDRR 2022	%	17.10%	30.00%	19.10%	21.00%

Key Performance Area	Weight	Lady Grey	Rhodes	Jozana	Rossouw
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	62.25%	67.83%	43.88%	40.40%
Blue Drop Score 2014	%	59.64%	76.26%	NI	NI
Blue Drop Score 2012	%	69.01%	61.03%	NI	NI
Blue Drop Score 2011	%	66.71%	77.66%	NI	47.68%
System Design Capacity	kL/d	4 800	500	1 080	75
System Available Capacity	kL/d	3 840	500	1 080	43
System Input Value	kL/d	1 393	113	704	43
Capacity Utilisation	%	36.28%	22.60%	65.20%	NI
Resource Abstracted From		Wilgespruit River	Bell River	Jozana Dam	Groundwater via Rossouw Boreholes
BDRR 2023	%	22.69%	13.69%	37.22%	36.59%
BDRR 2022	%	26.60%	12.40%	25.20%	24.50%

Key Performance Area	Weight	Sterkspruit	Aliwal North	Burgersdorp	Jamestown
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	49.15%	64.30%	51.05%	63.71%
Blue Drop Score 2014	%	83.85%	77.10%	81.69%	64.41%
Blue Drop Score 2012	%	95.90%	83.00%	85.25%	76.92%
Blue Drop Score 2011	%	95.02%	84.93%	64.19%	64.55%
System Design Capacity	kL/d	12 000	14 400	4 800	1 200
System Available Capacity	kL/d	12 000	14 400	4 400	1 440
System Input Value	kL/d	6 138	8 095	3 117	355
Capacity Utilisation	%	51.15%	56.21%	70.84%	24.65%
Resource Abstracted From		Jozana Dam	Orange River	J.L. De Bruin and Stormbergspruit River	Skulpspruit
BDRR 2023	%	47.96%	30.97%	37.21%	18.69%
BDRR 2022	%	38.20%	35.40%	35.70%	23.50%

Key Performance Area	Weight	Oviston	Steynsburg
Bulk/WSP		-	-
Blue Drop Score 2023	%	50.84%	56.24%
Blue Drop Score 2014	%	79.54%	68.22%
Blue Drop Score 2012	%	78.19%	NI
Blue Drop Score 2011	%	82.03%	NI
System Design Capacity	kL/d	4 500	2 000
System Available Capacity	kL/d	2 600	2 000
System Input Value	kL/d	2 480	1 800
Capacity Utilisation	%	95.38%	90.00%
Resource Abstracted From		Gariep Dam	Gariep Dam
BDRR 2023	%	37.21%	26.59%
BDRR 2022	%	33.30%	32.70%

Technical Site Assessment: Barkley East water system – 83%

5.9 Kouga Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	64.59%
Blue Drop Score 2014	%	51.83%
Blue Drop Score 2012	%	60.69%
Blue Drop Score 2011	%	74.93%

Key Performance Area	Weight	Hankey	Humansdorp	Jeffreys Bay	Loerie
Bulk/WSP		-	Nelson Mandela MM	Nelson Mandela MM	Nelson Mandela MM
Blue Drop Score 2023	%	53.59%	73.12%	70.96%	65.31%
Blue Drop Score 2014	%	33.49%	58.85%	59.86%	52.36%
Blue Drop Score 2012	%	52.86%	58.66%	73.17%	89.04%
Blue Drop Score 2011	%	45.67%	44.93%	68.68%	82.30%
System Design Capacity	kL/d	2 000	202 500	204 500	100 000
System Available Capacity	kL/d	2 000	102 500	104 500	100 000
System Input Value	kL/d	2 100	7 000	12 600	6 000
Capacity Utilisation	%	105.00%	45.07%	35.14%	17.23%
Resource Abstracted From		Gamtoos	Churchill, Springs north of Humansdorp	Boreholes, Churchill Dam- Purchase water	Loerie
BDRR 2023	%	26.40%	37.75%	25.85%	23.86%
BDRR 2022	%	21.70%	39.10%	29.50%	54.90%

Key Performance Area	Weight	Oyster Bay	Patensie	St. Francis Bay	Thornhill
Bulk/WSP		-	-	Nelson Mandela MM	Nelson Mandela MM
Blue Drop Score 2023	%	50.74%	44.60%	62.11%	53.21%
Blue Drop Score 2014	%	32.85%	30.32%	52.20%	53.33%
Blue Drop Score 2012	%	46.46%	55.39%	85.91%	85.91%
Blue Drop Score 2011	%	44.46%	44.08%	58.30%	81.50%
System Design Capacity	kL/d	800	1 900	200 000	100 000
System Available Capacity	kL/d	800	1 900	0	1 000 000
System Input Value	kL/d	800	1 900	1 500	6 000
Capacity Utilisation	%	100.00%	100.00%	0.00%	1.72%
Resource Abstracted From		Borehole Wind Farm	Gamtoos	Impofu	Loerie
BDRR 2023	%	22.42%	27.19%	25.47%	26.25%
BDRR 2022	%	50.90%	29.80%	62.30%	50.70%

Technical Site Assessment: Jefferies Bay WTW - 91%

5.10 Koukamma Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	24.05%
Blue Drop Score 2014	%	25.77%
Blue Drop Score 2012	%	5.60%
Blue Drop Score 2011	%	14.36%

Key Performance Area	Weight	Blikkiesdorp	Clarkson	Coldstream	Joubetina
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	27.70%	26.68%	30.40%	21.80%
Blue Drop Score 2014	%	0.00%	26.47%	22.84%	29.16%
Blue Drop Score 2012	%	Ni	3.39%	6.00%	3.39%
Blue Drop Score 2011	%	NI	13.11%	11.55%	12.04%
System Design Capacity	kL/d	80	345	79	690
System Available Capacity	kL/d	0	0	290	900
System Input Value	kL/d	80	360	79	864
Capacity Utilisation	%	NI	NI	27.24%	96.00%
Resource Abstracted From		Boreholes- 1 Northern side of settlements- Elevated storage tanks	Boreholes and weirs	Lottering river	Joubertina Dam
BDRR 2023	%	44.46%	90.14%	41.94%	91.12%
BDRR 2022	%	39.10%	74.90%	18.70%	73.40%

Key Performance Area	Weight	Kareedouw	Krakeel	Louterwater	Misgund
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	28.40%	24.90%	12.70%	14.10%
Blue Drop Score 2014	%	27.83%	19.78%	20.56%	16.83%
Blue Drop Score 2012	%	3.39%	3.39%	24.39%	19.59%
Blue Drop Score 2011	%	13.30%	6.06%	30.84%	10.13%
System Design Capacity	kL/d	2 400	404	720	287
System Available Capacity	kL/d	1 777	0	0	0
System Input Value	kL/d	2 400	404	720	287
Capacity Utilisation	%	47.27%	NI	NI	NI
Resource Abstracted From		Assegaai Bosch stream, eerste, derder and Weir	Bulk Water 4 Boreholes and 2 fountains at bottom of town	Boreholes in Louterwater and dam	Boreholes in Misgund
BDRR 2023	%	38.75%	90.14%	88.64%	95.35%
BDRR 2022	%	72.20%	88.80%	85.90%	20.40%

Key Performance Area	Weight	Sandrif	Storms River	Woodlands
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	**24.70%**	**25.08%**	**23.78%**
Blue Drop Score 2014	%	26.03%	19.78%	27.20%
Blue Drop Score 2012	%	3.09%	3.39%	5.64%
Blue Drop Score 2011	%	11.68%	11.57%	13.32%
System Design Capacity	kL/d	360	288	360
System Available Capacity	kL/d	0	0	62
System Input Value	kL/d	360	288	360
Capacity Utilisation	%	NI	NI	480.65%
Resource Abstracted From		Mountain stream-Sanddrfit River	Witklip River	Mountain Spring and boreholes
BDRR 2023	%	41.94%	91.40%	41.03%
BDRR 2022	%	76.80%	38.50%	36.30%

Technical Site Assessment: Kareedouw WTW - 50%

The Regulator notes the dire state of management and drinking water quality in the Blikkiesdorp, Clarkson, Coldstream, Joubetina, Kareedouw, Krakeel, Louterwater, Misgund, Sanddrif, Storms River and Woodlands water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

5.11 Makana Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	**32.46%**
Blue Drop Score 2014	%	**70.83%**
Blue Drop Score 2012	%	**71.90%**
Blue Drop Score 2011	%	**55.07%**

Key Performance Area	Weight	Grahamstown	Alicedale	Riebeeck East
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	**32.41%**	**31.55%**	**36.65%**
Blue Drop Score 2014	%	70.64%	68.59%	83.04%
Blue Drop Score 2012	%	71.86%	72.11%	75.09%
Blue Drop Score 2011	%	55.77%	48.03%	63.62%
System Design Capacity	kL/d	18 000	1 600	1 000
System Available Capacity	kL/d	18 000	1 600	1 000
System Input Value	kL/d	17 000	480	300
Capacity Utilisation	%	47.65%	30.00%	30.00%
Resource Abstracted From		Glem Melville Dam; Howiesonspoort Dam	Boreholes	6 Boreholes
BDRR 2023	%	53.85%	84.42%	38.48%
BDRR 2022	%	95.00%	47.80%	48.70%

Technical Site Assessment: James Kleynhans WTW - 68%

5.12 Ndlambe Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	57.55%
Blue Drop Score 2014	%	49.47%
Blue Drop Score 2012	%	42.37%
Blue Drop Score 2011	%	20.93%

Key Performance Area	Weight	Albany Coast	Cannon Rock	Port Alfred	Bathurst
Bulk/WSP		Amatola Water	-	-	-
Blue Drop Score 2023	%	57.27%	71.85%	57.53%	55.98%
Blue Drop Score 2014	%	69.27%	NI	43.46%	40.31%
Blue Drop Score 2012	%	23.40%	46.00%	25.60%	26.65%
Blue Drop Score 2011	%	43.86%	20.68%	15.77%	15.39%
System Design Capacity	kL/d	1 800	650	10 000	500
System Available Capacity	kL/d	1 800	500	10 000	430
System Input Value	kL/d	1 446	184	4 427	367
Capacity Utilisation	%	80.33%	36.80%	46.66%	85.42%
Resource Abstracted From		Boreholes	Boreholes	Kowie River & Sea water & Boreholes	Golden Ridge Dam, Mansfield Dam, Boreholes
BDRR 2023	%	54.63%	18.60%	31.61%	40.17%
BDRR 2022	%	73.10%	23.90%	60.30%	49.40%

Key Performance Area	Weight	Seafield / Kleinemonde
Bulk/WSP		-
Blue Drop Score 2023	%	51.00%
Blue Drop Score 2014	%	31.03%
Blue Drop Score 2012	%	26.35%
Blue Drop Score 2011	%	13.86%
System Design Capacity	kL/d	1 000
System Available Capacity	kL/d	1 000
System Input Value	kL/d	243
Capacity Utilisation	%	24.27%
Resource Abstracted From		Mount Welliten Dam
BDRR 2023	%	40.69%
BDRR 2022	%	42.10%

Technical Site Assessment: Cannon Rocks-Boknes WTW - 92%

5.13 Nelson Mandela Bay Metropolitan Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	85.03%
Blue Drop Score 2014	%	72.43%
Blue Drop Score 2012	%	90.04%
Blue Drop Score 2011	%	90.11%

Key Performance Area	Weight	Nelson Mandela MM (Whole system)
Bulk/WSP		-
Blue Drop Score 2023	%	85.03%
Blue Drop Score 2014	%	72.43%
Blue Drop Score 2012	%	90.04%
Blue Drop Score 2011	%	90.11%
System Design Capacity	kL/d	555 750
System Available Capacity	kL/d	555 750
System Input Value	kL/d	281 358
Capacity Utilisation	%	61.82%
Resource Abstracted From		Churchill, Groendal, Impofu, Loerie, Sandrivier, Sandrivier, Sondags
BDRR 2023	%	45.87%
BDRR 2022	%	31.90%

Technical Site Assessment: Linton WTW - 87%

5.14 OR Tambo District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	56.66%
Blue Drop Score 2014	%	41.18%
Blue Drop Score 2012	%	22.70%
Blue Drop Score 2011	%	43.69%

Key Performance Area	Weight	Butongweni	Coffee Bay	Corana	Flagstaff
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	38.98%	51.99%	56.64%	54.33%
Blue Drop Score 2014	%	NI	40.11%	49.65%	41.34%
Blue Drop Score 2012	%	NI	28.35%	22.76%	51.44%
Blue Drop Score 2011	%	NI	37.66%	44.61%	43.41%
System Design Capacity	kL/d	1 000	3 000	3 500	1 200
System Available Capacity	kL/d	0	3 000	3 500	1 200
System Input Value	kL/d	0	1 231	3 500	0
Capacity Utilisation	%	NI	41.03%	NI	NI
Resource Abstracted From		Mthakatya River	Mtata River	Gunyeni River	Gadu River
BDRR 2023	%	52.57%	37.83%	56.98%	53.64%
BDRR 2022	%	NI	48.80%	21.50%	80.40%

Key Performance Area	Weight	Lusikisiki	Mangxamfu	Mdlankala	Mhlahlane
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	50.53%	36.43%	44.93%	54.89%
Blue Drop Score 2014	%	34.99%	NI	47.83%	38.73%
Blue Drop Score 2012	%	28.14%	NI	29.64%	33.29%
Blue Drop Score 2011	%	42.16%	NI	44.16%	35.09%
System Design Capacity	kL/d	2 800	1 000	2 200	4 500
System Available Capacity	kL/d	2 800	0	2 000	4 500
System Input Value	kL/d	2 680	0	510	234
Capacity Utilisation	%	95.71%	NI	25.50%	5.20%
Resource Abstracted From		Xurha River	Xilinxa River and Hlabathi River	Mntafufu	Mtata River at Mabaleni Dam
BDRR 2023	%	66.05%	44.72%	58.99%	32.40%
BDRR 2022	%	48.80%	NI	48.80%	41.60%

Key Performance Area	Weight	Mhlanga	Mqanduli	Mvumelwano	Ngqeleni
Bulk/WSP		-	-	-	-

Key Performance Area	Weight	Mhlanga	Mqanduli	Mvumelwano	Ngqeleni
Blue Drop Score 2023	%	**53.48%**	**46.63%**	**62.41%**	**54.21%**
Blue Drop Score 2014	%	35.10%	29.60%	43.56%	39.70%
Blue Drop Score 2012	%	27.09%	21.99%	21.86%	25.45%
Blue Drop Score 2011	%	38.96%	51.94%	37.16%	34.19%
System Design Capacity	kL/d	2 000	1 000	2 400	500
System Available Capacity	kL/d	2 000	1 000	2 400	400
System Input Value	kL/d	2 000	1 000	867	182
Capacity Utilisation	%	NI	NI	36.13%	45.50%
Resource Abstracted From		Mhlanga River	Manqondo River	Itsitsa River	Mnguzena at Nzwakazi Dam
BDRR 2023	%	72.33%	49.76%	37.03%	31.62%
BDRR 2022	%	60.50%	41.10%	58.70%	37.20%

Key Performance Area	Weight	Ngqonweni	Port St Johns	Rosedale	Sidwadweni
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**48.13%**	**53.76%**	**61.60%**	**66.03%**
Blue Drop Score 2014	%	NI	NI	NI	50.07%
Blue Drop Score 2012	%	NI	NI	NI	47.54%
Blue Drop Score 2011	%	NI	NI	NI	53.46%
System Design Capacity	kL/d	2 100	6 000	1 500	1 800
System Available Capacity	kL/d	2 100	6 000	1 500	1 800
System Input Value	kL/d	72	5 918	161	1 800
Capacity Utilisation	%	3.44%	98.63%	10.73%	NI
Resource Abstracted From		Ngqongweni River	Mngaza River at Bulolo Dam	Mtata River	Nqadu dam
BDRR 2023	%	38.87%	54.65%	27.20%	29.50%
BDRR 2022	%	NI	54.24%	NI	56.14%

Key Performance Area	Weight	Thornhill	Tsolo	Umzimvubu	Upper Chulunca
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**58.29%**	**56.04%**	**43.03%**	**53.05%**
Blue Drop Score 2014	%	39.35%	50.03%	NI	32.31%
Blue Drop Score 2012	%	27.51%	35.44%	NI	27.59%
Blue Drop Score 2011	%	53.14%	51.14%	NI	40.41%
System Design Capacity	kL/d	80 000	1 400	2 500	2 500
System Available Capacity	kL/d	80 000	1 400	2 500	2 500
System Input Value	kL/d	48 724	1 400	2 500	989
Capacity Utilisation	%	60.91%	NI	NI	39.56%

Key Performance Area	Weight	Thornhill	Tsolo	Umzimvubu	Upper Chulunca
Resource Abstracted From		Mtata River and Mtata dam	Xhokonxa River	Mngaza River	Cengcane Dam (surface runoff)
BDRR 2023	%	43.19%	48.27%	75.27%	35.76%
BDRR 2022	%	52.50%	35.46%	52.70%	35.46%

Technical Site Assessment: Thornhill WTW - 86%

5.15 Sunday River Valley Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	25.60%
Blue Drop Score 2014	%	35.96%
Blue Drop Score 2012	%	25.37%
Blue Drop Score 2011	%	35.55%

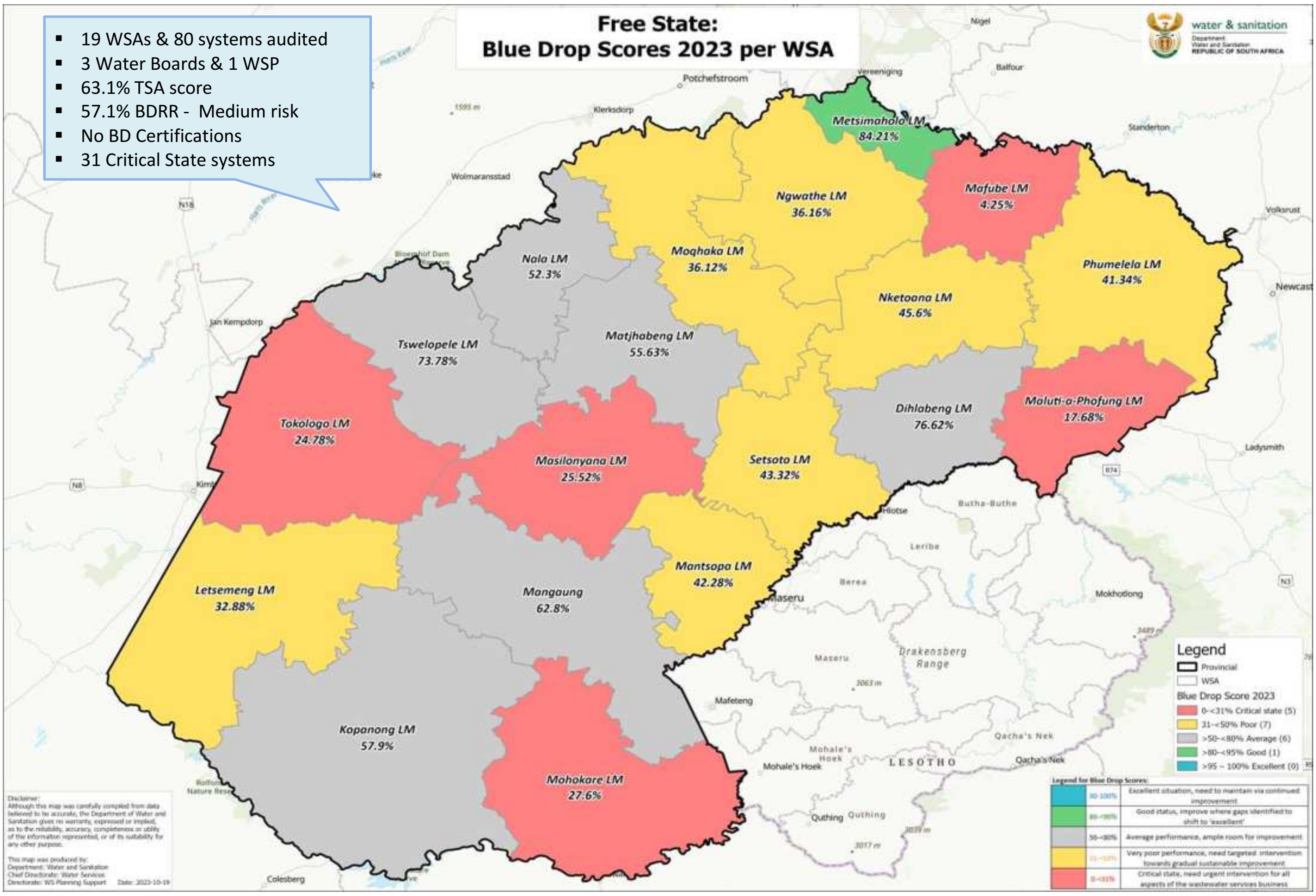
Key Performance Area	Weight	Addo WTW	Enon-Bersheba WTW	Kirkwood WTW
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	23.83%	34.98%	21.20%
Blue Drop Score 2014	%	46.09%	40.18%	31.73%
Blue Drop Score 2012	%	22.90%	25.33%	28.33%
Blue Drop Score 2011	%	33.67%	38.92%	38.72%
System Design Capacity	kL/d	7 776	3 456	5 127
System Available Capacity	kL/d	3 500	3 000	5 000
System Input Value	kL/d	3 500	3 000	5 000
Capacity Utilisation	%	222.17%	101.53%	102.54%
Resource Abstracted From		Gariep Dam and Water Irrigation Board Cannel	Canal from Gariep dam- Payment made to irrigation board	Gariep Dam Canal
BDRR 2023	%	65.00%	44.74%	76.40%
BDRR 2022	%	96.70%	45.40%	40.10%

Technical Site Assessment: Addo Nomathamsanqa WTW - 63%

The Regulator notes the dire state of management and drinking water quality in the Addo and Kirkwood water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

Firlands raw water pump station in excellent condition

Vaal Marina WTW: daily operational monitoring to ensure high quality water


19 WSAs & 80 systems audited
3 Water Boards & 1 WSP
63.1% TSA score
57.1% BDRR - Medium risk
No BD Certifications
31 Critical State systems
Free State:
Blue Drop Scores 2023 per WSA
water & sanitation
Metsimaholo LM 84.21%
Mafube LM 4.25%
Ngwathe LM 36.16%
Phumelela LM 41.34%
Moqhaka LM 36.12%
Nala LM 52.3%
Nketoana LM 45.6%
Matjhabeng LM 55.63%
Tswelopele LM 73.78%
Dihlabeng LM 76.62%
Maluti-a-Phofung LM 17.68%
Tokologo LM 24.78%
Masilonyana LM 25.52%
Setsoto LM 43.32%
Mantsopa LM 42.28%
Letsemeng LM 32.88%
Mangaung 62.8%
Kopanong LM 57.9%
Mohokare LM 27.6%
LESOTHO
Legend
Provincial
WSA
Blue Drop Score 2023
0-<31% Critical state (5)
31-<50% Poor (7)
>50-<80% Average (6)
>80-<95% Good (1)
>95 – 100% Excellent (0)


Eastern Cape:
Blue Drop Score Trend 2014 vs 2023 per WSA
water & sanitation
Alfred Nzo DM 2014: 62.87% 2023: 54.82%
Joe Gqabi DM 2014: 74.69% 2023: 55.99%
OR Tambo DM 2014: 41.18% 2023: 56.66%
Chris Hani DM 2014: 83.42% 2023: 45.27%
Amatole DM 2014: 80.24% 2023: 59.49%
Buffalo City LM 2014: 72.79% 2023: 83.48%
Blue Crane Route LM 2014: 35.1% 2023: 37.39%
Dr Beyers Naude LM 2014: 61.05% 2023: 24.19%
Makana LM 2014: 70.83% 2023: 32.46%
Ndlambe LM 2014: 49.47% 2023: 57.55%
Sundays River Valley LM 2014: 35.96% 2023: 25.6%
Nelson Mandela MM 2014: 72.43% 2023: 87.99%
Koukamma LM 2014: 25.77% 2023: 24.05%
Kouga LM 2014: 51.83% 2023: 64.59%
SOUTH AFRICA
LESOTHO
Legend
2014 vs 2023
2014 %
2023 %
WSA
Provincial

Provincial Synopsis

The Free State province provides drinking water to a total population of 3,028,741 persons in South Africa.

An audit attendance record of 100% of the 19 WSAs with 80 water supply systems across the province, 3 Water Boards (Bloem Water, Rand Water and Sedibeng Water) and MaP Water affirms the province's commitment to the Blue Drop national incentive-based regulatory programme. Bloem Water has taken over the Sedibeng Water supply systems and water treatment systems in the Free State and Northern Cape. It must be noted that Sedibeng Water was still in operation during the blue drop audit period and Bloem Water was not responsible for the respective systems over the audit period. Bloem Water has recently undergone a name change to Vaal Central Water (Government Gazette no. 48954 dated 13 July 2023). The main Bulk Water Supplier is Bloem Water who supplies potable water to 14 water supply systems in Mangaung MM and Kopanong LM and is followed by Sedibeng Water who supplies potable water to 7 water supply systems in Matjhabeng LM and Nala LM, and Rand Water who supplies potable water to 2 water supply systems in Metsimaholo LM and Ngwathe LM. The Regulator determined that no water supply system scored more than 95% when measured against the Blue Drop standards and thus did not qualify for the prestigious BD Certification. In 2014, 6 water supply systems were awarded Blue Drop status. Using the 2014 audit results as comparative baseline, the province shows a decline in excellence for 2023.

Only three (3) of 19 WSAs improved on their 2014 scores, namely Dihlabeng LM, Setsoto LM and Tswelopele LM. The remaining 16 WSAs regressed to lower Blue Drop scores compared to their 2014 baselines. The Metsimaholo LM (84.2%), Dihlabeng LM (76.6%) and Tswelopele LM (73.8%) are the best performing WSAs in the province. The Blue Drop scores of these top WSA performers were supported by technical site assessment scores of 82% for the Hoopstad WTW in Tswelopele LM, 68% for the Clarens and Fouriesburg WTWs in Dihlabeng LM, followed by the Deneysville WTW in Metsimaholo LM with a TSA score of 73%. 31 water supply systems were identified to be in a critical state in the province compared with 5 water supply systems in 2014.

The province's overall Blue Drop performance is characterised by particular strengths in none of the KPAs provincial averages <50% (KPAs 2 to 5) and 53.3% (KPA 1), with the exception of only 2 water supply systems that performed well with BD scores >80%, confirming that the combined with risk management practices are not well embedded in the water supply business. The KPAs that require attention and are reflecting scores below 50% are KPA 2 DWQ Risk Management (37.6%), KPA 3 Financial Management (49.3%), KPA 4 Technical Management (28.1%) and KPA 5 Drinking Water Quality Compliance (39.5%). The provincial Blue Drop Risk Rating (BDRR) remained in the average risk category but improved slightly from 61.9% in 2022 (BD PAT) to 57.1% in 2023. 34 (of 80) water supply systems are situated in the low risk category, 22 WSSs in the medium risk category, 13 WSSs in the high risk category, and 11 WSSs in the critical risk category.

The Regulator is optimistic that the 2023 Blue Drop report provides an updated residual basis from where a positive trajectory for water services delivery and improved performance will follow in the next BD audit. Municipalities and their service providers are encouraged to start preparation for the next Blue Drop audit cycle, which is planned to cover the financial year 2023/24 and released in 2025. The 2023 Blue Drop status for WSAs in the province are summarised in the table below.

Table 53 - 2023 Blue Drop Summary

WSA Name	2014 BD Score (%)	2023 BD Score (%)	2023 BD Certified ≥95%	2023 Critical State (<31%)
Dihlabeng LM	61.6%	76.6%↑	None	None
Kopanong LM	67.3%	57.9%↓	None	None
Letsemeng LM	62.6%	32.9%↓	None	None
Mafube LM	28.8%	4.3%↓	None	Frankfort, Tweeling, Villiers
Maluti-a-Phofung LM	97.7%	17.7%↓	None	Bluegumbosch, Kestell, Harankopane, Mphatlalatsane, Greater Qwaqwa, Makwane, Harrismith, Tshiame
Mangaung	77.5%	62.8%↓	None	Soutpan Krugersdrift Dam
Mantsopa LM	52.8%	42.3%↓	None	Hobhouse, Tweespruit
Masilonyana LM	29.6%	25.5%↓	None	Brandfort, Theunissen, Verkeerdevlei, Winburg
Matjhabeng LM	93.6%	55.6%↓	None	None
Metsimaholo LM	84.5%	84.2%↓	None	None
Mohokare LM	65.3%	27.6%↓	None	Rouxville, Smithfield, Zastron
Moqhaka LM	60.2%	36.1%↓	None	Steynsrus
Nala LM	81.3%	52.3%↓	None	None
Ngwathe LM	55.4%	36.2%↓	None	Parys, Vredefort, Koppies, Edenville boreholes
Nketoana LM	71.4%	45.6%↓	None	None
Phumelela LM	61.3%	41.3%↓	None	None
Setsoto LM	42.2%	43.3%↑	None	Clocolan, Senekal
Tokologo LM	56.8%	24.8%↓	None	Boshof, Dealesville
Tswelopele LM	70.1%	73.8%↑	None	None
Totals	-	-	0	31

↑= improvement, ↓= regress, →= no change

The Department of Water and Sanitation acknowledges the excellence in water services management achieved for the Blue Drop Audit year of 2021-22. No Blue Drop Certificates are awarded in the Free State Province.

Background to Water Delivery and Distribution Infrastructure

The total volume of water treated in the province is 788,990 kl/d. Nineteen (19) WSAs, 3 WBs (Bloem Water, Rand Water and Sedibeng Water)) and MaP Water are responsible for water services through a water network comprising of:

- 75 WTWs, boreholes and dams with the bulk of the water treated and supplied by the Mangaung MM (Bloem Water) and Matjhabeng LM WTWs with a total Average Daily Production of 238,530 kl/d and 292,000 kl/d respectively
- 23 (of 80) WSSs in 6 WSAs are provided with bulk potable water from Bloem Water, Rand Water and Sedibeng Water
- 228 pump stations, 1,480 km bulk water supply lines (10 of 19 WSAs), 6,172 km reticulation pipe lines (8 of 19 WSAs), and 335 reservoirs/ towers.

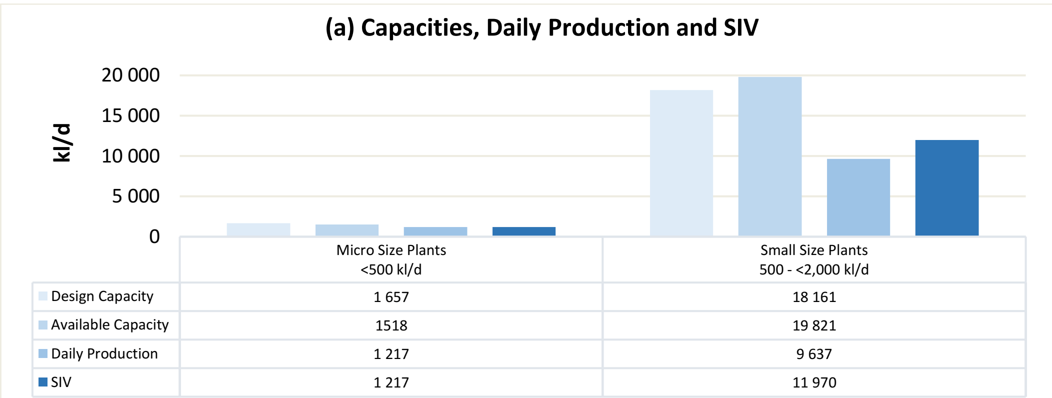
Table 54 - Summary of Capacities, Daily Production and SIV distribution according to plant sizes

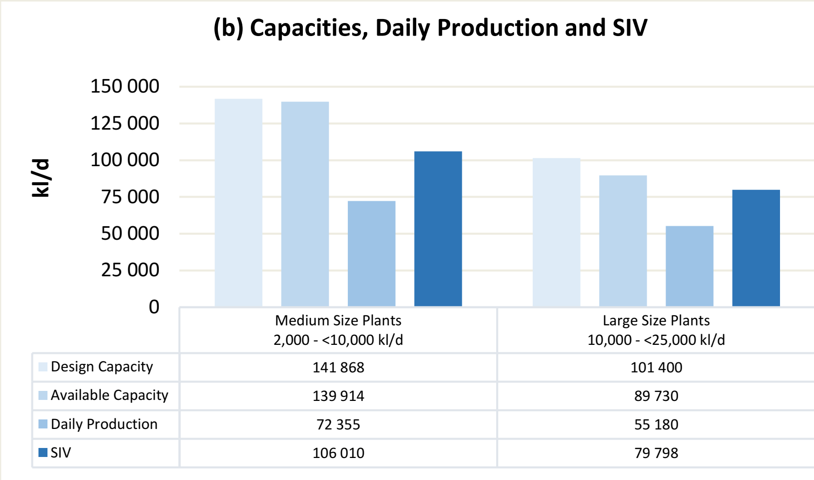
	Micro Size Plants	Small Size Plants	Medium Size Plants	Large Size Plants	Macro Size Plants	Unknown (NI)*	Total
	<500 kl/day	500 - <2,000 kl/day	2,000 - <10,000 kl/day	10,000 - <25,000 kl/day	>25,000 kl/day		
No. of WTWs, Boreholes, Springs	5 (7%)	18 (24%)	34 (45%)	8 (11%)	10 (13%)		75
Total Design Capacity (kl/day)	1,657	18,161	141,868	101,400	1,055,000	None	1,318,086
Total Available Capacity (kl/day)	1,518	19,821	139,914	89,730	1,021,325	None	1,272,308
Average Daily Treatment Volume (kl/day)	1,217	9,637	72,355	55,180	650,601	12 NI	788,990
Total SIV (kl/day)	1,217	11,970	106,010	79,798	592,648		791,643
Design Capacity Utilisation (%)	73%	53%	51%	54%	62%		60%
Available Capacity Utilisation (%)	80%	49%	52%	61%	64%		62%

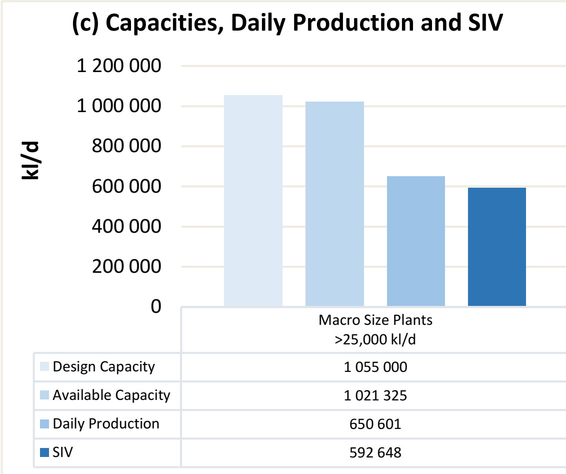
** "Unknown" means the number of WTWs with NI (No Information) on design capacity or available capacity or SIV*

The audit verified a total installed design capacity of 1,318,086 kl/d and a total available design capacity of 1,272,308 kl/d with most of this capacity residing in the macro-sized water treatment plants.

Collectively, the 75 WTWs produce 788,990 kl/d and distributes 791,643 kl/d across the water networks. By comparing the available treatment capacity with the treated water volume, a spare treatment capacity of 483,318 kl/d is available (38%) to meet additional future demands. However, the WUE for the province is high (ave. 261 l/p/d) compared to the international WUE benchmark of 180 l/p/d, indicating a high ratio between effective water use and actual water abstraction. Going forward, the province will have to dedicate significant resources to curb water losses and NRW.







Light blue to dark blue represents from left to right design capacity, available capacity, daily production and SIV

Figure 37 - Capacities, Daily Production and SIV Distribution - (a) micro to medium sized WTWs, (b) large WTWs, and (c) macro sized WTWs

In some cases, a Bulk Water Supplier supplies water across provincial borders and it is difficult to report accurately on design capacity and available capacity at provincial level, as the statistical data may become repetitive. Therefore, the reporting on the total system input volumes (SIV) would provide more accurate figures on the supply of treated water to the various water supply systems. The total SIV in the province is 791,643 kl/d and the average daily treatment volume is 788,990 kl/d and this indicates that the treated volume is nominally less than the total SIV (99.7%). The reasons for this could be that 18 WTWs/ boreholes/ etc. are not measuring their average daily treatment volumes, and Rand Water (from its two WTWs) are distributing water to 2 WSSs in the Metsimaholo LM and Ngwathe LM from the Gauteng province to the Free State province. The largest contributors to the total SIV are from the Mangaung MM (Bloem Water) and Matjhabeng LM WTWs with a total SIV contribution of 405,203 kl/d (51%). Diagnostic no. 2 to follow herein will unpack these statistics in more detail.

The water distribution infrastructure is summarised in the table below.

Table 55 - Summary of Water Distribution Infrastructure

WSA Name	# WSS with no WSP/WB	# WSS with WSP/WB	Water Distribution Infrastructure			
			# Pump Stations (#)	Bulk Water Supply Lines (km)	Reticulation pipe lines (km)	# Reservoirs/ Towers
Dihlabeng LM	3		13	49	611	27
Kopanong LM		8	9	94	348	17
Letsemeng LM	5		14	74	161	20
Mafube LM	3		8	NI	NI	8
Maluti-a-Phofung LM	8		19	NI	NI	28
Mangaung	2	5	17	854	2,861	40
Mantsopa LM	4	1	2	NI	302	21
Masilonyana LM	4		2	NI	NI	9
Matjhabeng LM		6	11	60	1,700	14
Metsimaholo LM	2	1	13	NI	NI	14
Mohokare LM	3		0	209	NI	10
Moqhaka LM	3		17	NI	NI	19
Nala LM		1	2	NI	NI	4
Ngwathe LM	4	1	8	NI	NI	25
Nketoana LM	4		11	71	NI	16
Phumelela LM	3		9	11	NI	16
Setsoto LM	4		1	11	19	12
Tokologo LM	3		64	NI	NI	27
Tswelopele LM	2		8	48	170	8
Totals	**57**	**23**	**228**	**1,480**	**6,172**	**335**

Provincial Blue Drop Analysis

The 100% response from the 19 WSAs audited demonstrates a firm commitment to water services management in the province. Local Government reforms resulted in the merging of Naledi LM into Mangaung Metro. Therefore, 19 WSAs were audited in 2023 compared to the 20 WSAs in 2014.

Table 56 - Blue Drop Comparative Analysis from 2012 to 2023

BLUE DROP COMPARATIVE ANALYSIS				
Performance Category	**2012**	**2014**	**2023**	**Performance trend 2014 and 2023**
Incentive-based indicators				
WSAs assessed (#)	20 (100%)	20 (100%)	19 (100%)	→
Water supply systems assessed (#)	79	79	80	↑
Blue Drop scores ≥50% (#)	45 (57%)	54 (68%)	33 (41%)	↓
Blue Drop scores <50% (#)	34 (43%)	25 (32%)	47 (59%)	↓
Blue Drop Certifications (#)	**7**	**6**	**0**	↓
Lowest Technical Site Assessment Score (%)	9%	30%	28%	↓
Highest Technical Site Assessment Score (%)	98%	91%	95%	↑

NA = Not Applied NI = No Information ↑= improvement, ↓= regress, →= no change

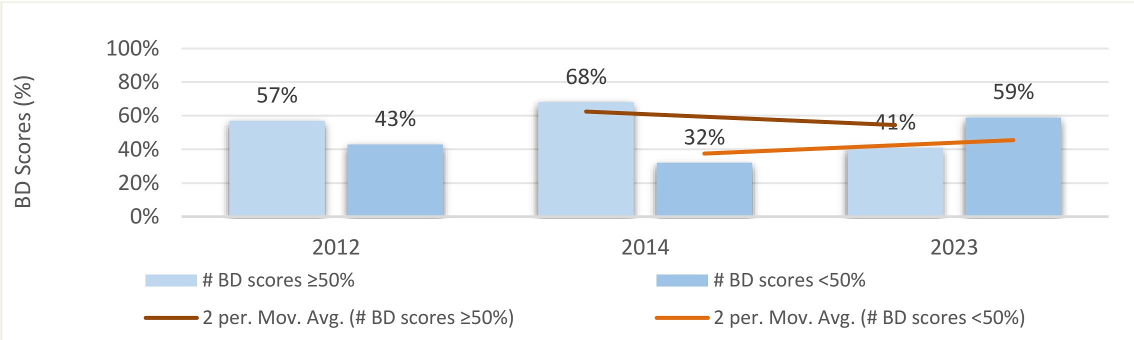


Figure 38 - Blue Drop trend analysis over the period 2012 to 2023, indicating the percentage BD scores above and below 50%

The trend analysis indicates that:

- The no. of systems audited has increased from 79 in 2014 to 80 in 2023
- The no. of systems with BD scores of ≥50% decreased from 54 (68%) in 2014 to 33 (41%) in 2023
- This trend was reversed with no. of systems with a BD score of ≤50% increasing from 25 (32%) in 2014 to 47 (59%) in 2023
- Blue Drop Certifications decreased from 6 awards in 2014 to 0 awards in 2023
- The lowest TSA score decreased from 30% in 2014 to 28% in 2023, with the highest TSA score increasing from 91% in 2014 to 95% in 2023
- An overall performance trend analyses indicates a regression in drinking water services from 2014 to 2023
- This negative trajectory reinforces the need for regular audits to ensure timely turnaround and continued improvement
- The negative trend also implies that performance has declined in the absence of regulatory engagement of the BD audits between 2014 to 2023.

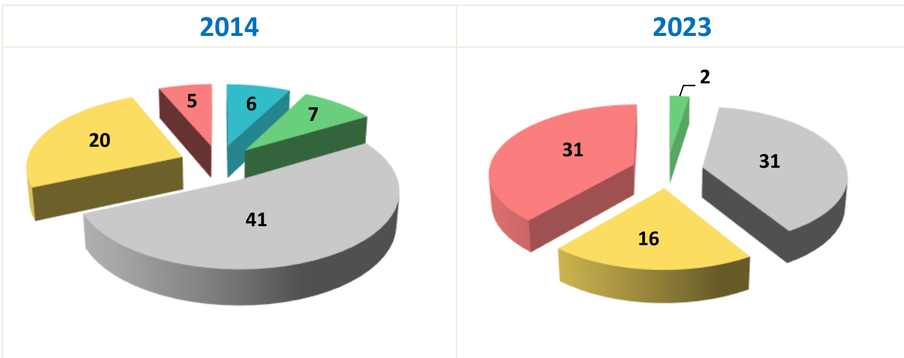


Figure 39 - No. WSSs in the Blue Drop score categories for 2014 and 2023 (graph legend to right)

Comparative analysis of the 2014 and 2023 blue drop scores indicates that only 2 system scores are in the >80-<95% (*Good Performance*) category, 31 systems reside in the >50-<80% (*Average Performance*) category, and 31 systems reside in the 0-<31% (*Critical state Performance*) category.

>95 – 100% Excellent	
>80-<95% Good	
>50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

In summary, trends over the years 2014 and 2023 indicate as follows:

- 31 Systems in a ‘critical state’
- Systems in a ‘poor state’ decreased from 20 to 16 systems
- Systems in an ‘average state’ decreased from 41 to 31 systems
- Systems in the ‘excellent and good state’ decreased from 13 systems (16%) to 2 systems (2.5%).

Provincial BDRR Analysis

The Blue Drop Risk Rating (BDRR) analysis assesses the risk across the entire water supply network. The BDRR formular was updated in 2021 to include an added risk indicator, i.e. ‘E: Water Safety Plans’, to address the risk assessment requirements outlined in SANS 241 of 2015. The BDRR now contains 5 risk indicators, i.e. design capacity (A), operational capacity (B), water quality compliance (C), technical capacity (D), and water safety plans (E). The results from the BDRR analyses are summarised in the table and figure following.

Table 57 - Municipal BDRR/BDRRmax Comparative Analysis from 2022 and 2023

BDRR/BDRR$_{max}$ COMPARATIVE ANALYSIS									
WSA Name	# WSSs	# WBs/ WSPs	2022 (BD PAT)	2023 (BD Audit)	Performance Trend 2022 and 2023	BDRR Risk Category Split			
						0-<50%	50-<70%	70-<90%	90-100%
Dihlabeng LM	3		71.8%	30.6%	↑	3			
Kopanong LM	8	8	82.6%	36.1%	↑	8			
Letsemeng LM	5		53.1%	55.5%	↓	1	4		
Mafube LM	3		95.1%	98.9%	↓				3
Maluti-a-Phofung LM	8		97.7%	93.4%	↑			3	5
Mangaung	7	5	72.5%	36.4%	↑	4	2	1	
Mantsopa LM	5	1	47.1%	50.5%	↓	2	3		
Masilonyana LM	4		69.0%	79.5%	↓			3	1
Matjhabeng LM	6	6	29.9%	57.9%	↓		6		
Metsimaholo LM	3	1	26.1%	30.2%	↓	3			
Mohokare LM	3		43.1%	45.6%	↓	2	1		
Moqhaka LM	3		63.4%	35.7%	↑	2	1		
Nala LM	1	1	45.6%	43.6%	↓	1			
Ngwathe LM	5	1	37.0%	42.6%	↓	1		2	2
Nketoana LM	4		46.3%	48.7%	↓	3	1		
Phumelela LM	3		96.6%	61.0%	↑		2	1	
Setsoto LM	4		58.7%	50.4%	↑	2	1	1	
Tokologo LM	3		100.0%	64.6%	↑		1	2	
Tswelopele LM	2		43.0%	23.2%	↑	2			
Totals & %BDRR/BDRR$_{max}$	**80**	**23**	**61.9%**	**57.1%**	↑	**34**	**22**	**13**	**11**

↑= improvement, ↓= regress, →= no change

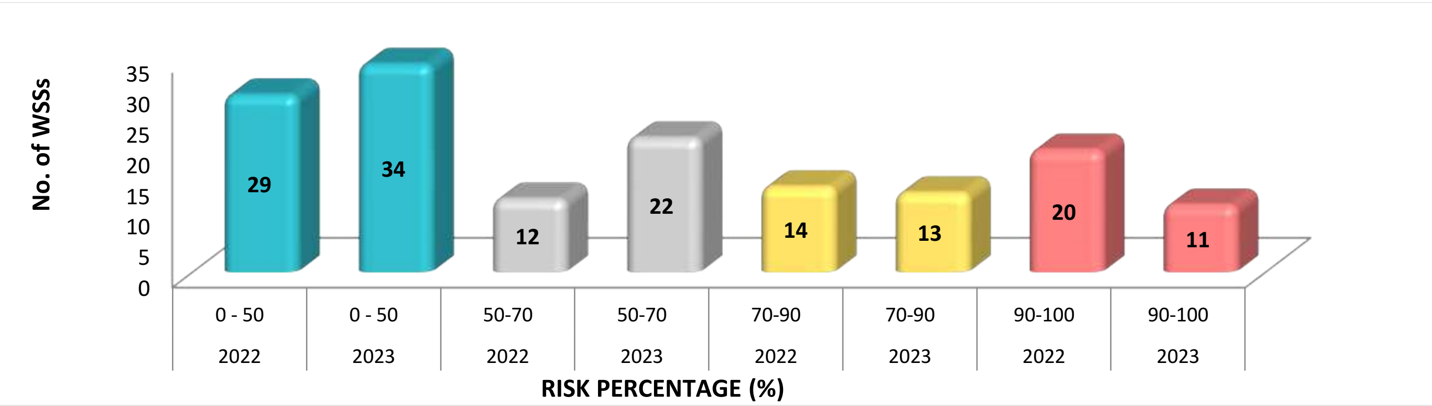


Figure 40 - a) WSS risk distribution and trends for 2022 and 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Trend analysis of the BDRR ratings for 2022 and 2023 indicates that:

- The 2023 audit cycle highlighted a slightly progressive shift with an increase in the no. of low risk WSSs (29 to 34) and medium risk WSSs (12 to 22) but a proportional decrease in the high risk WSSs (14 to 13) and the critical risk WSSs (20 to 11).

Regulatory Enforcement

Water supply systems which fail to achieve the minimum Blue Drop target of 31%, are placed under regulatory focus. The Regulator requires these WSAs to submit a detailed corrective action plan (CAP) within 20 working days from publishing of this report. 31 WSSs received Blue Drop scores below 31%, and hence are placed under **regulatory surveillance**, in accordance with the Water Services Act (108 0f 1997). DWS together with COGTA will through the grant allocation systems ensure priority is given to application of grants to rectify/restore the water services treatment and supply shortcomings identified in this report.

Table 58 - WSSs with <31% Blue Drop scores

WSA Name	2023 BD Score	WSSs with <31% score
Mangaung	**62.8%**	Soutpan Krugersdrift Dam
Setsoto LM	**43.3%**	Clocolan, Senekal
Mantsopa LM	**42.3%**	Hobhouse, Thaba Phatchoa, Tweespruit
Ngwathe LM	**36.2%**	Parys, Vredefort, Koppies, Edenville boreholes
Moqhaka LM	**36.1%**	Steynsrus
Mohokare LM	**27.6%**	Rouxville, Smithfield, Zastron
Masilonyana LM	**25.5%**	Brandfort, Theunissen, Verkeerdevlei, Winburg
Tokologo LM	**24.8%**	Boshof, Dealesville
Maluti-a-Phofung LM	**17.7%**	Bluegumbosch, Kestell, Harankopane, Mphatlalatsane, Greater Qwaqwa, Makwane, Harrismith, Tshiame
Mafube LM	**4.3%**	Frankfort, Tweeling, Villiers

The following WSAs and their associated water treatment systems are in high and/or critical BDRR risk positions, which means that some or all the risk indicators are in a precarious state, i.e. operational capacity, design capacity utilisation, water quality compliance, technical capacity, and water safety plans. WTWs in high risk and critical risk positions pose a serious risk to public health. The following WSAs will be required to assess their risk contributors and to provide corrective measures in the above mentioned action plans to mitigate these risks.

Table 59 - %BDRR/BDRR$_{max}$ scores and WSSs in critical and high-risk space

WSA Name	2023 Average %BDRR/BDRRmax	WSSs in critical and high-risk space	
		Critical Risk (90-100%)	High Risk (70-<90%)
Mafube LM	98.9%	Frankfort, Tweeling, Villiers	
Maluti-a-Phofung LM	93.4%	Bluegumbosch, Greater Qwaqwa, Harrismith, Kestell, Tshiame	HaRankopane, Makwane, Mphatlalatsane
Mangaung	36.4%		Soutpan (Krugersdrift Dam)
Masilonyana LM	79.5%	Brandfort	Theunissen, Winburg, Verkeerdevlei
Ngwathe LM	42.6%	Edenville (Boreholes), Koppies	Parys, Vredefort
Phumelela LM	61.0%		Memel
Setsoto LM	50.4%		Senekal
Tokologo LM	64.6%		Boshof, Dealesville
Totals		**11 of 80 (14%)**	**13 of 80 (16%)**

Good practice risk management requires that the Water Safety Plans (WaSPs) are informed by meaningful Process and Condition Audits, supported by zealous implementation of corrective measures and ongoing monitoring of risk movement. With the exception of 56 water supply systems situated in the low and medium risk positions, the remaining 24 water supply systems are situated in the high and critical risk positions.

Performance Barometer

The **Blue Drop Performance Barometer** presents the individual WSA Blue Drop Scores, which essentially reflects the level of mastery that a WSA has achieved in terms of its overall water services business. The bar chart below compares the 2014 and 2023 BD scores, ranked from lowest to highest performing WSA in 2023. The Metsimaholo LM is commended for maintaining good performance. 6 WSAs have achieved average performance and 7 WSAs have achieved poor performance. The remaining 5 WSAs are in critical state and are therefore placed under regulatory focus.

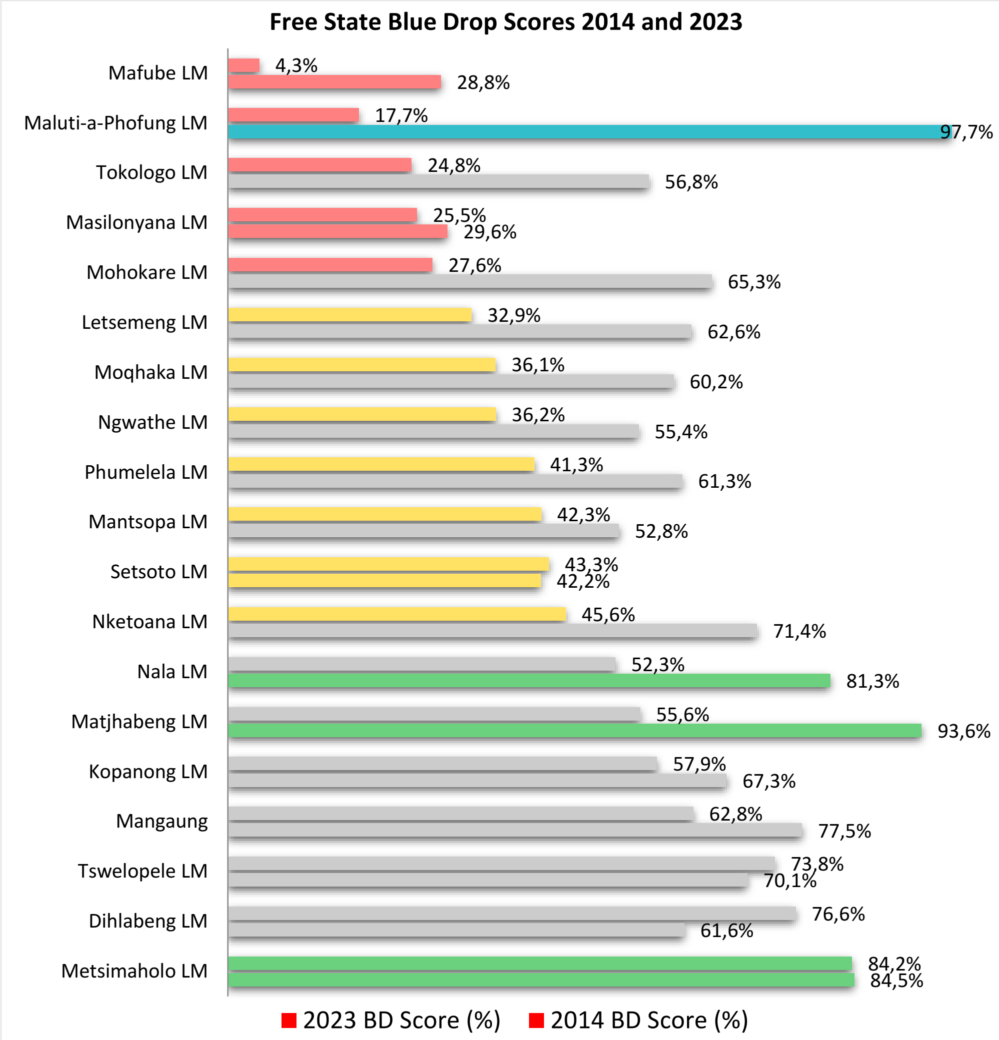


Figure 41 - a) Blue Drop scores 2014 (bar bottom) and 2023 (bar top); b) Colour legend

>95 – 100% Excellent	
>80-<95% Good	
>50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

The **BDRR Risk Barometer** expresses the level of risk that a WSA poses in respect of its water supply system. The schematic below presents the BDRR in ascending order – with the low-risk WSAs on the left and higher risk WSAs to the far right. The analysis reveals that there are 6 medium, 1 high and 2 critical risk WSAs in the province. 10 WSAs are situated in the low risk positions.

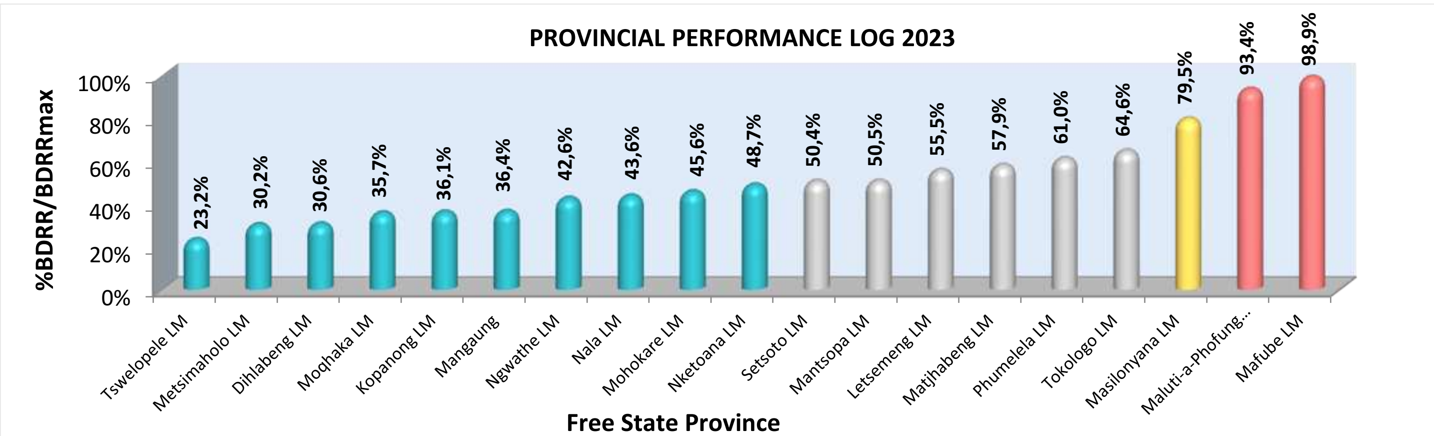


Figure 42 - a) %BDRR/BDRR$_{max}$ Risk Performance Profile/Log 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Provincial Best Performers

The **Metsimaholo Municipality** is the **BEST PERFORMING WSA** in the province, based on the following record of excellence attributed mainly to the Sasolburg supply system supplied by Rand Water:

- ✓ 2023 Blue Drop Score of 84.2%
- ✓ 2014 Blue Drop Score of 84.5%
- ✓ All 3 systems (100%) in the low risk position
- ✓ TSA score of 73% for the Deneysville WTW.

The **Dihlabeng Municipality** is the second-best scoring WSA:

- ✓ 2023 Blue Drop Score of 76.6%
- ✓ 2014 Blue Drop Score of 61.6%
- ✓ All 3 systems (100%) in low risk position
- ✓ TSA score of 68% for the Clarens & Fouriesburg WTWs.

The **Tswelopele Municipality** is the third-best scoring WSA:

- ✓ 2023 Blue Drop Score of 73.8%
- ✓ 2014 Blue Drop Score of 70.1%
- ✓ All 2 systems (100%) in low risk positions
- ✓ TSA score of 82% for the Hoopstad WTW.

KPA Diagnostics

The BD audit process collects a vast amount of data that yield valuable insight into the state of the water services delivery and water quality in each province. Five focus areas or 'diagnostics' have been configured from the 2021/22 audit data and are discussed below.

Table 60 - Summary of the key diagnostic themes and reference to the respective Blue Drop KPAs

Diagnostic #	Diagnostic Description	Diagnostic Reference
1	**Technical Competence**	KPA 1, 2 & Bonus
2	**Treatment Capacity and Flow Distribution**	KPA 4 & Generic Audit data set
3	**Drinking Water Quality (DWQ) Monitoring and Compliance**	KPA 2 & 4 & Bonus
4	**Technical Site Assessments**	TSA and 2023 Blue Drop Watch Report
5	**Operation, Maintenance and Refurbishment of Assets**	KPA 3 & 4

Diagnostic 1: Technical Competence

Aim: This focus area assesses the technical human resources capacity that is available to manage and operate water treatment processes and maintain the related water infrastructure. Theory advocates that a correlation exists between human resources capacity and capability (sufficient number of appropriately qualified staff) and a WSI's performance. Thus, it is hypothesised that high HR capacity would translate to compliant water treatment plants and functional water supply network. Blue Drop assesses technical compliance on two levels: i) WTW plant supervision and process control staff and ii) Technical, scientific and maintenance staff.

(i) Plant Supervisors and Process Controllers

Findings: According to regulations, water treatment plants are classified as Class A, B, C, D or E plants. Similarly, Process Controllers and Plant Supervisors are registered as Class I, II, III, IV, V or VI Process Controllers. Higher classed plants require a higher level of Process Controllers due to technology complexity and strict water quality standards. Technical compliance of PCs and Supervisors is determined against the Blue Drop standards, as defined by Reg. 2834 of the Water Act 1956 (Act 54 of 1956) for the erection, enlargement, operation, and registration of water care works and draft Reg. 813 of the Water Services Act (No 108 of 1997). Regulation 2834 has been replaced by Regulation 3630 in 2023 but will only come in effect during the next Blue Drop audit cycle.

Table 61 - No. compliant versus shortfall in Supervisor and Process Controller staff

WSA & WB Name	# WTWs	# WSSs	# Available Compliant Staff			Staff Shortfall		Ratio***	2023 BD Score (%)
			PCs	Supervisor**	Total	PCs	Supervisor		
Bloem Water now Vaal Central Water	7	11*	30	9	39	1	0	5.6	**57.9% ave.**
Bloem Water now Vaal Central Water (Sedibeng Water)	2	7	1	0	1	5	2	0.5	**54.6% ave.**
Dihlabeng LM	3	3	13	5	18	2	0	6.0	**76.6%**
Kopanong LM	6	8	25	5	30	2	0	7.3	**57.9%**
Letsemeng LM	5	5	4	5	9	10	0	1.8	**32.9%**
Mafube LM	3	3	5	3	8	5	0	2.7	**4.3%**
Maluti-a-Phofung LM	4	8	4	7	11	11	0	1.4	**17.7%**
Mangaung	7	7	0	1	1	11	0	3.0	**62.8%**
Mantsopa LM	4	5	12	5	17	8	0	3.4	**42.3%**
Masilonyana LM	4	4	4	0	4	11	4	1.0	**25.5%**
Matjhabeng LM	None	6							**55.6%**
Metsimaholo LM	2	3	1	0	1	7	1	0.3	**84.2%**
Mohokare LM	3	3	2	0	2	10	2	0.7	**27.6%**
Moqhaka LM	3	3	11	2	13	0	0	4.3	**36.1%**
Nala LM	None	1							**52.3%**
Ngwathe LM	4	5	11	1	12	7	1	2.4	**36.2%**
Nketoana LM	4	4	18	8	26	0	0	6.5	**45.6%**
Phumelela LM	4	3	10	0	10	6	2	3.3	**41.3%**
Setsoto LM	4	4	0	4	4	12	0	1.0	**43.3%**
Tokologo LM	4	3	0	0	0	11	2	0.0	**24.8%**
Tswelopele LM	2	2	3	3	6	3	0	3.0	**73.8%**
Totals	**75**	**80**	**154**	**58**	**172**	**122**	**14**		

Note: Nala LM and Matjhabeng LM have no WTWs of their own. Water is supplied by the previously Sedibeng owned WTWs

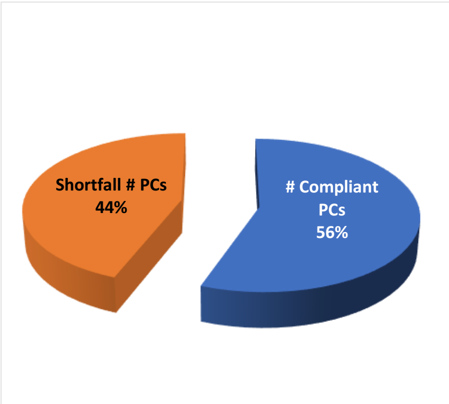
* Bloem Water supplies water to 14 WSSs. However, Bloem Water owns 7 WTWs that supply water to 11 of the 14 WSSs in the province

** NB: The Supervisor totals will be inflated as it is not possible to differentiate between which Supervisors are shared/ roaming with other Class C to E WTWs

*** Ratio depicts the no. of qualified staff divided by the no. of WTWs operated by this no. of staff. E.g., Dihlabeng has 18 compliant Sups + PCs, divided by 3 WTWs = 6 qualified staff per WTW

Note: "Compliant staff" means qualified and registered staff that meets the BD standard for a particular Class Works. "Staff shortfall" means staff that do not meet the BD standard for a particular Class of works (+1 for a shift) and/or staffing gaps exist at the respective WTWs.

Competent human resources are vital enablers in ensuring efficient and sustainable management of water services and delivery of safe water quality to consumers. For the province in general, the operational competencies are found to be excellent for the Supervisory staff in Bloem Water (now VCW) and 11 municipalities and excellent for the PCs in Bloem Water (now VCW) and only 2 of 17 municipalities (excluding Matjhabeng LM and Nala LM), as illustrated in the table above.



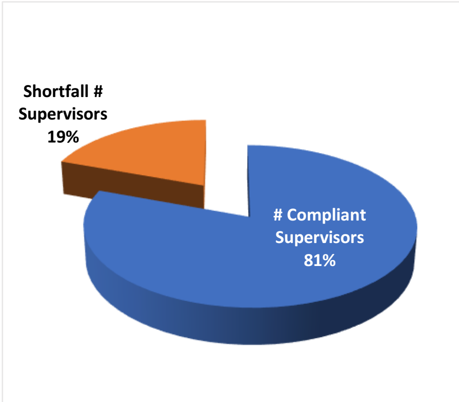


Figure 43 - Schematic illustration of compliant and shortfall of Supervisors (a) and Process Controllers (b)

Plant Supervisors: The pie charts indicate that 81% (58 of 72) of Plant Supervisors complies with the Blue Drop standard with a shortfall of 19% (14 of 72) for 7 WSAs. The highest shortfall is for the Masilonyana LM.

Process Controllers: Similarly, 56% (154 of 276) of the PC staff complies with the required standards, with a shortfall of 44% (122 of 276) for all the WSAs with the exception of Moqhaka LM and Nketoana LM. The highest shortfall (ranging from 5 to 12 PCs) are for 13 of the WSAs.

Blue Drop standards require of Class A and B plants to employ dedicated Supervisors per WTW and Process Controllers per shift per works, whereas Class C to E plants may share Supervisory staff across works. Shifts have been introduced to ensure optimal operations while addressing security risks, particularly as it relates to theft and vandalism. Telemetry also reduces the requirement for on-site staff during night shifts, but these relaxations have to be done within the DWS regulatory guidelines.

The Regulator expects correlation between the competence of an operational team and the performance of a WTW, as measured by the BD score. The data indicates as follows:

- 15 WSAs have some qualified PCs in place, with the exception of Setsoto LM, Tokologo LM and Mangaung MM (excluding Bloem Water) WTWs
- 12 WSAs have qualified Supervisors in place. It was not clear for roaming Supervisors linked to Class C to E WTWs
- 6 WSAs have shortfalls in Supervisors and 15 WSAs have shortfalls in qualified Process Controllers.

It is expected that a correlation would exist between the competence of an operational team and the performance of a water treatment works, as measured by the BD score. The results from the ratio analysis indicate high ratios ($\geq$3.0) for 8 WSAs.

Overall, the comparative bar chart does not provide a close correlation between the ratios (ranging from 3.0 to 5.5) and the BD scores as they appear to be too erratic with exceptions for Dihlabeng LM, Kopanong LM, Mangaung MM and Tswelopele LM. The anomalies are for Matjhabeng LM because of the Balkfontein WTW that has a huge shortfall in PC staff and for Metsimaholo LM Sasolburg WSS that receives water from Rand Water.

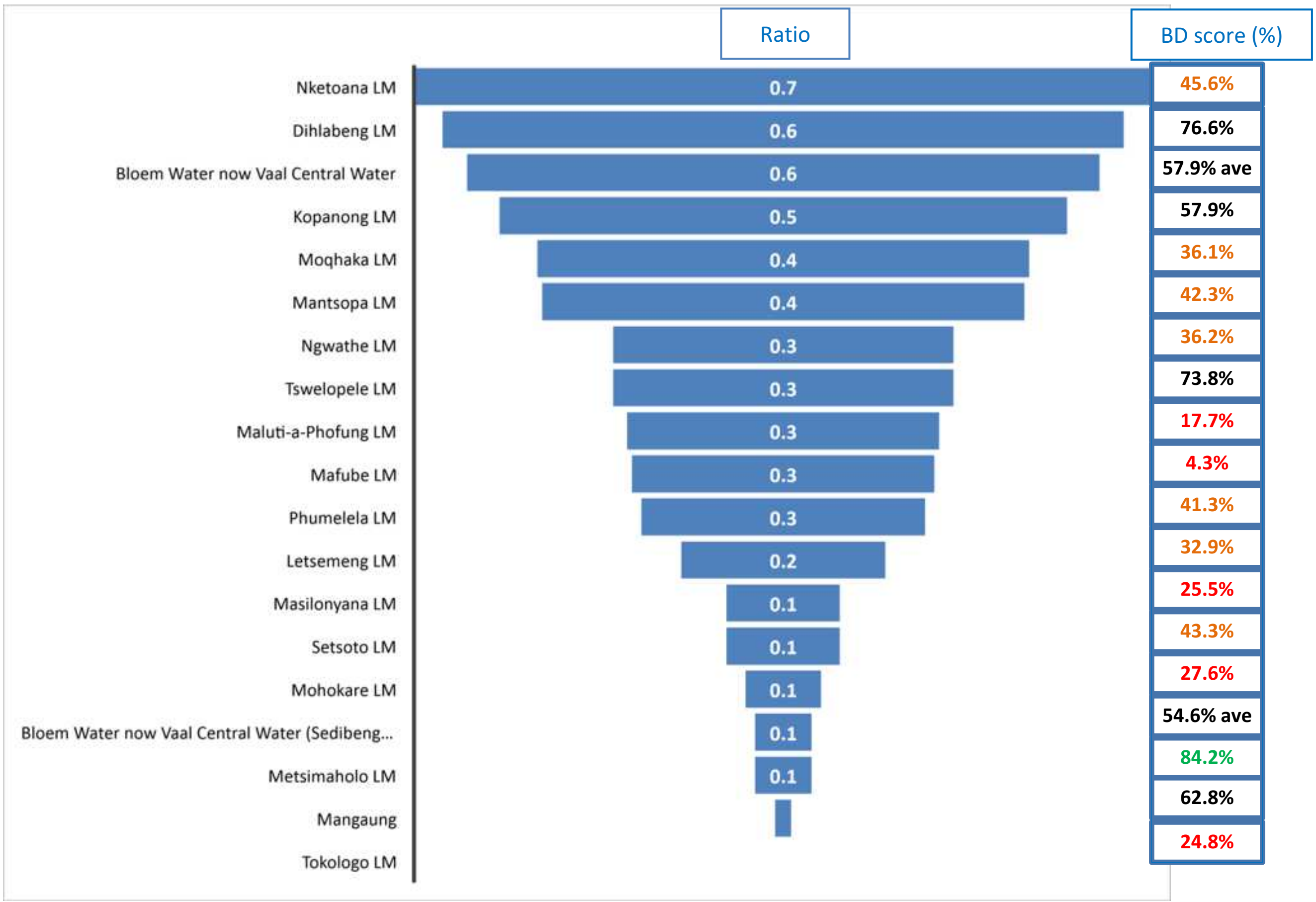


Figure 44 - Ratio of compliant operational staff to no. of WTWs and Comparison of Ratios with BD scores

(ii) Technical, Scientific and Maintenance staff

In addition to operational capacity (above), good management practice also requires access to qualified engineers, technicians, technologists, MISA appointees, scientists, and maintenance capability (below). Such competencies could reside in-house or accessible through term contracts and external specialists.

Table 62 - Summary of the maintenance capacity and no. of qualified and shortfall of Engineering, Technical and Scientific staff

WSA & WB Name	# WTWs	# WSSs	Maintenance Arrangement
Bloem Water now Vaal Central Water	7	11*	Internal+Specific Outsourcing
Bloem Water now Vaal Central Water (Sedibeng Water)	2	7	Internal+Specific Outsourcing
Dihlabeng LM	3	3	Internal+Term Contract
Kopanong LM	6	8	Internal+Specific Outsourcing; Partially Capacitated
Letsemeng LM	5	5	Partially Capacitated
Mafube LM	3	3	Internal Team (only); No Capacity
Maluti-a-Phofung LM	4	8	Internal Team (only); Partially Capacitated
Mangaung	7	7	Internal+Specific Outsourcing
Mantsopa LM	4	5	Internal+Specific Outsourcing
Masilonyana LM	4	4	Inadequate Capacity
Matjhabeng LM	None	6	Internal+Specific Outsourcing
Metsimaholo LM	2	3	Internal+Term Contract; Internal+Specific Outsourcing (Rand Water)
Mohokare LM	3	3	Internal Team (only)
Moqhaka LM	3	3	Internal Team (only)
Nala LM	None	1	Internal+Specific Outsourcing
Ngwathe LM	4	5	Internal+Specific Outsourcing (Rand Water); Inadequate Capacity
Nketoana LM	4	4	Internal Team (only)
Phumelela LM	4	3	Internal+Term Contract; Internal+Specific Outsourcing
Setsoto LM	4	4	Internal+Term Contract
Tokologo LM	4	3	Inadequate Capacity
Tswelopele LM	2	2	Internal+Term Contract
Totals	**75**	**80**	

Note: Nala LM and Matjhabeng LM have no WTWs of their own. Water is supplied by the previously Sedibeng owned WTWs
* Bloem Water supplies water to 14 WSSs. However, Bloem Water owns 7 WTWs that supply water to 11 of the 14 WSSs in the province

WSA & WB Name	# WTWs	# WSSs	Qualified Technical Staff (#)					Technical Shortfall (#)	Qualified Scientists (#)	Scientists Shortfall (#)	Ratio*	2023 BD Score (%)
			Technicians	Technologists	Engineers	MISA appointees	Total					
Bloem Water now Vaal Central Water	7	11	1	3	1	0	**5**	0	1	1	0.5	**57.9% ave.**
Bloem Water now Vaal Central Water (Sedibeng Water)	2	7	4	10	2	0	**16**	0	0	2	2.3	**54.6% ave.**
Dihlabeng LM	3	3	1	4	0	0	**5**	1	0	2	1.7	**76.6%**
Kopanong LM	6	8	1	2	1	0	**4**	0	0	2	0.5	**57.9%**
Letsemeng LM	5	5	2	0	0	0	**2**	2	0	2	0.4	**32.9%**
Mafube LM	3	3	0	1	0	0	**1**	3	0	2	0.3	**4.3%**
Maluti-a-Phofung LM	4	8	4	0	0	0	**4**	2	0	2	0.5	**17.7%**
Mangaung	7	7	1	2	0	0	**3**	1	1	1	0.4	**62.8%**
Mantsopa LM	4	5	1	2	1	0	**4**	0	1	1	0.8	**42.3%**
Masilonyana LM	4	4	3	1	0	0	**4**	1	0	2	1.0	**25.5%**
Matjhabeng LM	None	6									0.0	**55.6%**
Metsimaholo LM	2	3	0	2	0	0	**2**	2	0	2	0.7	**84.2%**
Mohokare LM	3	3	3	0	0	0	**3**	2	0	2	1.0	**27.6%**
Moqhaka LM	3	3	1	0	0	0	**1**	3	0	2	0.3	**36.1%**
Nala LM*	None	1									0.0	**52.3%**
Ngwathe LM	4	5	0	0	0	0	**0**	4	0	2	0.0	**36.2%**
Nketoana LM	4	4	1	1	0	0	**2**	2	0	2	0.5	**45.6%**
Phumelela LM	4	3	0	2	0	0	**2**	2	0	2	0.7	**41.3%**
Setsoto LM	4	4	2	1	0	0	**3**	1	0	2	0.8	**43.3%**
Tokologo LM	4	3	3	1	0	0	**4**	1	0	2	1.3	**24.8%**
Tswelopele LM	2	2	1	1	0	0	**2**	2	0	2	1.0	**73.8%**
Totals	**75**	**80**	**29**	**33**	**5**	**0**	**67**	**29**	**3**	**35**		

Note: Nala LM and Matjhabeng LM have no WTWs of their own. Water is supplied by the previously Sedibeng owned WTWs

* The single number ratio depicts the no. of qualified technical staff divided by the no. of WSSs that have access to the staff. E.g., Dihlabeng has 5 qualified staff, divided by 3 WSSs = 1.7 qualified staff per WSS

Note 1: "Qualified Technical Staff" means staff appointed in positions to support water services, and who has the required qualifications. "Technical Shortfall" is calculated based on a minimum requirement of at least 3 Engineers or more than 1 of each of Engineers, Technologists & Technicians; and at least one 1 Candidate Scientist and 1 Professional Scientist per WSI.

Note 2: "Qualified Scientists" means professional registered scientists (SACNASP) and candidate scientists appointed in positions to support water services. "Scientists shortfall" means that the WSA does not have at least one qualified SACNASP registered scientist and at least one 1 candidate scientist in their employ or contracted.

In terms of maintenance capacity, all the municipalities in the province have a reasonable contingent of qualified technical and maintenance staff. The maintenance staff comprises of a collective of in-house, contracted, or outsourced personnel. The data indicates that:

- 3 of 19 (16%) WSAs have in-house maintenance teams only
- 5 of 19 (26%) WSAs have internal maintenance teams supplemented with term contracts
- 8 of 19 (42%) WSAs have internal maintenance teams supplement with specific outsourced services
- 7 of 19 (37%) WSAs as a whole or in part are partially capacitated, inadequately capacitated, and have no capacity.

In general, the province presents a strong case for qualified professional technical staff as follows:

- A total of 67 qualified staff comprised of 5 Engineers, 33 Technologists, 29 Technicians, No MISA appointees (qualified); and 3 SACNASP registered scientists are assigned to the Water Boards and 19 WSAs
- A total shortfall of 64 persons is identified, consisting of 29 technical staff and 35 scientists
- 15 WSAs have a total shortfall of 29 qualified technical staff with the highest indicated for Ngwathe LM (4 no.), Mafube LM and Moqhaka LM (3), and 7 other WSAs (2)
- The Water Boards and 15 WSAs have access to credible laboratories that comply with the Blue Drop standards.

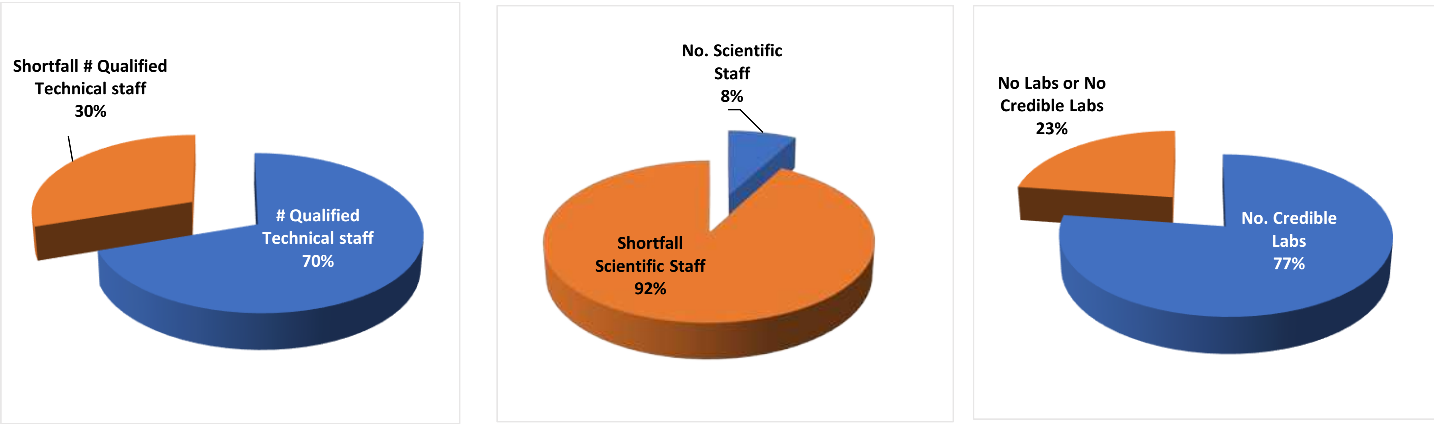


Figure 45 - Graphic illustration of the number and %: a) qualified engineering/technical staff; b) professional scientists; c) access to credible laboratory services that complies with Blue Drop standards

Ratio analysis has been done to determine the number of qualified technical and scientific staff assigned per WSS. It is expected that a higher ratio would correspond with well-performing and maintained water supply systems, as represented by the BD score.

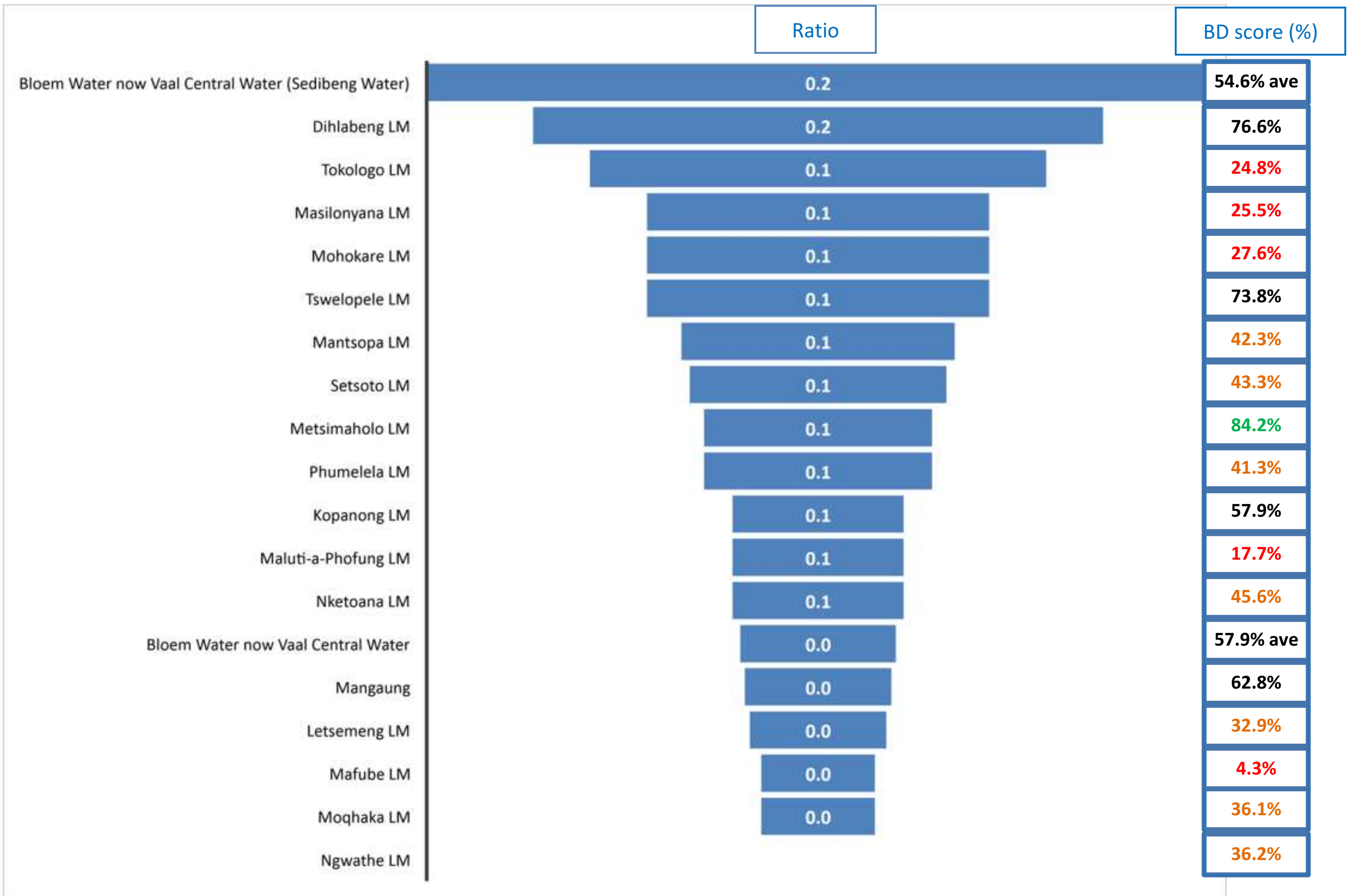


Figure 46 - Ratio of compliant technical staff to no. of WSSs and Comparison of Ratios with BD scores

The schematic above does show some correlation between medium ratios (≥ 1.0) and average BD scores with 3 WSA anomalies with <31% BD scores. Metsimaholo LM has a high BD score because of the Sasolburg system that receives water from Rand Water. Unlike the Green Drop 2022 diagnostics, no firm correlation can be drawn between technical capacity and water supply performance, mostly as result of the complexity of the WSA/Bulk Water Provider arrangement.

Overall, the results highlight the inter-dependency between technical capacity and performance. One of the options to enhance operational capacity is through dedicated training programmes. The Blue Drop audit incentivises training of operational staff over the 2-year period prior to the audit date. The results are summarised as follows:

Table 63 - No. of WTWs with operational staff sent on training over the past 2 years and vice versa

WSA & WB Name	# WTWs	# WTW staff attending training	# WTW without training
Bloem Water now Vaal Central Water	7		7
Bloem Water now Vaal Central Water (Sedibeng Water)	2		2
Dihlabeng LM	3	3	
Kopanong LM	6		6
Letsemeng LM	5		5
Mafube LM	3		3
Maluti-a-Phofung LM	4		4
Mangaung	7		7
Mantsopa LM	4		4
Masilonyana LM	4		4
Matjhabeng LM	None		
Metsimaholo LM	2	2	
Mohokare LM	3		3
Moqhaka LM	3	3	
Nala LM	None		
Ngwathe LM	4	3	1
Nketoana LM	4	4	
Phumelela LM	4		4
Setsoto LM	4		4
Tokologo LM	4	4	
Tswelopele LM	2		2
Totals	**75**	**19 (25%)**	**56 (75%)**

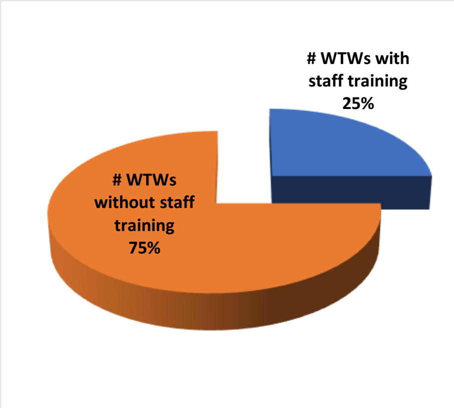


Figure 47 - %WTWs that have trained operational staff over the past two years

The results confirm that only staff members from 6 WSAs had staff attend training for 19 WTWs over the past 2 years. Overall, only 25% of operational staff attended safety and technical training, with the balance of 75% not partaking in any skills development initiatives. Investment in human capital through technical skills development is likely to mitigate some of the water quality failures and lower performances noted, and municipalities and water boards should prioritise ongoing skills development of technical staff and appointment of qualified staff that are legible for registration.

Diagnostic 2: Treatment Capacity and Flow Distribution

Aim: Diagnostic 2 deals with design and flow related dynamics, comprising of: i) design capacity and operational flow, ii) raw water abstraction, and iii) WUE and SIV.

(i) Design Capacity and Operational Flow

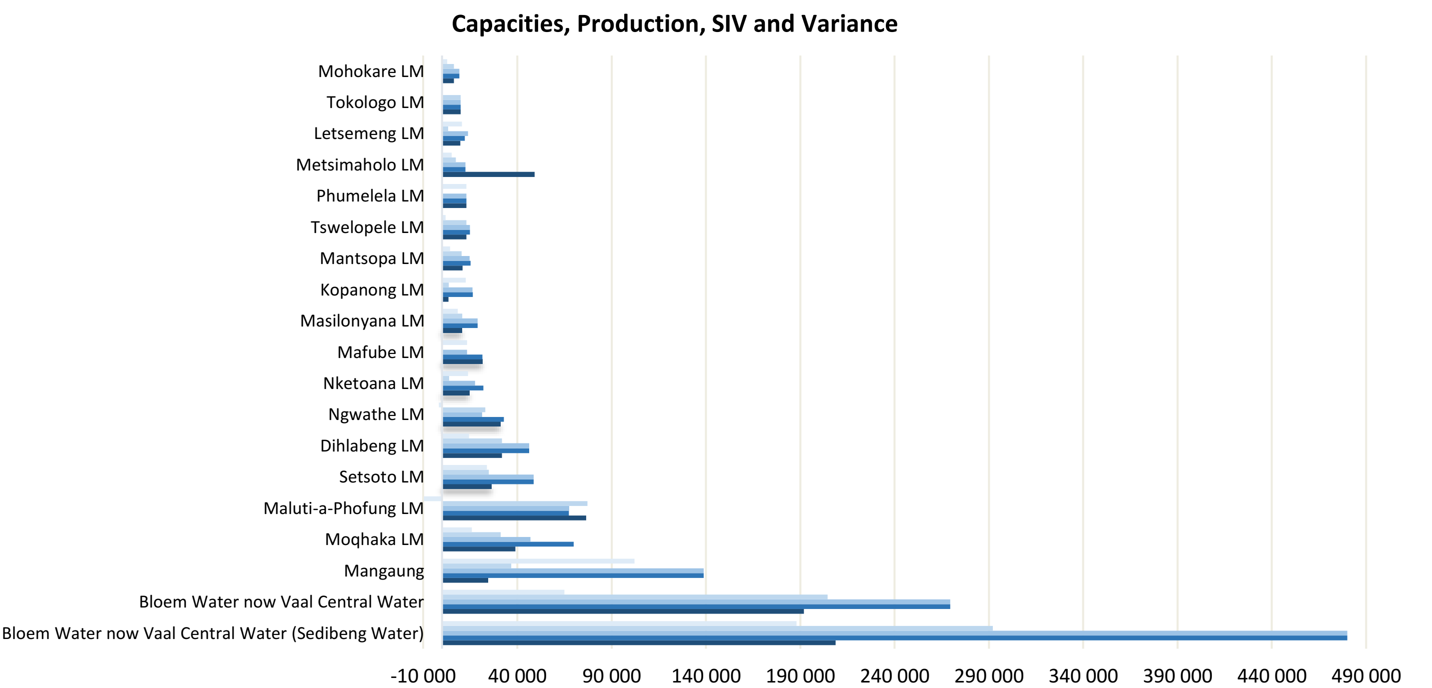
This diagnostic assesses the status of plant design capacity and daily water production at the WTWs, as well as SIVs as measured at the outflow from the WTW or inflow to the water distribution network. A capable WTW requires adequate installed design capacity and functional equipment to operate optimally. If the WTW design capacity is exceeded by the average daily production (treatment) volume, the WTW will not be able to deliver SANS compliant water quality. The available design capacity is typically exceeded when the water demand exceeds the installed design capacity, or when unit processes or equipment are dysfunctional, or when electrical supply problems render treatment and pumping of water defective. Typically, the production volume and SIV is the same if 1 WTW supplies 1 WSS, but different if multiple supply systems are feeding from a singular WTW.

Findings: Analysis of the design capacity and average daily production/ treatment volume indicate a total design capacity of 1,318,086 kl/d for the province, with a total average daily treatment (operational) volume of 788,990 kl/d. Theoretically, this implies that 60% of the design capacity is used with 40% available to meet additional water demand. However, the full 1,318,086 kl/d is not available as some infrastructure is dysfunctional, leaving 1,272,308 kl/d available. The capacity differential (difference between the installed and available capacity) means that the province is closer to its total available capacity (62%) with a 38% surplus available. This capacity differential will not constrain or impede any further social and economic development in the drainage areas. 5 WSAs do not report or have not knowledge of their available capacities, and a lower figure than 38% surplus available can be expected.

Table 64 - Summary of WTWs design and available capacities, average daily production, % available capacity, and total SIV towards the WSSs

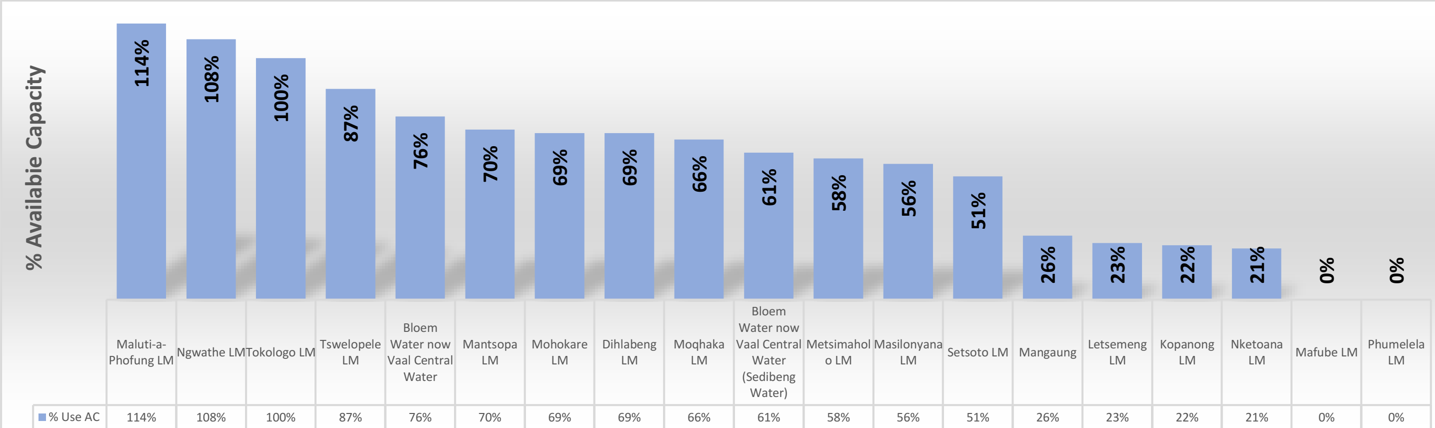
WSA & WB Name	# WTWs	# WSSs	Design Capacity (kl/d)	Available Design Capacity (kl/d)	Average Daily Production (kl/d)	Available Variance** (kl/d)	% Use Available Capacity	Total SIV towards the WSS (kl/d)
Bloem Water now Vaal Central Water	7	11*	269,423	269,423	204,469	64,954	76%	191,867
Bloem Water now Vaal Central Water (Sedibeng Water)	2	7	480,000	480,000	292,000	188,000	61%	208,758
Dihlabeng LM	3	3	46,185	46,188	31,867	14,321	69%	31,867
Kopanong LM	6	8	16,371	16,216	3,644	12,572	22%	3,372
Letsemeng LM	5	5	12,057	13,710	3,210	10,500	23%	9,782
Mafube LM	3	3	21,400	13,350	0	13,350	0%	21,400
Maluti-a-Phofung LM	4	8	67,200	67,400	77,064	-9,664	114%	76,443
Mangaung	7	7	138,800	138,800	36,723	102,077	26%	24,465
Mantsopa LM	4	5	15,160	14,690	10,355	4,335	70%	10,913
Masilonyana LM	4	4	18,948	18,948	10,650	8,298	56%	10,650
Matjhabeng LM	None	6						
Metsimaholo LM	2	3	12,490	12,490	7,300	5,190	58%	49,071
Mohokare LM	3	3	9,124	9,124	6,297	2,827	69%	6,296
Moqhaka LM	3	3	69,800	46,900	31,104	15,796	66%	38,904
Nala LM*	None	1						
Ngwathe LM	4	5	32,884	21,325	22,988	-1,663	108%	30,988
Nketoana LM	4	4	22,000	17,500	3,700	13,800	21%	14,700
Phumelela LM	4	3	13,000	13,000	0	13,000	0%	13,000
Setsoto LM	4	4	48,550	48,550	24,812	23,738	51%	26,360
Tokologo LM	4	3	9,894	9,894	9,894	0	100%	9,894
Tswelopele LM	2	2	14,800	14,800	12,913	1,887	87%	12,913
Totals	**75**	**80**	**1,318,086**	**1,272,308**	**788,990**	**483,318**	**62%**	**791,643**

Note: Nala LM and Matjhabeng LM have no WTWs of their own. Water is supplied by the previously Sedibeng owned WTWs
* Bloem Water supplies water to 14 WSSs. However, Bloem Water owns 7 WTWs that supply water to 11 of the 14 WSSs in the province
** Difference between the available design capacity and the average daily production



	Bloem Water now Vaal Central Water (Sedibeng Water)	Bloem Water now Vaal Central Water	Mangaung	Moqhaka LM	Maluti-a-Phofung LM	Setsoto LM	Dihlabeng LM	Ngwathe LM	Nketoana LM	Mafube LM	Masilonyana LM	Kopanong LM	Mantsopa LM	Tswelopele LM	Phumelela LM	Metsimaholo LM	Letsemeng LM	Tokologo LM	Mohokare LM
Available Variance (kl/d)	188 000	64 954	102 077	15 796	-9 664	23 738	14 321	-1 663	13 800	13 350	8 298	12 572	4 335	1 887	13 000	5 190	10 500	0	2 827
Ave. Daily Production (kl/d)	292 000	204 469	36 723	31 104	77 064	24 812	31 867	22 988	3 700	0	10 650	3 644	10 355	12 913	0	7 300	3 210	9 894	6 297
Available Design Capacity (kl/d)	480 000	269 423	138 800	46 900	67 400	48 550	46 188	21 325	17 500	13 350	18 948	16 216	14 690	14 800	13 000	12 490	13 710	9 894	9 124
Design Capacity (kl/d)	480 000	269 423	138 800	69 800	67 200	48 550	46 185	32 884	22 000	21 400	18 948	16 371	15 160	14 800	13 000	12 490	12 057	9 894	9 124
Total SIV (kl/d)	208 758	191 867	24 465	38 904	76 443	26 360	31 867	30 988	14 700	21 400	10 650	3 372	10 913	12 913	13 000	49 071	9 782	9 894	6 296

Figure 48 - Design and available capacity, average daily production, available variance and total SIV for the WTWs



Note: Maluti- Maluti-a-Phofung LM has 2 WTWs where the average daily production is exceeding the available capacity

Figure 49 - % available capacity

In sum, all WSAs have knowledge of their WTW installed design and available capacities. The average daily production is not known for 12 WTWs somewhat skewing the WSA data sets and for the province overall. The % use of installed and available capacity is not known for 3 WSAs.

(ii) Raw Water Abstraction

This diagnostic takes a snapshot view of the status of water abstraction authorisations from natural water resources across the province. As per the National Water Act (Act no 36 of 1998), Water Use Authorisation (WUA) mandate the maximum abstraction volumes of raw water, and the installation and monitoring of abstraction, inflow, and outflow meters, whilst the BD audit requires WSAs to report the flows on IRIS and to calibrate meters annually. Any defects in terms of abstracting water from a resource without an authorisation, or exceeding the authorised volume, or reporting inaccurate volumes, or not monitoring abstraction against authorised volumes, are considered to be a regulatory risk and contravention of the law.

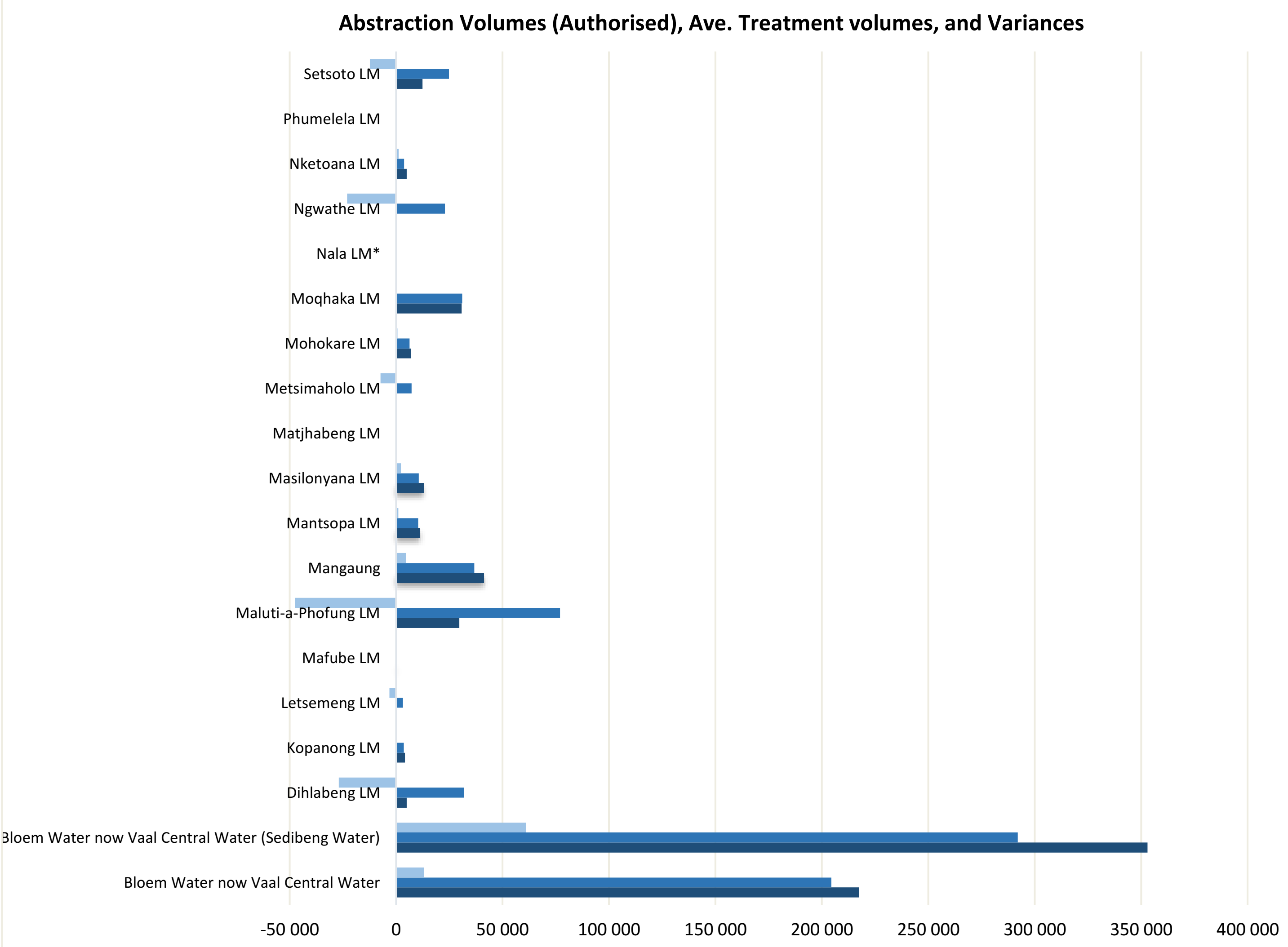
Findings: Data pertaining to the daily abstraction volumes (kl/d) (Authorised), average daily treatment volumes (kl/d), the names of the WTWs exceeding/with no Daily Abstraction Volumes (Authorised) and Average Daily Treatment Volumes (Authorised) is captured in the tables below.

Table 65 - Summary of Abstraction Volumes (Authorised), Average Daily Treatment Volumes, Variances & WTWs listed For Enforcement Action

WSA & WB Name	# WTWs	# WSSs	Daily Abstraction Volumes (Authorised) (kl/d)	Average Daily Treatment Volume (kl/d)	Average Variance (kl/d) [+ or Minus]
Bloem Water now Vaal Central Water	7	11	217,618	204,469	13,149
Bloem Water now Vaal Central Water (Sedibeng Water)	2	7	353,000	292,000	61,000
Dihlabeng LM	3	3	5,000	31,867	-26,867
Kopanong LM	6	8	4,110	3,644	466
Letsemeng LM	5	5	0	3,210	-3,210
Mafube LM	3	3	0	0	0
Maluti-a-Phofung LM	4	8	29,633	77,064	-47,431
Mangaung	7	7	41,353	36,723	4,630
Mantsopa LM	4	5	11,394	10,355	1,039
Masilonyana LM	4	4	12,950	10,650	2,300
Matjhabeng LM	None	6			
Metsimaholo LM	2	3	0	7,300	-7,300
Mohokare LM	3	3	6,968	6,297	671
Moqhaka LM	3	3	30,842	31,104	-262
Nala LM*	None	1			
Ngwathe LM	4	5	0	22,988	-22,988
Nketoana LM	4	4	4,900	3,700	1,200
Phumelela LM	4	3	0	0	0
Setsoto LM	4	4	12,456	24,812	-12,356
Tokologo LM	4	3	3,213	9,894	-6,681
Tswelopele LM	2	2	7,311	12,913	-5,602
Totals	**75**	**80**	**740,748**	**788,990**	**-48,242**

Note: Nala LM and Matjhabeng LM have no WTWs of their own. Water is supplied by the previously Sedibeng owned WTWs

WSA & WB Name	WTW exceeding the Daily Abstraction Volumes (Authorised)	WTW with no Daily Abstraction Volumes (Authorised)
Bloem Water now Vaal Central Water		Groothoek, Jagersfontein Boreholes,
Bloem Water now Vaal Central Water (Sedibeng Water)	Virginia	
Dihlabeng LM		Saulspoort, Clarens
Kopanong LM		Reddersburg
Letsemeng LM		All 4 WTWs
Mafube LM		All 3 WTWs
Maluti-a-Phofung LM	Wilge	Fika Patso, Makwane
Metsimaholo LM		Deneysville, Oranjeville
Moqhaka LM		Steynsrus, Viljoenskroon
Ngwathe LM		Edenville Boreholes, Koppies, Parys, Vredefort
Nketoana LM		Reitz
Phumelela LM		Memel, Vrede, Warden
Setsoto LM	Ficksburg	Clocolan, Senekal Cyferfontein Old & New, Senekal De Put
Tokologo LM		Boshof, Dealesville, Hertzogville
Tswelopele LM	Bultfontein, Hoopstad	
Totals	**5**	**33**



	Bloem Water now Vaal Central Water	Bloem Water now Vaal Central Water (Sedibeng Water)	Dihlabeng LM	Kopanong LM	Letsemeng LM	Mafube LM	Maluti-a-Phofung LM	Mangaung	Mantsopa LM	Masilonyana LM	Matjhabeng LM	Metsimaholo LM	Mohokare LM	Moqhaka LM	Nala LM*	Ngwathe LM	Nketoana LM	Phumelela LM	Setsoto LM
Average Variance (kl/d)	13 149	61 000	-26 867	466	-3 210	0	-47 431	4 630	1 039	2 300		-7 300	671	-262		-22 988	1 200	0	-12 356
Average Daily Treatment Volume (kl/d)	204 469	292 000	31 867	3 644	3 210	0	77 064	36 723	10 355	10 650		7 300	6 297	31 104		22 988	3 700	0	24 812
Daily Abstraction Vol (Authorized) (kl/d)	217 618	353 000	5 000	4 110	0	0	29 633	41 353	11 394	12 950		0	6 968	30 842		0	4 900	0	12 456

Figure 50 - Abstraction Volumes (Authorised), Average Daily Treatment Volumes, Variances

WTWs that exceed the Daily Abstraction Volumes (Authorised) and WTWs with no Daily Abstraction Volumes (Authorised) are reflected in the 2nd table above. WTWs that are not complying with the regulations will be required to show correction in the next Blue Drop audit cycle. The results conclude that no WTWs are exceeding the permitted abstraction limits and all WTWs provided authorised water use abstraction volumes. The Daily Abstraction Volumes (Authorised) are not known for 13 water treatment systems resulting in negative average variances that skew the data sets. Only one negative average variance could be clearly attributed to the Tswelopele LM for over abstraction. For future BD audits, WSA/WSPs will be required to provide 'actual' abstraction volumes so that a comparative analysis can be undertaken of the 'actual' abstraction volume versus the authorised water use abstraction volumes (maximum). This would require that the WSAs and WSPs/WBs monitor and record all critical path flows (abstraction, raw and final).

(iii) Water Use Efficiency and System Input Value

The Department is committed to consider issues related to water scarcity and security, aiming to ensure there is sufficient water for the population, the economy, and the environment by increasing water use efficiency across all sectors. Water use for services sectors is specifically dealing with the quantity of water used directly by the consumer through the public distribution network and industries connected to the network. This diagnostic assesses the water use efficiency (i.e., the average daily consumption in litres per person per day) and the individual and collective performance of the water supply systems. WUE indicates how effective water is used by consumers, i.e. the process between effective water use and actual water abstraction. This concept is closely related to the Department's No Drop Certification assessment, whereby WUE, NRW and water losses are targeted as part of Water Conservation and Water Demand Management strategies by municipalities.

Findings: Both the Blue Drop audit and No Drop audit requires an IWA water balance to determine the SIV into each water supply system, and to identify and quantify possible losses from abstraction to the end-of-use point. Bloem Water now Vaal Central Water, Kopanong LM and Mangaung MM (15 WSSs) and a few random systems in 3 other WSAs (3 WSSs) have full water balances in place for 18 WSSs in total. 26 WSSs in 6 WSAs have partial water balances in place, and 10 WSAs with a total of 36 WSSs do not have water balances in place.

WUE considers the SIV contributions, population served, and the average daily consumption, as summarised in the following table.

Table 66 - Summary of total SIV, total population served, average daily consumption, WUE status and performance trend

WSA Name	# WSSs	Total Population	Total SIV (kl/d)	2023 WUE (l/p/d)	2023 Blue Drop WUE Range and Performance	
Dihlabeng LM	3	122,908	31,867	259	>250-300	Poor
Kopanong LM	8	71,000	8,628	122	<150	Excellent
Letsemeng LM	5	35,690	9,782	274	>250-300	Poor
Mafube LM	3	62,794	21,400	341	>300	Extremely High
Maluti-a-Phofung LM	8	361,086	76,443	212	>200-250	Average
Mangaung	7	1,041,632	211,076	203	>200-250	Average
Mantsopa LM	5	51,691	10,913	211	>200-250	Average
Masilonyana LM	4	91,134	10,650	117	<150	Excellent
Matjhabeng LM	6	365,578	194,127	531	>300	Extremely High
Metsimaholo LM	3	149,287	49,071	329	>300	Extremely High
Mohokare LM	3	38,000	6,296	166	>150-200	Good
Moqhaka LM	3	138,354	38,904	281	>250-300	Poor
Nala LM*	1	104,594	14,631	140	<150	Excellent
Ngwathe LM	5	112,362	30,988	276	>250-300	Poor
Nketoana LM	4	76,756	14,700	192	>150-200	Good
Phumelela LM	3	29,694	13,000	438	>300	Extremely High
Setsoto LM	4	99,895	26,360	264	>250-300	Poor
Tokologo LM	3	28,986	9,894	341	>300	Extremely High
Tswelopele LM	2	47,300	12,913	273	>250-300	Poor
Totals	**80**	**3,028,741**	**791,643**	**261**		

WUE (l/cap/day) performance categories

Colour	WUE Range	Performance
	>300	Extremely high per capita water use
	>250-300	Poor per capita water use
	>200-250	Average per capita water use with potential for marked improvement
	>150-200	Good per capita water use but some improvement may be possible subject to economic benefits
	<150	Excellent per capita water use management

	Mangaung	Matjhabeng LM	Maluti-a-Phofung LM	Metsimaholo LM	Moqhaka LM	Dihlabeng LM	Ngwathe LM	Setsoto LM	Mafube LM	Nketoana LM	Nala LM*	Phumelela LM	Tswelopele LM	Mantsopa LM	Masilonyana LM	Tokologo LM	Letsemeng LM	Kopanong LM	Mohokare LM
Total SIV (Kl/d)	211 076	194 127	76 443	49 071	38 904	31 867	30 988	26 360	21 400	14 700	14 631	13 000	12 913	10 913	10 650	9 894	9 782	8 628	6 296

Figure 51 - Total SIV towards the WSSs

	Mangaung	Matjhabeng LM	Maluti-a-Phofung LM	Metsimaholo LM	Moqhaka LM	Dihlabeng LM	Ngwathe LM	Nala LM*	Setsoto LM	Masilonyana LM	Nketoana LM	Kopanong LM	Mafube LM	Mantsopa LM	Tswelopele LM	Mohokare LM	Letsemeng LM	Phumelela LM	Tokologo LM
Total Population	1 041 632	365 578	361 086	149 287	138 354	122 908	112 362	104 594	99 895	91 134	76 756	71 000	62 794	51 691	47 300	38 000	35 690	29 694	28 986

Figure 52 - Total Population served

For the province, 791,643 kl/d water is supplied to 3,028,741 consumers. Comparatively, Mangaung and Matjhabeng LM distribute 28% of the total provincial SIV, followed by Maluti-a-Phofung LM (10%) and Metsimaholo LM (6%). An average 261 litres of water is used per person per day, which implies a very high (poor) per capita water use. Results from the diagnostic data show that the 5 WSAs have WUEs of more than 300 l/c/d, which is regarded as extremely high according to national benchmarks. 6 WSAs have WUEs between 250–300 l/c/d, which is regarded as poor. No Drop Certification is specifically tasked with plans to curb water losses and improve NRW through water accounting assessments and water conservation and demand management.

Diagnostic 3: Drinking Water Quality (DWQ) Monitoring and Compliance

Aim: Blue Drop audits values the principles of "To measure is to know" and "To know is to manage". The primary objective of a water treatment plant is to produce final water quality that is safe for human consumption at the end of the distribution network. This standard can only be measured and achieved if operational and compliance monitoring and DWQ compliance is executed at the correct frequency, sample point, and determinand type. This diagnostic assesses the i) operational and compliance monitoring status, ii) drinking water quality compliance, and iii) risk defined compliance and laboratory credibility.

(i) Drinking water operational and compliance monitoring

Findings: A minimum level of 90% operational monitoring compliance is applied as benchmark, to give weight to the importance of sampling and monitoring of the raw water, process unit water, and final water across the treatment stream. Compliance monitoring is also informed by SANS 241:2015 and the requirement for risk-informed monitoring through the WaSP process at both the WTW final and distribution network. DWQ compliance is calculated against the population size and the mandatory limits set by SANS 241:2015 and the Blue Drop standards, as calculated and reported from data loaded in the IRIS.

Table 67 - Summary of the KPA 2 WTW operational and WSS compliance monitoring status

WSA & WB Name	# WTWs	# WSSs	WTW Operational monitoring [KPA 2 sub-KPA 2.b)]		WSS Compliance monitoring [KPA 2 sub-KPA 2.c)]	
			Satisfactory [BD score >90%]	Not Satisfactory [BD score <90%]	Satisfactory [BD score >90%]	Not Satisfactory [BD score <90%]
Bloem Water now Vaal Central Water	7	11	5	2		11

WSA & WB Name	# WTWs	# WSSs	WTW Operational monitoring [KPA 2 sub-KPA 2.b)]		WSS Compliance monitoring [KPA 2 sub-KPA 2.c)]	
			Satisfactory [BD score >90%]	Not Satisfactory [BD score <90%]	Satisfactory [BD score >90%]	Not Satisfactory [BD score <90%]
Bloem Water now Vaal Central Water (Sedibeng Water)	2	7	1	1		7
Dihlabeng LM	3	3	3	0		3
Kopanong LM	6	8	0	6		8
Letsemeng LM	5	5	3	2		5
Mafube LM	3	3	0	3		3
Maluti-a-Phofung LM	4	8	3	1		8
Mangaung	7	7	3	4		7
Mantsopa LM	4	5	0	4		5
Masilonyana LM	4	4	0	4		4
Matjhabeng LM	None	6				6
Metsimaholo LM	2	3	0	2	1	2
Mohokare LM	3	3	0	3		3
Moqhaka LM	3	3	0	3		3
Nala LM*	None	1				1
Ngwathe LM	4	5	0	4	1	4
Nketoana LM	4	4	2	2		4
Phumelela LM	4	3	3	1		3
Setsoto LM	4	4	0	4		4
Tokologo LM	4	3	1	3		3
Tswelopele LM	2	2	2	0		2
Totals	**75**	**80**	**26 (35%)**	**49 (65%)**	**2 (3%)**	**78 (97%)**

The performance recorded in the table above stems from performance data as measured against the Blue Drop Standard expressed in KPA 2 and sub-KPAs 2.b) and 2.c). Overall, an unsatisfactory sampling and analysis regime is observed for both operational (65%) and compliance (97%) monitoring.

The data indicates that 26 of 75 WTWs (35%) are on par with good practice for operational monitoring of the raw and final water and the respective process units at the WTW. Dihlabeng and Tswelopele are doing exceptionally well, whilst the remaining WSAs fail in varying degrees to meet the Blue Drop standard. In terms of compliance monitoring, only 2 WSSs (3%) are on par with good compliance monitoring practices, and 78 WSSs (97%) are failing the Blue Drop standard.

The latter observation is noted with deepening concern. Compliance monitoring is a legal requirement and the only means to measure the DWQ performance of a water supply system. Operational monitoring is the cornerstone of day-to-day process adjustments and optimisation to ensure that the water treatment is efficient and delivers quality final water. The results indicate that 49 WTWs and 78 WSSs are not achieving regulatory and industry standards.

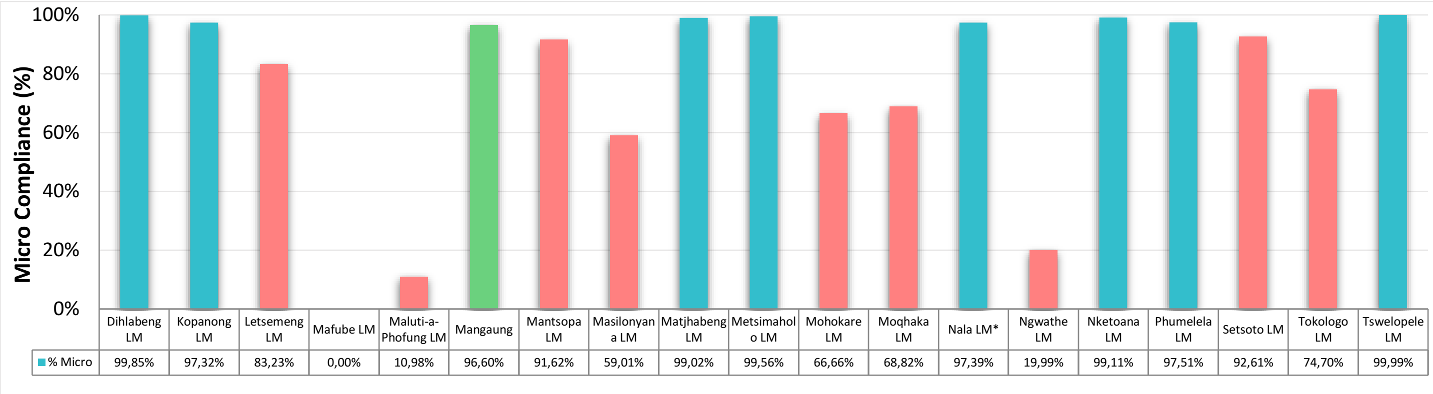
(ii) Drinking water quality compliance

Findings: DWQ compliance is measured against the requirements of SANS 241:2015 under KPA 5 of the Blue Drop audit. The tables following summarises the results of the DWQ status for Microbiological and Chemical Compliance, which also carries the highest Blue Drop score weighting of 35%.

Table 68 - Provincial Summary of the DWQ Status for Microbiological Compliance

WSA Name	# WSSs	Population	% Ave. Micro Compliance	# WSS Micro Performance Status		
				Excellent	Good	Unacceptable
Dihlabeng LM	3	122,908	99.85%	3		
Kopanong LM	8	71,000	97.32%	5	1	2
Letsemeng LM	5	35,690	83.23%			5
Mafube LM	3	62,794	0.00%			3
Maluti-a-Phofung LM	8	361,086	10.98%			8
Mangaung	7	1,041,632	96.60%	2	1	4
Mantsopa LM	5	51,691	91.62%	2		3
Masilonyana LM	4	91,134	59.01%			4
Matjhabeng LM	6	365,578	99.02%	6		
Metsimaholo LM	3	149,287	99.56%	3		
Mohokare LM	3	38,000	66.66%			3
Moqhaka LM	3	138,354	68.82%			3

WSA Name	# WSSs	Population	% Ave. Micro Compliance	# WSS Micro Performance Status		
				Excellent	Good	Unacceptable
Nala LM*	1	104,594	97.39%			1
Ngwathe LM	5	112,362	19.99%	1		4
Nketoana LM	4	76,756	99.11%	3	1	
Phumelela LM	3	29,694	97.51%	2		1
Setsoto LM	4	99,895	92.61%	2		2
Tokologo LM	3	28,986	74.70%	1		2
Tswelopele LM	2	47,300	99.99%	2		
Totals	**80**	**3,028,741**	**76.52%**	**32**	**3**	**45**



MICRO: Population <100,000		
Colour	Status	Percentage
	Excellent	>97%
	Good	>96 - <97%
	Unacceptable	<96%

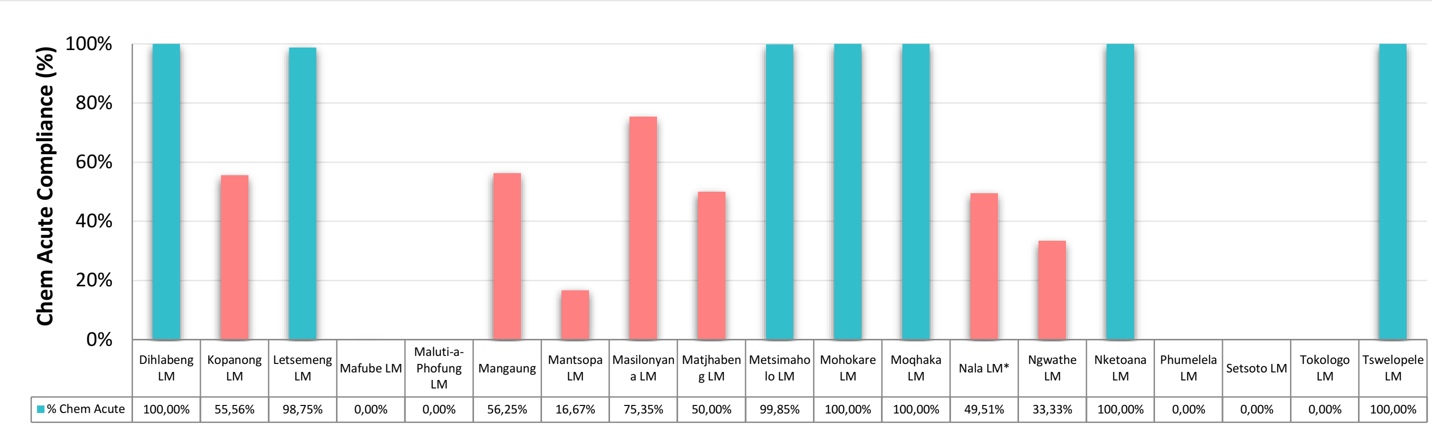
MICRO: Population >100,000		
Colour	Status	Percentage
	Excellent	>99%
	Good	>98 - <99%
	Unacceptable	<98%

Figure 53 - Provincial Microbiological Drinking Water Quality Status

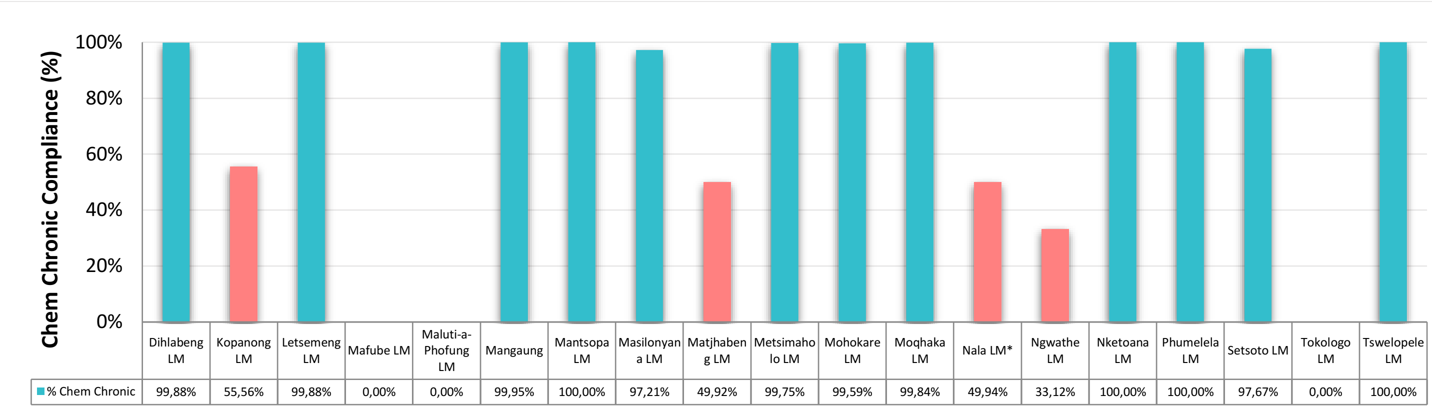
Out of the 80 WSSs, 32 (40%) systems achieved excellent microbiological quality whilst 45 (56%) systems have an unacceptable microbiological water quality status. The water in these systems pose a serious acute health risk to the community. Failure to produce water that meets microbiological compliance standards can be linked back to poor operations, defective infrastructure, inadequate dosing rates, absence of disinfection chemicals, lack of monitoring, lack of operating and chemistry knowledge, and several other root causes. WSIs that are not monitoring the final water quality at the outlet of the treatment plant or at specific end use points are required to develop a monitoring programme and resume with compliance monitoring as a matter of urgency.

Table 69 - Provincial Summary of the DWQ Status for Chemical Acute Health and Chronic Health Compliance

WSA Name	# WSSs	Population	% Ave. Chem Acute Health Compliance	# WSS Chem Acute Health Performance Status			% Ave. Chem Chronic Health Compliance	# WSS Chem Chronic Health Performance Status		
				Excellent	Good	Unacceptable		Excellent	Good	Unacceptable
Dihlabeng LM	3	122,908	100.0%	3			99.9%	3		
Kopanong LM	8	71,000	55.6%			8	55.6%			8
Letsemeng LM	5	35,690	98.8%	4		1	99.9%	5		
Mafube LM	3	62,794	0.0%			3	0.0%			3
Maluti-a-Phofung LM	8	361,086	0.0%			8	0.0%			8
Mangaung	7	1,041,632	56.3%	1		6	100.0%	7		
Mantsopa LM	5	51,691	16.7%			5	100.0%	5		
Masilonyana LM	4	91,134	75.3%	2		2	97.2%	3		1
Matjhabeng LM	6	365,578	50.0%			6	49.9%			6
Metsimaholo LM	3	149,287	99.8%	3			99.8%	3		
Mohokare LM	3	38,000	100.0%	3			99.6%	3		
Moqhaka LM	3	138,354	100.0%	3			99.8%	3		
Nala LM*	1	104,594	49.5%			1	49.9%			1
Ngwathe LM	5	112,362	33.3%	1		4	33.1%	1		4
Nketoana LM	4	76,756	100.0%	4			100.0%	4		
Phumelela LM	3	29,694	0.0%			3	100.0%	3		
Setsoto LM	4	99,895	0.0%			4	97.7%	4		
Tokologo LM	3	28,986	0.0%			3	0.0%			3
Tswelopele LM	2	47,300	100.0%	2			100.0%	2		
Totals	**80**	**3,028,741**	**54.5%**	**26**	**0**	**54**	**72.8%**	**46**	**0**	**34**



CHEM Acute Health: Population <100,000			CHEM Acute Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	>97%		Excellent	>99%
	Good	>95 - <97%		Good	>97 - <99%
	Unacceptable	<95%		Unacceptable	<97%



CHEM Chronic Health: Population <100,000			CHEM Chronic Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	>95%		Excellent	>97%
	Good	>93 - <95%		Good	>95 - <97%
	Unacceptable	<93%		Unacceptable	<95%

Figure 54 - Provincial Chemical Acute Health and Chronic Health Drinking Water Quality Status

Chemical acute health compliance shows that 26 (33%) systems have excellent, and no systems have good water quality, whilst 54 (67%) systems in 13 WSAs have an unacceptable chemical acute health compliance. Chemical chronic health compliance shows that 46 (58%) systems have excellent, and no systems have good water quality, whilst 34 (42%) systems in 8 WSAs have an unacceptable chemical chronic health compliance.

The Water Services Act upholds standards regarding the monitoring and reporting on drinking water quality and issuance of advisory notices to the public when significant DWQ failures are observed. The audit process applies a penalty when DWQ failures are noticed without issuing such Water Quality Alert Notices to forewarn consumers of the status of (unsafe) water quality and to advise communities to source alternative water sources or methods to disinfect water used for drinking water purposes.

The following table reflects the compliance status of the WSAs as regards the issuing of these notices for DWQ failures.

Table 70 - Summary of Penalties Applied to WSSs for not Issuing Advisory Notices

WSA Name	# WSS	# WSS No Penalty Applied	# WSS Partial Penalty Applied	WSS Names Partial Penalty	# WSS Full Penalty Applied	WSS Names Full Penalty
Dihlabeng LM	3	3				
Kopanong LM	8	3	2	Philippolis, Springfontein	3	Bethulie, Jagersfontein, Trompsburg
Letsemeng LM	5	3	2	Jacobsdal, Koffiefontein		
Mafube LM	3				3	Frankfort, Tweeling, Villiers
Maluti-a-Phofung LM	8				8	All 8 Systems
Mangaung	7	3			4	Botshabelo, Vanstadensrus, Soutpan, Thaba Nchu

WSA Name	# WSS	# WSS No Penalty Applied	# WSS Partial Penalty Applied	WSS Names Partial Penalty	# WSS Full Penalty Applied	WSS Names Full Penalty
Mantsopa LM	5	1	1	Ladybrand	3	Excelsior, Hobhouse, Tweespruit
Masilonyana LM	4				4	All 4 Systems
Matjhabeng LM	6		6	All 6 Systems		
Metsimaholo LM	3	3				
Mohokare LM	3				3	All 3 Systems
Moqhaka LM	3		3	All 3 Systems		
Nala LM*	1		1	Balkfontein		
Ngwathe LM	5		1	Heilbron	4	Koppies, Parys, Edenville, Vredefort
Nketoana LM	4	4				
Phumelela LM	3	2	1	Warden		
Setsoto LM	4	2	2	Clocolan, Senekal		
Tokologo LM	3		3	All 3 Systems		
Tswelopele LM	2	2				
Totals	**80**	**26**	**22**		**32**	

No penalties were applied to 26 (33%) WSSs, partial penalties were applied to 22 (27%) WSSs, and full penalties were applied to 32 (40%) WSSs. The names of the WSSs that received partial or full penalties are reflected in the table above.

(iii) Risk defined compliance and laboratory credibility

Findings: Risk-defined compliance standards aim to determine the compliance (to SANS 241) of those parameters that have been found to pose a risk in a specific WSS and need to be included in the routine monitoring programme or frequency as prescribed by SANS 241. The province achieved an average Annual Risk Defined Compliance of 71.7%, with the best performances coming from Kopanong LM and Tswelopele LM and the worst performances coming from Maluti-a-Phofung LM, Matjhabeng LM and Mantsopa LM. Excellent risk defined compliance was achieved by 15 (19%) systems, good compliance for 10 (13%) systems and bad compliance for 55 (68%) systems.

Table 71 - Summary of the DWQ Compliance for Risk Defined Compliance

WSA Name	# WSSs	Population	Ave. % Risk Defined Compliance	# WSS Performance Status		
					Good	Bad
Dihlabeng LM	3	122,908	95.60%	1	2	
Kopanong LM	8	71,000	97.48%	6	2	
Letsemeng LM	5	35,690	88.50%	1		4
Mafube LM	3	62,794	0.00%			3
Maluti-a-Phofung LM	8	361,086	9.87%			8
Mangaung	7	1,041,632	87.79%		3	4
Mantsopa LM	5	51,691	69.78%			5
Masilonyana LM	4	91,134	58.89%			4
Matjhabeng LM	6	365,578	58.94%			6
Metsimaholo LM	3	149,287	92.57%	1	1	1
Mohokare LM	3	38,000	66.66%			3
Moqhaka LM	3	138,354	77.46%			3
Nala LM*	1	104,594	96.87%		1	
Ngwathe LM	5	112,362	19.77%	1		4
Nketoana LM	4	76,756	92.57%	1	1	2
Phumelela LM	3	29,694	92.14%	1		2
Setsoto LM	4	99,895	83.40%			4
Tokologo LM	3	28,986	74.70%	1		2
Tswelopele LM	2	47,300	99.00%	2		
Totals	**80**	**3,028,741**	**71.68%**	**15**	**10**	**55**

The aim of operational determinand compliance is to determine the efficiency of the water treatment process, by monitoring those parameters which are used to control the treatment process. Although not necessarily a health risk, these parameters provide good information on the integrity of the WTW. The province achieved an average % Actual Operational Determinand Compliance of 43%, the best performance coming from Tswelopele LM only, and the worst performance coming from Kopanong LM. Excellent risk defined compliance was achieved by 15 (20%) systems, good compliance for none of the systems and bad compliance for 60 (80%) systems.

Table 72 - Summary of the Treatment (Operational) Efficiency Index

WSA & WB Name	# WTWs	Population	Ave. % Actual Operational Determinand Compliance	# WTW Performance Status		
				Excellent	Good	Bad
Bloem Water now Vaal Central Water	7	1,112,095	75%	5		2
Bloem Water now Vaal Central Water (Sedibeng Water)	2	470,172	93%	1		1
Dihlabeng LM	3	122,908	64%	1		2
Kopanong LM	6	71,000	45%	2		4
Letsemeng LM	5	35,690	0%			5
Mafube LM	3	62,794	13%			3
Maluti-a-Phofung LM	4	361,086	80%	2		2
Mangaung	7	1,041,632	24%	2		5
Mantsopa LM	4	51,691	0%			4
Masilonyana LM	4	91,134	13%			4
Matjhabeng LM	None	365,578				
Metsimaholo LM	2	149,287	50%			2
Mohokare LM	3	38,000	22%			3
Moqhaka LM	3	138,354	0%			3
Nala LM*	None	104594				
Ngwathe LM	4	112,362	33%			4
Nketoana LM	4	76,756	78%			4
Phumelela LM	4	29,694	68%			4
Setsoto LM	4	99,895	56%			4
Tokologo LM	4	28,986	0%			4
Tswelopele LM	2	47,300	99%	2		
Totals	**75**	**3,028,741**	**43%**	**15**	**0**	**60**

The data further confirms that 15 WSAs in the province have access to credible laboratories for compliance and operational analysis. These in-house or contracted laboratories are accredited with SANAS or have Proficiency Testing Schemes with SABS or have inter-laboratory quality checks in place to ensure that suitable analytical methods are applied and that quality assurance processes are followed to ensure credible water quality results. The province is predominantly meeting the regulatory expectation for the WSIs having access to credible analytical services for compliance and operational monitoring.

Diagnostic 4: Technical Site Assessments

Aim: The Blue Drop process makes provision for a Technical Site Assessment (TSA) in order to verify the desktop evidence through field-based inspections. This assessment includes a physical inspection of the entire water treatment plant with all its process units, as well as the reservoir and spot checks of a pumpstation and pipelines. The technical assessment is coupled with an asset condition check to determine an approximate cost (VROOM) to restore existing infrastructure to functional status for the treatment facility (only).

Findings: The results of the province's TSAs are summarised in the table below. A deviation of 10% between the BD and TSA score indicate a misalignment between the administrative aspects and the work on the ground. The Regulator regards a WTW with a TSA score of >80% to have an acceptable level of process control and functional equipment, and a TSA score of 90% as an excellent system that complies with most of the Blue Drop TSA standards. A TSA score of <30% indicates that the treatment facility and network fails in most regards, and is evident of dysfunctional infrastructure, failed process control, absence of record keeping and monitoring, and poor water quality.

The VROOM cost presents a ''Very Rough Order of Measurement" cost to return a WTWs functionality to its original design. More detail can be found in the Blue Drop Watch Report 2023.

Table 73 - %TSA and %BD score, and VROOM cost estimates total and split for civil, mechanical, and electrical

WSA & WB Name	TSA Name	%TSA	2023 BD Score (%)	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Bloem Water now Vaal Central Water	Welbedacht	72.0%	**62.8%**	9,062,500	21,750,000	5,437,500	36,250,000
Bloem Water now Vaal Central Water (Sedibeng Water)	Virginia	88.0%	**55.6%**	30,000,000	72,000,000	18,000,000	120,000,000
Bloem Water now Vaal Central Water (Sedibeng Water)	Balkfontein	82.0%	**52.3%**	11,520,000	69,120,000	34,560,000	115,200,000
Dihlabeng LM	Fouriesburg	68.0%	**76.6%**	2,146,297	613,228	306,614	3,066,139
Dihlabeng LM	Clarens	68.0%	**76.6%**	82,940	622,050	124,410	829,400

WSA & WB Name	TSA Name	%TSA	2023 BD Score (%)	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Kopanong LM	Bethulie	95.0%	**57.9%**	192,000	0	0	192,000
Letsemeng LM	Jacobsdal	81.0%	**32.9%**	1,249,600	156,200	156,200	1,562,000
Mafube LM	Frankfort	44.0%	**4.3%**	3,276,000	1,260,000	504,000	5,040,000
Maluti-a-Phofung LM	Wilge-Harrismith	67.0%	**17.7%**	1,520,639	1,520,639	337,920	3,379,197
Mangaung MM	Maselspoort	62.0%	**62.8%**	62,335,000	19,180,000	14,385,000	95,900,000
Mantsopa LM	Genoa	36.0%	**42.3%**	8,969,400	4,892,400	2,446,200	16,308,000
Masilonyana LM	Winburg	31.0%	**25.5%**	5,715,600	2,598,000	2,078,400	10,392,000
Metsimaholo LM	Deneysville	73.0%	**84.2%**	121,220	424,268	60,610	606,098
Mohokare LM	Zastron	40.0%	**27.6%**	2,993,760	1,905,120	544,320	5,443,200
Moqhaka LM	Vijoenskroon	62.0%	**36.1%**	2,691,000	2,421,900	269,100	5,382,000
Ngwathe LM	Parys	36.0%	**36.2%**	8,279,975	21,527,935	3,311,990	33,119,900
Nketoana LM	Reitz	28.0%	**45.6%**	23,625,000	30,375,000	13,500,000	67,500,000
Phumelela LM	Vrede	55.0%	**41.3%**	399,000	665,000	266,000	1,330,000
Setsoto LM	Ficksburg	81.0%	**43.3%**	2,672,342	5,344,685	890,781	8,907,808
Tokologo LM	Hertzogville	75.0%	**24.8%**	63,000	409,500	157,500	630,000
Tswelopele LM	Hoopstad	82.0%	**73.8%**	976,800	122,100	122,100	1,221,000
			Totals	**R177,892,073**	**R256,908,025**	**R97,458,645**	**R532,258,741**
			% Split of Cost Items	**34%**	**48%**	**18%**	**100%**

A deviation of >10% between the BD and TSA score is noted for 14 of the 21 WTWs assessed, whilst a deviation of >20% between the BD and TSA score is noted for 9 of the 21 WTWs assessed. For the individual WTWs assessed in the province, a total budget of R532.3m is estimated, with the bulk of the work (82%) going towards restoration of mechanical equipment (34%) and civil infrastructure (48%).

Diagnostic 5: Operation, Maintenance and Refurbishment of Assets

Aim: Insufficient financial resources are often cited as a root cause to dysfunctional or non-compliant water treatment works and water networks. Knowledge and monitoring of fiscal spending are therefore a critical part of water services management and municipal governance of public assets. This diagnostic investigates the status of financial information as pertaining to O&M budgets and expenditure, asset figures, and capital funding.

Findings: A substantial amount of financial information was presented during the audit process. Unfortunately, the evidence was presented in different formats, levels of detail, or absent for some WSAs. It was observed that WSA teams with financial officials that were present during the audits performed better and had a better understanding of the water services challenges experienced by their technical peers.

Discrepancies observed included amongst others - generic or non-ringfenced budgets, contract lump sums for service providers presented as budgets, outdated or incomplete asset registers, and some cost drivers which were lacking. As data credibility presents a significant challenge, the Regulator grouped data into different certainty levels, as summarised at the end of this Diagnostic.

The result of each financial portfolio is discussed hereunder.

NOTE: The Regulator regards the financial and asset information with low confidence. Not all WSAs submitted verifiable information or complete financial data sets for the audit year in question**.**

Capital, O&M Budget and Actual, and Asset Value

The capital budgets, O&M budgets, O&M actual expenditure, and current asset values are summarised below.

Table 74 - Summary of the capital budgets, O&M budgets, O&M actual expenditure, and current asset values

WSA & WB Name	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
Bloem Water now Vaal Central Water	NI	R269,165,411	R222,308,651	83%	R611,114,290
Bloem Water now Vaal Central Water (Sedibeng Water)	NI	R78,831	R61,702	78%	R3,004,315,995
Dihlabeng LM	R17,405,092	R48,937,947	R46,740,423	96%	R533,215,000
Kopanong LM	R65,000,000	R86,516,134	R63,038,716	73%	R212,964,733
Letsemeng LM	NI	NI	NI	NI	NI
Mafube LM	NI	NI	NI	NI	NI

WSA & WB Name	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
Maluti-a-Phofung LM	NI	NI	NI	NI	NI
Mangaung	R544,000,000	R115,388,996	R166,002,001	144%	R1,304,529,200
Mantsopa LM	R150,557,499	R19,955,993	R18,701,592	94%	R176,658,657
Masilonyana LM	NI	R63,346,637	R29,529,317	47%	R294,895,699
Matjhabeng LM	R68,000,000	R1,371,408,049	R1,974,278,094	144%	R1,035,973,434
Metsimaholo LM	R19,142,000	NI	NI	NI	R87,850,021
Mohokare LM	R250,100,000	R24,356,671	R24,585,642	101%	R30,041,726
Moqhaka LM	NI	NI	NI	NI	NI
Nala LM*	NI	NI	NI	NI	NI
Ngwathe LM	NI	R30,987,450	R15,161,744	49%	R112,496,829
Nketoana LM	NI	R329,880,178	R323,390,638	98%	R640,351,705
Phumelela LM	NI	R7,116,445	NI	NI	R354,278,032
Setsoto LM	R129,369,001	NI	NI	NI	NI
Tokologo LM	R959,991	R98,519,000	R98,519,000	100%	NI
Tswelopele LM	R58,736,154	R18,892,560	R23,839,135	126%	NI
Totals	**R1,303,269,737**	**R2,484,550,302**	**R3,006,156,655**	**121.0%**	**R8,398,685,321**

The Regulatory Comments following in this Chapter list the capital projects with secured funding for each municipality and/or its bulk water provider. The capital lists are deemed to be a definitive means to address water service inadequacies and ensuring water infrastructure investment. A total capital budget of R1.3b has been reported for the refurbishment and upgrades of water supply system infrastructure for most of the WSAs. The largest capital budgets are observed for Mangaung MM (R544m), Mohokare LM (R250.1m) and Mantsopa LM (R150.6).

For the 2021/22 fiscal year, the total O&M budget reported for the province was R2,485b, of which R3,006b (121%) has been expended. Over-expenditure of 144% by Matjhabeng LM and Mangaung MM respectively and 126% by Tswelopele LM, and under expenditure by Masilonyana LM (47%) and Ngwathe LM (49%) was observed. The provincial figures exclude 9 of the 19 WSAs who had no and partial financial information.

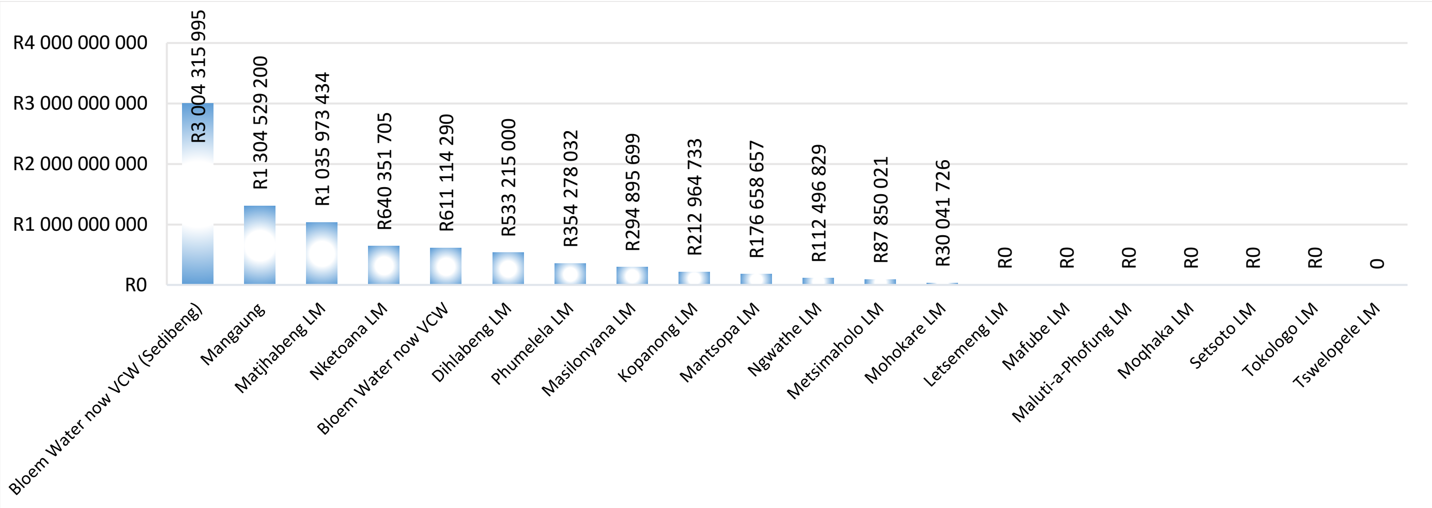


Figure 55 - Total current asset value reported

The total current asset value for water infrastructure (networks, pump stations, treatment plants) is reportedly R8.4b (excluding 7 WSAs with no asset value information). The highest asset values are observed for Bloem Water now Vaal Central Water (Sedibeng Water) (R3.0b), followed by Mangaung MM (R1.3b), Matjhabeng LM (R1.04b), Nketoana LM (R640m) and Dihlabeng LM (R533m).

O&M Cost Benchmarking

By combining the SALGA and WRC WATCOST models, an estimation of the maintenance cost required per asset type can be done, i.e. civil, buildings, pipelines, mechanical, electrical, and instrumentation.

Table 75 - SALGA-WRC annual maintenance budget guideline and cost estimation

Description	% of Current Asset Value	Asset Value Estimate	Modified SALGA Maintenance Guideline	Annual Maintenance Budget Guideline
Current Asset Value estimate	**100%**	**R8,398,685,321**	**15.75%**	**R181,411,603**
Broken down into:				
1. Civil Structures	46%	R3,863,395,248	0.50%	R19,316,976
2. Buildings	3%	R251,960,560	1.50%	R3,779,408
3. Pipelines	6%	R503,921,119	0.75%	R3,779,408
4. Mechanical Equipment	30%	R2,519,605,596	4.00%	R100,784,224
5. Electrical Equipment	11%	R923,855,385	4.00%	R36,954,215
6. Instrumentation	4%	R335,947,413	5.00%	R16,797,371
Totals	**100%**	**R8,398,685,321**	**15.75%**	**R181,411,603**
			Minus 20% P&Gs and 10% Installation	**R54,423,481**
			Total	**R126,988,122**

The model estimates that R181.4m (2.16%) is required per year to maintain the assets valued at about R8.4b. Notably, this maintenance estimate assumes that all assets are functional. In cases where Blue Drop Certification is not being achieved, it can be assumed that some form of inefficiency or constraint is being experienced, and national benchmarks closer to 7% of the asset value is advocated (R587.9m).

The table below indicates the SALGA maintenance cost estimation in relation to the O&M budget, and O&M actual expended.

Table 76 - O&M cost estimates by the SALGA versus actual budget and expenditure figures

Cost Reference	O&M Cost Estimate	Period	% of Asset Value
Modified SALGA	R181,411,603	Annually, estimation	2.16%
O&M Budget	R2,484,550,302	Actual for 2021/22	29.5%
O&M Spend	R3,006,156,655	Actual for 2021/22	35.8%

In addition, the table below indicates the Blue Drop audit findings on the water supply operations cost determination and water supply O&M budget status.

Table 77 - BD Audit Water Supply Operations Cost Determination and Water Supply O&M Budget status

WSA & WB Name	Water Supply Operations Cost Determination	Water Supply O&M Budget status
Bloem Water now Vaal Central Water	NOT SYSTEM SPECIFIC (GLOBAL), DETERMINED FOR PART OF SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Bloem Water now Vaal Central Water (Sedibeng Water)	NOT SYSTEM SPECIFIC (GLOBAL), DETERMINED FOR PART OF SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Dihlabeng LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Kopanong LM	NOT SYSTEM SPECIFIC (GLOBAL), DETERMINED FOR PART OF SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Letsemeng LM	NOT SYSTEM SPECIFIC (GLOBAL)	BUDGET IS NOT RINGFENCED FOR WATER ONLY
Mafube LM	NO PROOF (0% SCORE)	NO PROOF
Maluti-a-Phofung LM	NOT SYSTEM SPECIFIC (GLOBAL)	BUDGET IS NOT RINGFENCED FOR WATER ONLY
Mangaung	DETERMINED FOR PART OF SYSTEM, NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Mantsopa LM	DETERMINED FOR PART OF SYSTEM, NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Masilonyana LM	NOT SYSTEM SPECIFIC (GLOBAL)	BUDGET IS NOT RINGFENCED FOR WATER ONLY
Matjhabeng LM	DETERMINED FOR PART OF SYSTEM, NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Metsimaholo LM	NOT SYSTEM SPECIFIC (GLOBAL), DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY, SYSTEM SPECIFIC BUDGET (RAND WATER)
Mohokare LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Moqhaka LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Nala LM*	DETERMINED FOR PART OF SYSTEM, NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Ngwathe LM	DETERMINED FOR PART OF SYSTEM, NOT SYSTEM SPECIFIC (GLOBAL), DETERMINED OF THE WHOLE SYSTEM (RAND WATER)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY, SYSTEM SPECIFIC BUDGET (RAND WATER)
Nketoana LM	NOT SYSTEM SPECIFIC (GLOBAL)	SYSTEM SPECIFIC BUT INCLUDES WATER & SANITATION
Phumelela LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY

WSA & WB Name	Water Supply Operations Cost Determination	Water Supply O&M Budget status
Setsoto LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Tokologo LM	NO PROOF (0% SCORE)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Tswelopele LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY

From the tables above, the cost dynamics can be summarised as follows:

- The SALGA estimations for maintenance budgets is about 7.3% (Modified SALGA divided by O&M Budget) of the actual reported budgets for the 2021/22 fiscal year
- The actual O&M budget (29.5%) appears to be more than adequate when compared with the SALGA guideline (2.16%) or with the government benchmark (7%)
- These figures may be impacted by some of the smaller WSAs who did not provide budget and expenditure figures, and by some inaccurate asset values and where no asset values were provided for
- Lastly, the municipalities presents budget and expenditure data at different levels (table above) i.e. financial figures are not always ringfenced per water supply system – thus rendering provincial summaries to be indicative.

6.1 Bloem Water

Introduction

Bloem Water is a Water Board that extends operations to the Free State and Northern Cape areas after incorporation of former Sedibeng Water in August 2022.

It's customer base includes the following Municipalities: Mangaung Metropolitan, Mantsopa, Kopanong, Matjhabeng, Nala, Nama Khoi, Khai-Ma, Dikgatlong, Tsantsabane, Joe Morolong, Phokwane, Gamagara and Ga-Segonyana Local Municipalities, a total of twenty-six (26) Mines in the Free State and Northern Cape Provinces, Six (6) solar generation plants in the Northern Cape, Kalahari East Water Users Association in the Northern Cape and other stakeholders that cannot be serviced by Municipalities within the area of service for the Entity.

Bloem Water executes its operation through the twelve (12) schemes on behalf of DWS with the following treatment works located in Free State and Northern Cape.

Province	Region	WTW	Municipalities served as per BD audits
Free State	Former Sedibeng	Balkfontein – Bothaville and Virginia	Matjhabeng LM and Nala LM
	Caledon River Region	Welbedacht	Mangaung MM, Kopanong LM, Mantsopa LM (Excelsior system)
	Orange River Region	Bethulie; Gariep, Philippolis and Jagersfontein	Kopanong LM
	Modder River Region	Rustfontein and Groothoek	Mangaung MM
Northern Cape	Former Sedibeng	Vaal Gamagara	
	Namakwa	Henkries and Pella drift	Nama Khoi LM

Bloem Water is responsible for bulk water provisions to the municipalities. In some cases, the reservoirs are also part of Bloem Water network whereas in other cases the reservoirs may be operated by the municipality.

Given the large area of supply and dependency of thousands of water users on the continuous supply of high-quality water, the performance of this bulk water utility is critical to the well-being of the people serviced through the bulk supply and municipal water networks.

Regulator's Comment

Formerly Sedibeng Water

The WSP Bloem Water (former Sedibeng Water) was well prepared for the Blue Drop Audit and acknowledged for an excellent maintenance team and routine maintenance schedules. However, WSP is encouraged to update their current water safety plan to align with Blue Drop requirements, in particular site-specific risk assessment, water quality assessment and development of risk-based monitoring program.

With regards to the Balkfontein and Virginia WTW which were part of the former Sedibeng Water, the WSP is commended for the excellent operations of these two plants. Both treatment plants have functional treatment processes, competent staff, comprehensive operational monitoring, and excellent O&M capabilities which include staff, full mechanical, electrical workshop, and stock room with extensive range of spares with computerised stock control system. However, WSP is encouraged to update their current water safety plan to align with Blue Drop requirements, in particular site-specific risk assessment, water quality assessment and development of risk-based monitoring program.

There are a number of outstanding maintenance issues which have not been addressed since merging with Bloem Water due to insufficient budget. This is partially due to lack of payment by Matjhabeng LM and has negatively impacted on operations, monitoring, and reliability of the water supply. Bloem water must prioritize repairs to critical equipment and ensure there is sufficient budget to maintain the excellent condition and operations of these facilities to ensure they are able to produce reliable supply of safe water at all times. If the problem of funding is not addressed, these two excellent WTW will slide into non-functional state leading to poor water quality and insufficient supply. The Balkfontein WTW is a large bulk regional plant (capacity of 360ML/d): failure of this treatment plant will negatively impact on the health of the large population in the Free State region. Bloem Water should take this opportunity to engage, share and learn from their "Sedibeng Water" colleagues to ensure all plants have excellent systems and procedures that will ensure delivery of reliable supply of safe water to all consumers.

Caledon River

The WSP Bloem Water was well prepared for the Blue Drop Audit and acknowledged for an excellent maintenance team and routine maintenance schedules. However, WSP is encouraged to update their current water safety plan to align with Blue Drop requirements, in particular site-specific risk assessment, water quality assessment and development of risk-based monitoring programs.

Orange River

The Bloem Water team from the Orange River region is commended for their performance during the Blue Drop audits. The team was well represented at both audit and site visit with excellent POE for all criteria which was uploaded on IRIS. The WSP is encouraged to improve their Water Safety Plan and develop risk-based monitoring programs for all treatment plants. The WSP is further encouraged to include Kopanong LM in this exercise as this will support the WSA to implement risk management processes.

Blue Drop Findings

The Regulator summarises the collective recommendations as following:

- Process control staff and operational monitoring in place for all plants.
- Water Safety plan in place for WSP Bloem Water, however compliance monitoring is not risk-based for bulk system.
- Operational budgets and expenditure systems are in place but can be refined to reflect on water services (cost determination per supply system).

Technical Site Inspection

Former Sedibeng Water Plants

The Balkfontein WTW and the Virginia WTW were inspected to verify the Blue Drop audit findings and received a technical site score of 82% (Balkfontein) and 88% (Virginia) respectively. The general impression of both WTW is excellent as both treatment plants have functional treatment processes, competent staff, comprehensive operational monitoring, and excellent O&M capabilities. The potable water produced by both treatment plant complies with microbiological limits.

Due to lack of payment by Matjhabeng LM, supply is restricted to the municipality. The lack of budget has led to a number of outstanding maintenance issues which have not been addressed:

- Repairs to filters and backup pumps at Balkfontein WTW
- back up raw water pumps and repairs to filters at Virginia WTW
- reduced frequency of E. Coli testing due to lack of reagents. This is a high risk as the plant supplies water to a large population including Matjhabeng LM who is currently not conducting compliance monitoring due to budget constraints.

Caledon River

The Welbedacht water treatment plant is in need to maintenance to ensure delivery of safe drinking water.

There is an excellent mechanical workshop fully equipped for manufacture of valves, pipelines, gasket, etc, electrical workshop and fully stocked spares room. However, most unit processes need repairs/refurbishment i.e., clariflocculator is in process of refurbishment, 1 pulsator not working, 2 filters are not working, chemical dosing facility in a very poor state, reservoir lid is rusted, etc. At many processes, standby equipment is removed for repairs. Management must ensure the extensive maintenance resources at the plant are used effectively to ensure all process units are operational at all times with sufficient backup of critical equipment.

Bloem Water is commended for full time SHEQ officer and commitment to OHS. However, several OHS risks were observed on site and there is a lack of safety signs around pulsators and sedimentation tanks.

Acknowledgement is given for the installation of conduit hydropower plant at Brandkop to generate around 800MWH /year which is used to power office and UPS system for telemetry. This excellent initiative should be extended to other reservoirs to generate renewable energy.

DWS is responsible for maintenance of the dam wall. The issue of dam siltation must be addressed as the current dam capacity is estimated at 5% of the total capacity and high silt load has damaged horizontal screens, inlet pumps and leads to blockages of inlet pipeline.

Orange River

The Bethulie water treatment plant is in excellent condition with all unit processes operating effectively, onsite maintenance teams, competent staff, and dedicated management team. There is excellent housekeeping, operational monitoring, routine maintenance of all equipment and routine inspections of infrastructure.

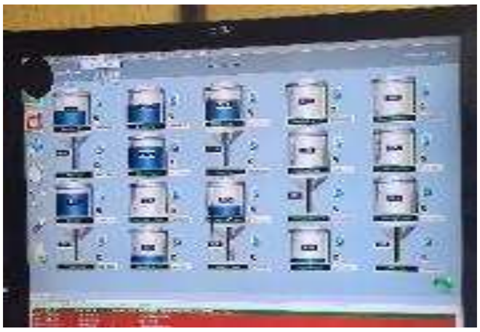
Installation of safety signs at chlorine room and chemical dosing is excellent but missing at other unit processes.

The plant is however only operating at 18% of design due to restricted flow to the municipality due to lack of payment. This results in water shortages in the municipality with routine water shedding taking place.

Excellent stock room at Virginia WTW

Excellent chemnical dosing system at Bethulie WTW

Welbedacht Bloem Water team during site inspection



SCADA system at Balkfontein WTW

Excellent OHS at chlorine dosing faciilty at Bethulie WTW

Bulk chemical storage at Balkfontein WTW

6.2 Dihlabeng Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	76.62%
Blue Drop Score 2014	%	61.59%
Blue Drop Score 2012	%	68.59%
Blue Drop Score 2011	%	30.76%

Key Performance Area	Weight	Bethlehem Water Supply System	Clarens Water Supply System	Fouriesburg Water Supply System
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	77.12%	73.98%	73.50%
Blue Drop Score 2014	%	66.80%	61.05%	40.18%
Blue Drop Score 2012	%	71.74%	60.51%	61.25%
Blue Drop Score 2011	%	31.49%	24.40%	27.88%
System Design Capacity	kL/d	40 000	1 001	5 184
System Available Capacity	kL/d	40 000	1 008	5 180
System Input Value	kL/d	27 325	901	3 641
Capacity Utilisation	%	68.31%	89.38%	70.29%
Resource Abstracted From		Sol Plaatje Dam (Liebenbergsvlei and Ash River)	Small Caledon and Tunnel	Caledon, Storage Dam Meirings kloof
BDRR 2023	%	31.72%	23.28%	23.31%
BDRR 2022	%	67.80%	47.10%	74.70%

Technical Site Assessment: Clarens WTW – 68%

6.3 Kopanong Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	57.92%
Blue Drop Score 2014	%	67.29%
Blue Drop Score 2012	%	68.70%
Blue Drop Score 2011	%	43.81%

Key Performance Area	Weight	Bethulie	Fauresmith	Gariep	Jagersfontein
Bulk/WSP		Bloem Water	Bloem Water	Bloem Water	Bloem Water
Blue Drop Score 2023	%	54.88%	56.75%	62.36%	50.08%
Blue Drop Score 2014	%	69.31%	61.87%	68.67%	66.08%
Blue Drop Score 2012	%	72.45%	43.15%	69.32%	47.30%
Blue Drop Score 2011	%	48.89%	NA	46.17%	NA
System Design Capacity	kL/d	12 000	2 750	2 800	2 120
System Available Capacity	kL/d	12 000	2 750	2 800	2 120
System Input Value	kL/d	1 183	570	789	564
Capacity Utilisation	%	17.88%	62.78%	28.18%	65.20%
Resource Abstracted From		Orange	Boreholes	Gariep	Kalkfontein
BDRR 2023	%	40.46%	32.16%	17.90%	48.08%
BDRR 2022	%	76.00%	91.60%	78.70%	95.40%

Key Performance Area	Weight	Philippolis	Reddersburg	Springfontein	Trompsburg
Bulk/WSP		Bloem Water	Bloem Water	Bloem Water	Bloem Water
Blue Drop Score 2023	%	52.83%	62.26%	57.52%	53.98%
Blue Drop Score 2014	%	69.22%	56.73%	70.76%	66.93%
Blue Drop Score 2012	%	62.37%	73.02%	70.13%	72.34%
Blue Drop Score 2011	%	45.93%	26.54%	41.59%	47.59%
System Design Capacity	kL/d	1 623	147 163	12 430	13 028
System Available Capacity	kL/d	1 623	147 163	12 275	13 028
System Input Value	kL/d	569	3 106	526	1 321
Capacity Utilisation	%	43.80%	69.60%	60.81%	63.11%
Resource Abstracted From		Orange River; Boreholes	Fouriespruit	Boreholes	Boreholes
BDRR 2023	%	27.59%	37.47%	23.61%	34.14%
BDRR 2022	%	94.20%	100.00%	88.80%	84.70%

Technical Site Assessment: Bethulie WTW - 95%

6.4 Letsemeng Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	32.88%
Blue Drop Score 2014	%	62.56%
Blue Drop Score 2012	%	49.98%
Blue Drop Score 2011	%	54.69%

Key Performance Area	Weight	Jacobsdal WTW	Koffiefontein	Luckhoff	Oppermangronde
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	33.80%	32.25%	32.55%	32.55%
Blue Drop Score 2014	%	57.76%	65.82%	42.81%	60.53%
Blue Drop Score 2012	%	47.24%	52.44%	47.24%	47.24%
Blue Drop Score 2011	%	70.51%	50.65%	51.00%	53.30%
System Design Capacity	kL/d	4 200	4 500	1 352	720
System Available Capacity	kL/d	4 200	0	0	0
System Input Value	kL/d	1 760	4 500	1 352	720
Capacity Utilisation	%	41.90%	NI	NI	NI
Resource Abstracted From		Kalkfontein Scheme (Riet River)	Kalkfontein scheme (Riet River); also from Orange-Riet during droughts	Oranje-Riet WUA (Vanderkloof Dam)	Oranje-Riet WUA (Vanderkloof Dam)
BDRR 2023	%	44.21%	49.10%	41.25%	56.56%
BDRR 2022	%	46.30%	60.90%	46.70%	57.90%

Key Performance Area	Weight	Petrusburg
Bulk/WSP		-
Blue Drop Score 2023	%	34.20%
Blue Drop Score 2014	%	63.50%
Blue Drop Score 2012	%	44.93%
Blue Drop Score 2011	%	50.00%
System Design Capacity	kL/d	1 285
System Available Capacity	kL/d	2 938
System Input Value	kL/d	1 450
Capacity Utilisation	%	NI
Resource Abstracted From		Thirteen boreholes
BDRR 2023	%	52.98%
BDRR 2022	%	31.60%

Technical Site Assessment: Jacobsdal WTW - 81%

6.5 Mafube Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	**%**	**4.25%**
Blue Drop Score 2014	**%**	**28.75%**
Blue Drop Score 2012	**%**	**18.16%**
Blue Drop Score 2011	**%**	**15.25%**

Key Performance Area	Weight	Frankfort	Tweeling	Villiers
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	**5.00%**	**2.70%**	**2.70%**
Blue Drop Score 2014	%	31.84%	21.22%	27.27%
Blue Drop Score 2012	%	18.35%	17.45%	18.24%
Blue Drop Score 2011	%	15.25%	15.25%	15.25%
System Design Capacity	kL/d	14 400	2 000	5 000
System Available Capacity	kL/d	7 200	2 000	4 150
System Input Value	kL/d	14 400	2 000	5 000
Capacity Utilisation	%	NI	NI	NI
Resource Abstracted From		Wilger River	Liebensburgvlei River	Vaal River
BDRR 2023	%	98.10%	100.00%	100.00%
BDRR 2022	%	95.10%	94.60%	95.10%

Technical Site Assessment: Frankfort WTW - 44%

The Regulator notes the dire state of management and drinking water quality in the Frankfort, Tweeling and Villiers water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

6.6 Maluti-A-Phofung Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	17.68%
Blue Drop Score 2014	%	97.66%
Blue Drop Score 2012	%	86.00%
Blue Drop Score 2011	%	88.94%

Key Performance Area	Weight	Bluegumbosch Supply system (Dr Limpho WTW and Fika Patso WTW)	Kestell Supply system (Dr Limpho WTW and Fika Patso WTW)	HaRankopane Supply System (Fika Patso WTW and Makwane WTW)	Mphatlalatsane Supply System (Fika Patso WTW and Makwane WTW)
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	19.35%	19.35%	17.60%	17.85%
Blue Drop Score 2014	%	Ni	Ni	NI	Ni
Blue Drop Score 2012	%	Ni	Ni	NI	NI
Blue Drop Score 2011	%	Ni	NI	NI	NI
System Design Capacity	kL/d	46 000	46 000	46 000	46 000
System Available Capacity	kL/d	46 200	46 000	46 200	46 200
System Input Value	kL/d	5 710	3 407	389	444
Capacity Utilisation	%	152.39%	152.39%	108.40%	108.40%
Resource Abstracted From		Fika Patso Dam (Namahadi River); Sterkfontein Dam (Nuwejaarspruit)	Fika Patso Dam (Namahadi River); Sterkfontein Dam (Nuwejaarspruit),	Metsimatsho Dam (Metsimatsho River), Fika Patso Dam (Namahadi River)	Metsimatsho Dam (Metsimatsho River), Fika Patso Dam (Namahadi River)
BDRR 2023	%	98.37%	98.37%	89.84%	89.84%
BDRR 2022	%	NI	NI	NI	NI

Key Performance Area	Weight	Greater QWAQWA Supply System (Fika - Patso WTW)	Makwane water supply system	Harrismith water Supply System (Wilge WTW)	Tshiame Water Supply System (Dr Limpho Letsela WTW)
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	17.60%	14.20%	17.75%	19.35%
Blue Drop Score 2014	%	97.65%	97.90%	97.86%	Ni
Blue Drop Score 2012	%	82.28%	97.20%	96.32%	Ni
Blue Drop Score 2011	%	86.54%	95.74%	95.74%	NI
System Design Capacity	kL/d	36 000	10 000	11 200	10 000
System Available Capacity	kL/d	36 200	10 000	11 200	10 000
System Input Value	kL/d	38 406	6 656	15 310	6 121
Capacity Utilisation	%	108.40%	66.56%	142.23%	152.39%
Resource Abstracted From		Fika Patso Dam (Namahadi River)	Metsimatsho Dam (Metsimatsho River)	Wilge River	Sterkfontein Dam (Nuwejaarspruit)
BDRR 2023	%	90.59%	87.08%	91.47%	97.93%

Key Performance Area	Weight	Greater QWAQWA Supply System (Fika - Patso WTW)	Makwane water supply system	Harrismith water Supply System (Wilge WTW)	Tshiame Water Supply System (Dr Limpho Letsela WTW)
BDRR 2022	%	98.50%	NI	89.30%	90.10%

Technical Site Assessment: Wilge WTW - 67%

The Regulator notes the dire state of management and drinking water quality in the Bluegumbosch, Kestell, HaRankopane, Mphatlalatsane, Greater Qwaqwa, Makwane, Harrismith and Tshiame water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

6.7 Mangaung Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	62.82%
Blue Drop Score 2014	%	77.47%
Blue Drop Score 2012	%	84.45%
Blue Drop Score 2011	%	0.00%

Key Performance Area	Weight	Bloemfontein	Botshabelo	Dewetsdorp	Soutpan Krugersdrift Dam
Bulk/WSP		Bloem Water	Bloem Water	Bloem Water	-
Blue Drop Score 2023	%	66.98%	54.35%	67.45%	23.40%
Blue Drop Score 2014	%	778.00%	77.46%	NI	NI
Blue Drop Score 2012	%	na	71.06%	Ni	Ni
Blue Drop Score 2011	%	na	NA	NI	NI
System Design Capacity	kL/d	382 500	100 500	145 000	1 000
System Available Capacity	kL/d	382 500	100 500	145 000	1 000
System Input Value	kL/d	143 609	53 969	2 451	2 160
Capacity Utilisation	%	69.86%	53.46%	72.43%	216.00%
Resource Abstracted From		Welbedacht Dam, Orange River	Caledon River, Boreholes	Welbedacht Dam, Orange river	Modder dam
BDRR 2023	%	33.54%	54.40%	30.79%	86.86%
BDRR 2022	%	69.60%	93.80%	69.40%	97.20%

Key Performance Area	Weight	Thaba Nchu	Vanstadensrus	Wepener
Bulk/WSP		Bloem Water	-	Bloem Water
Blue Drop Score 2023	%	52.71%	26.40%	68.15%
Blue Drop Score 2014	%	76.73%	NI	NI
Blue Drop Score 2012	%	62.69%	NI	NI
Blue Drop Score 2011	%	NI	NI	NI
System Design Capacity	kL/d	118 500	300	145 000
System Available Capacity	kL/d	118 500	0	145 000
System Input Value	kL/d	602 943	481	2 367
Design Capacity Utilisation	%	0.00%	0.00%	72.43%
Resource Abstracted From		Groothoek Dam, Caledon River, Boreholes	Boreholes	Welbedacht Dam, Orange River
BDRR 2023	%	36.05%	69.51%	29.71%
BDRR 2022	%	55.80%	74.40%	80.20%

Technical Site Assessment: Maselspoort WTW - 62%

The Regulator notes the dire state of management and drinking water quality in the Soutpan and Vanstadensrus water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

6.8 Mantsopa Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	42.28%
Blue Drop Score 2014	%	52.78%
Blue Drop Score 2012	%	47.09%
Blue Drop Score 2011	%	38.48%

Key Performance Area	Weight	Excelsior	Hobhouse	Ladybrand	Thaba Phatchoa
Bulk/WSP		Bloem Water	-	-	-
Blue Drop Score 2023	%	50.88%	30.05%	41.90%	45.55%
Blue Drop Score 2014	%	58.48%	40.99%	54.03%	47.06%
Blue Drop Score 2012	%	79.36%	39.78%	40.98%	52.15%
Blue Drop Score 2011	%	48.25%	30.10%	48.08%	41.61%
System Design Capacity	kL/d	100 720	1 640	10 800	600
System Available Capacity	kL/d	100 720	1 640	10 330	600
System Input Value	kL/d	910	129	9 291	274
Capacity Utilisation	%	77.25%	7.87%	88.87%	45.67%
Resource Abstracted From		Caledon River	Caledon River	Caledon River	Qahang River
BDRR 2023	%	51.06%	55.38%	47.90%	38.47%
BDRR 2022	%	53.50%	70.90%	43.10%	56.90%

Key Performance Area	Weight	Tweespruit
Bulk/WSP		-
Blue Drop Score 2023	%	30.65%
Blue Drop Score 2014	%	38.44%
Blue Drop Score 2012	%	41.28%
Blue Drop Score 2011	%	27.53%
System Design Capacity	kL/d	1 400
System Available Capacity	kL/d	1 400
System Input Value	kL/d	309
Capacity Utilisation	%	22.14%
Resource Abstracted From		Boreholes and Dam
BDRR 2023	%	59.35%
BDRR 2022	%	42.90%

Technical Site Assessment: Genoa WTW - 36%

The Regulator notes the dire state of management and drinking water quality in the Hobhouse, Thaba Phatchoa and Tweespruit water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

6.9 Masilonyana Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	25.52%
Blue Drop Score 2014	%	29.64%
Blue Drop Score 2012	%	11.40%
Blue Drop Score 2011	%	6.49%

Key Performance Area	Weight	Brandfort	Theunissen	Verkeerdevlei	Winburg
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	23.90%	25.30%	21.70%	29.10%
Blue Drop Score 2014	%	27.68%	31.59%	23.85%	31.16%
Blue Drop Score 2012	%	11.31%	10.79%	6.56%	14.91%
Blue Drop Score 2011	%	3.88%	7.08%	4.43%	90.80%
System Design Capacity	kL/d	2 400	6 800	7 348	2 400
System Available Capacity	kL/d	2 400	6 800	7 348	2 400
System Input Value	kL/d	2 500	3 200	1 750	3 200
Capacity Utilisation	%	104.17%	47.06%	23.82%	133.33%
Resource Abstracted From		Erfenis Dam from Sand Vet channel	Erfenis Dam	4 boreholes	Wolwas Dam 1 and 2, Rietfontein Dam
BDRR 2023	%	93.46%	82.61%	71.21%	82.06%
BDRR 2022	%	42.80%	86.90%	24.90%	46.70%

Technical Site Assessment: Winburg WTW - 30%

The Regulator noted the dire state of management and drinking water quality in the Brandfort, Theunissen, Verkeerdevlei and Winburg water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment

6.10 Matjhabeng Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	55.63%
Blue Drop Score 2014	%	93.60%
Blue Drop Score 2012	%	94.72%
Blue Drop Score 2011	%	79.91%

Key Performance Area	Weight	Allanridge	Henneman	Odendaalsrus	Ventersburg
Bulk/WSP		Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
Blue Drop Score 2023	%	54.89%	54.17%	54.57%	54.70%
Blue Drop Score 2014	%	92.80%	95.10%	92.75%	95.11%
Blue Drop Score 2012	%	95.20%	95.24%	92.05%	95.24%
Blue Drop Score 2011	%	78.70%	80.78%	80.59%	80.80%
System Design Capacity	kL/d	360 000	360 000	360 000	360 000
System Available Capacity	kL/d	360 000	360 000	360 000	360 000
System Input Value	kL/d	3 727	6 100	24 000	1 900
Capacity Utilisation	%	58.33%	58.33%	58.33%	58.33%
Resource Abstracted From		Vaal River	Vaal	Vaal	Vaal River
BDRR 2023	%	57.82%	57.82%	57.82%	57.82%
BDRR 2022	%	29.70%	30.50%	28.80%	28.33%

Key Performance Area	Weight	Virginia	Welkom
Bulk/WSP		Sedibeng Water	Sedibeng Water
Blue Drop Score 2023	%	55.71%	56.04%
Blue Drop Score 2014	%	97.27%	92.54%
Blue Drop Score 2012	%	95.24%	92.24%
Blue Drop Score 2011	%	79.80%	79.63%
System Design Capacity	kL/d	480 000	360 000
System Available Capacity	kL/d	480 000	360 000
System Input Value	kL/d	80 000	78 400
Capacity Utilisation	%	68.33%	58.33%
Resource Abstracted From		Vaal	Vaal
BDRR 2023	%	57.98%	57.82%
BDRR 2022	%	28.80%	33.60%

Technical Site Assessments: Balkfontein WTW - 82% and Virginia WTW - 88%

6.11 Metsimaholo Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	84.21%
Blue Drop Score 2014	%	84.52%
Blue Drop Score 2012	%	89.49%
Blue Drop Score 2011	%	48.86%

Key Performance Area	Weight	Deneysville	Oranjeville	Sasolburg
Bulk/WSP		-	-	Rand Water
Blue Drop Score 2023	%	53.60%	57.90%	89.38%
Blue Drop Score 2014	%	72.57%	68.88%	89.11%
Blue Drop Score 2012	%	82.06%	79.81%	94.18%
Blue Drop Score 2011	%	57.68%	58.10%	43.06%
System Design Capacity	kL/d	9 900	2 590	5 427 000
System Available Capacity	kL/d	9 900	2 590	5 427 000
System Input Value	kL/d	5 500	1 800	41 771
Capacity Utilisation	%	55.56%	69.50%	78.49%
Resource Abstracted From		Vaal Dam	Vaal Dam	Vaal Dam
BDRR 2023	%	43.40%	43.40%	30.18%
BDRR 2022	%	40.20%	39.00%	26.00%

Technical Site Assessment: Deneysville WTW - 73%

6.12 Mohokare Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	**27.58%**
Blue Drop Score 2014	%	**65.30%**
Blue Drop Score 2012	%	**77.04%**
Blue Drop Score 2011	%	**80.10%**

Key Performance Area	Weight	Rouxville Conventional Water Treatment Plant	Smithfield Conventional Water Treatment Plant	Zastron Conventional Water Treatment Plant
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	**27.18%**	**25.05%**	**30.28%**
Blue Drop Score 2014	%	67.17%	62.65%	65.62%
Blue Drop Score 2012	%	65.63%	82.97%	79.80%
Blue Drop Score 2011	%	80.38%	79.47%	80.28%
System Design Capacity	kL/d	2 880	3 220	3 024
System Available Capacity	kL/d	2 880	3 220	3 024
System Input Value	kL/d	1 769	2 200	2 327
Capacity Utilisation	%	61.42%	68.32%	76.98%
Resource Abstracted From		Kalkoenskraal Dam	Caledon River	Montague River
BDRR 2023	%	52.14%	47.80%	36.95%
BDRR 2022	%	39.00%	37.80%	52.50%

Technical Site Assessment: Zastron WTW - 40%

The Regulator notes the dire state of management and drinking water quality in the Rouxville, Smithfield and Zastron water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment

6.13 Moqhaka Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	36.12%
Blue Drop Score 2014	%	60.16%
Blue Drop Score 2012	%	54.93%
Blue Drop Score 2011	%	21.76%

Key Performance Area	Weight	Kroonstad	Steynsrus	Viljoenskroon
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	35.93%	29.58%	39.68%
Blue Drop Score 2014	%	59.81%	49.22%	65.00%
Blue Drop Score 2012	%	57.55%	37.86%	38.10%
Blue Drop Score 2011	%	20.91%	16.35%	31.51%
System Design Capacity	kL/d	60 000	2 900	6 900
System Available Capacity	kL/d	38 000	2 000	6 900
System Input Value	kL/d	29 104	2 900	6 900
Capacity Utilisation	%	76.59%	100.00%	NI
Resource Abstracted From		Vals River	Vals River	Renoster and Vaal Rivers
BDRR 2023	%	33.04%	38.24%	46.61%
BDRR 2022	%	65.90%	48.30%	48.30%

Technical Site Assessment: Viljoenskroon WTW - 62%

The Regulator notes the dire state of management and drinking water quality in the Steynsrus water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

6.14 Nala Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	52.30%
Blue Drop Score 2014	%	81.29%
Blue Drop Score 2012	%	67.23%
Blue Drop Score 2011	%	58.90%

Key Performance Area	Weight	Balkfontein (Sedibeng Water)
Bulk/WSP		Sedibeng Water
Blue Drop Score 2023	%	52.30%
Blue Drop Score 2014	%	81.36%
Blue Drop Score 2012	%	67.23%
Blue Drop Score 2011	%	58.90%
System Design Capacity	kL/d	360 000
System Available Capacity	kL/d	360 000
System Input Value	kL/d	14 631
Capacity Utilisation	%	58.33%
Resource Abstracted From		Vaal
BDRR 2023	%	43.57%
BDRR 2022	%	45.60%

Technical Site Assessment: Balkfontein WTW - 82%

6.15 Ngwathe Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	36.16%
Blue Drop Score 2014	%	55.43%
Blue Drop Score 2012	%	20.59%
Blue Drop Score 2011	%	45.37%

Key Performance Area	Weight	Parys	Vredefort	Koppies	Edenville (Boreholes)
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	22.58%	17.20%	15.08%	14.03%
Blue Drop Score 2014	%	53.14%	35.71%	53.75%	45.84%
Blue Drop Score 2012	%	14.33%	11.20%	11.00%	20.50%
Blue Drop Score 2011	%	39.55%	37.86%	24.11%	23.89%
System Design Capacity	kL/d	25 000	3 700	3 800	384
System Available Capacity	kL/d	13 125	3 600	4 200	400
System Input Value	kL/d	15 000	3 600	4 200	188
Capacity Utilisation	%	114.29%	100.00%	100.00%	47.00%
Resource Abstracted From		Vaal River	Vaal River	Renoster River	Groundwater
BDRR 2023	%	82.69%	86.06%	93.56%	91.90%
BDRR 2022	%	81.40%	84.70%	88.10%	92.00%

Key Performance Area	Weight	Heilbron
Bulk/WSP		Rand Water
Blue Drop Score 2023	%	81.73%
Blue Drop Score 2014	%	77.84%
Blue Drop Score 2012	%	54.73%
Blue Drop Score 2011	%	68.45%
System Design Capacity	kL/d	5 427 000
System Available Capacity	kL/d	5 427 000
System Input Value	kL/d	8 000
Capacity Utilisation	%	78.49%
Resource Abstracted From		Vaal Dam
BDRR 2023	%	42.31%
BDRR 2022	%	36.70%

Technical Site Assessment: Parys WTW - 36%

The Regulator notes the dire state of management and drinking water quality in the Parys, Vredefort, Koppies and Edenville (Boreholes)water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment

6.16 Nketoana Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	45.60%
Blue Drop Score 2014	%	71.40%
Blue Drop Score 2012	%	18.57%
Blue Drop Score 2011	%	6.33%

Key Performance Area	Weight	Reitz	Lindley	Arlington	Petrus Steyn
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	43.50%	52.35%	55.70%	45.20%
Blue Drop Score 2014	%	71.49%	68.42%	66.99%	81.78%
Blue Drop Score 2012	%	19.74%	15.43%	13.60%	18.16%
Blue Drop Score 2011	%	4.77%	10.22%	5.04%	5.31%
System Design Capacity	kL/d	15 000	4 000	2 000	1 000
System Available Capacity	kL/d	11 000	3 500	2 000	1 000
System Input Value	kL/d	11 000	2 700	500	500
Capacity Utilisation	%	NI	77.14%	25.00%	50.00%
Resource Abstracted From		Liebenbergsvlei	Vals	Hamanspruit	Kaloemspruit
BDRR 2023	%	53.36%	26.72%	19.43%	26.59%
BDRR 2022	%	48.51%	37.34%	29.60%	52.53%

Technical Site Assessment: Reitz WTW – 38%

6.17 Phumelela Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	41.34%
Blue Drop Score 2014	%	61.31%
Blue Drop Score 2012	%	17.90%
Blue Drop Score 2011	%	3.82%

Key Performance Area	Weight	Vrede	Warden	Memel
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	47.30%	41.30%	31.05%
Blue Drop Score 2014	%	62.55%	60.03%	60.75%
Blue Drop Score 2012	%	19.58%	11.83%	17.83%
Blue Drop Score 2011	%	1.00%	1.00%	9.46%
System Design Capacity	kL/d	3 500	7 500	2 000
System Available Capacity	kL/d	3 500	7 500	2 000
System Input Value	kL/d	3 500	7 500	2 000
Capacity Utilisation	%	NI	0.00%	NI
Resource Abstracted From		Ventersspruit	Cornelis Dam	Klip River
BDRR 2023	%	37.77%	63.00%	59.42%
BDRR 2022	%	96.30%	97.00%	95.50%

Technical Site Assessment: Vrede WTW - 55%

6.18 Setsoto Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	43.32%
Blue Drop Score 2014	%	42.21%
Blue Drop Score 2012	%	89.00%
Blue Drop Score 2011	%	88.64%

Key Performance Area	Weight	Clocolan (Clocolan TW)	Ficksburg (Ficksburg TW)	Marquard (Marquard TW)	Senekal (Cyferfontein and De Put TW)
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	26.28%	50.55%	34.18%	22.43%
Blue Drop Score 2014	%	31.49%	49.02%	39.26%	31.49%
Blue Drop Score 2012	%	89.47%	90.39%	87.15%	87.00%
Blue Drop Score 2011	%	94.11%	95.20%	91.89%	73.80%
System Design Capacity	kL/d	5 950	32 000	7 300	9 900
System Available Capacity	kL/d	5 950	32 000	7 300	6 600
System Input Value	kL/d	1 982	18 083	2 939	3 356
Capacity Utilisation	%	33.43%	56.51%	41.95%	50.85%
Resource Abstracted From		Caledon River, Lucretia Dam; Moperi Dam (overflow from Lucretia Dam)	Caledon River and Meulspruit	Laaispruit Dam (Laaispruit); Caledon River	Sand River; Sandspruit
BDRR 2023	%	58.86%	43.85%	40.45%	73.79%
BDRR 2022	%	79.60%	35.80%	95.90%	95.90%

Technical Site Assessment: Ficksburg WTW - 81%

The Regulator notes the dire state of management and drinking water quality in the Clocolan and Senekal water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

6.19 Tokologo Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	**%**	**24.78%**
Blue Drop Score 2014	**%**	**56.81%**
Blue Drop Score 2012	**%**	**25.46%**
Blue Drop Score 2011	**%**	**20.35%**

Key Performance Area	Weight	Boshof Water Supply System	Dealesville Water Supply System	Hertzogville Water Supply System
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	**17.68%**	**18.33%**	**31.48%**
Blue Drop Score 2014	%	57.89%	56.72%	56.08%
Blue Drop Score 2012	%	26.19%	24.51%	25.36%
Blue Drop Score 2011	%	22.85%	18.85%	18.85%
System Design Capacity	kL/d	2 972	1 922	5 000
System Available Capacity	kL/d	2 972	1 922	5 000
System Input Value	kL/d	2 972	1 922	5 000
Capacity Utilisation	%	100.00%	100.00%	100.00%
Resource Abstracted From		Groundwater	Groundwater	Surface Water (Vaal River) at Christiana
BDRR 2023	%	77.75%	79.52%	51.06%
BDRR 2022	%	97.20%	97.20%	100.00%

Technical Site Assessment: Hertzogville Water Purification Plant - 75%

The Regulator notes the dire state of management and drinking water quality in the Boshof and Dealesville water supply systems. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

6.20 Tswelopele Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	73.78%
Blue Drop Score 2014	%	70.10%
Blue Drop Score 2012	%	92.42%
Blue Drop Score 2011	%	54.71%

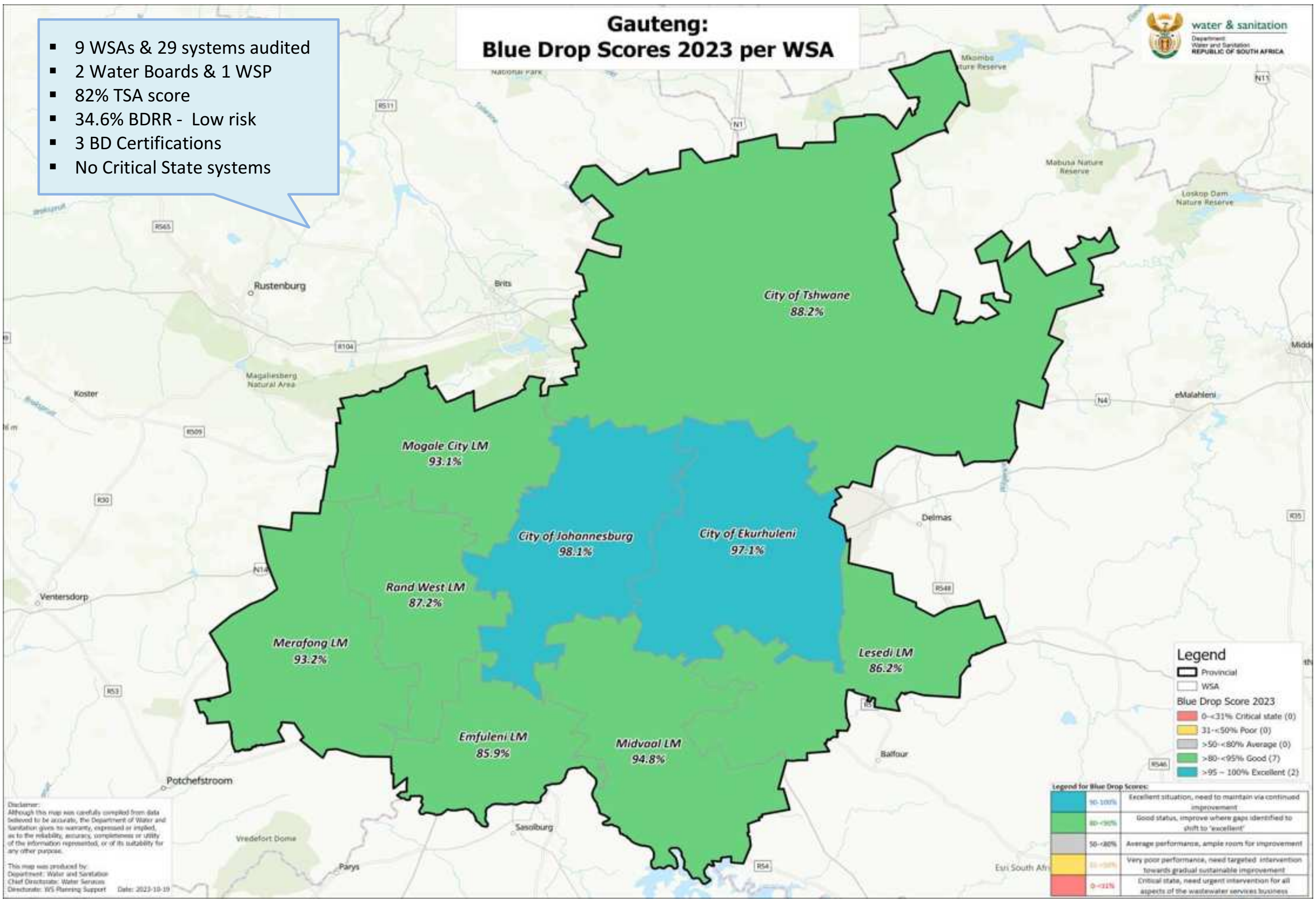
Key Performance Area	Weight	Bultfontein Supply Zone	Hoopstad Supply Zone
Bulk/WSP		-	-
Blue Drop Score 2023	%	73.76%	73.81%
Blue Drop Score 2014	%	70.28%	69.82%
Blue Drop Score 2012	%	92.97%	91.78%
Blue Drop Score 2011	%	62.10%	43.35%
System Design Capacity	kL/d	8 800	6 000
System Available Capacity	kL/d	8 800	6 000
System Input Value	kL/d	8 100	4 813
Capacity Utilisation	%	92.05%	80.22%
Resource Abstracted From		Vet	Vet
BDRR 2023	%	23.66%	22.62%
BDRR 2022	%	36.80%	52.50%

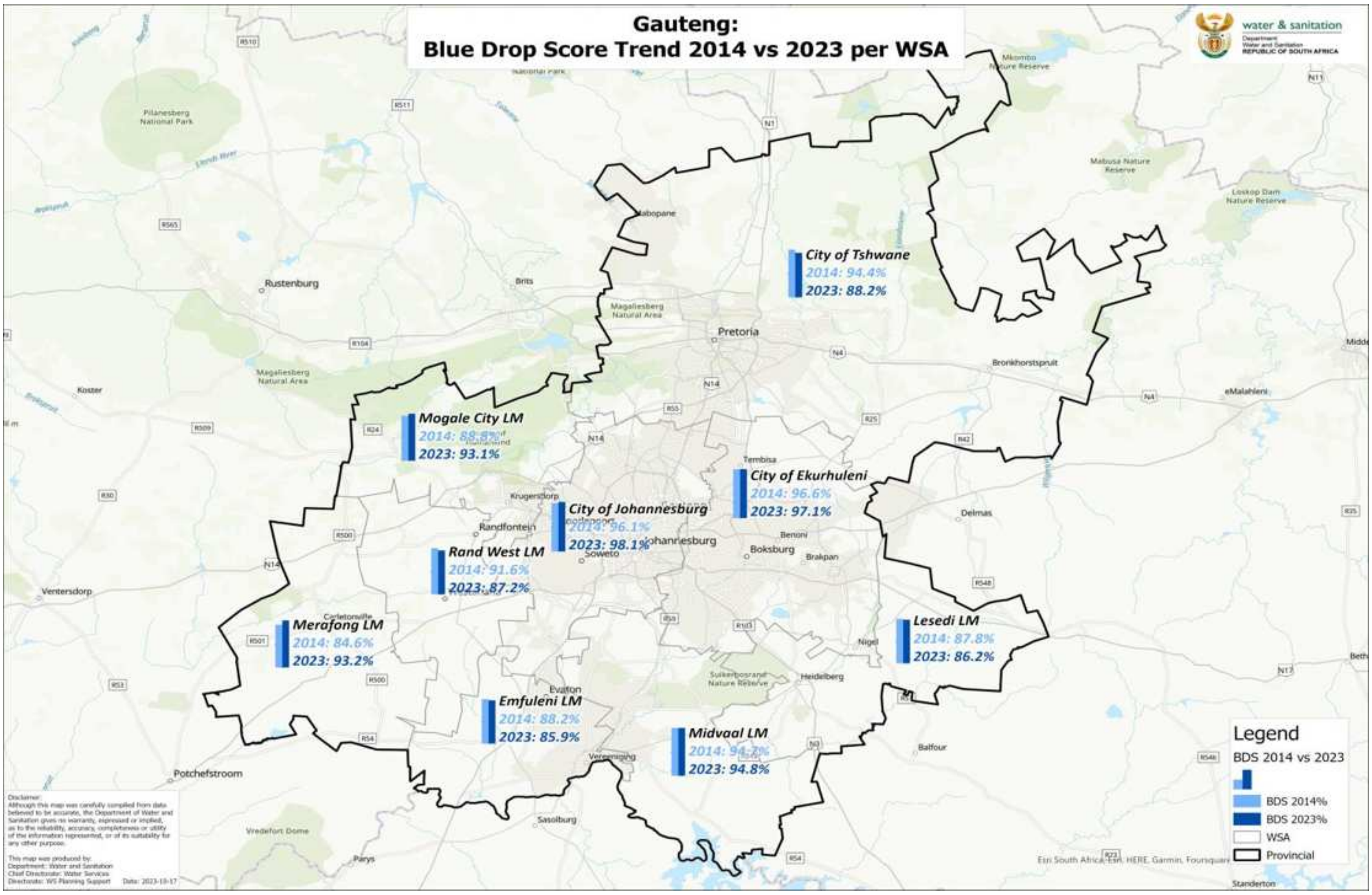
Technical Site Assessment: Hoopstad WTW - 82%

JB Marks officials and audit team – satisfied after a Blue Drop audit…

City of Ekurhuleni staff and audit team – still smiling after the audit…!

7. GAUTENG PROVINCE: MUNICIPAL WATER MANAGEMENT PERFORMANCE





Provincial Synopsis

The Gauteng province provides drinking water to the largest population of 13,928,777 persons in South Africa.

An audit attendance record of 100% of the 9 WSAs, 2 Water Boards (Rand Water and Magalies Water) and Johannesburg Water affirms the province's commitment to the Blue Drop national incentive-based regulatory programme. The main Bulk Water Supplier is Rand Water who supplies potable water to 17 (of 29) water supply systems across 9 municipalities, followed by Magalies Water who supplies potable water to 3 (of 29) water supply systems in the City of Tshwane. In addition to Gauteng, both Rand Water and Magalies Water also supply bulk water to other provinces. Rand Water owns and operates the Vereeniging and Zuikerbosch WTWs and Magalies Water owns and operates Cullinan, Klipdrift and Wallmansthal WTWs (Vaalkop WTW not included under GP as it is located in NW and supplies water to the NW and Limpopo provinces).

The Regulator determined that 3 water supply systems scored more than 95% when measured against the Blue Drop standards and thus qualified for the prestigious Blue Drop Certification. In 2014, 9 water supply systems were awarded Blue Drop status. Using the 2014 audit results as comparative baseline, the province shows a decline in excellence for 2023.

Five (5) of 9 WSAs improved on their 2014 scores, namely City of Ekurhuleni, City of Johannesburg, Merafong LM, Midvaal LM and Mogale City LM. The remaining 4 WSAs regressed to lower Blue Drop scores compared to their 2014 baselines but still retained their good performance status. The City of Johannesburg, City of Ekurhuleni and Midvaal LM are the best performing WSAs in the province, achieving Blue Drop Certifications for 3 water supply systems in total. The Blue Drop scores of these top WSA performers were supported by excellent technical site assessment scores of 97% for the Rand Water Vereeniging WTW linked to all the municipalities, followed by the Magalies Water's Cullinan WTW with a TSA score of 95%. No water supply system was identified to be in a critical state in the province for both 2014 and 2023.

The province's overall Blue Drop performance is characterised by particular strengths when measured against the KPAs. Water supply systems operated by Rand Water stand out for its compliance, good practice and risk management practices that are well embedded in the water services business. The predominant KPAs that require attention and that are reflecting scores below 50% are KPA 2 DWQ Risk Management, KPA 4 Technical Management and KPA 5 Drinking Water Quality Compliance.

The provincial Blue Drop Risk Rating (BDRR) remained in the low risk category but improved from 40.6% in 2022 to 34.6% in 2023. A total of 26 (of 29) WSSs are situated in the low risk category and 3 WSSs in the medium risk category. No WSSs were found in the high and critical risk categories.

The Regulator is optimistic that the 2023 Blue Drop report provides an updated residual basis from where a positive trajectory for water services delivery and improved performance will follow in the next BD audit. Municipalities and their service providers are encouraged to start preparation for the next Blue Drop audit cycle, which is planned to cover the financial year 2023/24 and released in 2025. The 2023 Blue Drop status for WSAs in the province are summarised in the table below.

Table 78 - 2023 Blue Drop Summary

WSA Name	2014 BD Score (%)	2023 BD Score (%)	2023 BD Certified ≥95%	2023 Critical State (<31%)
City of Ekurhuleni	96.6%	97.1%↑	Ekurhuleni (Rand Water)	None
City of Johannesburg	96.1%	98.1%↑	Greater Johannesburg WSS (Rand Water)	None
City of Tshwane	94.4%	88.2%↓	None	None
Emfuleni LM	88.2%	85.9%↓	None	None
Lesedi LM	87.8%	86.2%↓	None	None
Merafong LM	84.6%	93.2%↑	None	None
Midvaal LM	94.7%	94.8%↑	Meyerton (Rand Water)	None
Mogale City LM	88.8%	93.1%↑	None	None
Rand West LM	91.6%	87.2%↓	None	None
Totals	-	-	3	0

↑= improvement, ↓= regress, →= no change

The Department of Water and Sanitation acknowledges the excellence in water services management achieved for the Blue Drop Audit year of 2021-22. Three (3) Blue Drop Certificates are awarded in the Gauteng Province to the water supply systems of Ekurhuleni, Greater Johannesburg and Meyerton:

Province	2023 Blue Drop Certified Systems
Gauteng	**City of Ekurhuleni** ○ Ekurhuleni (Rand Water) **City of Johannesburg** ○ Greater Johannesburg (Rand Water) **Midvaal LM** ○ Meyerton (Rand Water).

Background to Water Delivery and Distribution Infrastructure

Gauteng province represents the highest volume of potable water treated in South Africa, totalling 4,923,288 kl/d. Nine (9) WSAs, 2 WBs (Rand Water and Magalies Water) and Johannesburg Water are responsible for water services through a water network comprising of:

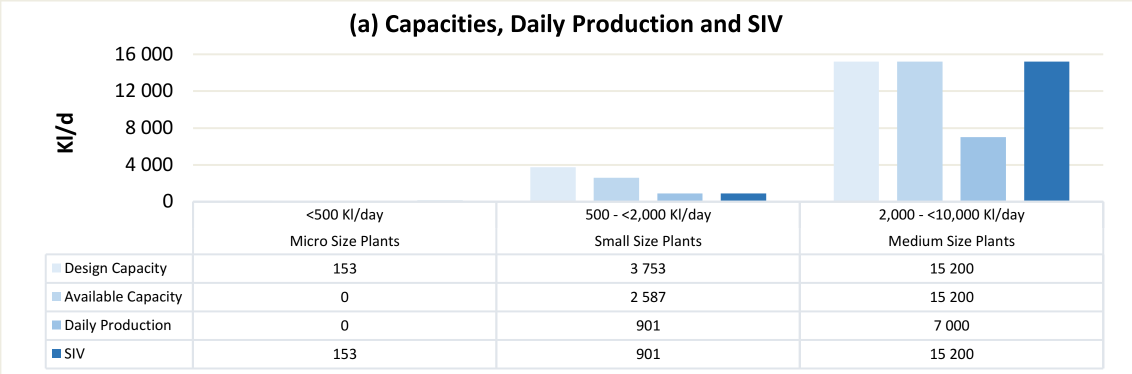
- 19 WTWs, boreholes and springs with the bulk of the water treated and supplied by the Rand Water Vereeniging and Zuikerbosch WTWs to all 9 municipalities with a total Average Daily Production of 4,681,827 kl/d
- 29 WSSs of which 17 systems receives bulk water from Rand Water and 3 systems from Magalies Water in the City of Tshwane (only)
- 211 pump stations, 5,084 km bulk water supply lines, 38,418 km reticulation pipe lines, and 538 reservoirs/ towers (excluding some of the smaller systems that were unable to provide data).

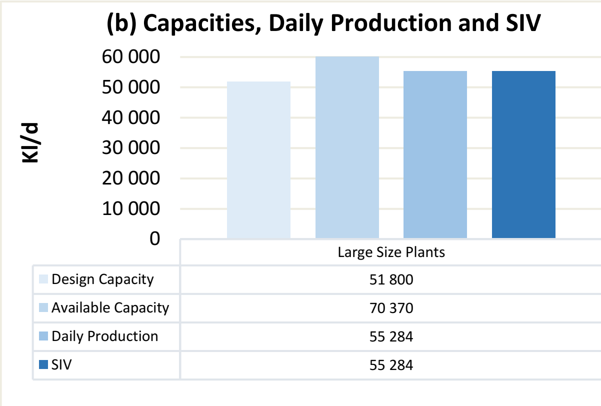
Table 79 - Summary of Capacities, Daily Production and SIV distribution according to plant sizes

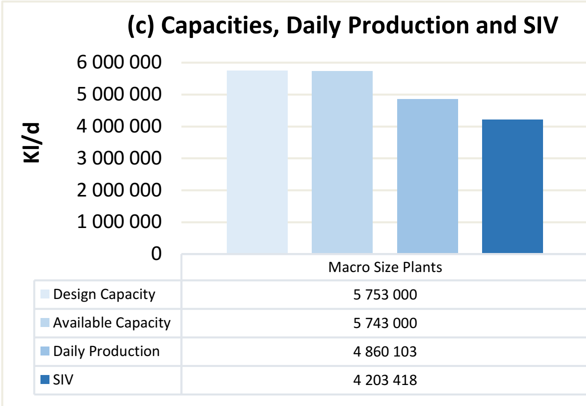
	Micro Size Plants	Small Size Plants	Medium Size Plants	Large Size Plants	Macro Size Plants	Unknown (NI)*	Total
	<500 kl/day	500 - <2,000 kl/day	2,000 - <10,000 kl/day	10,000 - <25,000 kl/day	>25,000 kl/day		
No. of WTWs, Boreholes, Springs	1 (5%)	4 (21%)	3 (16%)	4 (21%)	7 (37%)		19
No. of WSS	1 (3%)	4 (14%)	1 (3%)	4 (14%)	19 (66%)		29
Total Design Capacity (kl/day)	153	3,753	15,200	51,800	5,753,000	None	5,823,906
Total Available Capacity (kl/day)	NI	2,587	15,200	70,370	5,743,000	4 boreholes & springs	5,831,157
Average Daily Treatment Volume (kl/day)	NI	901	7,000	55,284	4,860,103	4 boreholes & springs	4,923,288
Total SIV (kl/day)	153	901	15,200	55,284	4,203,418		4,274,956
Design Capacity Utilisation (%)	NI	24%	NI	107%	84%		85%
Available Capacity Utilisation (%)	NI	35%	NI	79%	85%		84%

** "Unknown" means the number of WTWs with NI (No Information) on design capacity or available capacity or SIV*

The audit verified a total installed design capacity of 5,823,906 kl/d and a total available design capacity of 5,831,157 kl/d, with most of this capacity residing in the macro-sized water treatment plants (Note that the total available capacity exceeds the total installed design capacity due to the Pretoria Findley Fountains in the City of Tshwane that has an installed design capacity of 13,800 kl/d and an available design capacity of 32,370 kl/d). Collectively, the 19 WTWs produce 4,923,288 kl/d and distributes 4,274,9576 kl/d across the water networks. By comparing the available treatment capacity with the treated water volume, a spare treatment capacity of 900,618 kl/d is available (18.3%) to meet additional future demands. However, the WUE for the province is high (ave. 316 l/p/d) compared to the international WUE benchmark of 180 l/p/d, indicating a high ratio between effective water use and actual water abstraction. Going forward, the province will have to dedicate significant resources to curb water losses and NRW.







Zero in the graph above reflects NI; Light blue to dark blue represents from left to right design capacity, available capacity, daily production and SIV

Figure 56 - Capacities, Daily Production and SIV Distribution -(a) micro to medium sized WTWs, (b) large WTWs, and (c) macro sized WTWs

In some cases, a Bulk Water Supplier supplies water across provincial borders and it is difficult to report accurately on design capacity and available capacity at provincial level, as the statistical data may become repetitive. Therefore, the reporting on the total system input volumes (SIV) would provide more accurate figures on the supply of treated water to the various water supply systems. The total SIV in the province is 4,274,956 kl/d and the average daily treatment volume is 4,923,288 kl/d. It is expected that the volume of treated water would be close to the volume of water distributed to the consumers. However, the SIV profile indicates that the treated volume is more than the total SIV (87%). Reasons could include data credibility from water balances and flow measurements at the treatment plants, as well as the fact that 3 boreholes/springs/fountains are not measuring their average daily treatment volumes. The largest contributors to the total SIV for 17 WSSs from Rand Water are the Vereeniging and Zuikerbosch WTWs with a total SIV contribution of 4,025,142 kl/d (94% of total SIV). Diagnostic no. 2 to follow herein unpacks these statistics in more detail. The data shows that the Pretoria Findley upper and lower fountains daily average treatment volume exceeds the available design capacity. No other systems have daily treated volumes that exceed the authorised daily abstraction volumes. The water distribution infrastructure is summarised in the table below.

Table 80 - Summary of Water Distribution Infrastructure

WSA and WSP Name	# WSS with no WSP/WB	# WSS with WSP/WB	Water Distribution Infrastructure			
			# Pump Stations (#)	Bulk Water Supply Lines (km)	Reticulation pipe lines (km)	# Reservoirs/ Towers
Rand Water*	-	17**	13	3,399	141	60
Magalies Water*	-	3**	4	NI	NI	5
City of Ekurhuleni	-	1	52	541	10,150	80
City of Johannesburg	-	1	34	-	12,307	128
City of Tshwane	7	4	84	638	11,160	195
Emfuleni LM	1	1	2	479	2,231	11
Lesedi LM	-	1	7	27	185	12
Merafong LM	-	3	1	0	0	11
Midvaal LM	1	1	4	0	1,095	13
Mogale City LM	-	1	10	-	1,150	23
Rand West LM	-	7	-	-	-	-
Totals	**9**	**20****	**211**	**5,084**	**38,418**	**538**

* Rand Water and Magalies Water totals for all WSSs in all the provinces - no separation of the figures
** Rand Water = 17 no. and Magalies Water = 3 no gives total of 20 in GP only
Note: The grey highlight for Rand Water indicates that it is not included in the Totals in the table above.

Provincial Blue Drop Analysis

The 100% response from the 9 WSAs audited demonstrates a firm commitment to progressive water services management in the province. Local government reforms resulted in the merging of Randfontein LM and Westonaria LM into Rand West LM. Therefore, 9 WSAs were audited in 2021-22 compared to the 10 WSAs in 2014.

Table 81 - Blue Drop Comparative Analysis from 2012 to 2023

BLUE DROP COMPARATIVE ANALYSIS				
Performance Category	**2012**	**2014**	**2023**	**Performance trend 2014 and 2023**
Incentive-based indicators				
WSAs assessed (#)	10 (100%)	10 (100%)	9 (100%)	→
Water supply systems assessed (#)	31	29	29	→
Blue Drop scores ≥50% (#)	30 (97%)	29 (100%)	26 (90%)	↓
Blue Drop scores <50% (#)	1 (3%)	0 (0%)	3 (10%)	↓
Blue Drop Certifications (#)	16	9	3	↓
Lowest Technical Site Assessment Score (%)	NA	63%	53%	↓
Highest Technical Site Assessment Score (%)	NA	90%	97%	↑

NA = Not Applied NI = No Information *↑= improvement, ↓= regress, →= no change*

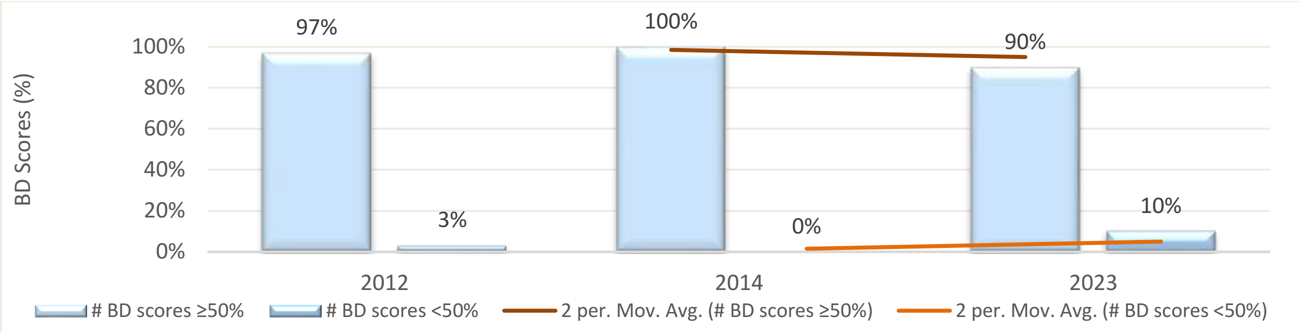


Figure 57 - Blue Drop trend analysis over the period 2012 to 2023, indicating the percentage BD scores above and below 50%

The trend analysis indicates that:

- The no. of systems audited has remained the same from the last BD audit in 2014
- The no. of systems with BD scores of ≥50% decreased from 29 (100%) in 2014 to 26 (90%) in 2023
- This trend was reversed with no. of systems with a BD score of ≤50% increasing from none (0%) in 2014 to 3 (10%) in 2023
- Blue Drop Certifications decreased from 9 awards in 2014 to 3 awards in 2023
- The lowest TSA score decreased from 63% in 2014 to 53% in 2023, with the highest TSA score increasing from 90% in 2014 to 97% in 2023
- An overall performance trend analyses indicates a regression in drinking water services from 2014 to 2023
- This negative trajectory reinforces the need for regular audits to ensure timely turnaround and continued improvement
- The negative trend also implies that performance has declined in the absence of regulatory engagement of the BD audits between 2014 to 2023.

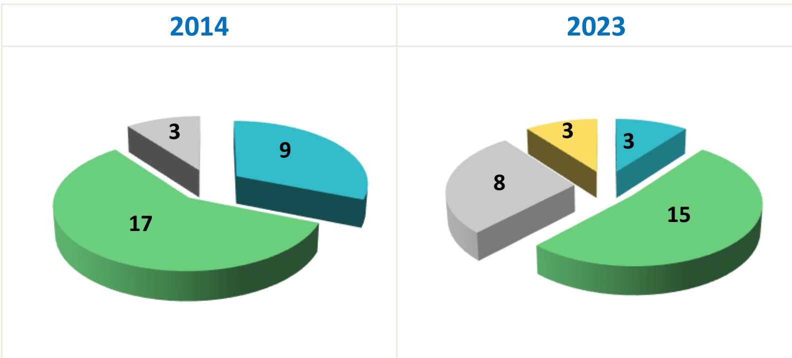


Figure 58 - No. WSSs in the Blue Drop score categories for 2014 and 2023 (graph legend to right)

≥95 – 100% Excellent	
≥80-<95% Good	
≥50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

Comparative analysis of the 2014 and 2023 Blue Drop scores indicates that system scores are predominantly in the >80 - <95% (*Good Performance*) category, with the >50-<80% (*Average Performance*) being the next largest category. It is concerning that 3 systems in 2023 reside in *Poor Performance* category. However, what has been maintained is that no systems are in *Critical State* (<31%). In summary, trend analysis since 2014 to 2023 indicate as follows:

- Systems in a ‘critical state’ remains at zero
- Systems in a ‘poor state’ increased from 0 to 3 systems
- Systems in an ‘average state’ increased from 3 to 8 systems
- Systems in the ‘excellent and good state’ decreased from 26 systems (90%) to 18 systems (62%).

Provincial BDRR Analysis

The Blue Drop Risk Rating (BDRR) analysis assesses the risk across the entire water supply network. The BDRR formular was updated in 2021 to include an added risk indicator, i.e. ‘E: Water Safety Plans’, to address the risk assessment requirements outlined in SANS 241 of 2015. The BDRR now contains 5 risk indicators, i.e. design capacity (A), operational capacity (B), water quality compliance (C), technical capacity (D), and water safety plans (E). The results from the BDRR analyses are summarised in the table and figure following.

Table 82 - Municipal BDRR/BDRRmax Comparative Analysis from 2022 and 2023

BDRR/BDRR$_{max}$ COMPARATIVE ANALYSIS									
WSA Name	# WSSs	# WBs/ WSPs	2022 (BD PAT)	2023 (BD Audit)	Performance Trend 2022 and 2023	BDRR Risk Category Split			
						0-<50%	50-<70%	70-<90%	90-100%
City of Ekurhuleni	1	1	33.3%	29.2%	↑	1			
City of Johannesburg	1	1	34.7%	29.2%	↑	1			
City of Tshwane	11	4	35.2%	33.1%	↑	8	3		
Emfuleni LM	2	1	86.9%	31.9%	↑	2			
Lesedi LM	1	1	35.1%	30.4%	↑	1			
Merafong LM	3	3	37.5%	30.0%	↑	3			
Midvaal LM	2	1	33.3%	30.0%	↑	2			
Mogale City LM	1	1	37.0%	29.4%	↑	1			
Rand West LM	7	7	35.9%	30.8%	↑	7			
Totals & %BDRR/BDRR$_{max}$	**29**	**20**	**40.6%**	**34.6%**	↑	**26**	**3**	**0**	**0**

↑= improvement, ↓= regress, →= no change

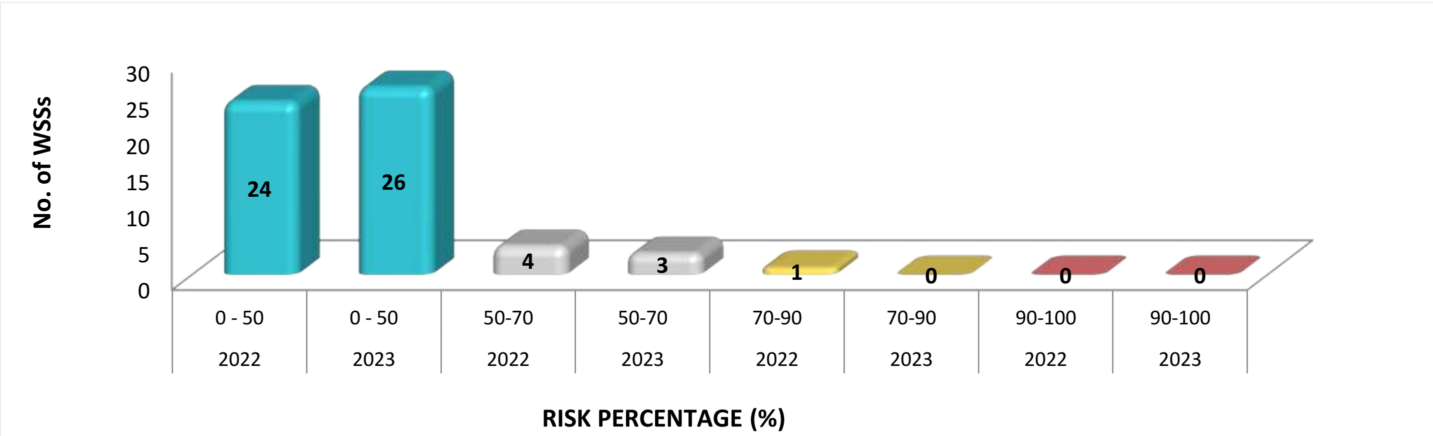


Figure 59 - a) WSS risk distribution and trends for 2022 and 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Trend analysis of the BDRR ratings for 2022 and 2023 indicates that:

- The 2023 audit cycle highlighted a slightly progressive shift with an increase in the no. of low risk WSSs (24 to 26) and a decrease in the medium risk WSSs (4 to 3).

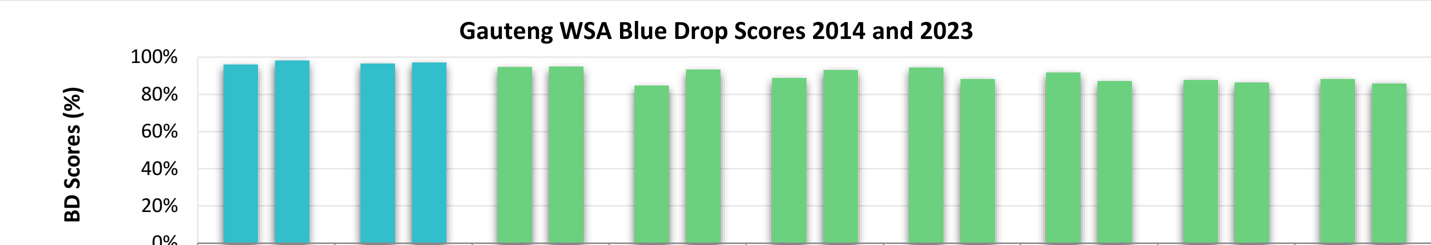
Regulatory Enforcement

Water supply systems which fail to achieve the minimum Blue Drop target of 31%, are placed under regulatory focus. The Regulator requires these WSAs to submit a detailed corrective action plan (CAP) within 20 working days from publishing of this report.

For Gauteng, none of the WSSs received Blue Drop scores below 31%, hence no municipalities are placed under regulatory surveillance, in accordance with the Water Services Act (108 0f 1997). None of the WSAs and their associated water supply systems are in high and/or critical BDRR risk positions, which implies that all risk indicators fall within reasonable limits, i.e. operational capacity, water quality compliance, technical capacity, and water safety planning. Typically, WSSs in high and critical risk positions pose a serious risk to public health.

Performance Barometer

The Blue Drop Performance Barometer presents the individual municipal Blue Drop scores, which essentially reflect the level of mastery that a WSA has achieved in terms of its overall water services business. The bar chart below compares the 2014 and 2023 BD scores, ranked from highest to lowest performing WSA in 2023. The City of Johannesburg and the City of Ekurhuleni are commended for maintaining excellent performance and improvement in their municipal Blue Drop scores. The remaining 5 WSAs have maintained a good performance, with Merafong LM and Mogale City LM having improved on their municipal Blue Drop scores of 2014.



	City of Johannesburg	City of Ekurhuleni	Midvaal LM	Merafong LM	Mogale City LM	City of Tshwane	Rand West LM	Lesedi LM	Emfuleni LM
2014 BD Score (%)	96,1%	96,6%	94,7%	84,6%	88,8%	94,4%	91,6%	87,8%	88,2%
2023 BD Score (%)	98,1%	97,1%	94,8%	93,2%	93,1%	88,2%	87,2%	86,2%	85,9%

Figure 60 - a) Blue Drop scores 2014 (bar left) and 2023 (bar right; b) Colour legend

≥95 – 100% Excellent	
≥80-<95% Good	
≥50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

The BDRR Risk Barometer expresses the level of risk that a WSA poses in respect of its water supply system. The schematic below presents the BDRR in ascending order – with the low-risk WSAs on the left and higher risk WSAs to the far right. The analysis reveals that there are no medium, high or critical risk WSAs in the province. All the WSAs are situated in the low risk positions despite 3 (of 11) WSSs that are in medium risk positions in the City of Tshwane.

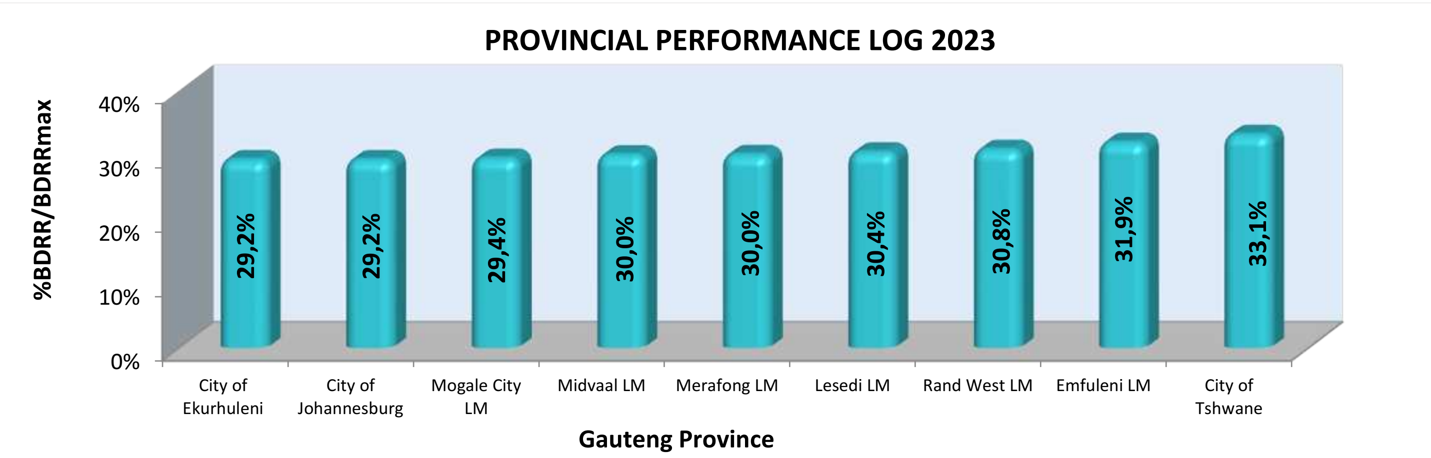


Figure 61 - a) %BDRR/BDRR$_{max}$ Risk Performance Profile/Log 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Provincial Best Performers

The **City of Johannesburg Metropolitan Municipality (with Rand Water as WSP)** is the **BEST PERFORMING WSA** in the province, based on the following record of excellence:

- ✓ 2023 Blue Drop Score of 98.1%
- ✓ 2014 Blue Drop Score of 96.1%
- ✓ Improvement on the BDRR from 34.7% in 2022 to 29.2% in 2023
- ✓ 1 system (100%) in the low risk position
- ✓ TSA score of 97% for Vereeniging WTW (Rand Water).

The **City of Ekurhuleni Metropolitan Municipality (with Rand Water as WSP)** is the second-best scoring WSA:

- ✓ 2023 Blue Drop Score of 97.1%
- ✓ 2014 Blue Drop Score of 96.6%
- ✓ Improvement on the BDRR from 33.3% in 2022 to 29.2% in 2023
- ✓ 1 system (100%) in low risk position
- ✓ TSA score of 97% for Vereeniging WTW (Rand Water).

The **Midvaal LM (with Rand Water as WSP)** is the third-best scoring WSA:

- ✓ 2023 Blue Drop Score of 94.8%
- ✓ 2014 Blue Drop Score of 94.7%
- ✓ Improvement on the BDRR from 33.3% in 2022 to 30.0% in 2023
- ✓ 2 systems both in low risk positions
- ✓ TSA score of 97% for Vereeniging WTW (Rand Water) and 81% for Vaal Marina WTW.

KPA Diagnostics

The Blue Drop audit process collects a vast amount of data that yield valuable insight into the state of the water services delivery and water quality in each province. Five focus areas or 'diagnostics' have been configured from the 2021/22 audit data and are discussed below.

Table 83 - Summary of the key diagnostic themes and reference to the respective Blue Drop KPAs

Diagnostic #	Diagnostic Description	Diagnostic Reference
1	**Technical Competence**	KPA 1, 2 & Bonus
2	**Treatment Capacity and Flow Distribution**	KPA 4 & Generic Audit data set
3	**Drinking Water Quality (DWQ) Monitoring and Compliance**	KPA 2 & 4 & Bonus
4	**Technical Site Assessments**	TSA and 2023 Blue Drop Watch Report
5	**Operation, Maintenance and Refurbishment of Assets**	KPA 3 & 4

Diagnostic 1: Technical Competence

Aim: This focus area assesses the technical human resources capacity that is available to manage and operate water treatment processes and maintain the related water infrastructure. Theory advocates that a correlation exists between human resources capacity and capability (sufficient number of appropriately qualified staff) and a WSI's performance. Thus, it is hypothesised that high HR capacity would translate to compliant water treatment plants and functional water supply network. Blue Drop assesses technical compliance on two levels: i) WTW plant supervision and process control staff and ii) Technical, scientific and maintenance staff.

(i) Plant Supervisors and Process Controllers

Findings: According to regulations, water treatment plants are classified as Class A, B, C, D or E plants. Similarly, Process Controllers and Plant Supervisors are registered as Class I, II, III, IV, V or VI Process Controllers. Higher classed plants require a higher level of Process Controllers due to technology complexity and strict water quality standards. Technical compliance of PCs and Supervisors is determined against the Blue Drop standards, as defined by Reg. 2834 of the Water Act 1956 (Act 54 of 1956) for the erection, enlargement, operation, and registration of water care works and draft Reg. 813 of the Water Services Act (No 108 of 1997). Regulation 2834 has been replaced by Regulation 3630 in 2023 but will only come in effect during the next Blue Drop audit cycle.

Table 84 - No. compliant versus shortfall in Supervisor and Process Controller staff

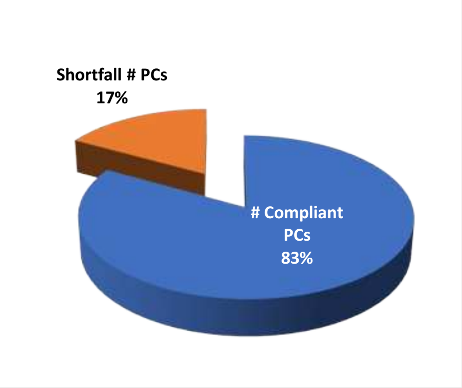
WSA and WSP Name	# WTWs	# WSSs	# Available Compliant Staff			Staff Shortfall		Ratio*	2023 BD Score (%)
			PCs	Supervisor	Total	PCs	Supervisor		
Rand Water-Vereeniging & Zuikerbosch	2	17	85	26	111	5	0	55.5	90.1% ave.***
Magalies Water - Cullinan, Klipdrift & Wallmansthal	3	3	14	3	17	0	0	5.7	66.2% ave***
City of Ekurhuleni	-	1	-	-	-	-	-		97.1%
City of Johannesburg	-	1	-	-	-	-	-		98.1%
City of Tshwane	12	11	21	9	30	20	0**	2.5	88.2%
Emfuleni LM	1	2	2	2	4	1	0	4.0	85.9%
Lesedi LM	-	1	-	-	-	-	-		86.2%
Merafong LM	-	3	-	-	-	-	-		93.2%
Midvaal LM	1	2	6	2	8	0	0	8.0	94.8%
Mogale City LM	-	1	-	-	-	-	-		93.1%
Rand West LM	-	7	-	-	-	-	-		87.2%
Totals	**19**	**29**	**128**	**42**	**170**	**26**	**0**		

The grey highlights means that this data is not included in the # WSS total at the bottom of the table. Rand Water WTWs supply water to a 17 WSSs in GP and Magalies Water to 3 WSSs in GP

* Ratio depicts the no. of qualified staff divided by the no. of WTWs operated by this no. of staff. E.g., City of Tshwane has 30 compliant Sups + PCs, divided by 12 WTWs = 2.5 qualified staff per WTW
** There are 4 Supervisors in the City of Tshwane that can do roaming for the other WTWs, boreholes, springs & fountains (Class C to E) - so sufficient in number – hence no shortfall in Supervisory staff
*** Average 2023 BD score for Rand Water and Magalies Water in GP

Note: "Compliant staff" means qualified and registered staff that meets the BD standard for a particular Class Works. "Staff shortfall" means staff that do not meet the BD standard for a particular Class of works (+1 for a shift) and/or staffing gaps exist at the respective WTWs.

Competent human resources are vital enablers in ensuring efficient and sustainable management of water services and delivery of safe water quality to consumers. For the province in general, the operational competencies are found to be excellent for the supervisory staff and predominantly excellent for the PCs in 7 of the 9 municipalities, with the exceptions being for PC staff shortages in the City of Tshwane, Emfuleni, and the Rand Water Zuikerbosch WTW, as illustrated in the table above.



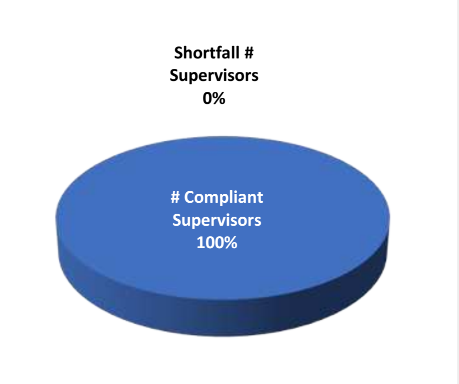


Figure 62 - Schematic illustration of compliant and shortfall of Supervisors (a) and Process Controllers (b)

Plant Supervisors: The pie charts indicate that 100% (42 of 42) of Plant Supervisors complies with the Blue Drop standard, with no shortfalls.

Process Controllers: Similarly, 83% (128 of 154) of the PC staff complies with the required standards, noting a zero shortfall for the Rand Water Vereeniging WTW, Magalies Water, and Midvaal. There is a 17% (26 of 154) shortfall in Process Controllers with the highest shortfall in the City of Tshwane.

Blue Drop standards require of Class A and B plants to employ dedicated Supervisors per WTW and Process Controllers per shift per works, whereas Class C to E plants may share staff across works. Shifts have been introduced to ensure optimal operations while addressing security risks, particularly as it relates to theft and vandalism. Telemetry also reduces the requirement for on-site staff during night shifts, but these relaxations have to be done within the DWS regulatory guidelines.

The Regulator expects correlation between the competence of an operational team and the performance of a WTW, as measured by the BD score. The data indicates as follows:

- All WSAs have qualified PCs in place, with the exception of 9 WTWs in the City of Tshwane and 1 WTW in Emfuleni
- All WSAs have qualified Supervisors per WTW, including the City of Tshwane that uses roaming Supervisors at their Class C to E WTWs
- The City of Tshwane and Emfuleni have shortfalls in qualified Process Controllers.

The results from the ratio analysis indicate high ratios for Rand Water, which does not necessarily translate to comparatively higher BD scores. The higher ratio and higher BD performance for Midvaal compares favourably with the slightly lower ratios and BD scores in Emfuleni and Tshwane.

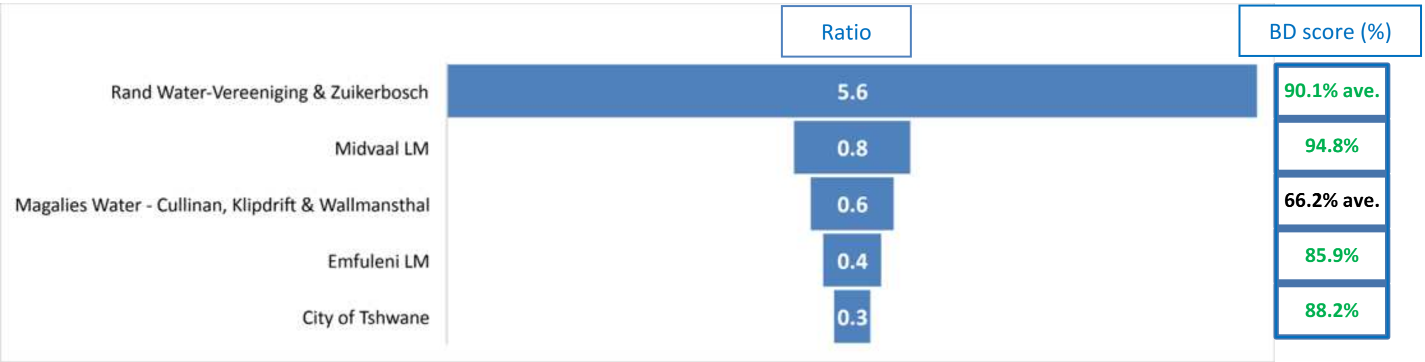


Figure 63 - Ratio of compliant operational staff to no. of WTWs and Comparison of Ratios with BD scores

Overall, the comparative bar chart confirms a reasonably close correlation between Rand Water and the WSAs with high ratios and high BD scores (ranging from 85.9% ave. to 94.8%). The anomaly being Magalies Water that has a high ratio but a low BD score on average.

(ii) Technical, Scientific and Maintenance staff

In addition to operational capacity (above), good management practice also requires access to qualified engineers, technicians, technologists, MISA appointees, scientists, and maintenance capability (below). Such competencies could reside in-house or accessible through term contracts and external specialists.

Table 85 - Summary of the maintenance capacity and no. of qualified and shortfall of Engineering, Technical and Scientific staff

WSA and WSP Name	# WTWs	# WSSs	Maintenance Arrangement
Rand Water	2	17	Internal+Specific Outsourcing
Magalies Water	3	3	Internal+Term Contract; Internal Team (only)
City of Ekurhuleni	-	1	Internal+Term Contract
City of Johannesburg	-	1	Internal+Specific Outsourcing
City of Tshwane	12	11	Internal+Specific Outsourcing; Internal+Term Contract; Internal Team (only)
Emfuleni LM	1	2	Internal+Specific Outsourcing; Internal Team (only)
Lesedi LM	-	1	Internal+Specific Outsourcing; Partially capacitated
Merafong LM	-	3	Internal+Specific Outsourcing
Midvaal LM	1	2	Internal+Specific Outsourcing; Internal+Term Contract
Mogale City LM	-	1	Internal+Specific Outsourcing; Internal+Term Contract
Rand West LM	-	7	Internal+Term Contract; Internal Team (only)
Totals	**19**	**29**	

WSA and WSP Name	# WTWs	# WSSs	Qualified Technical Staff (#)					Technical Shortfall (#)	Qualified Scientists (#)	Scientists Shortfall (#)	Ratio*	2023 BD Score (%)
			Technicians	Technologists	Engineers	MISA appointees	Total					
Rand Water	2	17	9	7	9	0	**25**	0	14	0	1.5	90.1%**
Magalies Water	3	3	1	5	1	0	**7**	0	5	0	2.3	66.2%**
City of Ekurhuleni	-	1	3	9	4	0	**16**	0	4	0	16.0	97.1%
City of Johannesburg	-	1	2	7	3	0	**12**	0	11	0	12.0	98.1%
City of Tshwane	12	11	1	3	0	0	**4**	1	1	1	0.4	88.2%
Emfuleni LM	1	2	2	1	1	0	**4**	0	2	0	2.0	85.9%
Lesedi LM	-	1	1	0	0	0	**1**	3	0	2	1.0	86.2%

WSA and WSP Name	# WTWs	# WSSs	Qualified Technical Staff (#)					Technical Shortfall (#)	Qualified Scientists (#)	Scientists Shortfall (#)	Ratio*	2023 BD Score (%)
			Technicians	Technologists	Engineers	MISA appointees	Total					
Merafong LM	-	3	0	2	0	0	**2**	2	0	2	0.7	93.2%
Midvaal LM	1	2	1	8	1	0	**10**	0	2	0	5.0	94.8%
Mogale City LM	-	1	4	0	1	0	**5**	1	1	1	5.0	93.1%
Rand West LM	-	7	1	2	0	0	**3**	1	0	2	0.4	87.2%
Totals	**19**	**29**	**25**	**44**	**20**	**0**	**89**	**8**	**40**	**8**		

* The single number ratio depicts the no. of qualified technical staff divided by the no. of WSSs that have access to the staff. E.g., City of Ekurhuleni has 16 qualified staff, divided by 1 WSS = 16 qualified staff per WSS
** Average 2023 BD scores for Rand Water with 17 WSSs in GP and 3 WSSs in GP for Magalies Water

Note 1: "Qualified Technical Staff" means staff appointed in positions to support water services, and who has the required qualifications. "Technical Shortfall" is calculated based on a minimum requirement of at least 3 Engineers or more than 1 of each of Engineers, Technologists & Technicians; and at least one 1 Candidate Scientist and 1 Professional Scientist per WSI.

Note 2: "Qualified Scientists" means professional registered scientists (SACNASP) and candidate scientists appointed in positions to support water services. "Scientists shortfall" means that the WSA does not have at least one qualified SACNASP registered scientist and at least one 1 candidate scientist in their employ or contracted.

In terms of maintenance capacity, all the municipalities have a reasonable contingent of qualified technical and maintenance staff. The maintenance staff comprises of a collective of in-house, contracted, or outsourced personnel. The data indicates that:

- Rand Water (Bulk Water Supplier) have internal maintenance teams supplement with specific outsourced services
- Magalies Water have internal maintenance teams supplemented with term contracts
- 3 of 9 (33%) WSAs have in-house maintenance teams
- 5 of 9 (56%) WSAs have internal maintenance teams supplemented with term contracts
- 7 of 9 (78%) WSAs have internal maintenance teams supplement with specific outsourced services.

In general, the province presents a strong case for qualified professional technical staff as follows:

- A total of 89 qualified staff comprised of 20 Engineers, 44 Technologists, 25 Technicians, 0 MISA appointees (qualified); and 40 SACNASP registered scientists in Rand Water, Magalies Water and 9 WSAs
- A total shortfall of 16 persons is identified, consisting of 8 technical staff and 8 scientists
- 5 WSAs have a total shortfall of 9 qualified technical staff with the highest indicated for Lesedi (3), and City Tshwane and Merafong (2 each)
- Rand Water, Magalies Water and all the WSAs have access to credible laboratories that comply with the Blue Drop standards.

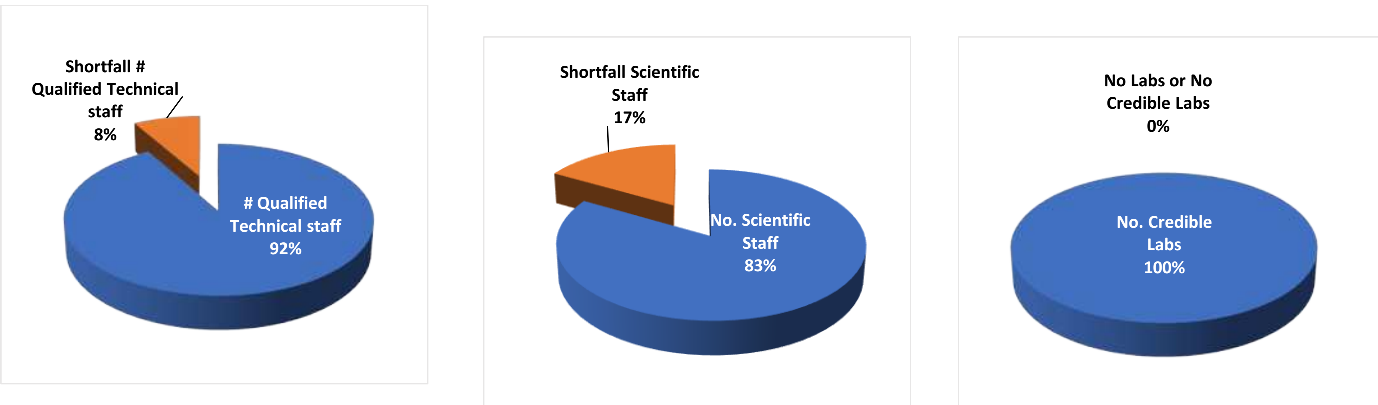


Figure 64 - Graphic illustration of the number and %: a) qualified engineering/technical staff; b) professional scientists; c) access to credible laboratory services that complies with Blue Drop standards

Ratio analysis has been done to determine the number of qualified technical and scientific staff assigned per WSS. It is expected that a higher ratio would correspond with well-performing and maintained water supply systems, as represented by the BD score.

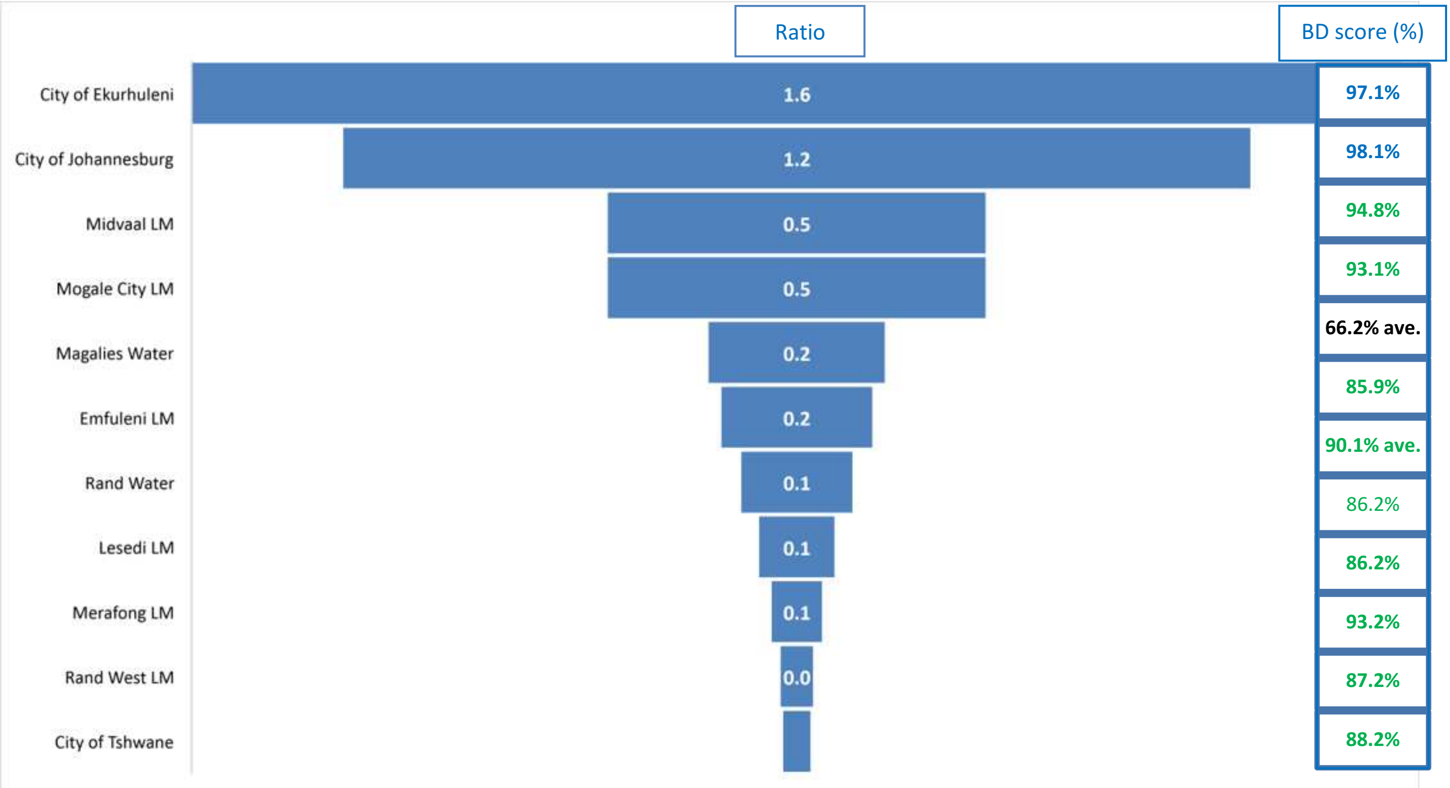


Figure 65 - Ratio of compliant technical staff to no. of WSSs and Comparison of Ratios with BD scores

The schematic above shows a prominent correlation between high ratios (>5.0) and high BD scores (ranging from 93.1% to 98.1%) for Ekurhuleni, Johannesburg, Midvaal and Mogale City. Lower ratios for Emfuleni, Rand Water and Lesedi (1.0 to 2.0) were associated with lower BD scores (ranging from 86.2% to 90.1%), with the only anomaly being that for Magalies Water that has a much lower BD score (66.2%) but a higher ratio (2.3). In contrast, Merafong, Rand West and the City of Tshwane have the lowest ratios (,1.0) but high BD scores are still being achieved (ranging from 87.2% to 93.2%).

Unlike the Green Drop 2022 diagnostics, no firm correlation can be drawn between technical capacity and water supply performance, mostly as result of the complexity of the WSA/Bulk Water Provider arrangement. However, it is observed that the involvement of Rand Water in all the 9 WSAs has a significant (positive) impact on the municipal BD scores particularly in the case of the City of Tshwane.

Overall, the results highlight the inter-dependency between technical capacity and performance. One of the options to enhance operational capacity is through dedicated training programmes. The Blue Drop audit incentivises training of operational staff over the 2-year period prior to the audit date. The results are summarised as follows:

Table 86 - No. of WTWs with operational staff sent on training over the past 2 years and vice versa

WSA and WSP Name	# WTWs	# WTW staff attending training	# WTW without training
Rand Water	2	2	-
Magalies Water	3	-	3
City of Ekurhuleni	-	-	-
City of Johannesburg	-	-	-
City of Tshwane	12	2	10
Emfuleni LM	1	-	1
Lesedi LM	-	-	-
Merafong LM	-	-	-
Midvaal LM	1	-	1
Mogale City LM	-	-	-
Rand West LM	-	-	-
Totals	**19**	**4 (21%)**	**15 (79%)**

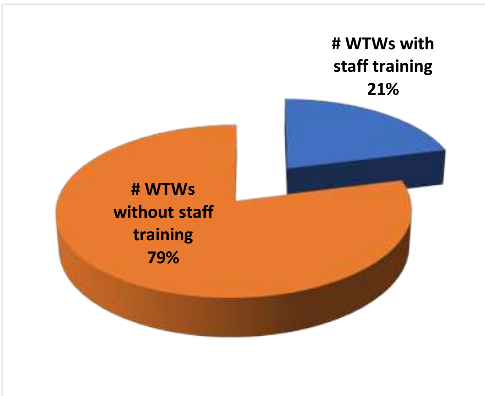


Figure 66 - %WTWs that have trained operational staff over the past two years

The results confirm that only staff members from Rand Water and the City of Tshwane attended training over the past 2 years. Overall, only 21% of operational staff attended safety and technical training, with the balance of 79% not partaking in any skills development initiatives. Investment in human capital through technical skills development is likely to mitigate some of the water quality failures and lower performances noted, and municipalities and water boards should prioritise ongoing skills development of technical staff and appointment of qualified and registered (new) staff.

Diagnostic 2: Treatment Capacity and Flow Distribution

Aim: Diagnostic 2 deals with design and flow related dynamics, comprising of: i) design capacity and operational flow, ii) raw water abstraction, and iii) WUE and SIV.

(i) Design Capacity and Operational Flow

This diagnostic assesses the status of plant design capacity and daily water production at the WTWs, as well as SIVs as measured at the outflow from the WTW or inflow to the water distribution network. A capable WTW requires adequate installed design capacity and functional equipment to operate optimally. If the WTW design capacity is exceeded by the average daily production (treatment) volume, the WTW will not be able to deliver SANS compliant water quality. The available design capacity is typically exceeded when the water demand exceeds the installed design capacity, or when processes or equipment are dysfunctional, or when electrical supply problems render treatment and pumping of water defective. Typically, the production volume and SIV is the same if 1 WTW supplies 1 WSS, but different if multiple supply systems are feeding from a singular WTW.

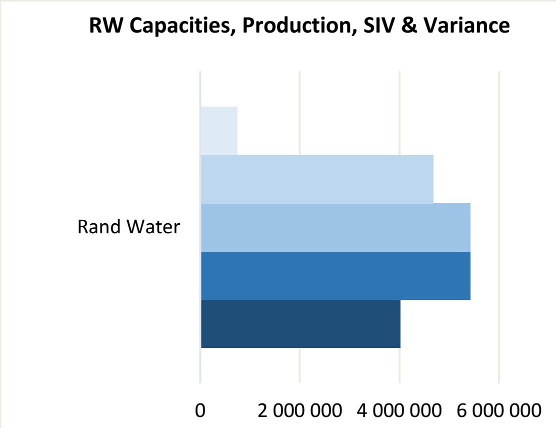
Findings: Analysis of the design capacity and average daily production/ treatment volume indicate a total design capacity of 5,823,906 kl/d for the province, with a total average daily treatment (operational) volume of 4,923,288 kl/d. Theoretically, this implies that 85% of the design capacity is used with 15% available to meet additional water demand. However, the full 5,823,906 kl/d is not available as some infrastructure is dysfunctional, leaving 5,831,157 kl/d available. The capacity differential (difference between the originally installed- and currently available capacity) confirms a 16% surplus if considering the total available capacity (84%). This capacity differential should not constrain or impede any further social and economic development in municipal water supply areas, although other aspects may impact on service delivery planning and execution. For Gauteng, all municipalities displayed adequate knowledge of their installed and available capacities.

The audit data confirms that all WTWs are operating within their design capacities with the exception of Pretoria Findley (Upper & Lower Fountains) that exceeds its total design capacity by 234%. This risk is currently mitigated through operational optimisation and preventative maintenance regimes.

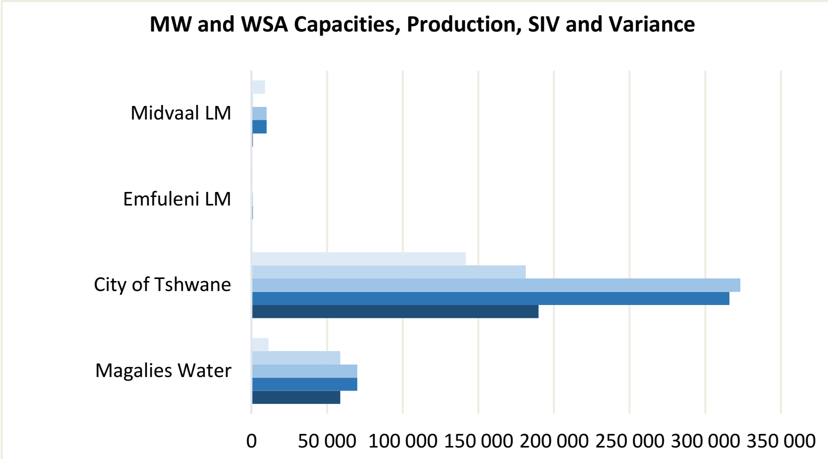
Table 87 - Summary of WTWs design and available capacities, average daily production, % available capacity, and total SIV towards the WSSs

WSA and WSP Name	# WTWs	# WSSs	Design Capacity (kl/d)	Available Design Capacity (kl/d)	Average Daily Production (kl/d)	Available Variance* (kl/d)	% Use Available Capacity	Total SIV towards the WSS (kl/d)
Rand Water	2	17	5,427,000	5,427,000	4,681,827	745,173	86%	4,025,142
Magalies Water	3	3	70,000	70,000	58,734	11,266	84%	58,734
City of Ekurhuleni	-	1	-	-	-	-	-	
City of Johannesburg	-	1	-	-	-	-	-	
City of Tshwane	12	11	315,906	323,157	181,427	141,730	56%	189,780
Emfuleni LM	1	2	1,000	1,000	300	700	30%	300
Lesedi LM	-	1	-	-	-	-	-	
Merafong LM	-	3	-	-	-	-	-	
Midvaal LM	1	2	10,000	10,000	1,000	9,000	10%	1,000
Mogale City LM	-	1	-	-	-	-	-	
Rand West LM	-	7	-	-	-	-	-	
Totals	**19**	**29**	**5,823,906**	**5,831,157**	**4,923,288**	**907,869**	**84%**	**4,274,956**

* Difference between the available design capacity and the average daily production

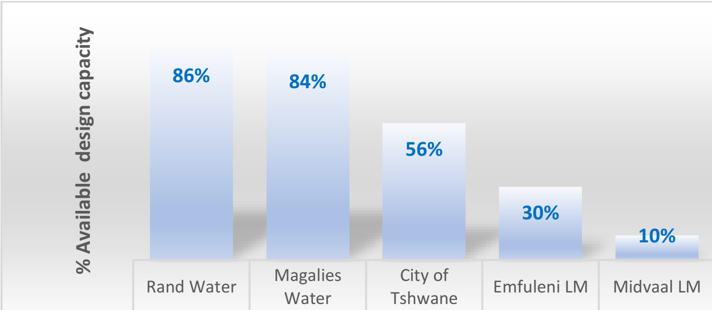


	Rand Water
Available Variance (kl/d)	745 173
Ave. Daily Production (kl/d)	4 681 827
Available Design Capacity (kl/d)	5 427 000
Design Capacity (kl/d)	5 427 000
Total SIV (kl/d)	4 025 142



	Magalies Water	City of Tshwane	Emfuleni LM	Midvaal LM
Available Variance (kl/d)	11 266	141 730	700	9 000
Ave. Daily Production (kl/d)	58 734	181 427	300	1 000
Available Design Capacity (kl/d)	70 000	323 157	1 000	10 000
Design Capacity (kl/d)	70 000	315 906	1 000	10 000
Total SIV (kl/d)	58 734	189 780	300	1 000

Figure 67 - Rand Water, Magalies Water and WSA design and available capacity, average daily production, available variance and total SIV



	Rand Water	Magalies Water	City of Tshwane	Emfuleni LM	Midvaal LM
% Use AC	86%	84%	56%	30%	10%

Figure 68 - Rand Water, Magalies Water and WSA % available capacity

(ii) Raw Water Abstraction

This diagnostic takes a snapshot view of the status of water abstraction authorisations from natural water resources across the province. As per the National Water Act (Act no 36 of 1998), Water Use Licenses (WULs) mandate the maximum abstraction volumes of raw water, and the installation and monitoring of abstraction, inflow, and outflow meters, whilst the BD audit requires WSAs to report the flows on IRIS and to calibrate meters annually. Any defects in terms of abstracting water from a resource without an authorisation, or exceeding the authorised volume, or reporting inaccurate volumes, or not monitoring abstraction against authorised volumes, are considered to be a regulatory risk and contravention of the law.

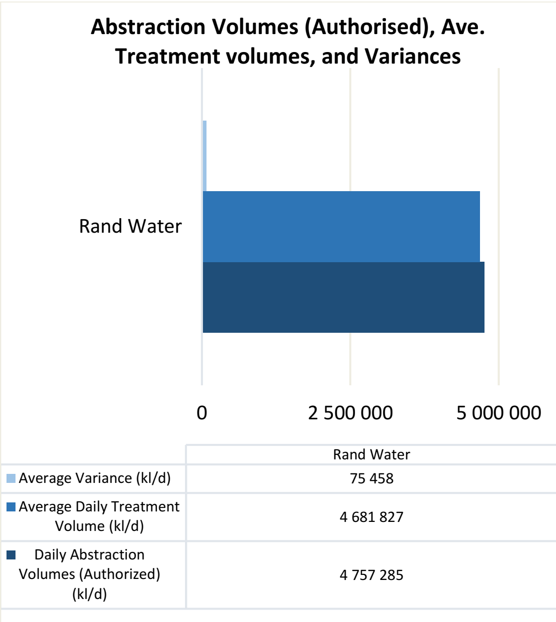
Findings: Data pertaining to the daily abstraction volumes (kl/d), average daily treatment volumes (kl/d), the names of the WTWs exceeding the Daily Abstraction Volumes (Authorised) and Average Daily Treatment Volumes (Authorised) is captured in the tables below.

Table 88 - Summary of Abstraction Volumes (Authorised), Average Daily Treatment Volumes, Variances & WTWs listed For Enforcement Action

WSA and WSP Name	# WTWs	# WSSs	Daily Abstraction Volumes (Authorised) (kl/d)	Average Daily Treatment Volume (kl/d)	Average Variance (kl/d) [+ or Minus]
Rand Water	2	17	4,757,285	4,681,827	75,458
Magalies Water	3	3	88,108	58,734	29,374
City of Ekurhuleni	-	1	-	-	-
City of Johannesburg	-	1	-	-	-
City of Tshwane	15	11	203,343	181,427	21,916
Emfuleni LM	1	2	300	300	0
Lesedi LM	-	1	-	-	-
Merafong LM	-	3	-	-	-

WSA and WSP Name	# WTWs	# WSSs	Daily Abstraction Volumes (Authorised) (kl/d)	Average Daily Treatment Volume (kl/d)	Average Variance (kl/d) [+ or Minus]
Midvaal LM	1	2	1,000	1,000	0
Mogale City LM	-	1	-	-	-
Rand West LM	-	7	-	-	-
Totals	**19**	**29**	**5,050,036**	**4,923,288**	**126,748**

WSA and WSP Name	WTW exceeding the Daily Abstraction Volumes (Authorised)	WTW with no Daily Abstraction Volumes (Authorised)
City of Tshwane	None	1 borehole & 1 spring



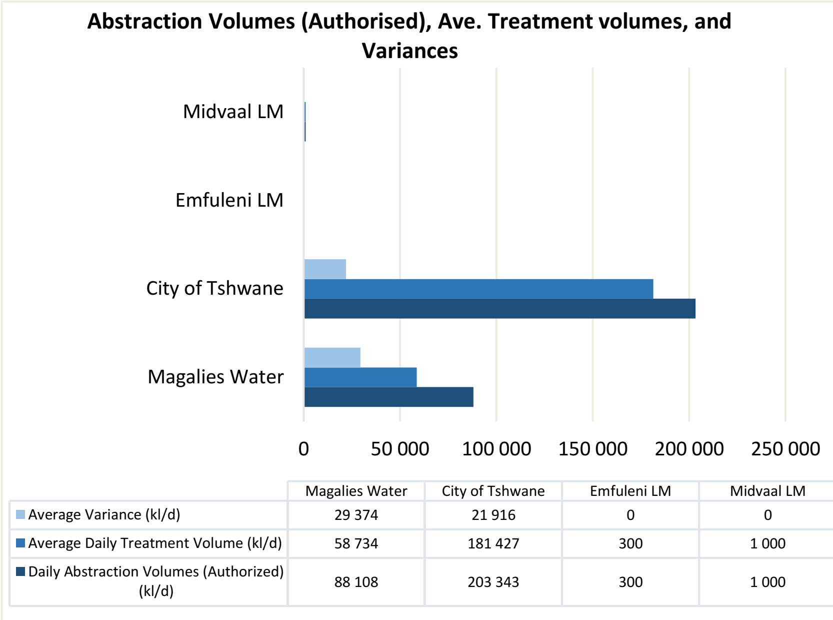


Figure 69 - Rand Water, Magalies Water and WSA Abstraction Volumes (Authorised), Average Daily Treatment Volumes, and Variances

WTWs that exceed the Daily Abstraction Volumes (Authorised) and WTWs with no Daily Abstraction Volumes (Authorised) are reflected in the 2nd table above. WTWs that are not complying with the regulations will be required to show correction in the next Blue Drop audit cycle. The results conclude that no WTWs are exceeding the permitted abstraction limits and all WTWs provided authorised water use abstraction volumes with the exception of 1 borehole and 1 spring in the City of Tshwane.

For future BD audits, WSA/WSPs will be required to provide ‘actual’ abstraction volumes so that a comparative analysis can be undertaken of the ‘actual’ abstraction volume versus the authorised water use abstraction volumes (maximum). This would require that the WSAs and WSPs/WBs monitor and record all critical path flows (abstraction, raw and final).

(iii) Water Use Efficiency and System Input Value

The Department is committed to consider issues related to water scarcity and security, aiming to ensure there is sufficient water for the population, the economy, and the environment by increasing water use efficiency across all sectors. Water use for services sectors is specifically dealing with the quantity of water used directly by the consumer through the public distribution network and industries connected to the network.

This diagnostic assesses the water use efficiency (i.e., the average daily consumption in litres per person per day) and the individual and collective performance of the water supply systems. WUE indicates how effective is water used by consumers, i.e. the process between effective water use and actual water abstraction. This concept is closely related to the Department’s No Drop Certification assessment, whereby WUE, NRW and water losses are targeted as part of Water Conservation and Water Demand Management strategies by municipalities.

Findings: Both the Blue Drop audit and No Drop audit requires an IWA water balance to determine the SIV into each water supply system, and to identify and quantify possible losses from abstraction to the end-of-use point. Rand Water has comprehensive water balances in place for all 17 WSSs in Gauteng including 1 WSS in Midvaal. Magalies Water has partial water balances in place for the 3 WSSs in the City of Tshwane. Partial water balances are available for the remaining 7 WSSs in the City of Tshwane and 1 WSS in Emfuleni. Only 1 WSS in Emfuleni does not have a water balance in place.

WUE is calculated based on the SIV contributions, population served, and the average daily consumption, as summarised in the table following.

Table 89 - Summary of total SIV, total population served, average daily consumption, WUE status and performance trend

WSA Name	# WSSs	Total Population	Total SIV (kl/d)	2023 WUE (l/p/d)	2023 Blue Drop WUE Range and Performance	
City of Ekurhuleni	1	3,774,542	986,972	261	>250-300	Poor
City of Johannesburg	1	5,866,550	1,686,097	287	>250-300	Poor
City of Tshwane	11	2,494,429	1,033,202	414	>300	Extremely High
Emfuleni LM	2	754,015	294,092	390	>300	Extremely High
Lesedi LM	1	99,950	23,350	234	>200-250	Average
Merafong LM	3	237,027	60,712	256	>250-300	Poor
Midvaal LM	2	67,000	34,371	513	>300	Extremely High
Mogale City LM	1	365,376	92,313	253	>250-300	Poor
Rand West LM	7	269,888	63,847	237	>200-250	Average
Totals	**29**	**13,928,777**	**4,274,956**	**316**		

WUE (l/cap/day) performance categories

Colour	WUE Range	Performance
	>300	Extremely high per capita water use
	>250-300	Poor per capita water use
	>200-250	Average per capita water use with potential for marked improvement
	>150-200	Good per capita water use but some improvement may be possible subject to economic benefits
	<150	Excellent per capita water use management

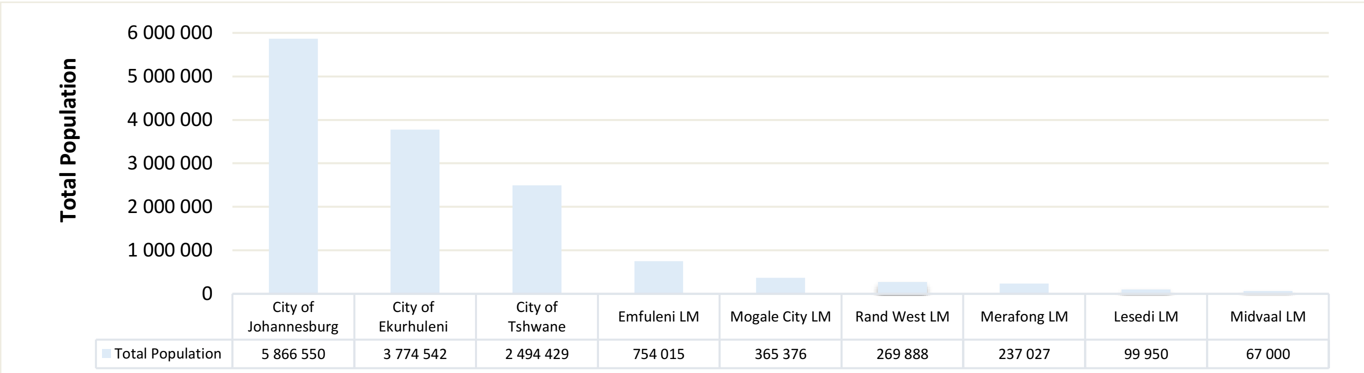


Figure 70 - Total SIV towards the WSSs

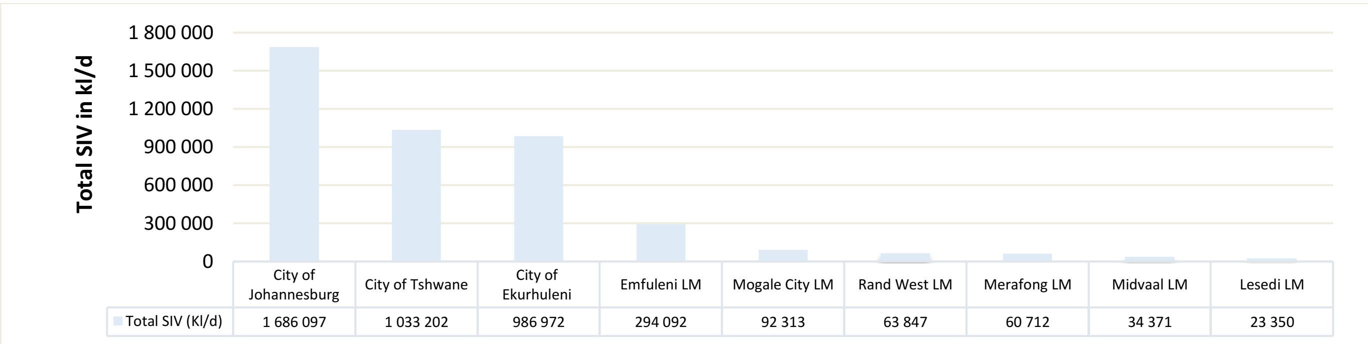


Figure 71 - Total Population served

For the Gauteng province, 4,274,956 kl/d water is supplied to 13,928,777 consumers. Comparatively, Johannesburg distributes 39.4% of the total provincial SIV, followed by Tshwane (24.1%) and Ekurhuleni (23.1%). An average 316 litre of water is used per person per day, which implies a very high (poor) per capita water use. Results from the diagnostic data show that the City of Tshwane, Emfuleni and Midvaal has WUEs of more than 300 l/p/d, which is regarded as extremely high according to national benchmarks.

City of Ekurhuleni, City of Johannesburg, Merafong and Mogale City has WUE between 250–300 l/p/d, which is regarded as poor. No Drop Certification is specifically tasked with plans to curb water losses and improve NRW through water accounting assessments and water conservation and demand management.

Diagnostic 3: Drinking Water Quality (DWQ) Monitoring and Compliance

Aim: Blue Drop audits values the principles of "To measure is to know" and "To know is to manage". The primary objective of a water treatment plant is to produce final water quality that is safe for human consumption at the end of the distribution network. This standard can only be measured and achieved if operational and compliance monitoring and DWQ compliance is executed at the correct frequency, sample point, and determinand type. This diagnostic assesses the i) operational and compliance monitoring status, ii) drinking water quality compliance, and iii) risk defined compliance and laboratory credibility.

(i) Drinking water operational and compliance monitoring

Findings: A minimum level of 90% operational monitoring compliance is applied as benchmark, to give weight to the importance of sampling and monitoring of the raw water, process unit water, and final water across the treatment stream. Compliance monitoring is also informed by SANS 241:2015 and the requirement for risk-informed monito
ring through the WaSP process at both the WTW final and distribution network. DWQ compliance is calculated against the population size and the mandatory limits set by SANS 241:2015 and the Blue Drop standards, as calculated and reported from data loaded in the IRIS.

Table 90 - Summary of the KPA 2 WTW operational and WSS compliance monitoring status

WSA and WSP Name	# WTWs	# WSSs	WTW Operational monitoring [KPA 2 sub-KPA 2.b)]		WSS Compliance monitoring [KPA 2 sub-KPA 2.c)]	
			Satisfactory [BD score >90%]	Not Satisfactory [BD score <90%]	Satisfactory [BD score >90%]	Not Satisfactory [BD score <90%]
Rand Water	2	17	2	0	16	1
Magalies Water	3	3	3	0	0	3
City of Ekurhuleni	-	1	-	-	1	0
City of Johannesburg	-	1	-	-	0	1
City of Tshwane	12	11	4	8	2	9
Emfuleni LM	1	2	0	1	0	2
Lesedi LM	-	1	-	-	0	1
Merafong LM	-	3	-	-	3	0
Midvaal LM	1	2	1	0	2	0
Mogale City LM	-	1	-	-	1	0
Rand West LM	-	7	-	-	7	0
Totals	**19**	**29**	**10 (53%)**	**9 (47%)**	**16 (55%)**	**13 (45%)**

Note: The numbers reflected in grey highlight are not reflected in the totals

The performance recorded in the table above stems from performance data as measured against the Blue Drop Standard expressed in KPA 2 and sub-KPAs 2.b) and 2.c). Overall, an unsatisfactory sampling and analysis regime is observed for both operational (47%) and compliance (45%) monitoring.

The data indicates that 10 of 19 WTWs (53%) are on par with good practice for operational monitoring of the raw and final water and the respective process units at the WTW. Rand Water, Magalies Water and Midvaal are doing exceptionally well, whilst the City of Tshwane and Emfuleni fail to meet the Blue Drop standard. In terms of compliance monitoring, 16 WSSs (55%) are on par with good compliance monitoring practices, and 13 WSSs (45%) are failing the Blue Drop standard.

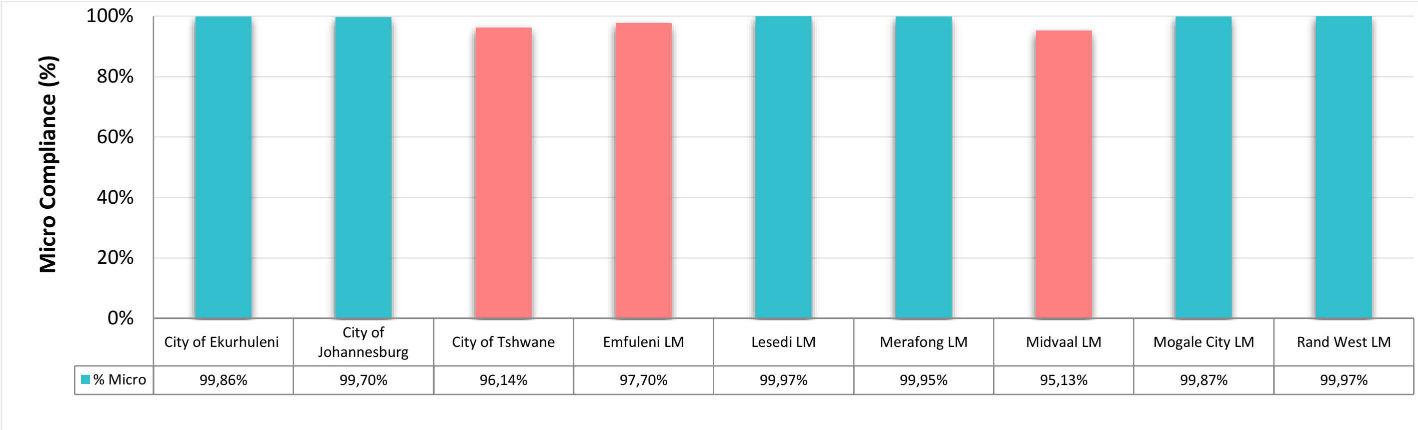
The latter observation is noted with deepening concern for the City of Tshwane. Compliance monitoring is a legal requirement and the only means to measure the DWQ performance of a water supply system. Operational monitoring is the cornerstone of day-to-day process adjustments and optimisation to ensure that the water treatment is efficient and delivers quality final water. The results indicate that 9 WTWs and 13 WSSs are not achieving regulatory and industry standards.

(ii) Drinking water quality compliance

Findings: DWQ compliance is measured against the requirements of SANS 241:2015 under KPA 5 of the Blue Drop audit. The tables following summarises the results of the DWQ status for Microbiological and Chemical Compliance, which also carries the highest Blue Drop score weighting of 35% (of 100%).

Table 91 - Provincial Summary of the DWQ Status for Microbiological Compliance

WSA Name	# WSSs	Population	% Ave. Micro Compliance	# WSS Micro Performance Status		
				Excellent	Good	Unacceptable
City of Ekurhuleni	1	3,774,542	99.86%	1		
City of Johannesburg	1	5,866,550	99.70%	1		
City of Tshwane	11	2,494,429	96.14%	7		4
Emfuleni LM	2	754,015	97.70%	1		1
Lesedi LM	1	99,950	99.97%	1		
Merafong LM	3	237,027	99.95%	3		
Midvaal LM	2	67,000	95.13%	1		1
Mogale City LM	1	365,376	99.87%	1		
Rand West LM	7	269,888	99.97%	7		
Totals	**29**	**13,928,777**	**98.70%**	**23**	**0**	**6**



MICRO: Population <100,000		
Colour	Status	Percentage
	Excellent	≥97%
	Good	≥96 - <97%
	Unacceptable	<96%

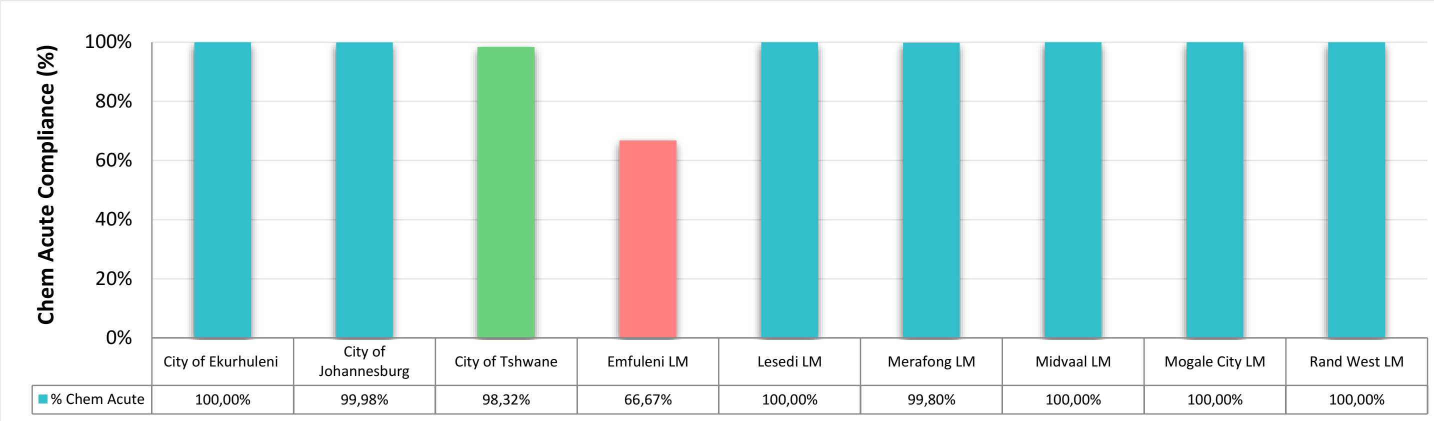
MICRO: Population >100,000		
Colour	Status	Percentage
	Excellent	≥99%
	Good	≥98 - <99%
	Unacceptable	<98%

Figure 72 - Provincial Microbiological Drinking Water Quality Status

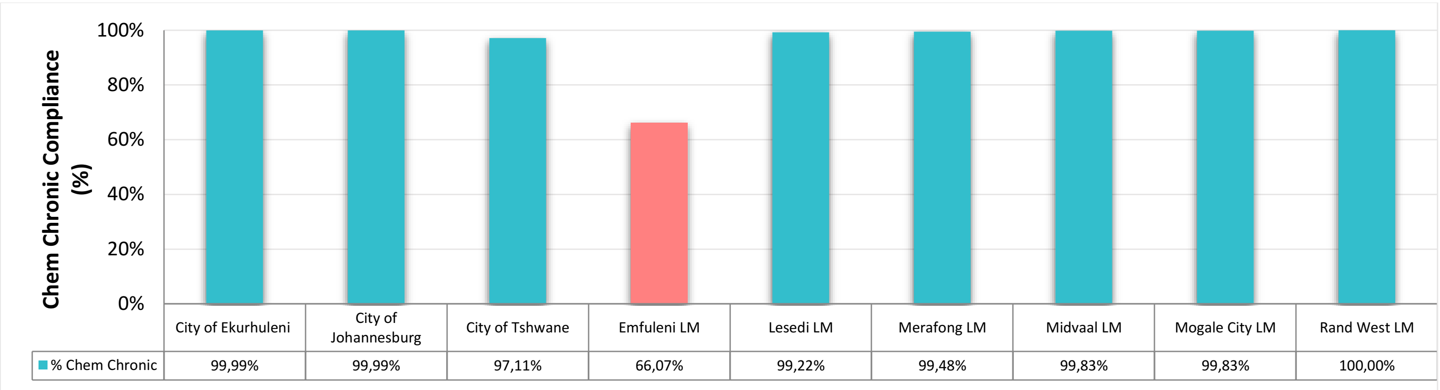
Out of the 29 WSSs, 23 (79%) systems achieved excellent microbiological quality, whilst 6 (21%) systems have an unacceptable microbiological water quality status. The water in these systems <u>pose a serious acute health risk</u> to the community. Failure to produce water that meets microbiological compliance standards can be linked back to poor operations, defective infrastructure, inadequate dosing rates, absence of disinfection chemicals, lack of monitoring, lack of operating and chemistry knowledge, and several other root causes. WSIs that are not monitoring the final water quality at the outlet of the treatment plant or at specific end use points are required to develop a monitoring programme and resume with compliance monitoring as a matter of urgency.

Table 92 - Provincial Summary of the DWQ Status for Chemical Acute Health and Chronic Health Compliance

WSA Name	# WSSs	Population	% Ave. Chem Acute Health Compliance	# WSS Chem Acute Health Performance Status			% Ave. Chem Chronic Health Compliance	# WSS Chem Chronic Health Performance Status		
				Excellent	Good	Unacceptable		Excellent	Good	Unacceptable
City of Ekurhuleni	1	3,774,542	100.0%	1			100.0%	1		
City of Johannesburg	1	5,866,550	100.0%	1			100.0%	1		
City of Tshwane	11	2,494,429	98.3%	9	1	1	97.1%	8	1	2
Emfuleni LM	2	754,015	66.7%	1		1	66.1%	1		1
Lesedi LM	1	99,950	100.0%	1			99.2%	1		
Merafong LM	3	237,027	99.8%	3			99.5%	3		
Midvaal LM	2	67,000	100.0%	2			99.8%	2		
Mogale City LM	1	365,376	100.0%	1			99.8%	1		
Rand West LM	7	269,888	100.0%	7			100.0%	7		
Totals	**29**	**13,928,777**	**96.1%**	**26**	**1**	**2**	**95.7%**	**25**	**1**	**3**



CHEM Acute Health: Population <100,000			CHEM Acute Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	>97%		Excellent	>99%
	Good	>95 - <97%		Good	>97 - <99%
	Unacceptable	<95%		Unacceptable	<97%



CHEM Chronic Health: Population <100,000			CHEM Chronic Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	>95%		Excellent	>97%
	Good	>93 - <95%		Good	>95 - <97%
	Unacceptable	<93%		Unacceptable	<95%

Figure 73 - Provincial Chemical Acute Health and Chronic Health Drinking Water Quality Status

Chemical acute health compliance shows that 26 (90%) systems have excellent water quality, and 1 (3%) system has good water quality, whilst 2 systems (1 in the City of Tshwane and 1 in Emfuleni) have an unacceptable chemical acute health compliance. Chemical chronic health compliance shows that 25 (86%) systems have excellent water quality, and 1 (3%) system has good water quality, whilst 3 systems (2 in City of Tshwane and 1 in Emfuleni) had an unacceptable chemical chronic health compliance.

The Water Services Act upholds standards regarding the monitoring and reporting on drinking water quality and issuance of advisory notices to the public when significant DWQ failures are observed. The audit process applies a penalty when DWQ failures are noticed without issuing such Water Quality Alert Notices to forewarn water users of the status of (unsafe) water quality and to advise communities to source alternative water sources or methods to disinfect water used for drinking water purposes.

The following table reflects the compliance status of the WSAs as regards the issuing of these notices for DWQ failures.

Table 93 - Summary of Penalties Applied to WSSs for not Issuing Advisory Notices

WSA Name	# WSS	# WSS No Penalty Applied	# WSS Partial Penalty Applied	WSS Names Partial Penalty	# WSS Full Penalty Applied	WSS Names Full Penalty
City of Tshwane	11	6	4	Onverwacht, Pretoria North Roodeplaat, Sokhulumi Informal Settlement & Walmansthal Area	1	Pretoria Temba

No penalties were applied to 24 (83%) WSSs in all of the 9 WSAs. Only 4 partial penalties and 1 full penalty was applied to 5 (17%) WSSs in the City of Tshwane.

(iii) Risk defined compliance and laboratory credibility

Findings: Risk-defined compliance standards aim to determine the compliance (to SANS 241) of those parameters that have been found to pose a risk in a specific WSS and need to be included in the routine monitoring programme or frequency as prescribed by SANS 241. The province achieved an average Annual Risk Defined Compliance of 95.5%, with the low risk WSSs coming from the City of Ekurhuleni, City of Johannesburg, Lesedi, Merafong and Rand West and the high risk WSSs coming from City of Tshwane and Emfuleni. Excellent risk-defined compliance was achieved by 21 (73%) systems, good compliance for 3 (10%) systems and poor compliance for 5 (17%) systems, with 4 of the latter 5 systems residing in the City of Tshwane.

Table 94 - Summary of the DWQ Compliance for Risk Defined Compliance

WSA Name	# WSSs	Population	% Ave. Risk Defined Compliance	# WSS Performance Status		
				Excellent	Good	Bad
City of Ekurhuleni	1	3,774,542	99.62%	1		
City of Johannesburg	1	5,866,550	99.36%	1		
City of Tshwane	11	2,494,429	85.37%	7	0	4
Emfuleni LM	2	754,015	92.56%	1		1
Lesedi LM	1	99,950	92.56%	1		
Merafong LM	3	237,027	99.76%	3		
Midvaal LM	2	67,000	94.52%		2	
Mogale City LM	1	365,376	96.02%		1	
Rand West LM	7	269,888	99.34%	7		
Totals	**29**	**13,928,777**	**95.46%**	**21**	**3**	**5**

The aim of operational determinand compliance is to determine the efficiency of the water treatment process, by monitoring those parameters which are used to control the treatment process. Although not necessarily a health risk, these parameters provide good information on the integrity of the WTW. The province achieved an average % Actual Operational Determinand Compliance of 82%, with the best performances coming from Rand Water, Magalies Water, Emfuleni and Midvaal and the worst performance coming from City of Tshwane. Excellent risk defined compliance was achieved by 7 (37%) WTWs and bad compliance for 12 (63%) WTWs with 11 of the 12 WTWs residing in the City of Tshwane.

Table 95 - Summary of the Treatment (Operational) Efficiency Index

WSA Name	# WTWs	Population	Ave. % Actual Operational Determinand Compliance	# WSS Performance Status		
				Excellent	Good	Bad
Rand Water	2	12,952,342	100%	2		
Magalies Water	3	446,375	100%	3		
City of Ekurhuleni	-	-				
City of Johannesburg	-	-				
City of Tshwane	12	524,860	56%	1		11
Emfuleni LM	1	1,200	92%			1
Lesedi LM	-	-				
Merafong LM	-	-				
Midvaal LM	1	4,000	100%	1		
Mogale City LM	-	-				
Rand West LM	-	-				
Totals	**19**	**13,928,777**	**82%**	**7**	**0**	**12**

The data further confirms that all of the WSSs in the province have access to credible laboratories for compliance and operational analysis. These in-house or contracted laboratories are accredited with SANAS or have Proficiency Testing Schemes with SABS or have inter-laboratory quality checks in place to ensure that suitable analytical methods are applied and that quality assurance processes are followed to ensure credible water quality results. The province is thus meeting the regulatory expectation that all WSIs have access to credible analytical services for compliance and operational monitoring.

Diagnostic 4: Technical Site Assessments

Aim: The Blue Drop process makes provision for a Technical Site Assessment (TSA) in order to verify the desktop evidence through field-based inspections. This assessment includes a physical inspection of the entire water treatment plant with all its process units, as well as the reservoir and spot checks of a pumpstation and pipelines. The technical assessment is coupled with an asset condition check to determine an approximate cost (VROOM) to restore existing infrastructure to functional status for the treatment facility (only).

Findings: The results of the province's TSAs are summarised in the table below. A deviation of 10% between the BD and TSA score indicate a misalignment between the administrative aspects and the work on the ground. The Regulator regards a WTW with a TSA score of >80% to have an acceptable level of process control and functional equipment, and a TSA score of 90% as an excellent system that complies with most of the Blue Drop TSA standards. A TSA score of <30% indicates that the treatment facility and network fails in most regards, and is evident of dysfunctional infrastructure, failed process control, absence of record keeping and monitoring, and poor water quality.

The VROOM cost presents a ''Very Rough Order of Magnitude" cost to return a WTWs functionality to its original design. More detail can be found in the Blue Drop Watch Report 2023.

Table 96 - %TSA and %DB score, and VROOM cost estimates total and split for civil, mechanical, and electrical

WSA and WSP Name	TSA Name	%TSA	2023 BD Score (%)	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Rand Water	Vereeniging WTW	97%	90.1% ave.	R8,340,150	R3,849,300	R641,550	R12,831,000
Magalies Water	Cullinan WTW	95%	66.2% ave.	R400,000	R1,200,000	R0	R1,600,000
City of Ekurhuleni	Impala Park Reservoirs	84%	97.1%	R117,700	R147,400	R245,300	R510,400
City of Johannesburg	Illovo Reservoirs	89%	98.1%	R1,443,200	R0	R0	R1,443,200
City of Tshwane	Temba WTW	73%	88.2%	R6,740,663	R17,525,723	R2,696,265	R26,962,650
Emfuleni LM	Vaaloewer WTW	81%	85.9%	R660,000	R385,000	R55,000	R1,100,000
Lesedi LM	Heidelberg Reservoirs	53%	86.2%	R181,500	R636,900	R564,300	R1,382,700
Midvaal LM	Vaal Marina WTW	81%	94.8%	R860,000	R6,880,000	R860,000	R8,600,000
			Totals	**R18,743,213**	**R30,624,323**	**R5,062,415**	**R54,429,950**
			% Split of Cost Items	**35%**	**56%**	**9%**	**100%**

- **No TSAs were undertaken for Merafong LM, Mogale City LM and Rand West LM as they received their Bulk Water from Rand Water**

A deviation of >10% between the BD and TSA score is noted for Magalies Water (29%), City of Ekurhuleni Impala Park Reservoirs (13%), City of Tshwane Temba WTW (15%), Lesedi Heidelberg Reservoirs (33%), and Midvaal Vaal Marina WTW (14%). A deviation of >20% between the BD and TSA score is noted for Magalies Water (29%) and the Lesedi Heidelberg Reservoirs (33%).

For the individual WTWs assessed in the province, a total budget of R54.43m is estimated, with the bulk of the work (91%) going towards restoration of mechanical equipment (56%) and civil infrastructure (35%).

Diagnostic 5: Operation, Maintenance and Refurbishment of Assets

Aim: Insufficient financial resources are often cited as a root cause to dysfunctional or non-compliant water treatment works and water networks. Knowledge and monitoring of fiscal spending are therefore a critical part of water services management and municipal governance of public assets. This diagnostic investigates the status of financial information as pertaining to O&M budgets and expenditure, asset figures, and capital funding.

Findings: A substantial amount of financial information was presented during the audit process. Unfortunately, the evidence was presented in different formats, levels of detail, or absent for some WSAs. It was observed that WSA teams with financial officials that were present during the audits performed better and had a better understanding of the water services challenges experienced by their technical peers.

Discrepancies observed included amongst others - generic or non-ringfenced budgets, contract lump sums for service providers presented as budgets, outdated or incomplete asset registers, and some cost drivers which were lacking. As data credibility presents a significant challenge, the Regulator grouped data into different certainty levels, as summarised at the end of this Diagnostic.

The result of each financial portfolio is discussed hereunder.

NOTE: The Regulator regards the financial and asset information with low confidence. Not all WSAs submitted verifiable information or complete financial data sets for the audit year in question**.**

Capital, O&M Budget and Actual, and Asset Value

The capital budgets, O&M budgets, O&M actual expenditure, and current asset values are summarised below.

Table 97 - Summary of the capital budgets, O&M budgets, O&M actual expenditure, and current asset values

WSA and WSP Name	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
Rand Water	R2,150,238,635	R4,912,181,598	R5,184,779,704	106%	R28,629,667,291
Magalies Water	NI	R90,004,502	R84,094,913	93%	R240,190,704
City of Ekurhuleni	R517,322,124	R4,623,459,441	R4,473,843,335	97%	R16,342,661,810
City of Johannesburg	R1,140,908,240	R7,556,461,598	R7,571,669,907	100%	R46,153,110,939
City of Tshwane	R713,900,000	R3,644,854,325	R3,596,798,601	99%	R2,643,350,608
Emfuleni LM	R85,322,891	NI	NI	NI	R725,657,378
Lesedi LM	NI	NI	NI	NI	NI
Merafong LM	R122,352,444	R81,724,835	NI	NI	R299,288,000
Midvaal LM	R32,051,602	R228,147,202	R273,420,834	120%	R376,431,000
Mogale City LM	R153,576,203	R485,271,642	R481,365,787	99%	R30,003,000
Rand West LM	NI	R386,978,858	R261,411,722	68%	NI
Totals	**R4,915,672,139**	**R22,009,084,001**	**R21,927,384,803**	**99.6%**	**R95,680,551,434**

The Regulatory Comments following in this Chapter list the capital projects with secured funding for each municipality and/or its bulk water provider (WSP). The capital lists are deemed to be a definitive means to address water service inadequacies and ensuring water infrastructure investment. A total capital budget of R4.915b has been reported for the refurbishment and upgrades of water infrastructure for most of the WSAs. The largest capital budgets are observed for Rand Water (R2.15b), City of Johannesburg (R1.14b), City of Tshwane (R713.9m) and City of Ekurhuleni (R517.3m).

For the 2021/22 fiscal year, the total O&M budget reported for the province was R22b, of which R21.93 (99.6%) has been expended. Over-expenditure of 120% by Midvaal and under expenditure by Rand West (68%) was observed. The provincial figures exclude Emfuleni, Lesedi and Merafong who had no and partial financial information.

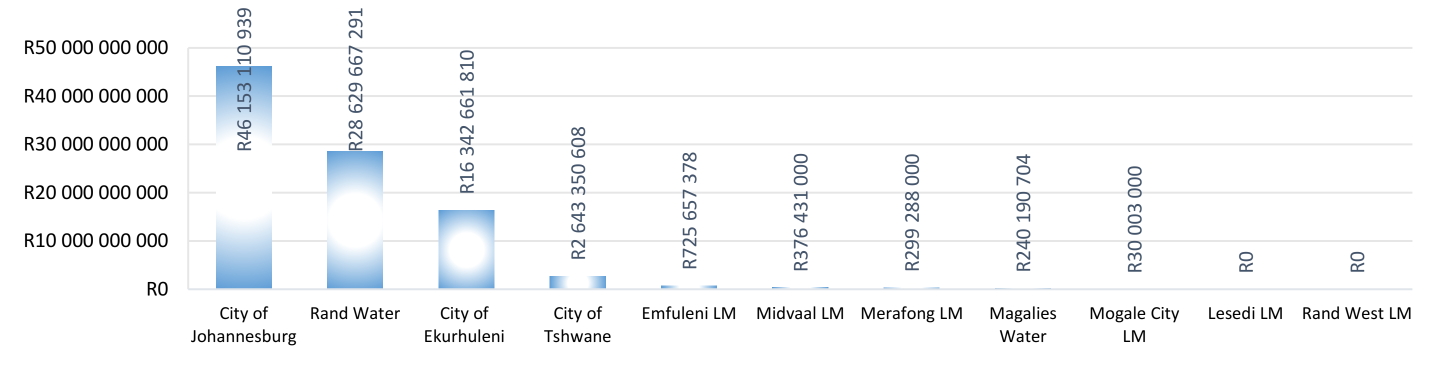


Figure 74 - Total current asset value reported by the WSAs

The total current asset value for water infrastructure (networks, pump stations, treatment plants) is reportedly R95.44b (excluding Lesedi and Rand West with no information). The highest asset values are observed for the City of Johannesburg (R46.2b), Rand Water (R28.6b) and City of Ekurhuleni (R16.3b).

O&M Cost Benchmarking

By combining the SALGA and WRC WATCOST models, an estimation of the maintenance cost required per asset type can be done, i.e. civil, buildings, pipelines, mechanical, electrical, and instrumentation.

Table 98 - SALGA-WRC annual maintenance budget guideline and cost estimation

Description	% of Current Asset Value	Asset Value Estimate	Modified SALGA Maintenance Guideline	Annual Maintenance Budget Guideline
Current Asset Value estimate	**100%**	**R95,440,360,730**	**15.75%**	**R2,061,511,792**
Broken down into:				
1. Civil Structures	46%	R43,902,565,936	0.50%	R219,512,830
2. Buildings	3%	R2,863,210,822	1.50%	R42,948,162
3. Pipelines	6%	R5,726,421,644	0.75%	R42,948,162
4. Mechanical Equipment	30%	R28,632,108,219	4.00%	R1,145,284,329
5. Electrical Equipment	11%	R10,498,439,680	4.00%	R419,937,587
6. Instrumentation	4%	R3,817,614,429	5.00%	R190,880,721

Description	% of Current Asset Value	Asset Value Estimate	Modified SALGA Maintenance Guideline	Annual Maintenance Budget Guideline
Current Asset Value estimate	**100%**	**R95,440,360,730**	**15.75%**	**R2,061,511,792**
Totals	**100%**	**R95,440,360,730**	**15.75%**	**R2,061,511,792**
			Minus 20% P&Gs and 10% Installation	**R618,453,538**
			Total	**R1,443,058,254**

The model estimates that R2.06b (2.16%) is required per year to maintain the assets valued at R95.44b. Notably, this maintenance estimate assumes that all assets are functional. In cases where Blue Drop Certification is not being achieved, it can be assumed that some form of inefficiency or constraint is being experienced, and national benchmarks closer to 7% of the asset value is advocated (R6.68b).

The table below indicates the SALGA maintenance cost estimation in relation to the O&M budget, and O&M actual expended.

Table 99 - O&M cost estimates by the SALGA versus actual budget and expenditure figures

Cost Reference	O&M Cost Estimate	Period	% of Asset Value
Modified SALGA	R2,061,511,792	Annually, estimation	2.16%
O&M Budget	R22,009,084,001	Actual for 2021/22	23%
O&M Spend	R21,927,384,803	Actual for 2021/22	22.9%

In addition, the table below indicates the Blue Drop audit findings on the water supply operations cost determination and water supply O&M budget status.

Table 100 - BD Audit Water Supply Operations Cost Determination and Water Supply O&M Budget status

WSA Name	Water Supply Operations Cost Determination	Water Supply O&M Budget status
Rand Water	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
Magalies Water	DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY; SYSTEM SPECIFIC BUDGET
City of Ekurhuleni	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUT INCLUDES WATER & SANITATION
City of Johannesburg	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUT INCLUDES WATER & SANITATION
City of Tshwane	DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Emfuleni LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Lesedi LM	NO PROOF (0% SCORE)	NO PROOF
Merafong LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Midvaal LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Mogale City LM	NOT SYSTEM SPECIFIC (GLOBAL)	BUDGET IS NOT RINGFENCED FOR WATER ONLY
Rand West LM	NOT SYSTEM SPECIFIC (GLOBAL)	BUDGET IS NOT RINGFENCED FOR WATER ONLY

From the tables above, the cost dynamics can be summarised as follows:

- The SALGA estimations for maintenance budgets is about 9.4% (Modified SALGA divided by O&M Budget) of the actual reported budgets for the 2021/22 fiscal year
- The actual O&M budget (23%) appears to be more than adequate when compared with the SALGA guideline (2.16%) or with the government benchmark (7%)
- These figures may be impacted by some of the smaller WSAs who did not provide budget and expenditure figures, and by some inaccurate asset values and where no asset values were provided for
- Lastly, the municipalities presents budget and expenditure data at different levels (table above) i.e. financial figures are not always ringfenced per water supply system – thus rendering provincial summaries to be indicative.

7.1 Rand Water

Introduction

Rand Water is the largest bulk water utility in Africa and supplies potable water to more than 16 million people in Gauteng and parts of Mpumalanga, the Free State and North West and even Limpopo, serving an area of more than 37 000 km^2. The utility serves the following 17 municipalities:

1. City of Johannesburg Metropolitan Municipality
2. City of Tshwane Metropolitan Municipality
3. City of Ekurhuleni Metropolitan Municipality
4. Mogale City Local Municipality
5. Emfuleni Local Municipality
6. Merafong Local Municipality
7. Midvaal Local Municipality
8. Rand West Local Municipality
9. Lesedi Local Municipality
10. Ngwathe Local Municipality
11. Rustenburg Local Municipality (which includes Royal Bafokeng Local Municipality)
12. Madibeng Local Municipality
13. Govan Mbeki Local Municipality
14. Thembisile Local Municipality
15. Victor Khanye Local Municipality
16. Metsimaholo Local Municipality

Given the large area of supply and dependency of thousands of water users on the continuous supply of high-quality water, the performance of this bulk water utility is critical to the well-being of the people serviced through the bulk supply and municipal water networks. Rand Water produces drinking water sourced from the Vaal dam and treated at Zuikerbosch and Vereeniging Water Treatment Works with an average supply of 4 443 ML/day and a peak day demand of 5,069 ML/day. The water produced is fed to 27 mines and 952 industries as well as direct consumers and the municipalities listed above. The water is fed into a distribution network of over 3500km of large diameter pipelines feeding 60 service reservoirs before being distributed to the consumers. The four pump stations (Mapleton, Palmiet, Zwartkopjes and Eikenhof) are utilised to chloraminate the water prior to pumping it over the long distances required to ensure that the consumers receive safe drinking water that complies with SANS 241 specifications.

Regulator's Comment

The Blue Drop Audit was well attended by all relevant staff members and the personnel were well prepared, experienced, and understood the requirements of the Blue Drop Audit. Rand Water is commended for their preparedness and information provided. The scale of the Rand Water system is significant, and the local municipalities are fortunate to have this utility to assist them in the provision of safe drinking water for their consumers.

Rand Water uses a Water Quality Management System (WQMS) which integrates all aspects of water quality management across all operational and maintenance teams. The audit team was able to follow an incident with this WQMS right down to the results in the laboratory. Therefore, consumers can be assured that the Rand Water team continuously monitors all potential problems and actively manage these risks to ensure that the drinking water supplied is of excellent quality. The water quality data shows excellent compliance to all the required parameters and consumers within the Rand Water area of supply are assured of being able to drink water straight from the tap.

Rand Water operates and maintains its systems with a vast technical, operational, and scientific team who are qualified and competent in all technical, operational, and scientific aspects of drinking water supply. There are contracts in place for chemical supply and evidence of Capex budget and expenditure with long term planning. Pipeline age analysis is performed with upgrades and augmentation for pipelines, reservoirs, and other work via a rolling 5-year Capex forecast. Reservoirs and pipes are checked, and reports are generated weekly to assist in managing the system. Rand Water publishes water quality results on their website and their staff are managed with the provision of drinking water of good quality as the primary focus. Rand Water can be commended for managing this large complex system with excellence!

Blue Drop Findings

The Regulator notes finds that that there were some shortcomings, and the following summarises the collective recommendations as following:

- The condition assessment of the works is done at a high level and more detail is expected in these documents. In addition, the data used was not within the assessment period (2017) and summary reports provided were compiled in 2020, which is outside the assessment period.
- The available budget was overspent by a small margin.
- During the site visit a water leak at the chemical plant was observed but service personnel had already been alerted to this.
- The pipe service ducts on site were not safe and this was pointed out to the Rand Water staff during the assessment.

Technical Site Inspection

The **Vereeniging WTW** is in a good condition with a TSA score of 97%.

The Regulator observed that regular routine maintenance is done on site with no significant operational or maintenance issues noted. The water leak at the chemical plant was already logged for the maintenance team to attend to. Both the operational and compliance water quality data show that this plant is producing water which complies with the drinking water standard.

The Rand Water team was able to show how all divisions of the utility are able to maintain the water treatment processes as efficiently as possible with a large team. Rand Water makes use of a Water Quality Management System which aims to breach the gaps between the various departments of this large utility. The documentation provided allowed the audit team to drill down to the water quality results as well as up to identify the control measures and the risks carried by the utility. As such, the Rand Water team is to be commended on a job well done, setting a prime example of care, competence, and diligence in providing excellent water quality to consumers.


Sedimentation tank at Vereeniging


Clear overflow from sedimentation tanks


Reservoir inspection at site visit


Filter backwashing at Vereeniging WTW


Ammonia dosing station


Distribution network pumps at Palmiet Pump Station

7.2 Magalies Water

Introduction

Magalies Water is the bulk water utility in South Africa and supplies potable water to more than 500 000 people in Gauteng, North West, Limpopo. Magalies Water operations cover an area of 42 000 km^2 across the three provinces with water sourced from two major catchments being the Crocodile and the Pienaars rivers. However, in certain municipalities, Magalies Water serve on an operations and Maintenance contractual agreement where they operate the infrastructure owned by the local authority such as in Ngaka Modiri Molema DM and Dr Ruth Segomotsi Mompati DM in the North West province.

The utility serves the following 6 municipalities:

1. City of Tshwane Metropolitan Municipality, supplied with 15.872 Ml/d
2. Moses Kotane Local Municipality, supplied with 36 Ml/d
3. Rustenburg Local Municipality, supplied with 20 M/d
4. Modimolle/Mookgopong Local Municipality, supplied with 6.1 Ml/d
5. Thabazimbi Local Municipality, supplied with 11 Ml/d
6. Bela-Bela Local Municipality, supplied with 7.05 Ml/d

Magalies Water abstracts raw water and channelled to water treatments plants where it is treated before is supplied to its municipal and industrial clients. The Water Board own four WTPs, namely Vaalkop, Klipdrift, Wallmansthal and Cullinan. In total Magalies Water currently has the infrastructure and capacity to supply 314 megalitres or 314 million litres of water per day to all the municipalities mentioned above and the mines in the surrounding areas receiving bulk water from the water utility. Water is transported through pipelines, reservoirs, pumping stations, reticulation systems and owns a South African National Accreditation System (SANAS) accredited laboratory that is authorised and certified to analyse and rate the quality of water supplied to consumers. As such the performance of this bulk water utility is critical to the well-being of the people in area of supply.

Regulator's Comment

The Blue Drop Audit was well attended by all relevant staff members and the personnel were well prepared, experienced, and understood the requirements of the Blue Drop Audit. Magalies Water is commended for their preparedness and information provided. The scale of the Magalies Water system is significant, and the local municipalities are fortunate to have this utility to assist them in the provision of safe drinking water for their consumers.

Magalies Water proactively seeks to comply with the ISO 14001 certification requirements and ensures that all its areas of operations have no impact on the environment. All the four water treatment works owned and operated by Magalies Water are ISO 14001 certified and have been retained the certification to date. The Water Board is equipped with a laboratory accredited with a South African National Accredited System (SANAS) that is authorised and certified to analyse water quality. The accreditation ensures that credibility of the results from the laboratory is not questionable and follows accredited methods in analytical procedures followed by the laboratory. These results are then submitted to the Departmental owned web-based system were drinking water quality results are submitted called Integrated Regulatory Information Systems (IRIS). The lab results as well as Incident Management Protocol are aligned such that any incidents with respect to failures in the systems are investigated and rectified immediately. The audit team was able to follow any incident within the systems. Therefore, consumers can be assured that the Magalies Water team continuously monitors all potential problems and actively manage these risks to ensure that the drinking water supplied is of excellent quality. The water quality data shows excellent compliance to all the required parameters and consumers within the Magalies Water area of supply are assured of being able to drink water straight from the tap. Water Quality results are published in the Water Boards annual reports and also when incidents are picked up, communication is issued to clients and also placed on Magalies Water website and can be commended for managing these large and complex systems with excellence!

Magalies Water operates and maintains its systems with a vast technical, operational, and scientific team who are qualified and competent in all technical, operational, and scientific aspects of drinking water supply. There are contracts in place for chemical supply, calibration/verification of meters and evidence of Capex budget and expenditure with long term planning. Pipelines equipped with cathodic protection however age analysis and network related audits and planning are still lacking. Operational costs determination based on all the five costs drivers, chemical costs, maintenance costs, compensation of employee, energy costs and raw water costs are in place.

Blue Drop Findings

The Regulator Notes finds that that there were some shortcomings, and the following summarises the collective recommendations as following:

- With the exception of Cullinan WTW which had a process audit in place to assess the integrity of the WTW whether it meets all the design specification as originally intended. However all the WTW owned and operated by Magalies Water have condition assessment of the works is done, this is a shortcoming as it is not awarded a full score for the KPA however the Department is comforted by the fact that findings and recommendations of the condition assessments are implemented.
- The available budget was overspent by a small margin.
- Record keeping of maintenance work done and the maintenance planning that is aligned with asset register needs to be improved
- Minor improvements on asset register that is aligned with Blue Drop assessment criteria is required.

Technical Site Inspection

The Cullinan WTW is in a good condition with a TSA score of 94%. The Regulator observed that regular routine maintenance is done on site with no significant operational or maintenance issues noted. Both the operational and compliance water quality data show that this plant is producing water which complies with the drinking water standard.

The Magalies Water team was able to show how all divisions of the utility are able to maintain the water treatment processes as efficiently as possible with a large team. With jar Tests conducted on site to address any water quality variation that may occur that may require adjustments of chemical. The documentation provided allowed the audit team to drill down to the water quality results as well as up to identify the control measures and the risks carried by the utility. This included chemical stocks available, adjustments made and dosage rates which will help in estimation of duration it takes for a batch to complete and this helps in supply chain management to ensure there is sufficient stock of treatment chemicals. The team is commended on a job well done, setting a prime example of care, competence, and diligence in providing excellent water quality to consumers.

Sedimentation tank at Cullinan WTW

Overflow from sedimentation tanks

Panel 5 BD assessors and Magalies Water Team

Filter backwashing at Cullinan WTW

Jar Test Procedure used to determine of optimum dosage of treatment chemicals

Pumps to the command reservoir

7.3 City of Ekurhuleni

Municipal Blue Drop Score		
Blue Drop Score 2023	%	**97.06%**
Blue Drop Score 2014	%	**96.62%**
Blue Drop Score 2012	%	**98.95%**
Blue Drop Score 2011	%	**97.44%**

Key Performance Area	Weight	Ekurhuleni
Bulk/WSP		Rand Water
Blue Drop Score 2023	%	**97.06%**
Blue Drop Score 2014	%	96.60%
Blue Drop Score 2012	%	99.00%
Blue Drop Score 2011	%	97.40%
System Design Capacity	kL/d	5 427 000
System Available Capacity	kL/d	5 427 000
System Input Value	kL/d	986 972
Capacity Utilisation	%	85.48%
Resource Abstracted From		Vaal River
BDRR 2023	%	29.17%
BDRR 2022	%	33.30%

Technical Site Assessment: Impala Park Reservoirs - 84%

7.4 City of Johannesburg Metropolitan Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	98.10%
Blue Drop Score 2014	%	96.06%
Blue Drop Score 2012	%	98.92%
Blue Drop Score 2011	%	97.63%

Key Performance Area	Weight	Greater Johannesburg WSS
Bulk/WSP		Rand Water
Blue Drop Score 2023	%	98.10%
Blue Drop Score 2014	%	96.06%
Blue Drop Score 2012	%	98.92%
Blue Drop Score 2011	%	97.69%
System Design Capacity	kL/d	5 427 000
System Available Capacity	kL/d	5 427 000
System Input Value	kL/d	1 686 097
Capacity Utilisation	%	85.48%
Resource Abstracted From		Vaal River
BDRR 2023	%	29.17%
BDRR 2022	%	34.70%

Technical Site Assessment: Illovo Command Reservoir - 89%

7.5 City of Tshwane Metropolitan Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	83.23%
Blue Drop Score 2014	%	94.43%
Blue Drop Score 2012	%	95.76%
Blue Drop Score 2011	%	90.41%

Key Performance Area	Weight	CULLINAN AREA (MAGALIES Cullinan WTW)	WALMANSTHAL AREA (MAGALIES Walmansthal WTW)	PRETORIA Temba (Temba WTW)	PRETORIA Central & South (Rietvlei WTW & Rand Water)
Bulk/WSP		Magalies Water	Magalies Water	CoT & Magalies Water	CoT & Rand Water
Blue Drop Score 2023	%	72.89%	69.65%	55.97%	89.36%
Blue Drop Score 2014	%	95.05%	90.02%	88.97%	97.56%
Blue Drop Score 2012	%	90.75%	90.75%	93.50%	99.20%
Blue Drop Score 2011	%	83.01%	84.50%	82.35%	97.22%
System Design Capacity	kL/d	16 000	12 000	172 000	5 482 200
System Available Capacity	kL/d	16 000	12 000	162 000	5 482 200
System Input Value	kL/d	10 414	11 600	101 927	831 058
Capacity Utilisation	%	65.09%	96.67%	66.26%	84.47%
Resource Abstracted From		Bronkhorstspruit Dam	Pienaars	Pienaars	Rietvlei Dam, Grootfontein, Sterkfontein, Kentron
BDRR 2023	%	26.42%	32.39%	63.03%	32.01%
BDRR 2022	%	26.40%	30.40%	54.30%	34.60%

Key Performance Area	Weight	PRETORIA Findley (Fountains)	PRETORIA North - (Roodeplaat WTW)	KUNGWINI - (Bronkhorstpruit Town WTW)	KUNGWINI (Bronkhorstbaai WTW)
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	64.44%	63.56%	42.30%	52.64%
Blue Drop Score 2014	%	96.04%	97.22%	96.80%	90.67%
Blue Drop Score 2012	%	97.02%	96.88%	95.33%	78.07%
Blue Drop Score 2011	%	92.22%	95.48%	81.24%	66.99%
System Design Capacity	kL/d	13 800	60 000	54 000	500
System Available Capacity	kL/d	32 370	60 000	54 000	480
System Input Value	kL/d	32 270	20 078	25 101	211
Design Capacity Utilisation	%	99.69%	33.46%	46.48%	43.96%
Resource Abstracted From		Natural Dolomitic Springs	Roodeplaat dam	Bronkhorstspruit River (Hondsrivier)	Bronkhorstspruit dam
BDRR 2023	%	40.94%	28.31%	55.97%	39.27%
BDRR 2022	%	43.40%	20.20%	67.20%	64.30%

Key Performance Area	Weight	KUNGWINI (Summerplace WTW)	SOKHULUMI Informal Settlement	ONVERWACHT Informal settlement
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	54.24%	43.93%	47.20%
Blue Drop Score 2014	%	95.53%	74.91%	73.26%
Blue Drop Score 2012	%	66.33%	NI	NA
Blue Drop Score 2011	%	NA	NI	NA
System Design Capacity	kL/d	700	1 553	153
System Available Capacity	kL/d	700	407	0
System Input Value	kL/d	105	285	153
Capacity Utilisation	%	15.00%	70.02%	NI
Resource Abstracted From		Bronkhorstspruit dam	Groundwater	Groundwater
BDRR 2023	%	22.76%	47.07%	47.66%
BDRR 2022	%	47.00%	28.00%	27.10%

Technical Site Assessment: Temba WTW – 73%

7.6 Emfuleni Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	85.90%
Blue Drop Score 2014	%	88.16%
Blue Drop Score 2012	%	96.80%
Blue Drop Score 2011	%	95.75%

Key Performance Area	Weight	Emfuleni	Vaaloewer
Bulk/WSP		Rand Water	-
Blue Drop Score 2023	%	85.93%	58.08%
Blue Drop Score 2014	%	88.27%	67.81%
Blue Drop Score 2012	%	96.87%	84.10%
Blue Drop Score 2011	%	96.42%	93.76%
System Design Capacity	kL/d	5 427 000	1 000
System Available Capacity	kL/d	5 427 000	1 000
System Input Value	kL/d	4 800 000	300
Design Capacity Utilisation	%	86.35%	30.00%
Resource Abstracted From		Vaal River	Vaal River
BDRR 2023	%	31.89%	42.10%
BDRR 2022	%	86.9%	93.8%

Technical Site Assessment: Vaaloewer WTW – 81%

7.7 Lesedi Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	86.22%
Blue Drop Score 2014	%	87.75%
Blue Drop Score 2012	%	92.92%
Blue Drop Score 2011	%	87.41%

Key Performance Area	Weight	Lesedi Main (Rand Water)
Bulk/WSP		Rand Water
Blue Drop Score 2023	%	86.22%
Blue Drop Score 2014	%	87.75%
Blue Drop Score 2012	%	92.92%
Blue Drop Score 2011	%	87.41%
System Design Capacity	kL/d	5 427 000
System Available Capacity	kL/d	5 427 000
System Input Value	kL/d	23 350
Capacity Utilisation	%	85.48%
Resource Abstracted From		Vaal River
BDRR 2023	%	30.43%
BDRR 2022	%	35.10%

Technical Site Assessment: Heidelberg Command Reservoir – 53%

7.8 Merafong Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	93.22%
Blue Drop Score 2014	%	84.56%
Blue Drop Score 2012	%	92.21%
Blue Drop Score 2011	%	86.46%

Key Performance Area	Weight	Carletonville	Fochville	Wedela
Bulk/WSP		Rand Water	Rand Water	Rand Water
Blue Drop Score 2023	%	93.31%	93.03%	93.31%
Blue Drop Score 2014	%	91.60%	84.19%	84.19%
Blue Drop Score 2012	%	95.26%	89.05%	90.76%
Blue Drop Score 2011	%	86.41%	86.36%	86.98%
System Design Capacity	kL/d	5 427 000	5 427 000	5 427 000
System Available Capacity	kL/d	5 427 000	5 427 000	5 427 000
System Input Value	kL/d	33 305	20 491	6 916
Capacity Utilisation	%	86.35%	86.35%	86.35%
Resource Abstracted From		Vaal River	Vaal River	Vaal River
BDRR 2023	%	30.04%	30.04%	30.04%
BDRR 2022	%	37.50%	37.50%	37.50%

Technical Site Assessment - No TSA was conducted for the WSA as there are no WTWs to assess.

7.9 Midvaal Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	94.80%
Blue Drop Score 2014	%	94.65%
Blue Drop Score 2012	%	84.10%
Blue Drop Score 2011	%	67.94%

Key Performance Area	Weight	Meyerton	Vaal Marina
Bulk/WSP		Rand Water	-
Blue Drop Score 2023	%	95.12%	84.03%
Blue Drop Score 2014	%	95.10%	83.96%
Blue Drop Score 2012	%	85.95%	39.65%
Blue Drop Score 2011	%	85.73%	35.31%
System Design Capacity	kL/d	5 427 000	10 000
System Available Capacity	kL/d	5 427 000	10 000
System Input Value	kL/d	33 371	1 000
Capacity Utilisation	%	86.35%	10.00%
Resource Abstracted From		Vaal River	Vaal Dam
BDRR 2023	%	29.98%	21.21%
BDRR 2022	%	33.30%	16.80%

Technical Site Assessment: Vaal Marina WTW – 81%

7.10 Mogale City Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	93.06%
Blue Drop Score 2014	%	88.80%
Blue Drop Score 2012	%	98.79%
Blue Drop Score 2011	%	97.32%

Key Performance Area	Weight	Mogale City WSSs
Bulk/WSP		Rand Water
Blue Drop Score 2023	%	93.06%
Blue Drop Score 2014	%	88.80%
Blue Drop Score 2012	%	98.79%
Blue Drop Score 2011	%	96.19%
System Design Capacity	kL/d	5 427 000
System Available Capacity	kL/d	5 427 000
System Input Value	kL/d	92 313
Capacity Utilisation	%	86.35%
Resource Abstracted From		Vaal River
BDRR 2023	%	29.43%
BDRR 2022	%	37.00%

Technical Site Assessment - No TSA was conducted for the WSA as there are no WTWs to assess.

7.11 Rand West Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	87.23%
Blue Drop Score 2014	%	91.60%
Blue Drop Score 2012	%	97.54%
Blue Drop Score 2011	%	95.24%

Key Performance Area	Weight	Bekkersdal	Glenharvie	Suurbekom	Wagterskop
Bulk/WSP		Rand Water	Rand Water	Rand Water	Rand Water
Blue Drop Score 2023	%	86.11%	86.81%	86.81%	86.81%
Blue Drop Score 2014	%	86.23%	86.42%	86.23%	86.23%
Blue Drop Score 2012	%	95.29%	95.29%	95.76%	95.60%
Blue Drop Score 2011	%	84.37%	84.42%	84.42%	84.35%
System Design Capacity	kL/d	5 427 000	5 427 000	5 427 000	5 427 000
System Available Capacity	kL/d	5 427 000	5 427 000	5 427 000	5 427 000
System Input Value	kL/d	15 141	1 420	472	236
Capacity Utilisation	%	86.35%	86.35%	86.35%	86.35%
Resource Abstracted From		Vaal River	Vaal River	Vaal River	Vaal River
BDRR 2023	%	31.33%	30.03%	31.33%	31.02%
BDRR 2022	%	37.50%	34.20%	36.40%	36.40%

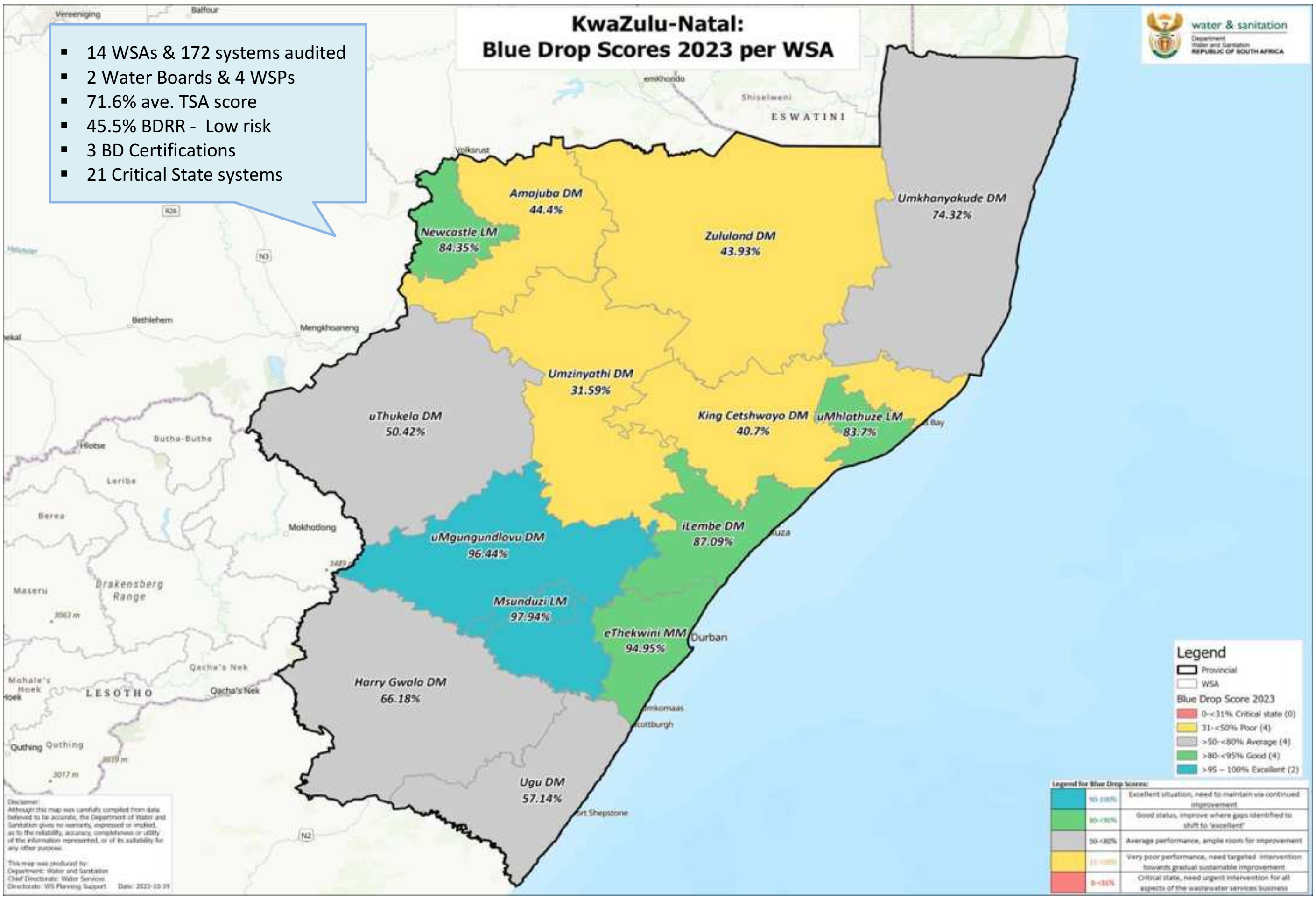
Key Performance Area	Weight	Waterpan	Westonaria	Randfontein
Bulk/WSP		Rand Water	Rand Water	Rand Water
Blue Drop Score 2023	%	86.81%	86.81%	87.86%
Blue Drop Score 2014	%	86.42%	86.42%	91.60%
Blue Drop Score 2012	%	96.57%	95.60%	97.54%
Blue Drop Score 2011	%	77.07%	84.42%	95.24%
System Design Capacity	kL/d	5 427 000	5 427 000	5 427 000
System Available Capacity	kL/d	5 427 000	5 427 000	5 427 000
System Input Value	kL/d	118	10 645	35 815
Capacity Utilisation	%	86.35%	86.35%	86.35%
Resource Abstracted From		Vaal River	Vaal River	Vaal River
BDRR 2023	%	31.02%	30.33%	30.33%
BDRR 2022	%	36.40%	34.20%	36.20%

Technical Site Assessment: No TSA was conducted for the WSA as there are no WTWs to assess.

Vaal Marina site assessment – good participation by technical staff to benefit from the consultative auditing process

City of Cape Town, Steenbras WTW in pristine condition, well operated with competent staff

8. KWAZULU NATAL PROVINCE: MUNICIPAL WATER MANAGEMENT PERFORMANCE



Provincial Synopsis

The KwaZulu Natal province provides drinking water to a total population of 8,787,506 persons in South Africa.

An audit attendance record of 100% of the 14 WSAs, with 172 water supply systems across the province, 2 Water Boards (Umgeni Water and Mhlathuze Water), Bulk Water Provider uThukela Water and WSPs (WSSA now Zana Manzi, Novubu Construction and Siza Water) affirms the province's commitment to the Blue Drop national incentive-based regulatory programme. Umgeni Water own eleven water treatments works that supply potable water to 14 water supply systems in 6 WSAs (eThekwini MM, Harry Gwala DM, iLembe DM, Ugu DM, Msunduzi LM and uMgungundlovu DM). Umgeni Water also provides O&M support under a contractual arrangement to other water treatment systems (22) in the Ugu DM, uMgungundlovu DM and King Cetshwayo DM. Mhlathuze Water has recently merged with Umgeni Water in July 2023 to form uMngeni-uThukela Water (Government Gazette no. 48833 dated 19 June 2023). Mhlathuze LM owns one water treatment works and operates and maintains three other water treatment works that supplies potable water to 4 water supply systems in the uMhlathuze LM.

The Regulator determined that 3 water supply systems scored more than 95% when measured against the Blue Drop standards and thus qualified for the prestigious Blue Drop Certification. In 2014, 8 water supply systems were awarded Blue Drop status. Using the 2014 audit results as comparative baseline, the province shows a decline in excellence for 2023. Five (5) of 14 WSAs improved on their 2014 scores, namely Harry Gwala DM, iLembe DM, uMgungundlovu DM, Umkhanyakude DM and uThukela DM. The eThekwini MM and Msunduzi LM blue drop score comparison was very marginal. The remaining 7 WSAs regressed to lower Blue Drop scores compared to their 2014 baselines with at least Newcastle LM and uMhlathuze LM maintaining their good performance status. eThekwini MM, Msunduzi LM, uMgungundlovu DM and iLembe DM are the best performing WSAs in the province, with 3 of these 4 WSAs achieving Blue Drop Certifications for one water supply system each (3 in total). Excellent technical site assessment scores were achieved by the Midmar WTW in uMgungundlovu DM with a TSA score pf 95% and by the Nsezi WTW in uMhlathuze LM with a TSA score of 90%. 21 water supply systems were identified to be in a critical state in the province compared with 18 water supply systems in 2014.

The province's overall Blue Drop performance is characterised by particular strengths when measured against the KPAs. Umgeni Water, Mhlathuze Water, uThukela Water, Siza Water, Msunduzi LM, uMgungundlovu DM and uMhlathuze LM stand out for its compliance, good practice and risk management practices that are well embedded in the water supply business. The KPAs that require attention and are the worst performing are KPA 4 Technical Management (37.4%) and KPA 5 DWQ Compliance (54.3%).

The provincial Blue Drop Risk Rating (BDRR) improved from 50.4% (medium risk category) in 2022 (BD PAT) to 45.4% (low risk category) in 2023. 113 (of 172) water supply systems are situated in the low risk category, 34 WSSs in the medium risk category, 15 WSSs in the high risk category, and 10 WSSs in the critical risk category.

The Regulator is optimistic that the 2023 Blue Drop report provides an updated residual basis from where a positive trajectory for water services delivery and improved performance will follow in the next BD audit. Municipalities and their service providers are encouraged to start preparation for the next Blue Drop audit cycle, which is planned to cover the financial year 2023/24 and released in 2025. The 2023 Blue Drop status for WSAs in the province are summarised in the table below.

Table 101 - 2023 Blue Drop Summary

WSA Name	2014 BD Score (%)	2023 BD Score (%)	2023 BD Certified ≥95%	2023 Critical State (<31%)
Amajuba DM	58.18%	44.40%↓		
eThekwini MM	95.90%	94.95%↓		
Harry Gwala DM	62.86%	66.18%↑		Machunwini, Chibini
iLembe DM	86.72%	87.09%↑	Dolphin Coast Ballito (Siza Water and Umgeni Water)	
King Cetshwayo DM	74.08%	40.70%↓		Khombe, Pikiliyeza
Newcastle LM	89.06%	84.35%↓		
Msunduzi LM	97.97%	97.94%↓	Umsunduzi Umgeni Water)	
Ugu DM	66.29%	57.14%↓		
uMgungundlovu DM	89.94%	96.44%↑	UW-uMgungundlovu DM (Umgeni Water)	
uMhlathuze LM	89.60%	83.70%↓		
Umkhanyakude DM	57.87%	74.32%↑		
Umzinyathi DM	78.02%	31.59%↓		12 of 13 WSSs
uThukela DM	34.50%	50.42%↑		
Zululand DM	51.18%	43.93%↓		Coronation, eMondlo, Hlobane, Louwsberg, Vryheid
Totals	-	-	3	21

↑= improvement, ↓= regress, →= no change

The Department of Water and Sanitation acknowledges the excellence in water services management achieved for the Blue Drop Audit year of 2021-22. Three (3) Blue Drop Certificates are awarded in the KwaZulu Natal Province to the water supply systems of iLembe DM, Msunduzi LM and uMgungundlovu DM:

Province	2023 Blue Drop Certified Systems
KwaZulu Natal	**iLembe DM** ○ Dolphin Coast Ballito (Siza Water and Umgeni Water) **Msunduzi LM** ○ Umsunduzi (Umgeni Water) **uMgungundlovu DM** ○ UW-uMgungundlovu DM (Umgeni Water)

Background to Water Delivery and Distribution Infrastructure

The total volume of water treated in the province is 2,284,424 kl/d. Fourteen (14) WSAs, 2 Water Boards (Umgeni Water and Mhlathuze Water), Bulk Water Provider uThukela Water and WSPs (WSSA now Zana Manzi, Novubu Construction and Siza Water) are responsible for water services through a water network comprising of:

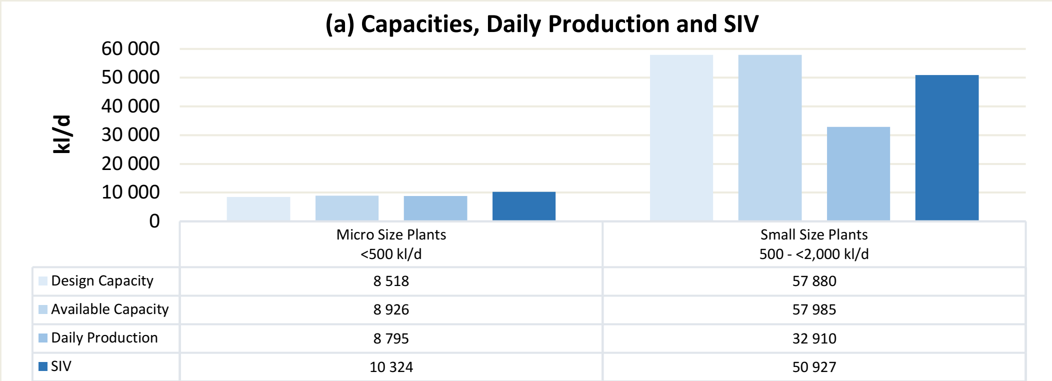
- 190 WTWs, boreholes and springs with the bulk of the water treated and supplied by the 12 WTWs of Umgeni Water and Mhlathuze Water to 7 WSAs with a total Average Daily Production of 1,611,562 kl/d
- 172 WSSs of which 15 WSSs in 7 WSAs are provided with bulk potable water from Umgeni Water and Mhlathuze Water, and 29 WSSs by Newcastle LM, Ugu DM and uThukela DM
- 816 pump stations, 4,763 km bulk water supply lines, 37,188 km reticulation pipe lines, and 1,975 reservoirs/ towers (excluding systems in 7 WSAs that were unable to provide some verifiable data)

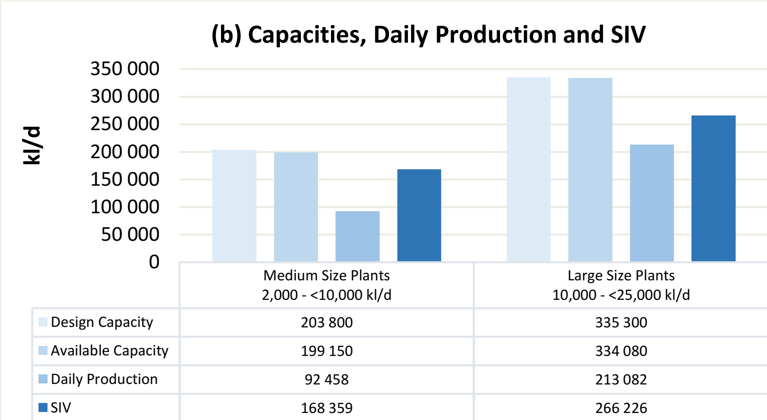
Table 102 - Summary of Capacities, Daily Production and SIV distribution according to plant sizes

	Micro Size Plants	Small Size Plants	Medium Size Plants	Large Size Plants	Macro Size Plants	Unknown (NI)*	Total
	<500 kl/day	500 - <2,000 kl/day	2,000 - <10,000 kl/day	10,000 - <25,000 kl/day	>25,000 kl/day		
No. of WTWs, Boreholes, Springs	36 (19%)	68 (36%)	48 (25%)	22 (12%)	16 (8%)		190
Total Design Capacity (kl/day)	8,518	57,880	203,800	335,300	2,328,400	None	2,933,898
Total Available Capacity (kl/day)	8,926	57,985	199,150	334,080	2,294,400	None	2,894,541
Average Daily Treatment Volume (kl/day)	8,795	32,910	92,458	213,082	1,937,179	47 NI	2,284,424
Total SIV (kl/day)	10,324	50,927	168,359	266,226	2,080,791		2,576,627
Design Capacity Utilisation (%)	103%	57%	45%	64%	83%		78%
Available Capacity Utilisation (%)	99%	57%	46%	64%	84%		79%

** "Unknown" means the number of WTWs with NI (No Information) on design capacity or available capacity or SIV*

The audit verified a total installed design capacity of 2,933,898 kl/d and a total available design capacity of 2,894,541 kl/d with most of this capacity residing in the macro-sized water treatment plants. Collectively, the 190 WTWs produce 2,284,424 kl/d and distributes 2,576,627 kl/d across the water networks. By comparing the available treatment capacity with the treated water volume, a spare treatment capacity of 610,117 kl/d is available (21%) to meet additional future demands. However, the WUE for the province is high (ave. 253 l/p/d) compared to the international WUE benchmark of 180 l/p/d, indicating a high ratio between effective water use and actual water abstraction. Going forward, the province will have to dedicate significant resources to curb water losses and NRW.





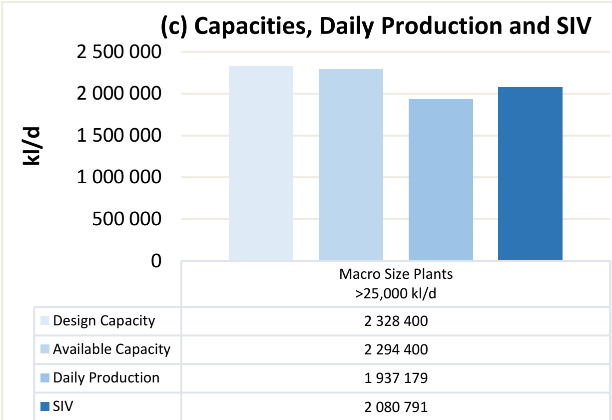


Figure 75 - Capacities, Daily Production and SIV Distribution - (a) micro to medium sized WTWs, (b) large WTWs, and (c) macro sized WTWs

In some cases, a Bulk Water Supplier supplies water across provincial borders and it is difficult to report accurately on design capacity and available capacity at provincial level, as the statistical data may become repetitive. Therefore, the reporting on the total system input volumes (SIV) would provide more accurate figures on the supply of treated water to the various water supply systems. The total SIV in the province is 2,576,627 kl/d and the average daily treatment volume is 2,284,424 kl/d, and this indicates that the treated volume is less than the total SIV (89%) as 47 WTWs/boreholes/springs are not measuring their average daily treatment volumes and in most cases the design capacity is used as the default SIV. The stand-alone largest contributor to the total SIV for 14 WSSs is from Umgeni Water with a total SIV contribution of 1,663,279 kl/d (65%). Diagnostic no. 2 to follow herein will unpack these statistics in more detail. The data shows that 24 WTWs daily average treatment volume exceeds the available design capacity. 14 of the WTWs have daily production volumes that exceed the authorised daily abstraction volumes.

The water distribution infrastructure is summarised in the table below.

Table 103 - Summary of Water Distribution Reticulation Infrastructure

WSA & WB Name	# WSS with no WSP/WB	# WSS with WSP/WB	Water Distribution Infrastructure			
			# Pump Stations (#)	Bulk Water Supply Lines (km)	Reticulation pipe lines (km)	# Reservoirs/ Towers
Umgeni Water	-	14	86	1,200	2,063	201
Mhlathuze Water	-	1	3	NI	0	0
Amajuba DM	3		57	NI	NI	9
eThekwini MM		1	63	1,305	13,182	525
Harry Gwala DM	20	1	27	NI	507	93
iLembe DM	14	5	20	1,064	9,043	408
King Cetshwayo DM		12	8	NI	NI	5
Newcastle LM	1	1	7	170	10	13
Msunduzi LM		1	9	NI	2,041	32
Ugu DM	8	5	255	NI	4,094	282
uMgungundlovu DM	7	1	21	2	528	18
uMhlathuze LM	3	1	7	60	NI	15
Umkhanyakude DM		22	72	23	NI	105
Umzinyathi DM	12	1	34	30	1,763	77
uThukela DM	14		53	57	669	30
Zululand DM		39	94	852	3,287	162
Totals	**82**	**90**	**816**	**4,763**	**37,188**	**1,975**

Provincial Blue Drop Analysis

The 100% response from the 14 WSAs audited demonstrates a firm commitment to progressive water services management in the province. There was no merging of municipalities only name changes of Sisonke DM to Harry Gwala DM and uThungulu DM to King Cetshwayo DM. Therefore, 14 WSAs were audited in 2023 compared to the 14 WSAs in 2014.

Table 104 - Blue Drop Comparative Analysis from 2012 to 2023

BLUE DROP COMPARATIVE ANALYSIS				
Performance Category	**2012**	**2014**	**2023**	**Performance trend 2014 and 2023**
Incentive-based indicators				
WSAs assessed (#)	14 (100%)	14 (100%)	14 (100%)	→
Water supply systems assessed (#)	191	209	172	↓
Blue Drop scores ≥50% (#)	172 (90%)	148 (71%)	117 (68%)	↓
Blue Drop scores <50% (#)	19 (10%)	61 (29%)	55 (32%)	↑
Blue Drop Certifications (#)	**16**	**8**	**3**	↓
Lowest Technical Site Assessment Score (%)	50%	28%	50%	↑
Highest Technical Site Assessment Score (%)	96%	99%	90%	↓

NA = Not Applied *NI = No Information* *↑= improvement, ↓= regress, →= no change*

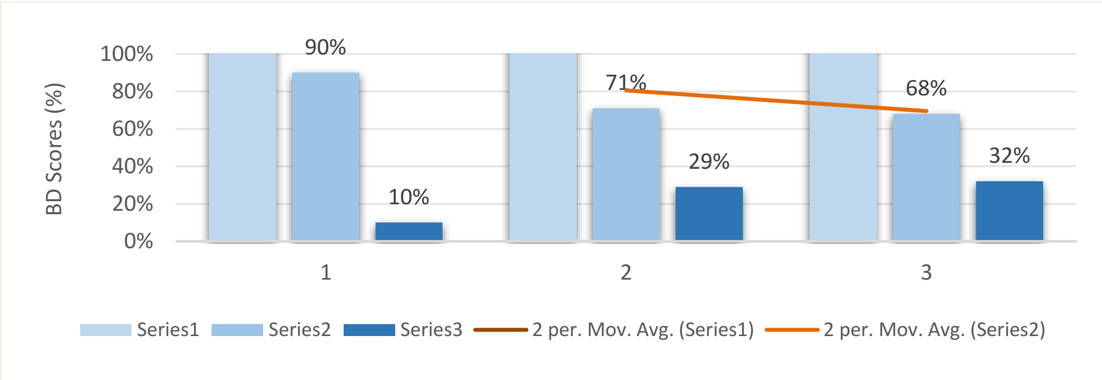
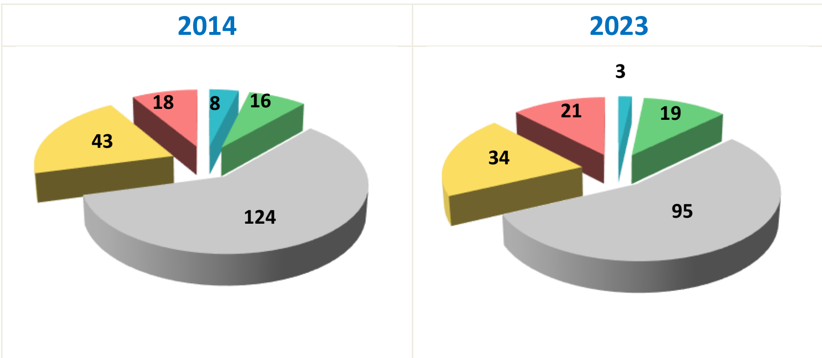


Figure 76 - Blue Drop trend analysis over the period 2012 to 2023, indicating the percentage BD scores above and below 50%

The trend analysis indicates that:

- The no. of systems audited decreased from 209 systems in 2014 to 172 systems in 2023
- The no. of systems with BD scores of ≥50% decreased from 71% in 2014 to 68% in 2023
- This trend was reversed with no. of systems with a BD score of ≤50% increased from 29% in 2014 to 32% in 2023
- Blue Drop Certifications decreased from 8 awards in 2014 to 3 awards in 2023
- The lowest TSA score increased from 28% in 2014 to 50% in 2023, with the highest TSA score decreasing from 99% in 2014 to 90% in 2023
- The overall performance trend indicates a regression from 2014 to 2023
- This negative trajectory reinforces the need for regular audits to ensure timely turnaround and continued improvement
- The negative trend also implies that performance has declined slightly in the absence of regulatory engagement of the BD audits between 2014 to 2023.



>95 – 100% Excellent	
>80-<95% Good	
>50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

Figure 77 - No. WSSs in the Blue Drop score categories for 2014 and 2023 (graph legend to right)

Comparative analysis of the 2014 and 2023 BD scores, indicates that most of the system scores are in the >50-<80% (*Average Performance*) category, with the >31-<50% (*Poor Performance*) being the next largest category. It is concerning that 21 systems in 2023 reside in the *Critical State* (<31%).

In summary, trend analysis since 2014 to 2023 indicate as follows:

- Systems in a 'critical state' increased from 18 systems to 21 systems
- Systems in a 'poor state' decreased from 43 systems to 34 systems
- Systems in an 'average state' decreased from 124 systems to 95 systems
- Systems in the 'excellent and good state' increased slightly (%wise not #) from 11% (24 systems) to 13% (22 systems).

Provincial BDRR Analysis

The Blue Drop Risk Rating (BDRR) analysis assesses the risk across the entire water supply network. The BDRR formular was updated in 2021 to include an added risk indicator, i.e. 'E: Water Safety Plans', to address the risk assessment requirements outlined in SANS 241 of 2015. The BDRR now contains 5 risk indicators, i.e. design capacity (A), operational capacity (B), water quality compliance (C), technical capacity (D), and water safety plans (E). The results from the BDRR analyses are summarised in the table and figure following.

Table 105 - Municipal BDRR/BDRRmax Comparative Analysis from 2022 and 2023

BDRR/BDRR$_{max}$ COMPARATIVE ANALYSIS									
WSA Name	# WSSs	# WBs/ WSPs	2022 (BD PAT)	2023 (BD Audit)	Performance Trend 2022 and 2023	BDRR Risk Category Split			
						0-<50%	50-<70%	70-<90%	90-100%
Amajuba DM	3		43.7%	34.7%	↑	2	1		
eThekwini MM	1	1	32.6%	31.6%	↑	1			
Harry Gwala DM	21	1	36.6%	36.7%	↓	12	3	3	3
iLembe DM	19	5	54.8%	32.0%	↑	16	1	2	
King Cetshwayo DM	12	12	42.2%	55.7%	↓	2	8		2
Newcastle LM	2	1	25.9%	28.5%	↓	2			
Msunduzi LM	1	1	100.0%	28.4%	↑	1			
Ugu DM	13	5	40.5%	41.9%	↓	11	2		
uMgungundlovu DM	8	1	28.1%	28.2%	↓	8			
uMhlathuze LM	4	1	32.4%	30.6%	↑	4			
Umkhanyakude DM	22	22	86.1%	36.3%	↑	14	5	3	
Umzinyathi DM	13	1	65.3%	59.5%	↑	2	4	7	
uThukela DM	14		54.7%	51.7%	↑	8	6		
Zululand DM	39	39	63.3%	65.3%	↓	30	4		5
Totals & %BDRR/BDRR$_{max}$	**172**	**90**	**50.4%**	**45.5%**	↑	**113**	**34**	**15**	**10**

↑= improvement, ↓= regress, →= no change

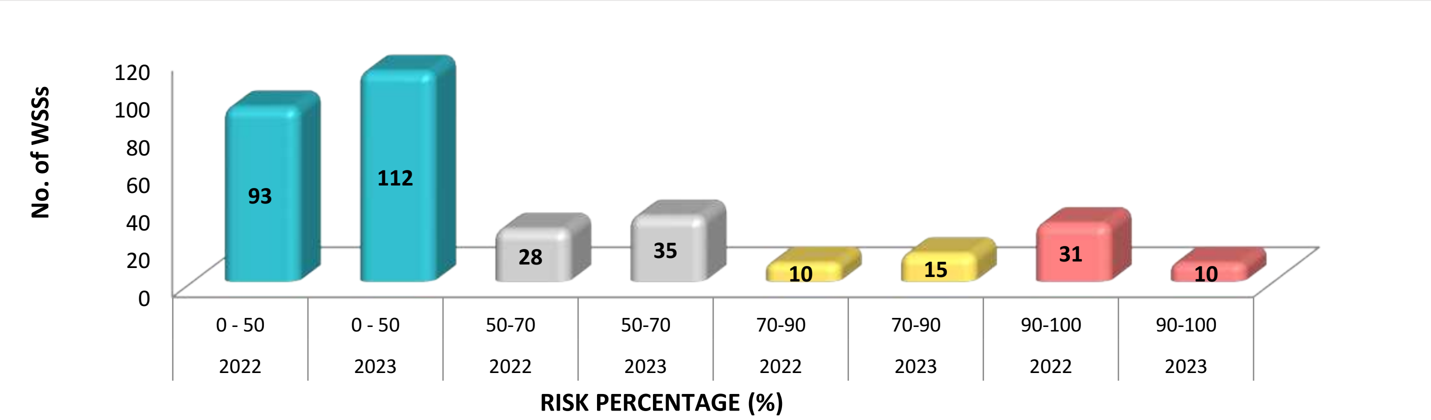


Figure 78 - a) WSS risk distribution and trends for 2022 and 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Trend analysis of the BDRR ratings for 2022 and 2023 indicates that:

- The 2023 audit cycle highlighted a progressive shift with an increase in the low risk WSSs (93 to 112), an increase in the medium risk WSSs (28 to 35), an increase in the high risk WSSs (10 to 15), and a decrease in critical risk WSSs (31 to 10).

Regulatory Enforcement

Water supply systems which fail to achieve the minimum Blue Drop target of 31%, are placed under regulatory focus. The Regulator requires these WSAs to submit a detailed corrective action plan (CAP) within 20 working days from publishing of this report.

21 WSSs received Blue Drop scores below 31%, and hence are placed under **regulatory surveillance**, in accordance with the Water Services Act (108 0f of 1997). DWS together with COGTA will through the grant allocation systems ensure priority is given to application of grants to rectify/restore the water services treatment and supply shortcomings identified in this report.

Table 106 - WSSs with <31% Blue Drop scores

WSA Name	2023 BD Score	WSSs with <31% score
Harry Gwala DM	**66.18%**	Machunwini, Chibini
King Cetshwayo DM	**40.70%**	Khombe, Pikiliyeza
Umzinyathi DM	**31.59%**	12 of 13 WSSs
Zululand DM	**43.93%**	Coronation, eMondlo, Hlobane, Louwsberg, Vryheid

The following WSAs and their associated water treatment systems are in high and/or critical BDRR risk positions, which means that some or all the risk indicators are in a precarious state, i.e. operational capacity, design capacity utilisation, water quality compliance, technical capacity, and water safety plans. WTWs in high risk and critical risk positions pose a serious risk to public health. The following WSAs will be required to assess their risk contributors and to provide corrective measures in the above mentioned action plans to mitigate these risks.

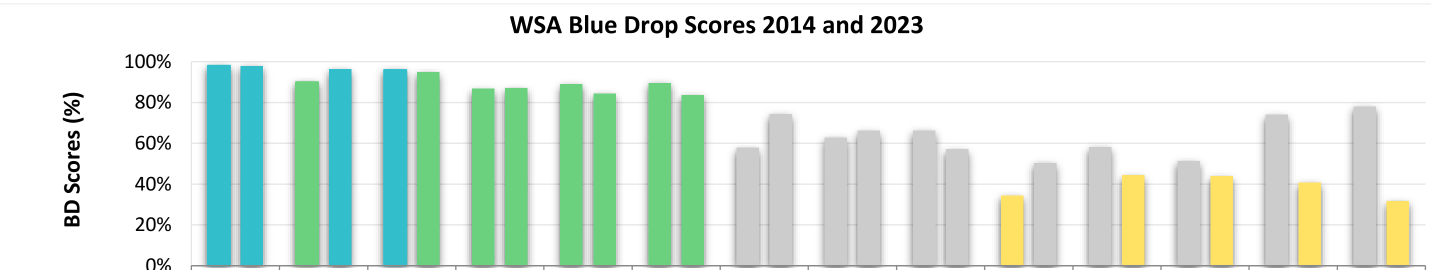
Table 107 - %BDRR/BDRR$_{max}$ scores and WSSs in critical and high-risk space

WSA Name	2023 Average %BDRR/BDRRmax	WSSs in critical and high-risk space	
		Critical Risk (90-100%)	High Risk (70-<90%)
Harry Gwala DM	36.7%	Chibini, Machunwini, Njunga	Mangwaneni, Mnqumeni, Rietvlei
iLembe DM	32.0%		Lambothi, Waterfall
King Cetshwayo DM	55.7%	Khombe, Pikiliyeza	
Umkhanyakude DM	36.3%		Hlabisa, Hluhluwe Ph 2, Manguzi
Umzinyathi DM	59.5%		Fabeni, Pomeroy, Sampofu, Isandlwana, Amakhabaleni, Greytown, Muden
Zululand DM	65.3%	Coronation, eMondlo Town, Hlobane, Louwsberg, Vryheid	
Totals		**10 of 172 (6%)**	**15 of 172 (9%)**

Good practice risk management requires that the Water Safety Plans (WaSPs) are informed by meaningful Process and Condition Audits, supported by zealous implementation of corrective measures and ongoing monitoring of risk movement. With the exception of 25 water supply systems in the 6 WSAs above, the remaining 147 water supply systems are in the low and medium risk positions.

Performance Barometer

The **Blue Drop Performance Barometer** presents the individual WSA Blue Drop scores, which essentially reflects the level of mastery that a WSA has achieved in terms of its overall water services business. The bar chart below compares the 2014 and 2023 BD scores, ranked from highest to lowest performing WSA in 2023. The Msunduzi LM is commended for maintaining excellent performance and uMgungundlovu is congratulated for achieving excellent performance. 5 WSAs improved on their 2014 scores, namely Harry Gwala DM, iLembe DM, uMgungundlovu DM, Umkhanyakude DM and uThukela DM. The eThekwini MM BD score comparison was very marginal. The remaining 7 WSAs regressed to lower Blue Drop scores compared to their 2014 baselines with at least Newcastle LM and uMhlathuze LM maintaining their good performance status.



	Msunduzi LM	uMgungundlovu DM	eThekwini MM	iLembe DM	Newcastle LM	uMhlathuze LM	Umkhanyakude DM	Harry Gwala DM	Ugu DM	uThukela DM	Amajuba DM	Zululand DM	King Cetshwayo DM	Umzinyathi DM
2014 BD Score (%)	98,0%	89,9%	95,9%	86,7%	89,1%	89,6%	57,9%	62,9%	66,3%	34,5%	58,2%	51,2%	74,1%	78,0%
2023 BD Score (%)	97,9%	96,4%	94,95%	87,1%	84,4%	83,7%	74,3%	66,2%	57,1%	50,4%	44,4%	43,9%	40,7%	31,6%

Figure 79 - a) Blue Drop scores 2014 (bar left) and 2023 (bar right; b) Colour legend

>95 – 100% Excellent	
>80-<95% Good	
>50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

The BDRR Risk Barometer expresses the level of risk that a WSA poses in respect of its water supply system. The schematic below presents the BDRR in ascending order – with the low-risk WSAs on the left and higher risk WSAs to the far right. The analysis reveals that there are 4 medium risk WSAs in the province. 10 WSAs are situated in the low risk positions with 113 (of 172) WSSs low risk and 34 (of 172) in medium risk positions respectively.

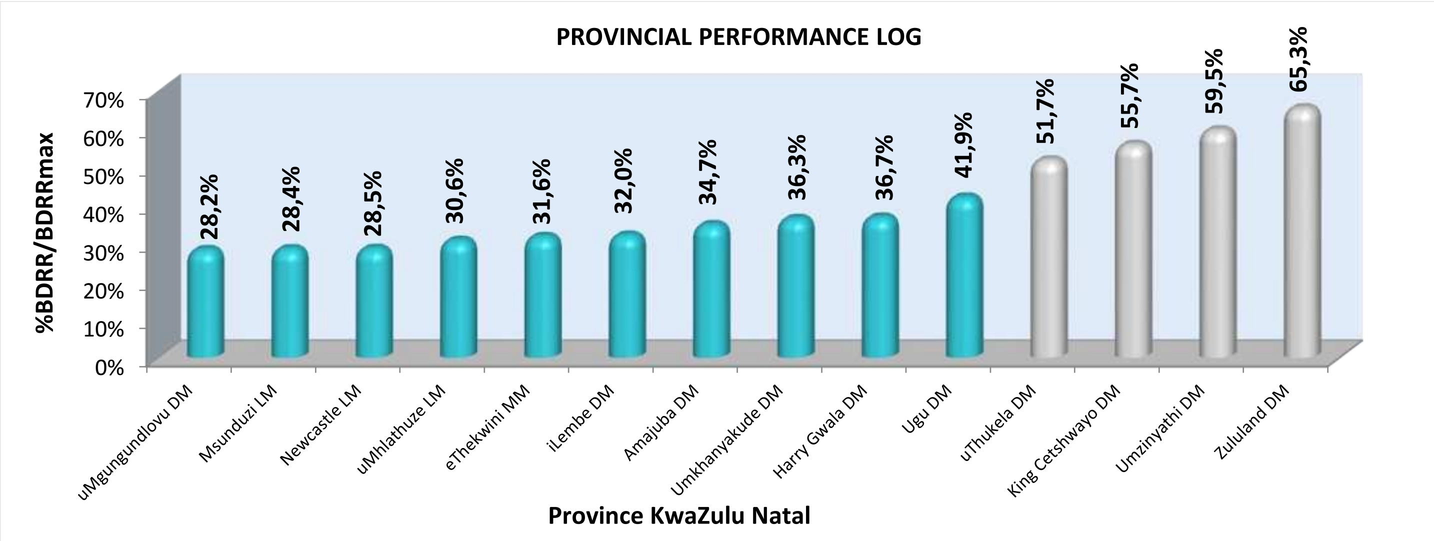


Figure 80 - a) %BDRR/BDRR$_{max}$ Risk Performance Profile/Log 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Provincial Best Performers

The **Msunduzi Local Municipality (Umgeni Water)** is the **BEST PERFORMING WSA** in the province, based on the following record of excellence:

- ✓ 2023 Blue Drop Score of 97.94%
- ✓ 2014 Blue Drop Score of 97.97%
- ✓ Significant improvement on the BDRR from 100% in 2022 to 28.4% in 2023
- ✓ 1 system (100%) in the low risk position
- ✓ No TSA score as no WTW in the Msunduzi LM (Potable water supplied by Umgeni Water WTWs)

The **uMgungundlovu District Municipality (Umgeni Water)** is the second-best scoring WSA:

- ✓ 2023 Blue Drop Score of 96.44%
- ✓ 2014 Blue Drop Score of 89.94%
- ✓ BDRR maintained with 28.1% in 2022 & 28.2% in 2023
- ✓ 8 systems (100%) in low risk position
- ✓ TSA score of 95% for the Midmar WTW

The **eThekwini Metropolitan Municipality (Umgeni Water)** is the third-best scoring WSA:

- ✓ 2023 Blue Drop Score of 94.95%
- ✓ 2014 Blue Drop Score of 95.9%
- ✓ Improvement on the BDRR from 32.6% in 2022 to 31.6% in 2023
- ✓ 1 system (100%) in the low risk position
- ✓ TSA score of 77% for the Kloof WTW

KPA Diagnostics

The BD audit process collects a vast amount of data that yield valuable insight into the state of the water services delivery and water quality in each province. Five focus areas or 'diagnostics' have been configured from the 2021/22 audit data and are discussed below.

Table 108 - Summary of the key diagnostic themes and reference to the respective Blue Drop KPAs

Diagnostic #	Diagnostic Description	Diagnostic Reference
1	**Technical Competence**	KPA 1, 2 & Bonus
2	**Treatment Capacity and Flow Distribution**	KPA 4 & Generic Audit data set
3	**Drinking Water Quality (DWQ) Monitoring and Compliance**	KPA 2 & 4 & Bonus
4	**Technical Site Assessments**	TSA and 2023 Blue Drop Watch Report
5	**Operation, Maintenance and Refurbishment of Assets**	KPA 3 & 4

Diagnostic 1: Technical Competence

Aim: This focus area assesses the technical human resources capacity that is available to manage and operate water treatment processes and maintain the related water infrastructure. Theory advocates that a correlation exists between human resources capacity and capability (sufficient number of appropriately qualified staff) and a WSI's performance. Thus, it is hypothesised that high HR capacity would translate to compliant water treatment plants and functional water supply network. Blue Drop assesses technical compliance on two levels: i) WTW plant supervision and process control staff and ii) Technical, scientific and maintenance staff.

(i) Plant Supervisors and Process Controllers

Findings: According to regulations, water treatment plants are classified as Class A, B, C, D or E plants. Similarly, Process Controllers and Plant Supervisors are registered as Class I, II, III, IV, V or VI Process Controllers. Higher classed plants require a higher level of Process Controllers due to technology complexity and strict water quality standards. Technical compliance of PCs and Supervisors is determined against the Blue Drop standards, as defined by Reg. 2834 of the Water Act 1956 (Act 54 of 1956) for the erection, enlargement, operation, and registration of water care works and draft Reg. 813 of the Water Services Act (No 108 of 1997). Regulation 2834 has been replaced by Regulation 3630 in 2023 but will only come in effect during the next Blue Drop audit cycle.

Table 109 - No. compliant versus shortfall in Supervisor and Process Controller staff

WSA & WB Name	# WTWs	# WSSs	# Available Compliant Staff			Staff Shortfall		Ratio**	2023 BD Score (%)
			PCs	Supervisor***	Total	PCs	Supervisor		
Umgeni Water	11	14	67	13	80	0	1	7.3	86.98% ave
Mhlathuze Water	1	1	4	3	7	0	0	7.0	93.23%
Amajuba DM	3	3	0	0	0	10	1	0.0	44.40%
eThekwini MM	5	1	15	5	20	4	0	4.0	94.95%
Harry Gwala DM	20	21	31	20	51	18	0	2.6	66.18%
iLembe DM	17	19	17	32	49	23	0	2.9	87.09%
King Cetshwayo DM	18	12	13	16	29	48	0	1.6	40.70%
Newcastle LM	2	2	6	1	7	2	1	3.5	84.35%
Msunduzi LM*	None	1							97.94%
Ugu DM	12	13	15	10	25	17	3	2.1	57.14%
uMgungundlovu DM	7	8	27	7	34	0	0	4.9	96.44%
uMhlathuze LM	3	4	1	6	7	8	0	2.3	83.70%
Umkhanyakude DM	22	22	25	6	31	37	0	1.4	74.32%
Umzinyathi DM	13	13	3	1	4	39	4	0.3	31.59%
uThukela DM	15	14	24	11	35	29	0	2.3	50.42%
Zululand DM	41	39	46	12	58	86	1	1.4	43.93%
Totals	**190**	**172**	**294**	**143**	**437**	**321**	**11**		

** Msunduzi LM receives water from Umgeni Water and has no WTWs in the LM*
*** Ratio depicts the no. of qualified staff divided by the no. of WTWs operated by this no. of staff. E.g., eThekwini MM has 20 compliant Sups + PCs, divided by 5 WTWs = 4.0 qualified staff per WTW*
*** NB: The Supervisor totals will be inflated as it is not possible to differentiate between which Supervisors are shared/ roaming with other Class C to E WTWs
Note: "Compliant staff" means qualified and registered staff that meets the BD standard for a particular Class Works. "Staff shortfall" means staff that do not meet the BD standard for a particular Class of works (+1 for a shift) and/or staffing gaps exist at the respective WTWs.

Competent human resources are vital enablers in ensuring efficient and sustainable management of water services and delivery of safe water quality to consumers. For the province in general, the operational competencies are found to be excellent for the Supervisory staff and for the PCs in Umgeni Water, Mhlathuze Water and uMgungundlovu DM, as illustrated in the table above.

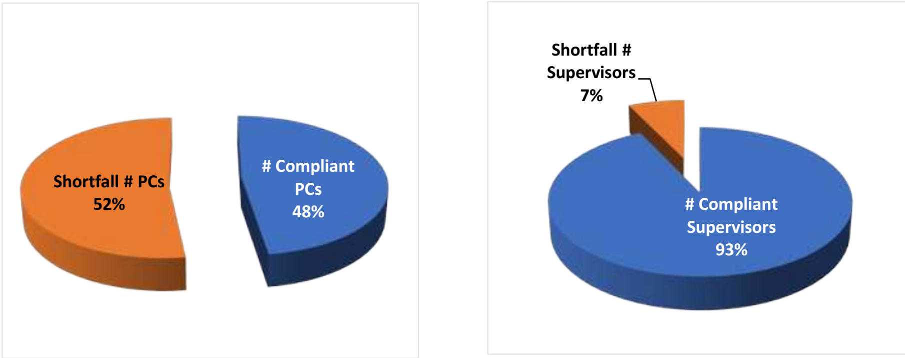


Figure 81 - Schematic illustration of compliant and shortfall of Supervisors (a) and Process Controllers (b)

Plant Supervisors: The pie charts indicate that 93% (143 of 154) of Plant Supervisors complies with the Blue Drop standard, with 11 shortfalls; *Process Controllers:* Similarly, 48% (294 of 615) of the PC staff complies with the required standards, noting a zero shortfall for Umgeni Water, Mhlathuze Water, and uMgungundlovu DM. There is a 52% (321 of 615) shortfall in Process Controllers with the highest shortfalls in Zululand DM, King Cetshwayo DM, Umkhanyakude DM and Umzinyathi DM.

Blue Drop standards require of Class A and B plants to employ dedicated Supervisors per WTW and Process Controllers per shift per works, whereas Class C to E plants may share Supervisory staff across works. Shifts have been introduced to ensure optimal operations while addressing security risks, particularly as it relates to theft and vandalism. Telemetry also reduces the requirement for on-site staff during night shifts, but these relaxations have to be done within the DWS regulatory guidelines. The Regulator expects correlation between the competence of an operational team and the performance of a WTW, as measured by the BD score. The data indicates as follows:

- All WSAs have qualified PCs in place, with the exception of the Amajuba DM
- All WSAs have qualified Supervisors per WTW, with the exception of the Amajuba DM. With the exception of the Umkhanyakude DM and Zululand DM, the Supervisor totals will be inflated as it is not possible to differentiate between what Supervisors are shared/ roaming with other Class C to E WTWs
- All the WSAs have shortfalls in qualified PCs with the exception of Umgeni Water, Mhlathuze Water and uMgungundlovu DM, and all the WSAs have shortfalls in qualified Supervisors with the exception of Mhlathuze Water and 8 WSAs.

It is expected that a correlation would exist between the competence of an operational team and the performance of a water treatment works, as measured by the BD score. The results from the ratio analysis indicate high ratios (>2.5) for Umgeni Water, Mhlathuze Water and 4 WSAs with WTWs.

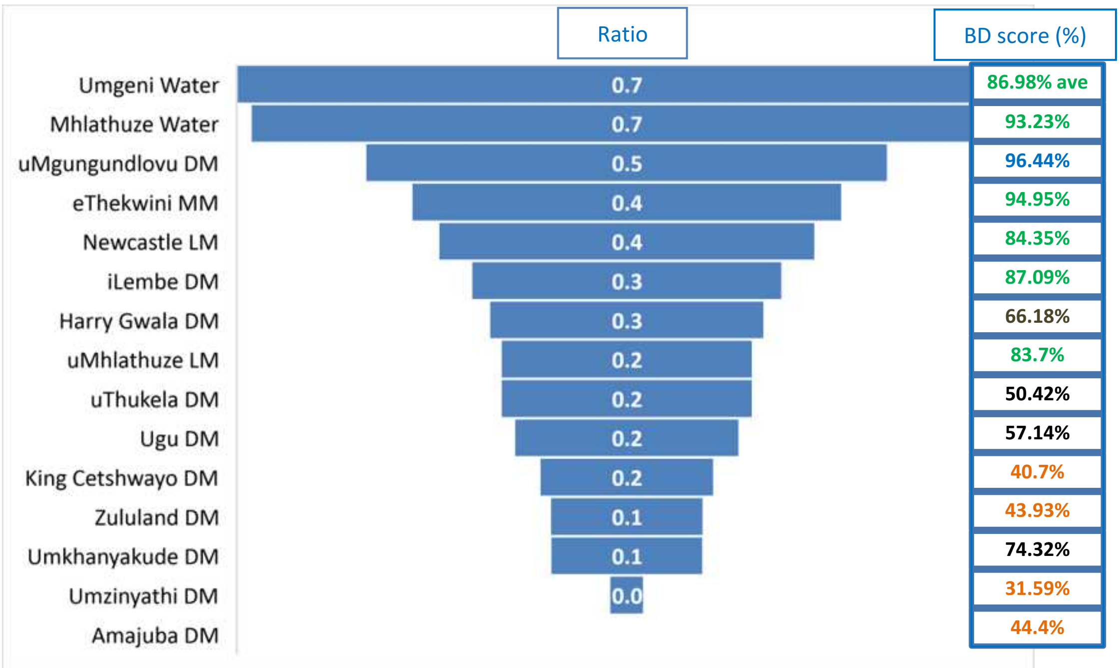


Figure 82 - Ratio of compliant operational staff to no. of WTWs and Comparison of Ratios with BD scores

Overall, the comparative bar chart confirms a reasonably close correlation from Umgeni Water to uMhlathuze LM with medium-high ratios (ranging from 2.3 to 7.3) and medium-high BD scores (ranging from 66.2% to 96.4%), and similarly there is a close correlation from uThukela DM to Umzinyathi DM medium-low ratios (ranging from 0.3 to 2.3) and medium-high BD scores (ranging from 31.6% to 57.1%) with only Umkhanyakude DM the anomaly with a lower ratio but higher BD score.

(ii) Technical, Scientific and Maintenance staff

In addition to operational capacity (above), good management practice also requires access to qualified engineers, technicians, technologists, MISA appointees, scientists, and maintenance capability (below). Such competencies could reside in-house or accessible through term contracts and external specialists.

Table 110 - Summary of the maintenance capacity and no. of qualified and shortfall of Engineering, Technical and Scientific staff

WSA & WB Name	# WTWs	# WSSs	Maintenance Arrangement
Umgeni Water	11	14	Internal+Term Contract, Internal + Specific Outsourcing, Internal Team (Only)
Mhlathuze Water	1	1	Internal + Specific Outsourcing
Amajuba DM	3	3	Internal+Term Contract, Internal + Specific Outsourcing
eThekwini MM	5	1	Internal Team (Only), Internal + Specific Outsourcing
Harry Gwala DM	20	21	Internal + Term Contract, Internal + Specific Outsourcing
iLembe DM	17	19	Internal+Term Contract, Internal + Specific Outsourcing, Internal Team (Only)
King Cetshwayo DM	18	12	Inadequate Capacity
Newcastle LM	2	2	Internal+Term Contract, Internal Team (Only)
Msunduzi LM	None	1	Internal + Specific Outsourcing
Ugu DM	12	13	Internal+Term Contract, Internal Team (Only)
uMgungundlovu DM	7	8	Internal+Term Contract, Internal + Specific Outsourcing
uMhlathuze LM	3	4	Internal + Specific Outsourcing, Internal Team (Only)
Umkhanyakude DM	22	22	Internal+Term Contract
Umzinyathi DM	13	13	Internal+Term Contract, Internal + Specific Outsourcing
uThukela DM	15	14	Internal+Term Contract
Zululand DM	41	39	Internal+Term Contract
Totals			

WSA & WB Name	# WTWs	# WSSs	Qualified Technical Staff (#)					Technical Shortfall (#)	Qualified Scientists (#)	Scientists Shortfall (#)	Ratio*	2023 BD Score (%)
			Technicians	Technologists	Engineers	MISA appointees	Total					
Umgeni Water	11	14	15	18	16	0	**49**	0	18	0	3.5	86.98% ave
Mhlathuze Water	1	1	1	3	1	0	**5**	0	3	0	5.0	93.23%
Amajuba DM	3	3	0	0	0	0	**0**	4	0	2	0.0	44.40%
eThekwini MM	5	1	7	3	7	0	**17**	0	Umgeni Water	0	17.0	94.95%
Harry Gwala DM	20	21	4	4	0	0	**8**	1	0	2	0.4	66.18%
iLembe DM	17	19	3	8	2	0	**13**	0	Umgeni Water	0	0.7	87.09%
King Cetshwayo DM	18	12	1	1	0	0	**2**	2	4	0	0.2	40.70%
Newcastle LM	2	2	1	2	1	0	**4**	0	2	0	2.0	84.35%
Msunduzi LM**	None	1	2	5	2	3	**12**	0	Umgeni Water	0	12.0	97.94%
Ugu DM	12	13	5	2	2	0	**9**	0	Umgeni Water	0	0.7	57.14%
uMgungundlovu DM	7	8	2	4	4	0	**10**	0	2	0	1.3	96.44%
uMhlathuze LM	3	4	2	1	1	0	**4**	0	Mhlathuze Water	0	1.0	83.70%
Umkhanyakude DM	22	22	2	1	1	0	**4**	0	1	1	0.2	74.32%
Umzinyathi DM	13	13	1	1	1	0	**3**	1	2	0	0.2	31.59%
uThukela DM	15	14	0	1	0	0	**1**	3	0	2	0.1	50.42%
Zululand DM	41	39	5	8	2	0	**15**	0	3	0	0.4	43.93%
Totals	**190**	**172**	**35**	**41**	**23**	**3**	**102**	**11**	**14**	**7**		

* The single number ratio depicts the no. of qualified technical staff divided by the no. of WSSs that have access to the staff. E.g., Harry Gwala DM has 8 qualified staff, divided by 21 WSSs = 0.4 qualified staff per WSS

** There is no WTW in Msunduzi LM but it is supplied with potable water from Umgeni Water and the DWQ is monitored by Umgeni Water

Note 1: "Qualified Technical Staff" means staff appointed in positions to support water services, and who has the required qualifications. "Technical Shortfall" is calculated based on a minimum requirement of at least 3 Engineers or more than 1 of each of Engineers, Technologists & Technicians; and at least one 1 Candidate Scientist and 1 Professional Scientist per WSI.

Note 2: "Qualified Scientists" means professional registered scientists (SACNASP) and candidate scientists appointed in positions to support water services. "Scientists shortfall" means that the WSA does not have at least one qualified SACNASP registered scientist and at least one 1 candidate scientist in their employ or contracted.

In terms of maintenance capacity, all the municipalities in the province have a reasonable contingent of qualified technical and maintenance staff. The maintenance staff comprises of a collective of in-house, contracted, or outsourced personnel. The data indicates that:

- Umgeni Water and Mhlathuze Water have internal maintenance teams supplement with specific outsourced services
- 12 of 14 (86%) WSAs have in-house maintenance teams
- 10 of 14 (71%) WSAs have internal maintenance teams supplemented with term contracts
- 8 of 14 (57%) WSAs have internal maintenance teams supplement with specific outsourced services
- 1 WSA has inadequate capacity.

In general, the province presents a strong case for qualified professional technical staff as follows:

- A total of 102 qualified staff comprised of 23 Engineers, 41 Technologists, 35 Technicians,3 MISA appointees (qualified); and 14 SACNASP registered scientists
- A total shortfall of 18 persons is identified, consisting of 11 technical staff and 7 scientists
- 5 WSAs have a total shortfall of 11 qualified technical staff with the highest indicated for Amajuba LM (4), uThukela DM (3) and King Cetshwayo DM (2)
- Umgeni Water, Mhlathuze Water and 13 WSAs have access to credible laboratories that comply with the Blue Drop standards.

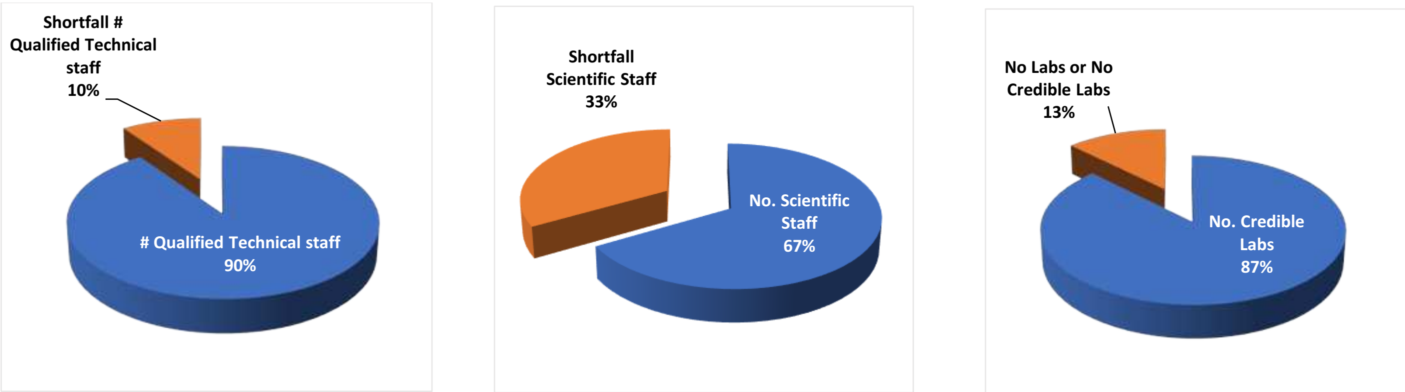


Figure 83 - Graphic illustration of the number and %: a) qualified engineering/technical staff; b) professional scientists; c) access to credible laboratory services that complies with Blue Drop standards

Ratio analysis has been done to determine the number of qualified technical and scientific staff assigned per WSS. It is expected that a higher ratio would correspond with well-performing and maintained water supply systems, as represented by the BD score.

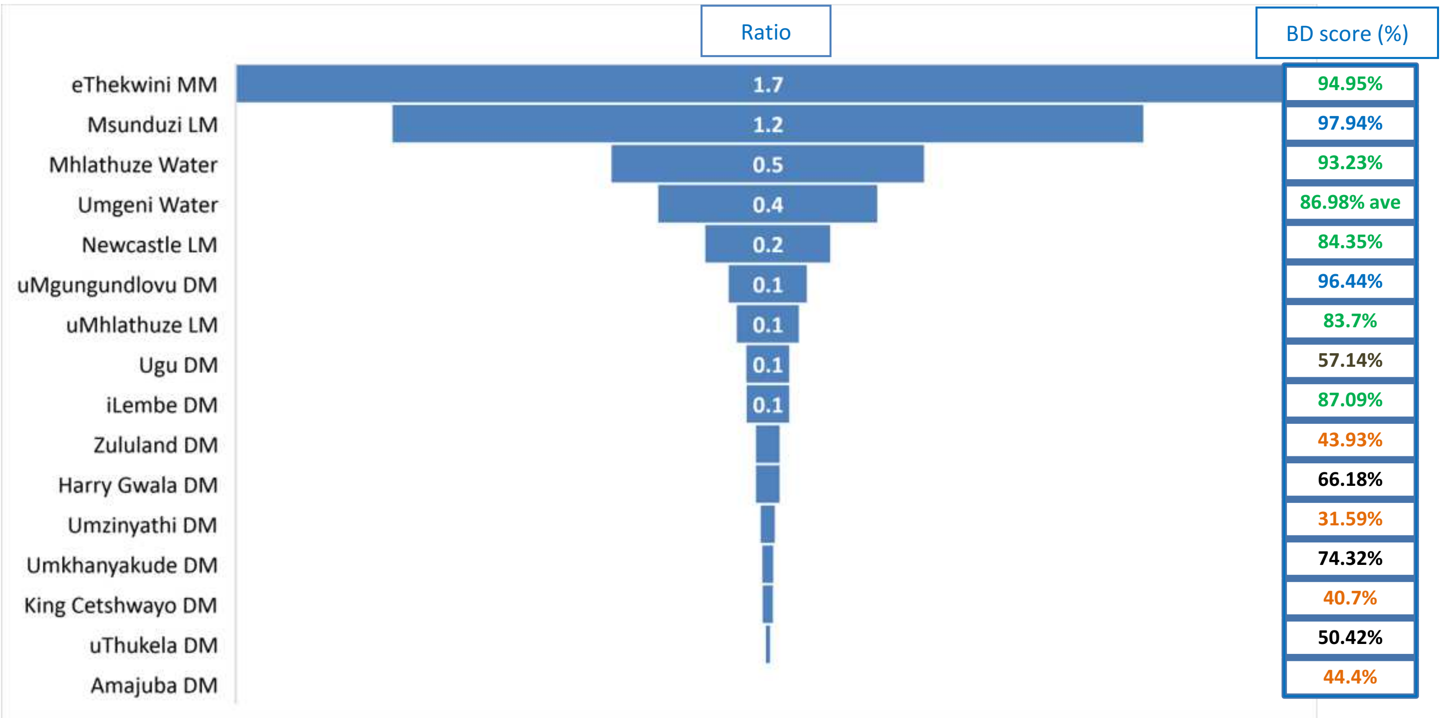


Figure 84 - Ratio of compliant technical staff to no. of WSSs and Comparison of Ratios with BD scores

The schematic above does show a strong correlation between high ratios (≥2.0) and high BD scores from eThekwini MM to Newcastle LM (ranging from 84.35% to 97.94%). Similarly, there is a correlation between low ratios (<0.5) from Zululand DM to uThukela DM and low BD scores (ranging from 41% to 50.42%) with the only anomalies being Harry Gwala DM and Umkhanyakude DM. A reasonably firm correlation can be drawn between technical capacity and water supply performance, mostly as result of the complexity of the WSA/Bulk Water Provider arrangement. However, it is observed that the involvement of Umgeni Water, Mhlathuze Water, uThukela Water and Siza Water has made a significant (positive) impact on the municipal BD scores.

Overall, the results highlight the inter-dependency between technical capacity and performance. One of the options to enhance operational capacity is through dedicated training programmes. The Blue Drop audit incentivises training of operational staff over the 2-year period prior to the audit date. The results are summarised as follows:

Table 111 - No. of WTWs with operational staff sent on training over the past 2 years and vice versa

WSA & WB Name	# WTWs	# WTW staff attending training	# WTW without training
Umgeni Water	11	10	1
Mhlathuze Water	1	1	
Amajuba DM	3		3
eThekwini MM	5	1	4
Harry Gwala DM	20	14	6
iLembe DM	17	17	
King Cetshwayo DM	18	2	16
Newcastle LM	2	1	1
Msunduzi LM	None		
Ugu DM	12	3	9
uMgungundlovu DM	7	2	5
uMhlathuze LM	3	4	
Umkhanyakude DM	22	9	13
Umzinyathi DM	13		13
uThukela DM	15	5	10
Zululand DM	41	2	39
Totals	**190**	**71 (36%)**	**119 (64%)**

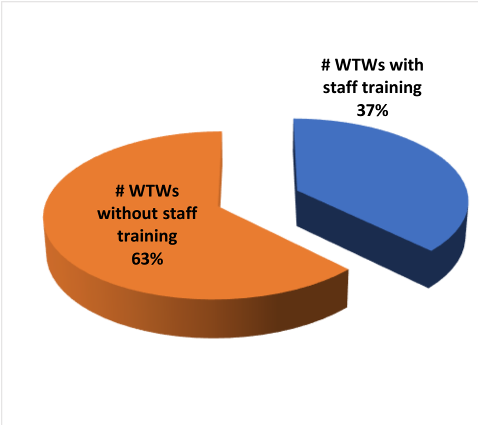


Figure 85 - %WTWs that have trained operational staff over the past two years

The results confirm that Umgeni Water, Mhlathuze Water and 11 WSAs had their operational staff attend training over the past 2 years. 71 WTWs had their operational staff attend training over the past 2 years. Investment in human capital through technical skills development is likely to mitigate some of the water quality failures and lower performances noted, and municipalities and water boards should prioritise ongoing skills development of technical staff and appointment of qualified staff that are legible for registration.

Diagnostic 2: Treatment Capacity and Flow Distribution

Aim: Diagnostic 2 deals with design and flow related dynamics, comprising of: i) design capacity and operational flow, ii) raw water abstraction, and iii) WUE and SIV.

(i) Design Capacity and Operational Flow

This diagnostic assesses the status of plant design capacity and daily water production at the WTWs, as well as SIVs as measured at the outflow from the WTW or inflow to the water distribution network. A capable WTW requires adequate installed design capacity and functional equipment to operate optimally. If the WTW design capacity is exceeded by the average daily production (treatment) volume, the WTW will not be able to deliver SANS compliant water quality. The available design capacity is typically exceeded when the water demand exceeds the installed design capacity, or when unit processes or equipment are dysfunctional, or when electrical supply problems render treatment and pumping of water defective. Typically, the production volume and SIV is the same if 1 WTW supplies 1 WSS, but different if multiple supply systems are feeding from a singular WTW.

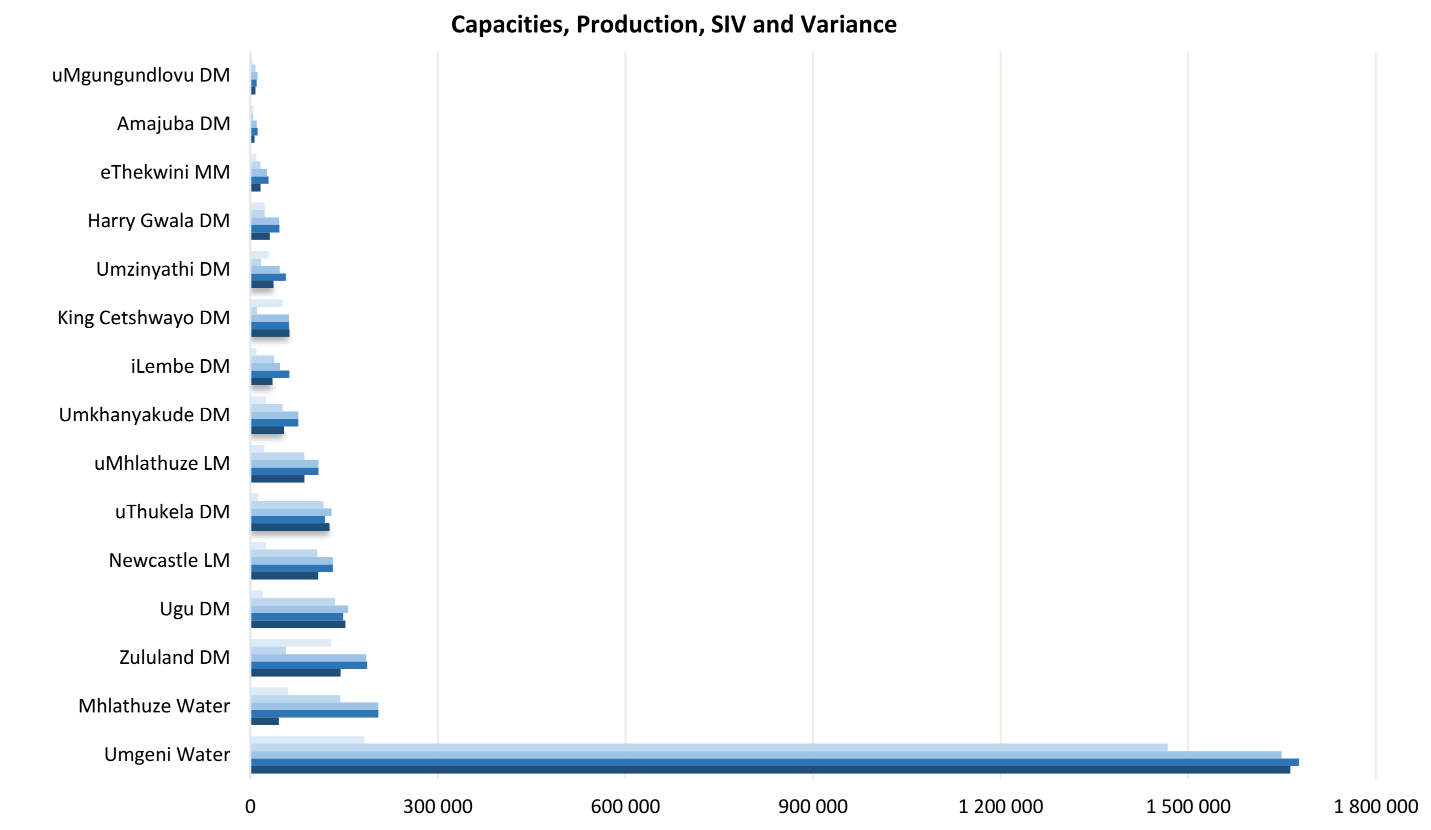
Findings: Analysis of the design capacity and average daily production/ treatment volume indicate a total design capacity of 2,933,898 kl/d for the province, with a total average daily treatment (operational) volume of 2,284,424 kl/d. Theoretically, this implies that 78% of the design capacity is used with 22% available to meet additional water demand. However, the full 2,933,898 kl/d is not available as some infrastructure is dysfunctional, leaving 2,894,541 kl/d available. The reduced capacity means that the province is closer to its total available capacity (79%) with a 21% surplus available. The capacity differential (difference between the installed and available capacity) will not constrain or impede any further social and economic development in the drainage areas. WSAs do report and have knowledge of their installed and available capacities, and a higher figure than 21% surplus available cannot be expected.

Most of the WSAs have their full installed capacity available. For the province in general, 166 WTWs are operating within their design capacities with the exception of 24 WTWs that exceeds their total design capacity (13%). This risk is currently mitigated through operational optimisation and preventative maintenance regimes.

Table 112 - Summary of WTWs design and available capacities, average daily production, % available capacity, and total SIV towards the WSSs

WSA & WB Name	# WTWs	# WSSs	Design Capacity (kl/d)	Available Design Capacity (kl/d)	Average Daily Production (kl/d)	Available Variance* (kl/d)	% Use Available Capacity	Total SIV towards the WSS (kl/d)
Umgeni Water	11	14	1,677,000	1,649,590	1,467,562	182,028	89%	1,663,279
Mhlathuze Water	1	1	205,000	205,000	144,000	61,000	70%	45,546
Amajuba DM	3	3	12,000	10,000	4,856	5,144	49%	6,856
eThekwini MM	5	1	29,400	26,460	16,473	9,987	62%	16,390
Harry Gwala DM	20	21	46,810	45,830	22,802	23,028	50%	31,164
iLembe DM	17	19	62,426	47,826	38,164	9,662	80%	35,209
King Cetshwayo DM	18	12	61,750	61,750	10,600	51,150	17%	62,350
Newcastle LM	2	2	132,000	132,000	106,800	25,200	81%	108,450
Msunduzi LM	None	1						
Ugu DM	12	13	148,300	156,200	135,520	20,680	87%	152,203
uMgungundlovu DM	7	8	10,208	11,656	8,041	3,616	69%	8,120
uMhlathuze LM	3	4	109,000	109,000	86,590	22,410	79%	86,590
Umkhanyakude DM	22	22	76,734	76,734	51,616	25,118	67%	53,416
Umzinyathi DM	13	13	57,050	47,050	17,522	29,528	37%	36,572
uThukela DM	15	14	119,200	129,940	117,200	12,740	90%	126,204
Zululand DM	41	39	187,020	185,505	56,678	128,827	31%	144,278
Totals	**190**	**172**	**2,933,898**	**2,894,541**	**2,284,424**	**610,117**	**79%**	**2,576,627**

* Difference between the available design capacity and the average daily production



	Umgeni Water	Mhlathuze Water	Zululand DM	Ugu DM	Newcastle LM	uThukela DM	uMhlathuze LM	Umkhanyakude DM	iLembe DM	King Cetshwayo DM	Umzinyathi DM	Harry Gwala DM	eThekwini MM	Amajuba DM	uMgungundlovu DM
Available Variance (kl/d)	182 028	61 000	128 827	20 680	25 200	12 740	22 410	25 118	9 662	51 150	29 528	23 028	9 987	5 144	3 616
Ave. Daily Production (kl/d)	1 467 562	144 000	56 678	135 520	106 800	117 200	86 590	51 616	38 164	10 600	17 522	22 802	16 473	4 856	8 041
Available Design Capacity (kl/d)	1 649 590	205 000	185 505	156 200	132 000	129 940	109 000	76 734	47 826	61 750	47 050	45 830	26 460	10 000	11 656
Design Capacity (kl/d)	1 677 000	205 000	187 020	148 300	132 000	119 200	109 000	76 734	62 426	61 750	57 050	46 810	29 400	12 000	10 208
Total SIV (kl/d)	1 663 279	45 546	144 278	152 203	108 450	126 204	86 590	53 416	35 209	62 350	36 572	31 164	16 390	6 856	8 120

Figure 86 - Design and available capacity, average daily production, available variance and total SIV for the WTWs

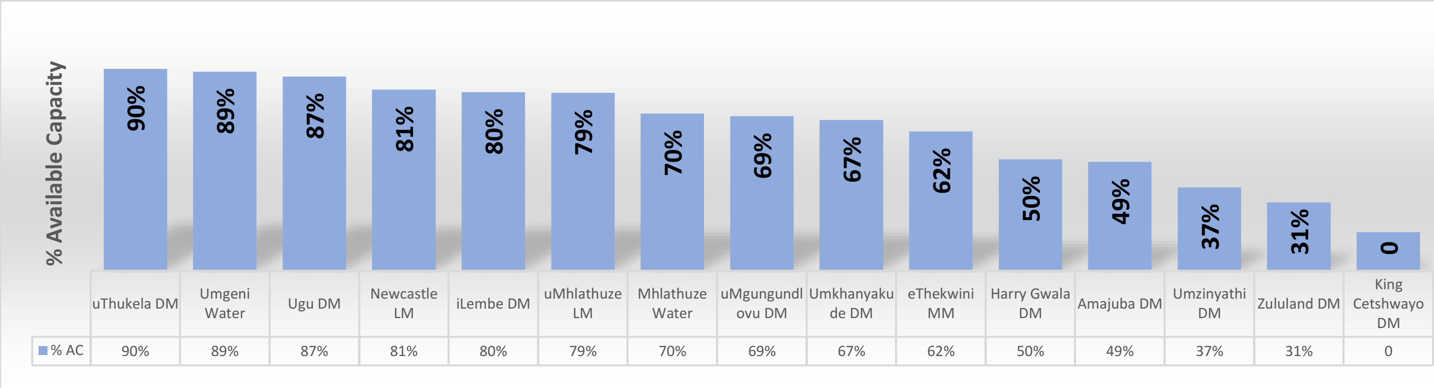


Figure 87 - % available capacity

(ii) Raw Water Abstraction

This diagnostic takes a snapshot view of the status of water abstraction authorisations from natural water resources across the province. As per the National Water Act (Act no 36 of 1998), Water Use Authorisation (WUA) mandate the maximum abstraction volumes of raw water, and the installation and monitoring of abstraction, inflow and outflow meters, whilst the BD audit requires WSAs to report the flows on IRIS and to calibrate meters annually. Any defects in terms of abstracting water from a resource without an authorisation, or exceeding the authorised volume, or reporting inaccurate volumes, or not monitoring abstraction against authorised volumes, are considered to be a regulatory risk and contravention of the law.

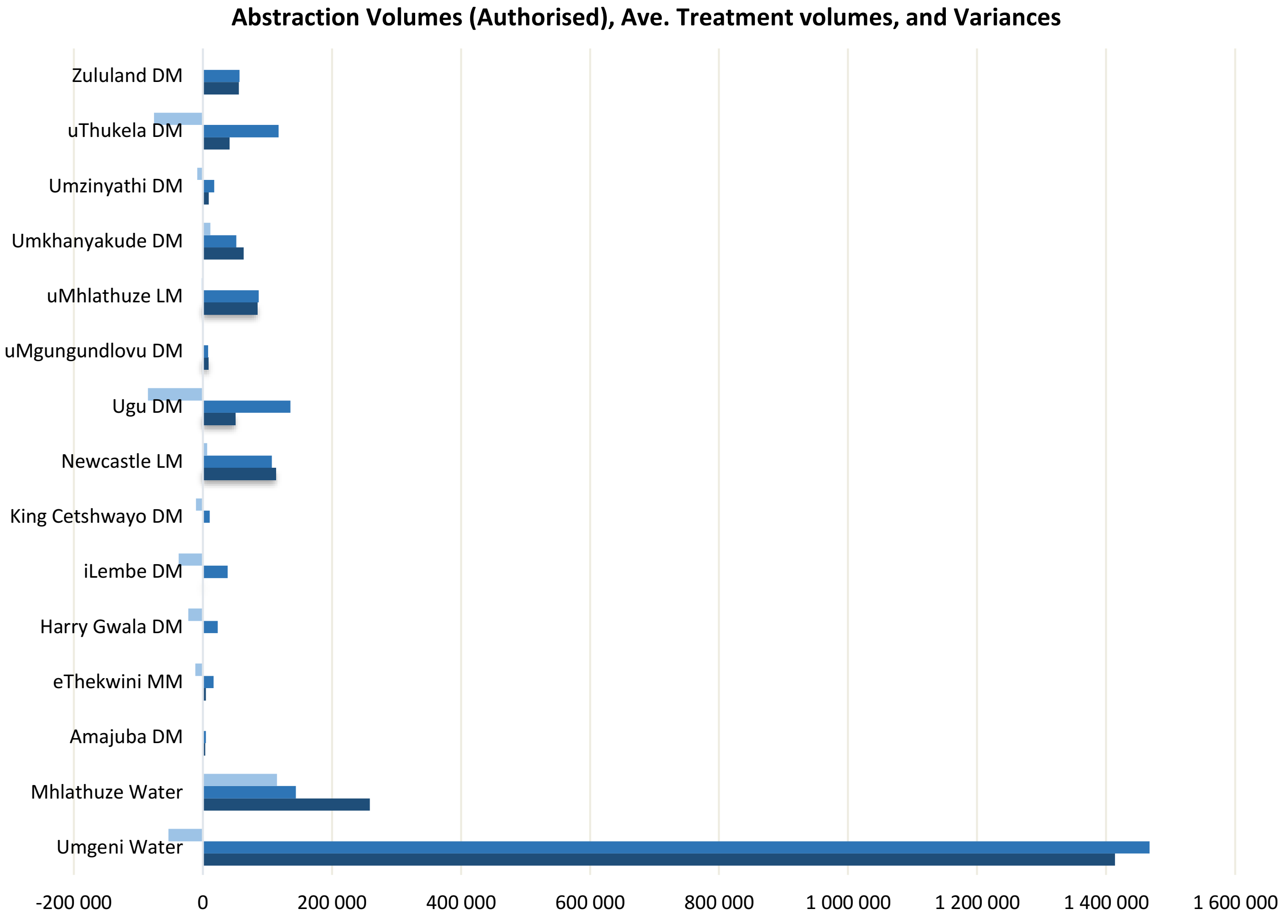
Findings: Data pertaining to the daily abstraction volumes (kl/d) (Authorised), average daily treatment volumes (kl/d), the names of the WTWs exceeding/with no Daily Abstraction Volumes (Authorised) and Average Daily Treatment Volumes (Authorised) is captured in the tables below.

Table 113 - Summary of Abstraction Volumes (Authorised), Average Daily Treatment Volumes, Variances & WTWs listed For Enforcement Action

WSA & WB Name	# WTWs	# WSSs	Daily Abstraction Volumes (Authorised) (kl/d)	Average Daily Treatment Volume (kl/d)	Average Variance (kl/d) [+ or Minus]
Umgeni Water	11	14	1,413,957	1,467,562	-53,605
Mhlathuze Water	1	1	258,840	144,000	114,840
Amajuba DM	3	3	3,730	4,856	-1,126
eThekwini MM	5	1	4,629	16,473	-11,844
Harry Gwala DM	20	21	0	22,802	-22,802
iLembe DM	17	19	626	38,164	-37,538
King Cetshwayo DM	18	12	0	10,600	-10,600
Newcastle LM	2	2	113,528	106,800	6,728
Msunduzi LM	None	1			
Ugu DM	12	13	50,493	135,520	-85,027
uMgungundlovu DM	7	8	8,700	8,041	660
uMhlathuze LM	3	4	84,591	86,590	-1,999
Umkhanyakude DM	22	22	63,324	51,616	11,708
Umzinyathi DM	13	13	9,000	17,522	-8,522
uThukela DM	15	14	41,562	117,200	-75,638
Zululand DM	41	39	55,886	56,678	-792
Totals	**190**	**172**	**2,108,866**	**2,284,424**	**-175,558**

WSA & WB Name	WTW exceeding the Daily Abstraction Volumes (Authorised)	WTW with no Daily Abstraction Volumes (Authorised)
Umgeni Water	1 WTW	1 WTW
Amajuba DM		2 WTWs
eThekwini MM	1 WTW	3 WTWs
Harry Gwala DM		20 WTWs
iLembe DM		15 WTWs
King Cetshwayo DM		All 19 WTWs
Newcastle LM		1 WTW
Ugu DM	2 WTWs	6 WTWs
uMgungundlovu DM		2 WTWs
uMhlathuze LM	1 WTW	1 WTW
Umkhanyakude DM	1 WTW	14 WTWs
Umzinyathi DM	1 WTW	12 WTWs
uThukela DM	5 WTWs	5 WTWs
Zululand DM	2 WTWs	28 WTWs

WSA & WB Name	WTW exceeding the Daily Abstraction Volumes (Authorised)	WTW with no Daily Abstraction Volumes (Authorised)
Totals	**14**	**129**



	Umgeni Water	Mhlathuze Water	Amajuba DM	eThekwini MM	Harry Gwala DM	iLembe DM	King Cetshwayo DM	Newcastle LM	Ugu DM	uMgungundlovu DM	uMhlathuze LM	Umkhanyakude DM	Umzinyathi DM	uThukela DM	Zululand DM
Ave. Variance (kl/d)	-53 605	114 840	-1 126	-11 844	-22 802	-37 538	-10 600	6 728	-85 027	660	-1 999	11 708	-8 522	-75 638	-792
Ave. Daily Treatment (kl/d)	1 467 562	144 000	4 856	16 473	22 802	38 164	10 600	106 800	135 520	8 041	86 590	51 616	17 522	117 200	56 678
Daily Abstraction (kl/d)	1 413 957	258 840	3 730	4 629	0	626	0	113 528	50 493	8 700	84 591	63 324	9 000	41 562	55 886

Figure 88 - Abstraction Volumes (Authorised), Average Daily Treatment Volumes, and Variances

WTWs that exceed the Daily Abstraction Volumes (Authorised) and WTWs with no Daily Abstraction Volumes (Authorised) are reflected in the 2nd table above. WTWs that are not complying with the regulations will be required to show correction in the next Blue Drop audit cycle. The results conclude that 14 WTWs are exceeding the permitted abstraction limits and 61 WTWs provided authorised water use abstraction volumes. The Daily Abstraction Volumes (Authorised) are not known for 129 water treatment systems resulting in negative average variances that skew the data sets. The negative average variances could be clearly attributed to over abstraction. For future BD audits, WSA/WSPs will be required to provide 'actual' abstraction volumes so that a comparative analysis can be undertaken of the 'actual' abstraction volume versus the authorised water use abstraction volumes (maximum). This would require that the WSAs and WSPs/WBs monitor and record all critical path flows (abstraction, raw and final).

(iii) Water Use Efficiency and System Input Value

The Department is committed to consider issues related to water scarcity and security, aiming to ensure there is sufficient water for the population, the economy, and the environment by increasing water use efficiency across all sectors. Water use for services sectors is specifically dealing with the quantity of water used directly by the consumer through the public distribution network and industries connected to the network. This diagnostic assesses the water use efficiency (i.e., the average daily consumption in litres per person per day) and the individual and collective performance of the water supply systems. WUE indicates how effective water is used by consumers, i.e. the process between effective water use and actual water abstraction. This concept is closely related to the Department's No Drop Certification assessment, whereby WUE, NRW and water losses are targeted as part of Water Conservation and Water Demand Management strategies by municipalities.

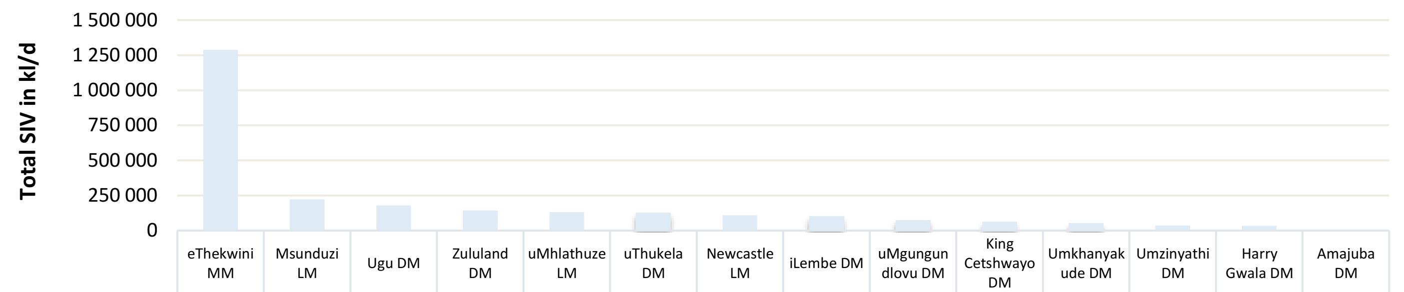
Findings: Both the Blue Drop audit and No Drop audit requires an IWA water balance to determine the SIV into each water supply system, and to identify and quantify possible losses from abstraction to the end-of-use point. Umgeni Water and 4 WSA systems have full water balances in place for 59 WSSs in total. 66 WSSs in 8 WSAs have partial water balances in place, and 6 WSAs with a total of 47 WSSs do not have water balances in place. WUE is calculated based on the SIV contributions, population served, and the average daily consumption, as summarised in the following table.

Table 114 - Summary of total SIV, total population served, average daily consumption, WUE status and performance trend

WSA & WB Name	# WSSs	Total Population	Total SIV (kl/d)	2023 WUE (l/p/d)	2023 Blue Drop WUE Range and Performance	
Amajuba DM	3	60,437	6,856	113	<150	Excellent
eThekwini MM	1	3,285,026	1,288,030	392	>300	Extremely High
Harry Gwala DM	21	162,274	33,570	207	>200-250	Average
iLembe DM	19	599,027	100,972	169	>150-200	Good
King Cetshwayo DM	12	295,071	62,350	211	>200-250	Average
Newcastle LM	2	520,988	108,450	208	>200-250	Average
Msunduzi LM	1	536,613	223,000	416	>300	Extremely High
Ugu DM	13	760,409	179,363	236	>200-250	Average
uMgungundlovu DM	8	192,137	74,710	389	>300	Extremely High
uMhlathuze LM	4	570,270	132,136	232	>200-250	Average
Umkhanyakude DM	22	779,000	53,416	69	<150	Excellent
Umzinyathi DM	13	188,692	36,572	194	>150-200	Good
uThukela DM	14	277,564	126,204	455	>300	Extremely High
Zululand DM	39	559,998	144,278	258	>250-300	Poor
Totals	**172**	**8,787,506**	**2,569,907**	**253**		

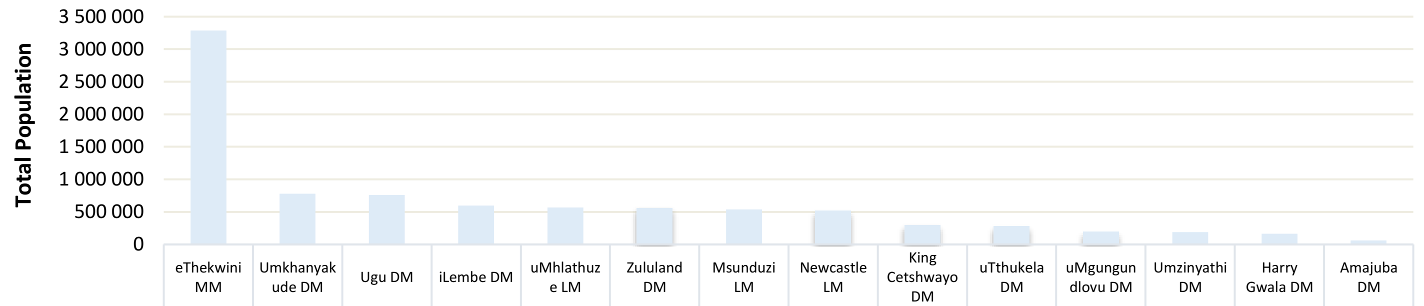
WUE (l/cap/day) performance categories

Colour	WUE Range	Performance
	>300	Extremely high per capita water use
	>250-300	Poor per capita water use
	>200-250	Average per capita water use with potential for marked improvement
	>150-200	Good per capita water use but some improvement may be possible subject to economic benefits
	<150	Excellent per capita water use management



	eThekwini MM	Msunduzi LM	Ugu DM	Zululand DM	uMhlathuze LM	uThukela DM	Newcastle LM	iLembe DM	uMgungundlovu DM	King Cetshwayo DM	Umkhanyakude DM	Umzinyathi DM	Harry Gwala DM	Amajuba DM
Series1	1 288 030	223 000	179 363	144 278	132 136	126 204	108 450	100 972	74 710	62 350	53 416	36 572	33 570	6 856

Figure 89 - Total SIV towards the WSSs



	eThekwini MM	Umkhanyakude DM	Ugu DM	iLembe DM	uMhlathuze LM	Zululand DM	Msunduzi LM	Newcastle LM	King Cetshwayo DM	uTthukela DM	uMgungundlovu DM	Umzinyathi DM	Harry Gwala DM	Amajuba DM
Total Population	3 285 026	779 000	760 409	599 027	570 270	559 998	536 613	520 988	295 071	277 564	192 137	188 692	162 274	60 437

Figure 90 - Total Population served

For the province, 2,569,907 kl/d water is supplied to 8,787,506 consumers. Comparatively, eThekwini MM distributes 50% of the total provincial SIV, followed by Msunduzi LM (9%) and Ugu DM (7%). An average 253 litre of water is used per person per day, which implies a poor per capita water use.

Results from the diagnostic data show that 4 WSAs have WUEs of more than 300 l/c/d, which is regarded as extremely high according to national benchmarks. Only 1 WSA has a WUE between 250–300 l/c/d, which is regarded as poor. No Drop Certification is specifically tasked with plans to curb water losses and improve NRW through water accounting assessments and water conservation and demand management.

Diagnostic 3: Drinking Water Quality (DWQ) Monitoring and Compliance

Aim: Blue Drop audits values the principles of "To measure is to know" and "To know is to manage". The primary objective of a water treatment plant is to produce final water quality that is safe for human consumption at the end of the distribution network. This standard can only be measured and achieved if operational and compliance monitoring and DWQ compliance is executed at the correct frequency, sample point, and determinand type. This diagnostic assesses the i) operational and compliance monitoring status, ii) drinking water quality compliance, and iii) risk defined compliance and laboratory credibility.

(i) Drinking water operational and compliance monitoring

Findings: A minimum level of 90% operational monitoring compliance is applied as benchmark, to give weight to the importance of sampling and monitoring of the raw water, process unit water, and final water across the treatment stream. Compliance monitoring is also informed by SANS 241:2015 and the requirement for risk-informed monitoring through the WaSP process at both the WTW final and distribution network. DWQ compliance is calculated against the population size and the mandatory limits set by SANS 241:2015 and the Blue Drop standards, as calculated and reported from data loaded in the IRIS.

Table 115 - Summary of the KPA 2 WTW operational and WSS compliance monitoring status

WSA & WB Name	# WTWs	# WSSs	WTW Operational monitoring [KPA 2 sub-KPA 2.b)]		WSS Compliance monitoring [KPA 2 sub-KPA 2.c)]	
			Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]	Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]
Umgeni Water	11	14	11		14	
Mhlathuze Water	1	1	1		1	
Amajuba DM	3	3	1	2		3
eThekwini MM	5	1	5			1
Harry Gwala DM	20	21	16	4	18	3
iLembe DM	17	19	2	15	14	5
King Cetshwayo DM	18	12	7	11		12
Newcastle LM	2	2	2			2
Msunduzi LM	None	1			1	
Ugu DM	12	13	6	6		13
uMgungundlovu DM	7	8	7		8	
uMhlathuze LM	3	4	3		4	
Umkhanyakude DM	22	22	5	17	22	
Umzinyathi DM	13	13	1	12		13
uThukela DM	15	14		15		14
Zululand DM	41	39	37	4	30	9
Totals	**190**	**172**	**104 (55%)**	**86 (45%)**	**97 (56%)**	**75 (44%)**

The performance recorded in the table above stems from performance data as measured against the Blue Drop Standard expressed in KPA 2 and sub-KPAs 2.b) and 2.c). Overall, an unsatisfactory sampling and analysis regime is observed for both operational (45%) and compliance (44%) monitoring.

The data indicates that 104 of 190 WTWs (55%) are on par with good practice for operational monitoring of the raw and final water and the respective process units at the WTW. Umgeni Water, Mhlathuze Water, eThekwini MM, Newcastle LM, uMgungundlovu DM and uMhlathuze LM are doing exceptionally well, whilst the remaining WSAs fail to meet the Blue Drop standard. In terms of compliance monitoring, 97 WSSs (56%) are on par with good compliance monitoring practices, and 75 WSSs (44%) are failing the Blue Drop standard.

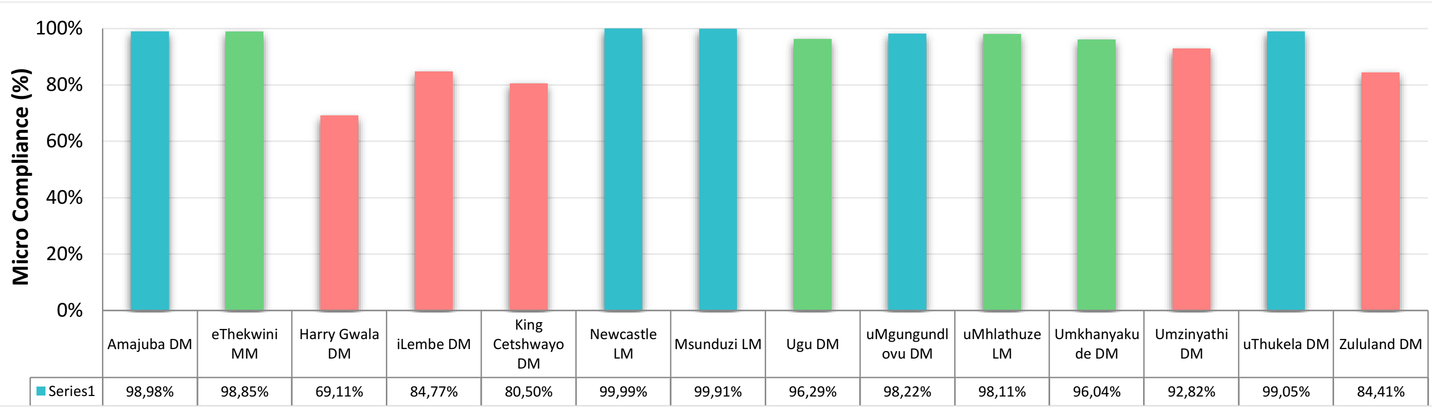
The latter observation is noted with deepening concern. Compliance monitoring is a legal requirement and the only means to measure the DWQ performance of a water supply system. Operational monitoring is the cornerstone of day-to-day process adjustments and optimisation to ensure that the water treatment is efficient and delivers quality final water. The results indicate that 86 WTWs and 75 WSSs are not achieving regulatory and industry standards.

(ii) Drinking water quality compliance

Findings: DWQ compliance is measured against the requirements of SANS 241:2015 under KPA 5 of the Blue Drop audit. The tables following summarises the results of the DWQ status for Microbiological and Chemical Compliance, which also carries the highest Blue Drop score weighting of 35%.

Table 116 - Provincial Summary of the DWQ Status for Microbiological Compliance

WSA Name	# WSSs	Population	% Ave. Micro Compliance	# WSS Micro Performance Status		
				Excellent	Good	Unacceptable
Amajuba DM	3	60,437	98.98%	3		
eThekwini MM	1	3,285,026	98.85%		1	
Harry Gwala DM	21	162,274	69.11%	6		15
iLembe DM	19	599,027	84.77%	6		13
King Cetshwayo DM	12	295,071	80.50%	5	2	5
Newcastle LM	2	520,988	99.99%	2		
Msunduzi LM	1	536,613	99.91%	1		
Ugu DM	13	760,409	96.29%	8	1	4
uMgungundlovu DM	8	192,137	98.22%	6	2	
uMhlathuze LM	4	570,270	98.11%	3		1
Umkhanyakude DM	22	779,000	96.04%	13		9
Umzinyathi DM	13	188,692	92.82%	5		8
uThukela DM	14	277,564	99.05%	13	1	
Zululand DM	39	559,998	84.41%	22	2	15
Totals	**172**	**8,787,506**	**92.65%**	**93**	**9**	**70**



MICRO: Population <100,000		
Colour	Status	Percentage
	Excellent	>97%
	Good	>96 - <97%
	Unacceptable	<96%

MICRO: Population >100,000		
Colour	Status	Percentage
	Excellent	>99%
	Good	>98 - <99%
	Unacceptable	<98%

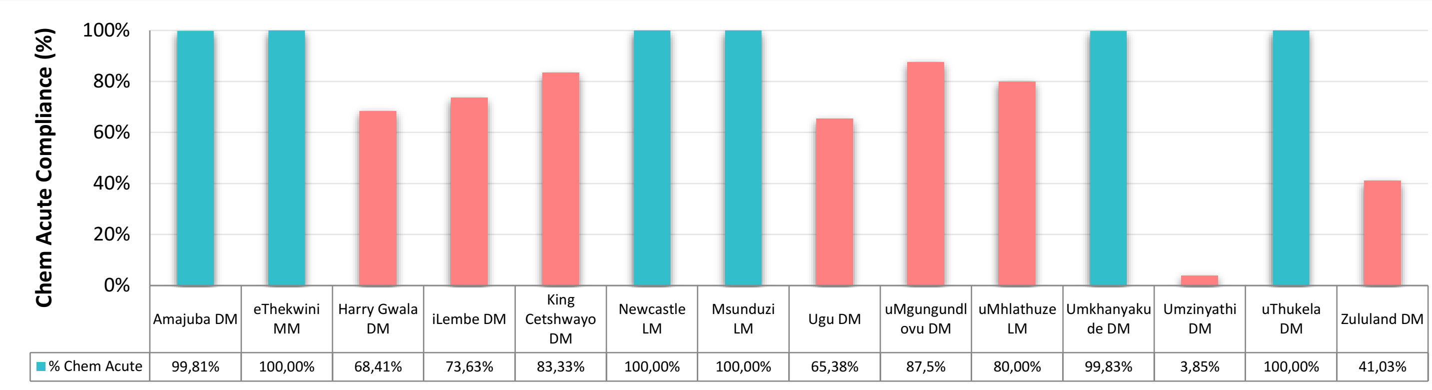
Figure 91 - Provincial Microbiological Drinking Water Quality Status

Out of the 172 WSSs, 102 (59%) systems achieved excellent and good microbiological quality, whilst 70 (41%) systems have an unacceptable microbiological water quality status. The water in these systems pose a serious acute health risk to the community. Failure to produce water that meets microbiological compliance standards can be linked back to poor operations, defective infrastructure, inadequate dosing rates, absence of disinfection chemicals, lack of monitoring, lack of operating and chemistry knowledge, and several other root causes. WSIs that are not monitoring the final water quality at the outlet of the treatment plant or at specific end use points are required to develop a monitoring programme and resume with compliance monitoring as a matter of urgency.

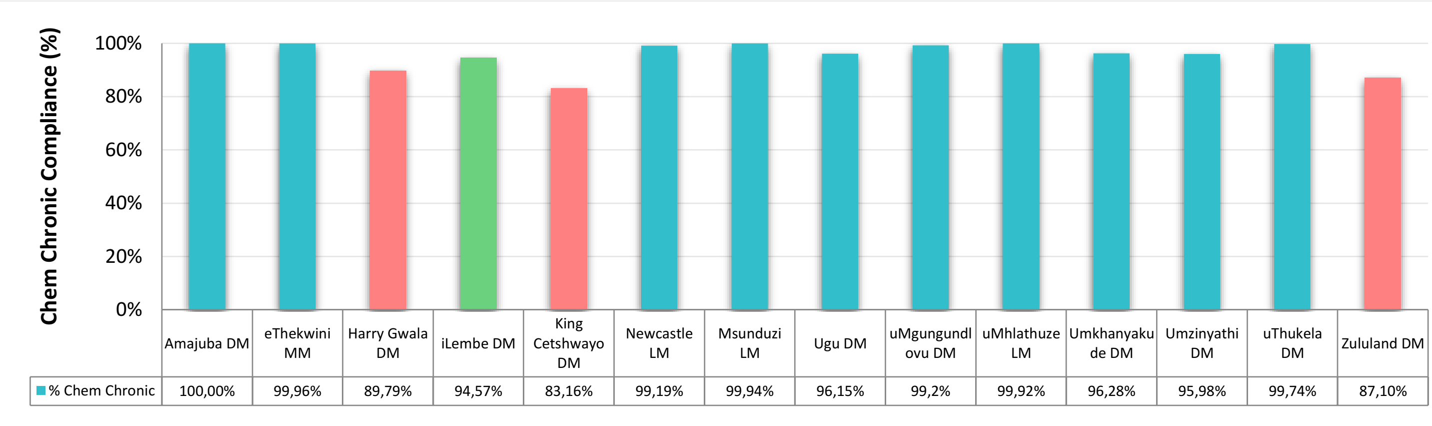
Table 117 - Provincial Summary of the DWQ Status for Chemical Acute Health and Chronic Health Compliance

WSA Name	# WSSs	Population	% Ave. Chem Acute Health Compliance	# WSS Chem Acute Health Performance Status			% Ave. Chem Chronic Health Compliance	# WSS Chem Chronic Health Performance Status		
				Excellent	Good	Unacceptable		Excellent	Good	Unacceptable
Amajuba DM	3	60,437	99.8%	3			100.0%	3		
eThekwini MM	1	3,285,026	100.0%	1			100.0%	1		

WSA Name	# WSSs	Population	% Ave. Chem Acute Health Compliance	# WSS Chem Acute Health Performance Status			% Ave. Chem Chronic Health Compliance	# WSS Chem Chronic Health Performance Status		
				Excellent	Good	Unacceptable		Excellent	Good	Unacceptable
Harry Gwala DM	21	162,274	68.4%	12		9	89.8%	19		2
iLembe DM	19	599,027	73.6%	13		6	94.6%	18		1
King Cetshwayo DM	12	295,071	83.3%	10		2	83.2%	10		2
Newcastle LM	2	520,988	100.0%	2			99.2%	2		
Msunduzi LM	1	536,613	100.0%	1			99.9%	1		
Ugu DM	13	760,409	65.4%	7		6	96.2%	12		1
uMgungundlovu DM	8	192,137	87.5%	7		1	99.2%	8		
uMhlathuze LM	4	570,270	80.0%	3		1	99.9%	4		
Umkhanyakude DM	22	779,000	99.8%	21	1		96.3%	18		4
Umzinyathi DM	13	188,692	3.8%			13	96.0%	12		1
uThukela DM	14	277,564	100.0%	14			99.7%	14		
Zululand DM	39	559,998	41.0%	16		23	87.1%	34		5
Totals	**172**	**8,787,506**	**78.8%**	**110**	**1**	**61**	**95.8%**	**156**	**0**	**16**



CHEM Acute Health: Population <100,000			CHEM Acute Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	≥97%		Excellent	≥99%
	Good	≥95 - <97%		Good	≥97 - <99%
	Unacceptable	<95%		Unacceptable	<97%



CHEM Chronic Health: Population <100,000			CHEM Chronic Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	≥95%		Excellent	≥97%
	Good	≥93 - <95%		Good	≥95 - <97%
	Unacceptable	<93%		Unacceptable	<95%

Figure 92 - Provincial Chemical Acute Health and Chronic Health Drinking Water Quality Status

Chemical acute health compliance shows that 110 (64%) systems have excellent, and 1 (1%) system has good water quality, whilst 61 (35%) systems in 8 WSAs have an unacceptable chemical acute health compliance. Chemical chronic health compliance shows that 156 (91%) systems have excellent water quality, whilst 16 (9%) systems in 7 WSAs have an unacceptable chemical chronic health compliance.

The Water Services Act upholds standards regarding the monitoring and reporting on drinking water quality and issuance of advisory notices to the public when significant DWQ failures are observed. The audit process applies a penalty when DWQ failures are noticed without issuing such Water Quality Alert Notices to forewarn consumers of the status of (unsafe) water quality and to advise communities to source alternative water sources or methods to disinfect water used for drinking water purposes.

The following table reflects the compliance status of the WSAs as regards the issuing of these notices for DWQ failures.

Table 118 - Summary of Penalties Applied to WSSs for not Issuing Advisory Notices

WSA Name	# WSS	# WSS No Penalty Applied	# WSS Partial Penalty Applied	WSS Names Partial Penalty	# WSS Full Penalty Applied	WSS Names Full Penalty
Amajuba DM	3		3	Dannhauser, Durnacol, Utrecht		
eThekwini MM	1	1				
Harry Gwala DM	21	11	8	Esiqandulweni, Franklin, Mangwaneni, Mnqumeni, Mqatsheni, Njunga, Umzimkhulu, Washbank/ Highlands	2	Chibini, Machunwini
iLembe DM	19	19				
King Cetshwayo DM	12	5	5	Catherine Booth, Eshowe, Greater Mthonjaneni, Melmoth, Middledrift	2	Khombe, Pikiliyeza
Newcastle LM	2	2				
Msunduzi LM	1	1				
Ugu DM	13	11	2	Harding, Mtamvuna		
uMgungundlovu DM	8	8				
uMhlathuze LM	4	4				
Umkhanyakude DM	22	1	21	21 of 22 WSSs		
Umzinyathi DM	13		4	Dundee, Keat`s Drift, Vant`s Drift, Qudeni	9	9 of 13 WSSs
uThukela DM	14	14				
Zululand DM	39	2	33	33 of 39 WSSs	4	eDumbe, eMondlo Town, Louwsberg, Vryheid
Totals	**172**	**79**	**76**		**17**	

No penalties were applied to 79 (46%) WSSs in 12 WSAs. Partial penalties were applied to 76 (44%) WSSs in 7 WSAs and full penalties were applied to 17 (10%) WSSs in 4 WSAs.

(iii) Risk defined compliance and laboratory credibility

Findings: Risk-defined compliance standards aim to determine the compliance (to SANS 241) of those parameters that have been found to pose a risk in a specific WSS and need to be included in the routine monitoring programme or frequency as prescribed by SANS 241. The province achieved an average Annual Risk Defined Compliance of 85.6%, with the best performances coming from eThekwini MM, Msunduzi LM, and uMgungundlovu DM, and the worst performances coming from Harry Gwala DM, iLembe DM, Umkhanyakude DM, uThukela DM and Zululand DM. Excellent risk defined compliance was achieved by 33 (19%) systems, good compliance for 9 (5%) systems and bad compliance for 130 (76%) systems.

Table 119 - Summary of the DWQ Compliance for Risk Defined Compliance

WSA Name	# WSSs	Population	Ave. % Risk Defined Compliance	# WSS Performance Status		
				Excellent	Good	Bad
Amajuba DM	3	60,437	91.36%		1	2
eThekwini MM	1	3,285,026	97.87%	1		
Harry Gwala DM	21	162,274	71.73%	4		17
iLembe DM	19	599,027	79.81%	3	1	15
King Cetshwayo DM	12	295,071	73.54%	2	1	9
Newcastle LM	2	520,988	91.89%	1		1
Msunduzi LM	1	536,613	99.81%	1		
Ugu DM	13	760,409	85.50%	3	1	9
uMgungundlovu DM	8	192,137	96.19%	6		2
uMhlathuze LM	4	570,270	96.17%	2	1	1
Umkhanyakude DM	22	779,000	88.10%	7		15
Umzinyathi DM	13	188,692	85.82%	2	2	9
uThukela DM	14	277,564	68.31%			14
Zululand DM	39	559,998	72.86%	1	2	36
Totals	**172**	**8,787,506**	**85.64%**	**33**	**9**	**130**

The aim of operational determinand compliance is to determine the efficiency of the water treatment process, by monitoring those parameters which are used to control the treatment process. Although not necessarily a health risk, these parameters provide good information on the integrity of the WTW. The province achieved an average % Actual Operational Determinand Compliance of 65%, the best performances coming from Umgeni Water, Mhlathuze Water and eThekwini MM, and the worst performances coming from Harry Gwala DM, iLembe DM, King Cetshwayo DM, Ugu DM, Umkhanyakude DM, Umzinyathi DM, uThukela DM and Zululand DM. Excellent operational determinand compliance was achieved by 39 (21%) WTWs and bad compliance for 151 (79%) WTWs.

Table 120 - Summary of the Treatment (Operational) Efficiency Index

WSA & WB Name	# WTWs	Population	Ave. % Actual Operational Determinand Compliance	# WTW Performance Status		
				Excellent	Good	Bad
Umgeni Water	11	4,758,833	99%	11		
Mhlathuze Water	1	75,000	100%	1		
Amajuba DM	3	60,437	77%	1		2
eThekwini MM	5	3,285,026	93%	4		1
Harry Gwala DM	20	162,274	55%	1		19
iLembe DM	17	599,027	6%	1		16
King Cetshwayo DM	18	295,071	53%			18
Newcastle LM	2	520,988	91%	1		1
Msunduzi LM	None	536,613				
Ugu DM	12	760,409	25%	2		10
uMgungundlovu DM	7	192,137	90%	4		3
uMhlathuze LM	3	570,270	57%			3
Umkhanyakude DM	22	779,000	65%	3		19
Umzinyathi DM	13	188,692	47%	1		12
uThukela DM	15	277,564	45%			15
Zululand DM	41	559,998	69%	9		32
Totals	**190**	**8,787,506**	**65%**	**39**	**0**	**151**

The data confirms that Umgeni Water, Mhlathuze Water and 13 WSAs (93%) in the province have access to credible laboratories for compliance and operational analysis. These in-house or contracted laboratories are accredited with SANAS or have Proficiency Testing Schemes with SABS or have inter-laboratory quality checks in place to ensure that suitable analytical methods are applied and that quality assurance processes are followed to ensure credible water quality results. The province is meeting the regulatory expectation for the WSIs having access to credible analytical services for compliance and operational monitoring.

Diagnostic 4: Technical Site Assessments

Aim: The Blue Drop process makes provision for a Technical Site Assessment (TSA) in order to verify the desktop evidence through field-based inspections. This assessment includes a physical inspection of the entire water treatment plant with all its process units, as well as the reservoir and spot checks of a pumpstation and pipelines. The technical assessment is coupled with an asset condition check to determine an approximate cost (VROOM) to restore existing infrastructure to functional status for the treatment facility (only).

Findings: The results of the province's TSAs are summarised in the table below. A deviation of 10% between the BD and TSA score indicate a misalignment between the administrative aspects and the work on the ground. The Regulator regards a WTW with a TSA score of >80% to have an acceptable level of process control and functional equipment, and a TSA score of 90% as an excellent system that complies with most of the Blue Drop TSA standards. A TSA score of <30% indicates that the treatment facility and network fails in most regards, and is evident of dysfunctional infrastructure, failed process control, absence of record keeping and monitoring, and poor water quality.

The VROOM cost presents a ''Very Rough Order of Measurement" cost to return a WTWs functionality to its original design. More detail can be found in the Blue Drop Watch Report 2023.

Table 121 - %TSA and %BD score, and VROOM cost estimates total and split for civil, mechanical, and electrical

WSA & WB Name	TSA Name	%TSA	2023 BD Score (%)	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Umgeni Water (UMDM)	Midmar WTP	95.0%	96.44%	6,715,000	53,720,000	6,715,000	67,150,000
Mhlathuze Water (uMhlathuze LM)	Nsezi	90.0%	83.70%	1,537,500	4,612,500	0	6,150,000

WSA & WB Name	TSA Name	%TSA	2023 BD Score (%)	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Amajuba DM	Durnacol	51.0%	44.40%	10,847,100	6,327,475	903,925	18,078,500
eThekwini MM	Kloof	77.0%	94.95%	3,430,000	5,390,000	980,000	9,800,000
Harry Gwala DM	Kokstad	73.0%	66.18%	7,020,000	2,700,000	1,080,000	10,800,000
iLembe DM	Sundumbili	69.0%	87.09%	9,241,320	7,701,100	13,861,980	30,804,400
King Cetshwayo DM	Greater Mthonjaneni	62.0%	40.70%	1,340,000	6,030,000	6,030,000	13,400,000
Newcastle LM	Ngagane	87.0%	84.35%	2,340,000	9,360,000	0	11,700,000
Ugu DM	Bobhoyi	61.0%	57.14%	28,917,000	53,014,500	14,458,500	96,390,000
uMgungundlovu DM	Impendle Spring	50.0%	96.44%	580,720	72,590	72,590	725,900
uMhlathuze LM	Mzingazi	64.0%	83.70%	31,005,000	56,842,500	15,502,500	103,350,000
Umkhanyakude DM	Mtubatuba	57.0%	74.32%	4,000,000	2,800,000	1,200,000	8,000,000
Umzinyathi DM	Vant`s Drift	80.0%	31.59%	690,000	2,070,000	0	2,760,000
uThukela DM	Ladysmith	89.0%	50.42%	2,300,000	2,070,000	230,000	4,600,000
Zululand DM	Ulundi	69.0%	43.93%	1,900,800	475,200	0	2,376,000
			Totals	**R111,864,440**	**R213,185,865**	**R61,034,495**	**R386,084,800**
			% Split of Cost Items	**29%**	**55%**	**16%**	**100%**

A deviation of >10% between the BD and TSA score is noted for eThekwini MM (18%), iLembe DM (18%), King Cetshwayo DM (22%), uMgungundlovu DM (46%), uMhlathuze LM (19%), Umkhanyakude DM (17%), Umzinyathi DM (48%), uThukela DM (39%) and Zululand DM (25%). A deviation of >20% between the BD and TSA score is noted for 5 WSAs.

For the individual WTWs assessed in the province, a total budget of R386m is estimated, with the bulk of the work (84%) going towards restoration of mechanical equipment (55%) and civil infrastructure (29%).

Diagnostic 5: Operation, Maintenance and Refurbishment of Assets

Aim: Insufficient financial resources are often cited as a root cause to dysfunctional or non-compliant water treatment works and water networks. Knowledge and monitoring of fiscal spending are therefore a critical part of water services management and municipal governance of public assets. This diagnostic investigates the status of financial information as pertaining to O&M budgets and expenditure, asset figures, and capital funding.

Findings: A substantial amount of financial information was presented during the audit process. Unfortunately, the evidence was presented in different formats, levels of detail, or absent for some WSAs. It was observed that WSA teams with financial officials that were present during the audits performed better and had a better understanding of the water services challenges experienced by their technical peers.

Discrepancies observed included amongst others - generic or non-ringfenced budgets, contract lump sums for service providers presented as budgets, outdated or incomplete asset registers, and some cost drivers which were lacking. As data credibility presents a significant challenge, the Regulator grouped data into different certainty levels, as summarised at the end of this Diagnostic.

The result of each financial portfolio is discussed hereunder.

NOTE: The Regulator regards the financial and asset information with low confidence. Not all WSAs submitted verifiable information or complete financial data sets for the audit year in question.

Capital, O&M Budget and Actual, and Asset Value

The capital budgets, O&M budgets, O&M actual expenditure, and current asset values are summarised below.

Table 122 - Summary of the capital budgets, O&M budgets, O&M actual expenditure, and current asset values

WSA & WB Name	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
Umgeni Water	NI	R2,012,361,963	R2,225,309,612	111%	R10,227,680,261
Mhlathuze Water	NI	R119,985,665	R104,039,413	87%	NI
Amajuba DM	R81,650,000	R77,500,000	R68,800,000	89%	R341,000,000
eThekwini MM	R264,324,000	R3,825,032,091	R3,390,781,491	89%	NI
Harry Gwala DM	NI	NI	NI	NI	R832,184,829
iLembe DM	NI	R120,363,034	R115,707,731	96%	R11,441,938,921

WSA & WB Name	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
King Cetshwayo DM	R55,000,000	R73,212,000	R99,819,700	136%	NI
Newcastle LM	R304,140,000	R264,875,980	R368,780,041	139%	R264,470,091
Msunduzi LM	R42,848,488	R1,140,091,936	R918,725,973	81%	R1,695,785,679
Ugu DM	NI	R70,583,000	R145,553,000	206%	NI
uMgungundlovu DM	R219,893,000	R45,167,287	R69,642,330	154%	R100,742,172
uMhlathuze LM	R15,119,600	R890,244,885	R773,060,127	87%	R1,468,947,855
Umkhanyakude DM	R468,563,939	R67,500,042	R60,461,823	90%	R280,808,124
Umzinyathi DM	NI	R311,355,085	R500,673,945	161%	R2,941,795,906
uThukela DM	NI	NI	NI	NI	R3,211,623,612
Zululand DM	R604,077,000	R324,425,305	R344,993,361	106%	R225,237,773
Totals	**R2,055,616,027**	**R9,342,698,273**	**R9,186,348,546**	**98%**	**R33,032,215,222**

The Regulatory Comments following in this Chapter list the capital projects with secured funding for each municipality and/or its bulk water provider (WSP). The capital lists are deemed to be a definitive means to address water service inadequacies and ensuring water infrastructure investment. A total capital budget of R2.06b has been reported for the refurbishment and upgrades of water supply system infrastructure for most of the WSAs. The largest capital budgets are observed for Zululand DM (R604m), Umkhanyakude DM (R468m), Newcastle LM (R304m), and eThekwini MM (R264m).

For the 2021/22 fiscal year, the total O&M budget reported for the province was R9.343b, of which R9.186b (98%) has been expended. The highest over-expenditure of 206% by Ugu DM and the lowest under expenditure by Msunduzi LM (81%) was observed. The provincial figures exclude 6 WSAs who had no and partial financial information.

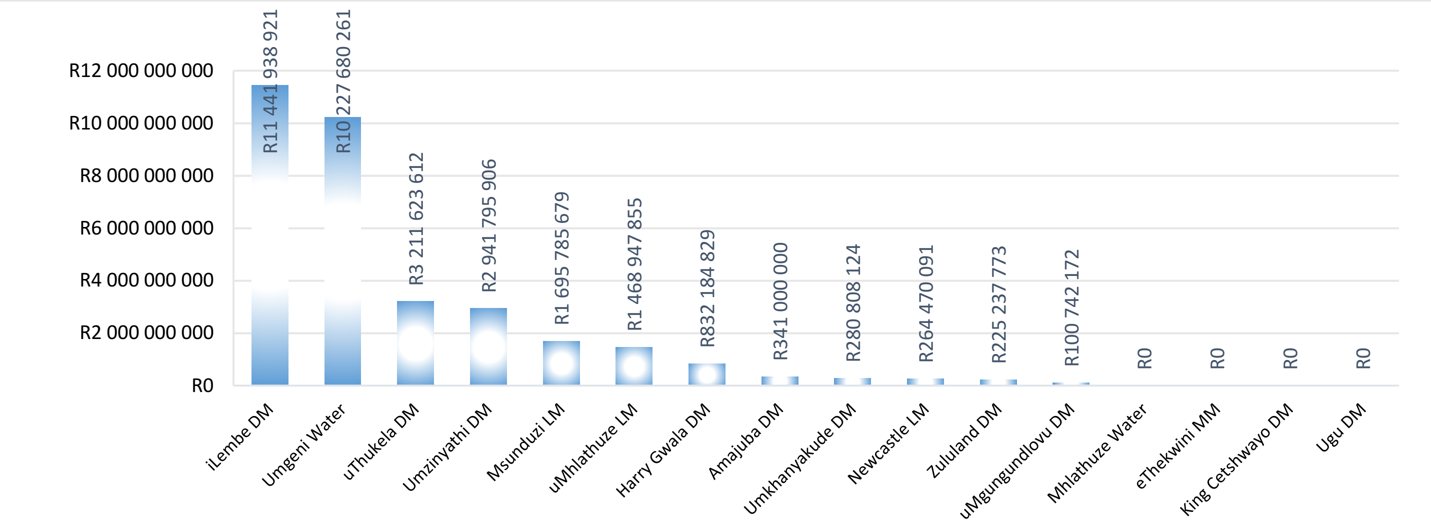


Figure 93 - Total current asset value reported

The total current asset value for water infrastructure (networks, pump stations, treatment plants) is reportedly R33b (excluding 4 WSAs with no information). The highest asset values are observed for iLembe DM (R11.4b), followed by Umgeni Water (R10.2b), uThukela DM (R3.2b) and Umzinyathi DM (R2.9b).

O&M Cost Benchmarking

By combining the SALGA and WRC WATCOST models, an estimation of the maintenance cost required per asset type can be done, i.e. civil, buildings, pipelines, mechanical, electrical, and instrumentation.

Table 123 - SALGA-WRC annual maintenance budget guideline and cost estimation

Description	% of Current Asset Value	Asset Value Estimate	Modified SALGA Maintenance Guideline	Annual Maintenance Budget Guideline
Current Asset Value estimate	**100%**	**R33,032,215,222**	**15.75%**	**R713,495,849**
Broken down into:				
1. Civil Structures	46%	R15,194,819,002	0.50%	R75,974,095
2. Buildings	3%	R990,966,457	1.50%	R14,864,497
3. Pipelines	6%	R1,981,932,913	0.75%	R14,864,497
4. Mechanical Equipment	30%	R9,909,664,567	4.00%	R396,386,583

Description	% of Current Asset Value	Asset Value Estimate	Modified SALGA Maintenance Guideline	Annual Maintenance Budget Guideline
Current Asset Value estimate	**100%**	**R33,032,215,222**	**15.75%**	**R713,495,849**
5. Electrical Equipment	11%	R3,633,543,674	4.00%	R145,341,747
6. Instrumentation	4%	R1,321,288,609	5.00%	R66,064,430
Totals	**100%**	**R33,032,215,222**	**15.75%**	**R713,495,849**
			Minus 20% P&Gs and 10% Installation	**R214,048,755**
			Total	**R499,447,094**

The model estimates that R713m (2.16%) is required per year to maintain the assets valued at R33b. Notably, this maintenance estimate assumes that all assets are functional. In cases where Blue Drop Certification is not being achieved, it can be assumed that some form of inefficiency or constraint is being experienced, and national benchmarks closer to 7% of the asset value is advocated (R2,31b).

The table below indicates the SALGA maintenance cost estimation in relation to the O&M budget, and O&M actual expended.

Table 124 - O&M cost estimates by the SALGA versus actual budget and expenditure figures

Cost Reference	O&M Cost Estimate	Period	% of Asset Value
Modified SALGA	R713,495,849	Annually, estimation	2.16%
O&M Budget	R9,342,698,273	Actual for 2021/22	28.2%
O&M Spend	R9,186,348,546	Actual for 2021/22	27.8%

In addition, the table below indicates the Blue Drop audit findings on the water supply operations cost determination and water supply O&M budget status.

Table 125 - BD Audit Water Supply Operations Cost Determination and Water Supply O&M Budget status

WSA & WB Name	Water Supply Operations Cost Determination	Water Supply O&M Budget status
Umgeni Water	DETERMINED OF THE WHOLE SYSTEM; NOT SYSTEM SPECIFIC (GLOBAL)	SYSTEM SPECIFIC BUDGET: WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY; BUDGET IS NOT RINGFENCED FOR WATER ONLY
Mhlathuze Water	NOT SYSTEM SPECIFIC (GLOBAL)	SYSTEM SPECIFIC BUDGET
Amajuba DM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
eThekwini MM	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
Harry Gwala DM	NOT SYSTEM SPECIFIC (GLOBAL)	BUDGET IS NOT RINGFENCED FOR WATER ONLY
iLembe DM	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET: WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
King Cetshwayo DM	DETERMINED FOR PART OF SYSTEM	SYSTEM SPECIFIC BUDGET
Newcastle LM	NOT SYSTEM SPECIFIC (GLOBAL); DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Msunduzi LM	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
Ugu DM	NOT SYSTEM SPECIFIC (GLOBAL);	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
uMgungundlovu DM	NOT SYSTEM SPECIFIC (GLOBAL)	BUDGET IS NOT RINGFENCED FOR WATER ONLY
uMhlathuze LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Umkhanyakude DM	DETERMINED FOR PART OF SYSTEM	SYSTEM SPECIFIC BUT INCLUDES WATER & SANITATION
Umzinyathi DM	DETERMINED OF THE WHOLE SYSTEM; NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY; BUDGET IS NOT RINGFENCED FOR WATER ONLY
uThukela DM	NOT SYSTEM SPECIFIC (GLOBAL)	BUDGET IS NOT RINGFENCED FOR WATER ONLY
Zululand DM	DETERMINED OF THE WHOLE SYSTEM; NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY

From the tables above, the cost dynamics can be summarised as follows:

- The SALGA estimations for maintenance budgets is about 7.6% (Modified SALGA divided by O&M Budget) of the actual reported budgets for the 2021/22 fiscal year
- The actual O&M budget (28.2%) appears to be more than adequate when compared with the SALGA guideline (2.16%) or with the government benchmark (7%)
- These figures may be impacted by some of the WSAs who did not provide budget and expenditure figures, and by some inaccurate asset values and where no asset values were provided for
- Lastly, the municipalities presents budget and expenditure data at different levels (table above) i.e. financial figures are not always ringfenced per water supply system – thus rendering provincial summaries to be indicative).

8.1 Umgeni Water

Introduction

Umgeni Water supplies potable water to more than 52% of the households in KwaZulu Natal. The utility serves the following municipalities:

1. eThekwini Metropolitan Municipality
2. Harry Gwala District Municipality
3. iLembe District Municipality
4. King Cetshwayo District Municipality
5. Msunduzi Local Municipality
6. Ugu District Municipality
7. uMgungundlovu District Municipality

Umgeni Water also supports WSA through the operation of some of their WWTWs, supply of laboratory services, Blue Drop support and preparation and training.

Regulator's Comment

Umgeni Water was very well prepared for the Blue Drop assessment, which was well attended by all the relevant divisions within the organisation. It was very clear from the outset that one of the strengths of the organisation is its teamwork, which was displayed throughout the audit process. Every department was aware of the information that they were to provide and how it fitted into the Blue Drop criteria.

Umgeni Water has set up impressive internal systems which are focused on making sure water quality is maintained at a high standard. Everyone appears to understand how their role fits into ensuring water quality. Maintenance of their facilities, to keep all equipment in good working order, appears to be a strength, along with excellent operational monitoring systems. The organisation has clearly taken a risk-based approach to their operations which shows in robust and well-considered systems.

It would be important to note that all these systems are underpinned by professional, motivated, and competent staff who work well together, which appears to be the key to their success.

Blue Drop Findings

All the systems that Umgeni Water owns received excellent Blue Drop scores. Areas of excellence to be noted include:

- A well-managed maintenance schedule for each item of equipment, which is kept up to date and linked to the asset register.
- Experienced and professional technical, scientific, maintenance and operations teams.
- Excellent Water Safety Plans with regular reviews, regular adjustment of monitoring programmes based on incidents and feedback systems, thorough risk assessments and tracking of implementation.
- The operational and compliance monitoring exceeds SANS241 as they have carefully assessed risks in the development of their monitoring programmes.
- Financials are well managed, and operations costs are known.
- Generally, the compliance of their operational determinants is excellent (all > 99%).
- Umgeni Water has also undertaken numerous cross-pollination activities in KZN with many of the WSAs, and their commitment to supporting their customers should be commended.
- Their proactive management of water quality during the 2022 floods should be commended as they were able to maintain excellent water quality under the most challenging conditions.

Some recommendations for improvement include:

- A water reticulation network report consolidating the various condition assessments of the distribution network is needed.
- In a few cases, the abstraction rates from the water resource were greater than the authorised quantities. This needs to be rectified.
- The iXopo system requires a registered supervisor, flow meter verification and the recording of the operational data to calculate the operational efficiency index.

Technical Site Inspection

The ***Midmar WTW*** is in good condition with a TSA score of 95%. The Regulator noted that the works is well maintained and there are excellent monitoring systems in place to ensure compliant water quality. It was clear that the staff are proud of their facility, and this reflects in the management of the plant.

Health and Safety compliance is of a high standard. Chemical stocks are well-managed and organised. Phase separation (clarification and filtration) is excellent with automated backwashing. Sludge dewatering is partially inhibited by centrifuges which required extensive maintenance and alternative dewatering technologies could be investigated. All mechanical equipment is kept in a very well-maintained condition both within the works as well as within the distribution network (reservoirs and pump stations).

Well maintained grounds

Backwash pumps at Midmar WTW

Backwashing cycle in progress

Chlorine storage tanks

A well maintained bulk reservoir

The Blue Drop Team during the site inspection

8.2 uMhlathuze Water

Introduction

uMhlathuze Water manages raw water sources, designs, optimises, installs, extends, operates, and maintains the required infrastructure to meet the bulk water services requirements and related services to customers. uMhlathuze Water is situated in KwaZulu Natal in Richards bay and supplies bulk water to:

1. Mondi Paper
2. City of uMhlathuze Local Municipality

uMhlathuze Water's area of supply covers some 37 000 km^2 stretching from uThukela River in the South and up the East Coast to the Mozambique and Swaziland borders, around Vryheid and back to the Thukela River. The plant has two raw water sources, namely: uMhlathuze River (Weir) and Nsezi Lake. The Weir is used as the primary source, and it has a capacity of 205 ML/d. The Weir pump station was upgraded in 2010 however recently it is unable to reach its design capacity. The maximum flow that can be achieved is 144 ML/d (6000 m3/h). As a result, supplementing of the Lake level from the Weir was also suspended as the plant demand increased. The plant has three chlorine dosing facilities, two pre-chlorine room for the respective raw water sources and one post chlorine room for disinfection. The plant is generally well operated, and it is compliant with the drinking water standards SANS 241:2015. The raw water quality has deteriorated over the years. The plant recently has been experiencing elevated level of total organic carbon (TOC) as well as sporadic high level of manganese. The presence of organics in raw water causes water quality problems such as: colour, taste and odour, increased coagulant usage, DBPs and promoting biological regrowth within the distribution system. Powder activated carbon and potassium permanganate should be dosed to remove organics and manganese respectively.

Raw water from Mhlathuze River is pumped using Weir Pump station that is more than 6km away from Nsezi WTP. Sometime water is pump from Nsezi lake 200 meters away from Nsezi WTP. The pumped water first enters into the head of works (Mixing Tower). The raw water is pre-chlorinated before the mixing Tower using a dosing line from chlorine facility. The chlorinated water enters the mixing tower from the bottom. Two coagulants compounds or chemicals are dosed at the mixing tower, namely aluminium sulphate, and the primary polymeric coagulant. Flush mixing is achieved through a hydraulic jump which creates turbulence across the Mixing Tower (the mixing tower has three passes). The coagulated water is gravitated to three clariflocculators where solids are settled out. The sludge from the clariflocculators is collected in the sludge holding tank from where it is pumped to the buoyant effluent Collecting Chamber for disposal. The clarified water is gravitated to the secondary coagulation chamber and a portion of the clarified water stream is distributed for industrial use. Flash mixing for the secondary polymeric coagulant is achieved through water turbulence (there are two mechanical mixers which are currently not in use). The re-coagulated water is gravitated to eight flocculation tanks each fitted with a paddle mixer. The flocculated water is gravitated to eight dissolved air flotation tanks where solids are separated by injecting a mixture of pressurised air and water. The Sludge from the Dissolved Air Floatation (DAF) units is mixed with the sludge from the clariflocculators.

The clarified water from the DAF is filtered through twelve rapid gravity sand filters. The filtered water is dosed with chlorine for disinfection and sodium hydroxide for pH correction. Final water is distributed to both industrial and domestic customers. The spent backwash water is recycled back to the head of works or mixing tower.

Regulator's Comment

uMhlathuze Water was represented with a team that came to the assessments well prepared and demonstrated their commitment to the Blue Drop process and water quality excellence. The water service provider is commended for the diligence in getting the relevant and required documentation for the Blue Drop application.

uMhlathuze Water takes pride in knowing that they work with world-class team of specialists who work together daily to ensure the different parts of the water supply puzzle are resolved. This shows that customers of uMhlathuze Water are always assured of reliable and high-quality service. The water service provider was able to demonstrate good planning through precise and well-planned logistics for the initial meeting up to the end of the assessment period including confirmations sessions.

The water service provider has a well-rounded team with adequate skills and qualification to carryout maintenance work both at the plant and bulk supply. Compliance and operational monitoring programmes are conducted as required. Water service provider is equipped with accredited laboratory and skilled personnel to do all the necessary analysis.

It must also be noted that uMhlathuze water is currently in process of amalgamating with Umgeni Water. uMhlathuze water has initiated engagements with DWS to be assessed separately from City of uMhlathuze Local municipality. The water service provider is under the view that if they are the dilution of the score with the municipality is not doing justice to them.

Blue Drop Findings

The Regulator Notes finds that that there were some shortcomings, and the following summarises the collective recommendations as following:

- Although the laboratory is SANAS accredited it was noted that certified data analysis does not yield 100%, therefore, water service provider would need to further follow up with the DWS to determine the gap in methods submitted.
- When the site was visited the O& M manuals were not on site but kept in offices, it was recommended that a copy be made available for the site.
- Three backwash pumps are installed and in working condition. Media will require replacement as well as few minor pipes paintings and mechanical equipment (slight rust was visible).

Technical Site Inspection

The ***Nsezi WTW*** is in very good condition with a TSA score of 90%. The Regulator observed that regular routine maintenance is done on site with no significant operational or maintenance issues noted. The reservoirs were surrounded by a fence and a gated entrance. Telemetry at the command reservoirs is operational and can be observed from the operations room at the WTW. The reservoirs were observed to be leak free.

Six recycle pumps are installed and are new and in good condition. Saturator was serviced in the last 12 months; it was noted to be serviced at least every 2 - 3 years nevertheless it is in good working condition. 2 duty pumps & 2 standby. All pumps in working good condition. Pipeline appears to be in good condition - servitude in place with concrete vents and manholes. Even cathodic protection analysis was being undertaken. A large flow splitting tower with 'cascade' to each clarifier with even flow splitting.

Refer to the Blue Drop Watch Report 2023 for more detail.

All pumps working - 4 installed 2 duty & 2 standby

Chemical feed in a very good condition - duty/standby alum dosing noted dripping

Excellent white-water and good DAF operation

The clarifiers are generally in very good condition with very minimal floc carry-over

General workplace and personnel were in good spirit and expressed satisfaction at the workplace

Six recycle pumps are installed and are new and in good condition

8.3 uThukela Water

Introduction

uThukela Water (Pty) Ltd was initially the first municipal entity which provided a full spectrum of bulk and reticulation water and sanitation services, and in this case, on a regional basis to its three fully owned shareholders, namely Amajuba District Municipality, uMzinyathi District Municipality, and Newcastle Municipality. Following a Section 78 assessment undertaken in 2011, the Entity has transferred the water reticulation services back to the municipalities, and now only operates as a bulk water services provider to the shareholders. uThukela Water has established itself to be an industry leader with emphasis on a high-quality water product, and prides itself on this achievement. uThukela Water provides bulk water from two WTW namely, Ngagane and Biggarsberg water treatment plants. uThukela Water's head offices and laboratory facilities are situated in Newcastle.

The Ngagane Water Treatment Works was initially constructed around 1965 with a daily capacity of 24 Ml/day. The plant was upgraded and consisted of 8 rapid sand filters and 16 candy vertical sedimentation tanks. A second upgrade was undertaken which resulted into Plant 2, consisting of 6 rapid sand filters and 2 horizontal sedimentation tanks. In 2002 a third upgrade resulted in Plant 3, consisting of 5 rapid sand filters and 10 candy vertical sedimentation tanks. Ngagane water treatment currently has a total capacity of 130Ml/d. Ngangane WTW supplies bulk water to the areas of Newcastle, Madadeni, Osizweni, Brakfontein, Kilbarchan, Eskom Village, Ballengeich and the rural areas of the Amajuba District Municipality.

The Biggarsberg water plant has a design capacity of 19,3Ml/d and is currently operating at 15,84 Ml/d. Plans are also afoot to increase this plant's capacity, but these are restricted by the availability of sufficient and sustainable raw water sources. The Company's Master Plan does address this matter and makes recommendations to source water higher up in the Drakensberg catchment areas to augment the scarce water supplies in the uMzinyathi area. The Biggarsberg plant supplies water to the areas of Dundee, Glencoe, Sithembile, Wasbank, Hattinghspruit and certain rural areas. Both water plants achieved Blue Drop status determined in terms of national norms and standards and denote the high quality of water delivered to the municipalities from these plants.

Regulator's Comment

uThukela Water continues to set a benchmark for many bulk water service providers with regards to effective drinking water quality management. The highly passionate and committed members of the service provider are commended for their remarkable efforts to maintain excellence in their daily operations and therefore deserve the recognition.

The department wishes to commend uThukela Water for being consistent in complying excellently with the regulatory requirements of the Blue Drop certification programme. The constant engagements between uThukela Water and the auditors speaks of a remarkable dedication towards achieving management of excellent and effective drinking water quality management.

Blue Drop Findings

The Regulator notes finds that that there were some shortcomings, and the following summarises the collective recommendations as following:

- Lack of bulk inspection.
- No process audit or conditional assessment for Biggarsberg WTW.
- Meter calibration or verification outside the assessment period.
- The final water pipeline to the command reservoirs was not assessed. However, it was indicated that the bulk line to Hilldrop has cathodic protection, and the maintenance team does regular spot checks on all the bulk pipelines. Valve chambers were inspected and found to be in secure and safe condition. One valve chamber was flooded (rain/ ground water ingress).

Technical Site Inspection

Ngagane WTW is in very good condition with a TSA score of 87%. Rotameters all observed to be in good condition and working. The works uses chlorine gas with enough stock to last up to 30 days at any given time. The plant has 3 modules with a total of 28 clarifiers. There was limited floc carryover at the clarifiers at module 1 and 3. The static clarifiers at module 2 were observed to have a lot of flocs which had accumulated at the units, but these are designed to be periodically desludged. No carry-over of floc over the weirs. Desludging of the clarifiers is done once/day at module 2 (and full emptying monthly) and twice/day at module 1 and 3. The reservoirs were surrounded by a fence and a gated entrance. Telemetry at the command reservoirs is operational and can be observed from the operations room at the WTW. The reservoirs were observed to be leak free.

Refer to the Blue Drop Watch Report 2023 for more detail.


General weeding and upkeep is maintained when requried


PCs were very proud of their plant and quite satisfied with their workplace


There is more than 30 days storage of poly available at the works


Ngagane river pump station


Flow splitting to module 1 and 2


There were two lime feeders that were in good condition

8.4 Amajuba District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	44.40%
Blue Drop Score 2014	%	58.18%
Blue Drop Score 2012	%	83.31%
Blue Drop Score 2011	%	84.43%

Key Performance Area	Weight	DANNHAUSER LM - Durnacol WTW	DANNHAUSER LM - Dannhauser WTW	UTRECHT LM - Utrecht WTW
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	43.75%	38.70%	48.30%
Blue Drop Score 2014	%	47.35%	58.61%	58.61%
Blue Drop Score 2012	%	77.42%	77.05%	77.05%
Blue Drop Score 2011	%	82.75%	84.33%	84.33%
System Design Capacity	kL/d	5 000	2 000	5 000
System Available Capacity	kL/d	5 000	0	5 000
System Input Value	kL/d	1 656	2 000	3 200
Capacity Utilisation	%	33.12%	NI	64.00%
Resource Abstracted From		Ntshingwayo Dam	Chelmsford Dam	Balele Dam
BDRR 2023	%	27.65%	51.28%	29.64%
BDRR 2022	%	31.70%	76.80%	35.00%

Technical Site Assessment: Durnacol WTW (package plant) - 49%

8.5 eThekwini Metropolitan Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	94.95%
Blue Drop Score 2014	%	95.90%
Blue Drop Score 2012	%	98.77%
Blue Drop Score 2011	%	95.71%

Key Performance Area	Weight	eThekwini Main
Bulk/WSP		Umgeni Water
Blue Drop Score 2023	%	94.95%
Blue Drop Score 2014	%	96.18%
Blue Drop Score 2012	%	98.79%
Blue Drop Score 2011	%	96.05%
System Design Capacity	kL/d	1 632 400
System Available Capacity	kL/d	1 603 460
System Input Value	kL/d	1 288 030
Capacity Utilisation	%	88.95%
Resource Abstracted From		Nungwane; Nagle; Mbokodweni
BDRR 2023	%	31.61%
BDRR 2022	%	32.60%

Technical Site Assessment: Kloof WTW - 79% and Midmar WTW - 95%

8.6 Harry Gwala District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	66.18%
Blue Drop Score 2014	%	62.86%
Blue Drop Score 2012	%	69.35%
Blue Drop Score 2011	%	40.09%

Key Performance Area	Weight	Bulwer	Chibini	Creighton	Esiqandulweni
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	70.48%	29.00%	57.43%	54.10%
Blue Drop Score 2014	%	46.02%	NA	69.92%	44.81%
Blue Drop Score 2012	%	47.40%	NA	47.40%	43.80%
Blue Drop Score 2011	%	35.60%	NA	38.80%	NA
System Design Capacity	kL/d	1 000	1 000	1 000	1 000
System Available Capacity	kL/d	1 000	1 000	1 100	780
System Input Value	kL/d	1 000	1 000	722	357
Capacity Utilisation	%	72.20%	NI	65.64%	45.77%
Resource Abstracted From		Upper Bisi	Xobho	boreholes	Mkomazi
BDRR 2023	%	21.89%	95.31%	35.30%	30.50%
BDRR 2022	%	48.10%	44.80%	30.30%	26.40%

Key Performance Area	Weight	Franklin	Hlanganani/Polela	Ibisi	Ixopo
Bulk/WSP		-	-	-	Umgeni Water
Blue Drop Score 2023	%	58.13%	68.96%	72.26%	85.92%
Blue Drop Score 2014	%	47.29%	68.05%	65.56%	90.11%
Blue Drop Score 2012	%	NA	49.00%	61.30%	95.10%
Blue Drop Score 2011	%	NA	32.80%	27.00%	77.20%
System Design Capacity	kL/d	500	250	5 000	4 000
System Available Capacity	kL/d	500	250	5 000	2 590
System Input Value	kL/d	800	250	135	2 406
Capacity Utilisation	%	160.00%	NI	2.71%	92.90%
Resource Abstracted From		Umzintlava River	Ohane River, Umkhohlwa River and 3 boreholes	Ibisi River	Xobho
BDRR 2023	%	34.46%	20.65%	16.04%	22.46%
BDRR 2022	%	26.80%	31.80%	24.00%	16.80%

Key Performance Area	Weight	Kokstad	Machunwini	Mangwaneni WTW	Mnqumeni WTW
Bulk/WSP		-	-	-	-

Key Performance Area	Weight	Kokstad	Machunwini	Mangwaneni WTW	Mnqumeni WTW
Blue Drop Score 2023	%	84.03%	22.80%	37.00%	34.90%
Blue Drop Score 2014	%	66.31%	NA	NA	NA
Blue Drop Score 2012	%	70.70%	NA	NA	NA
Blue Drop Score 2011	%	35.20%	NA	NA	NA
System Design Capacity	kL/d	18 000	600	1 000	2 000
System Available Capacity	kL/d	18 000	600	500	2 000
System Input Value	kL/d	12 775	600	500	1 750
Capacity Utilisation	%	70.97%	NI	NI	87.50%
Resource Abstracted From		uMzintlava River	Upper Bisi	Mkomazi	Bisi
BDRR 2023	%	24.23%	100.00%	85.77%	78.13%
BDRR 2022	%	29.40%	NA	86.90%	70.10%

Key Performance Area	Weight	Mqatsheni WTW	Njunga	Nokweja	Rietvlei
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	53.93%	35.25%	62.48%	48.00%
Blue Drop Score 2014	%	NA	NA	49.48%	NA
Blue Drop Score 2012	%	NA	NA	53.30%	NA
Blue Drop Score 2011	%	NA	NA	NA	NA
System Design Capacity	kL/d	1 200	480	1 800	500
System Available Capacity	kL/d	1 200	480	1 440	500
System Input Value	kL/d	1 000	231	1 100	414
Capacity Utilisation	%	83.33%	48.13%	76.39%	NI
Resource Abstracted From		boreholes	2 x Boreholes	uMzimkhulu River	Mzimkulwana
BDRR 2023	%	22.01%	90.69%	34.48%	66.78%
BDRR 2022	%	23.70%	72.80%	48.40%	30.80%

Key Performance Area	Weight	Riverside	St Apollinaris	Umzimkhulu	Underberg
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	49.10%	56.60%	57.05%	54.08%
Blue Drop Score 2014	%	63.89%	64.70%	51.59%	66.64%
Blue Drop Score 2012	%	50.63%	71.43%	71.29%	58.55%
Blue Drop Score 2011	%	15.00%	31.65%	38.68%	33.93%
System Design Capacity	kL/d	500	660	5 000	4 500
System Available Capacity	kL/d	500	660	5 000	4 500
System Input Value	kL/d	500	600	2 610	4 000
Capacity Utilisation	%	NI	90.91%	52.20%	NI
Resource Abstracted From		Ngwagwane River	uMzimkhulu River	uMzimkhulu River	uMzimkhulu River

Key Performance Area	Weight	Riverside	St Apollinaris	Umzimkhulu	Underberg
BDRR 2023	%	38.96%	34.16%	38.11%	48.19%
BDRR 2022	%	37.40%	32.30%	35.80%	45.50%

Key Performance Area	Weight	Washbank/Highlands
Bulk/WSP		-
Blue Drop Score 2023	%	**48.95%**
Blue Drop Score 2014	%	48.75%
Blue Drop Score 2012	%	61.20%
Blue Drop Score 2011	%	9.63%
System Design Capacity	kL/d	820
System Available Capacity	kL/d	820
System Input Value	kL/d	820
Capacity Utilisation	%	NI
Resource Abstracted From		Mshushwane River
BDRR 2023	%	56.42%
BDRR 2022	%	38.50%

Technical Site Assessment: Kokstad WTW - 73%

The Regulator notes the dire state of management and drinking water quality in the Chibini and Machunwini water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

8.7 iLembe District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	87.09%
Blue Drop Score 2014	%	86.72%
Blue Drop Score 2012	%	88.26%
Blue Drop Score 2011	%	85.54%

Key Performance Area	Weight	Ifalethu	Isithundu	Lambothi	Lower Tukela
Bulk/WSP		-	-	-	Umgeni Water
Blue Drop Score 2023	%	66.84%	68.86%	55.38%	90.44%
Blue Drop Score 2014	%	60.36%	72.87%	36.06%	NI
Blue Drop Score 2012	%	31.95%	65.03%	28.70%	NI
Blue Drop Score 2011	%	54.47%	53.37%	39.38%	NI
System Design Capacity	kL/d	50	500	50	55 000
System Available Capacity	kL/d	50	500	50	55 000
System Input Value	kL/d	50	500	50	19 341
Capacity Utilisation	%	100.00%	100.00%	100.00%	83.51%
Resource Abstracted From		Ifalethu borehole	Unknown Spring	Unnamed borehole	Tugela
BDRR 2023	%	38.38%	30.05%	77.02%	32.23%
BDRR 2022	%	90.20%	28.70%	90.20%	28.10%

Key Performance Area	Weight	Makwanini	Maphumulo Borehole Supply system	Maphumulo WTW-Reticulation	Montebello
Bulk/WSP		-	-	Umgeni Water	-
Blue Drop Score 2023	%	57.72%	61.63%	93.99%	74.86%
Blue Drop Score 2014	%	42.94%	80.04%	94.48%	78.62%
Blue Drop Score 2012	%	45.45%	77.10%	NI	73.33%
Blue Drop Score 2011	%	40.63%	59.60%	NI	76.76%
System Design Capacity	kL/d	50	900	11 000	500
System Available Capacity	kL/d	50	900	11 000	500
System Input Value	kL/d	50	900	7 267	246
Capacity Utilisation	%	100.00%	100.00%	66.06%	49.20%
Resource Abstracted From		Unknown	NI	iMvutshane Dam	Mdloti
BDRR 2023	%	49.20%	55.56%	28.27%	26.58%
BDRR 2022	%	62.40%	29.20%	66.10%	21.50%

Key Performance Area	Weight	Ncebo	Nsuze	Ntabaskop	Sundumbili
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	84.51%	75.64%	69.62%	76.55%
Blue Drop Score 2014	%	78.18%	NI	57.20%	88.54%
Blue Drop Score 2012	%	77.59%	NI	78.87%	90.67%
Blue Drop Score 2011	%	74.73%	NI	54.67%	91.54%
System Design Capacity	kL/d	4 000	2 000	250	40 000
System Available Capacity	kL/d	3 840	600	250	27 000
System Input Value	kL/d	917	281	3 112	25 750
Capacity Utilisation	%	23.88%	46.83%	1,244.80%	95.37%
Resource Abstracted From		Tugela	Nsuze	Unknown	Tugela
BDRR 2023	%	16.11%	29.05%	34.46%	39.22%
BDRR 2022	%	16.30%	34.20%	91.60%	36.10%

Key Performance Area	Weight	Umvoti	Vukile	Waterfall
Bulk/WSP		Umgeni Water	-	-
Blue Drop Score 2023	%	88.70%	71.86%	54.28%
Blue Drop Score 2014	%	82.83%	63.95%	70.08%
Blue Drop Score 2012	%	87.40%	79.80%	56.46%
Blue Drop Score 2011	%	91.40%	74.00%	63.90%
System Design Capacity	kL/d	67 000	500	500
System Available Capacity	kL/d	67 000	500	500
System Input Value	kL/d	12 135	288	66
Capacity Utilisation	%	76.28%	57.60%	13.20%
Resource Abstracted From		Mvoti	Unknown	Unknown name
BDRR 2023	%	39.00%	30.05%	87.46%
BDRR 2022	%	29.70%	22.60%	NI

Technical Site Assessment: Sundumbili WTW – 69%

8.8 King Cetshwayo District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	40.70%
Blue Drop Score 2014	%	74.08%
Blue Drop Score 2012	%	75.51%
Blue Drop Score 2011	%	71.31%

Key Performance Area	Weight	Eshowe WTW	Gingindlovu (Gingindlovu WTW)	Khombe	Pikiliyeza
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	34.48%	55.35%	16.28%	12.05%
Blue Drop Score 2014	%	73.68%	78.00%	NI	NI
Blue Drop Score 2012	%	77.77%	69.86%	NI	NI
Blue Drop Score 2011	%	74.98%	75.80%	NI	NI
System Design Capacity	kL/d	9 000	2 000	1 000	500
System Available Capacity	kL/d	9 000	2 000	1 000	500
System Input Value	kL/d	9 000	2 600	1 000	500
Capacity Utilisation	%	NI	130.00%	NI	0.00%
Resource Abstracted From		Mlalazi	Matigulu	Not confirmed	Unknown
BDRR 2023	%	58.32%	24.15%	100.00%	100.00%
BDRR 2022	%	55.80%	17.00%	NI	NI

Key Performance Area	Weight	Greater Mthonjaneni	Melmoth (Melmoth WTW)	Middledrift	Mtunzini
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	35.52%	45.00%	50.66%	50.75%
Blue Drop Score 2014	%	56.40%	64.96%	49.67%	77.18%
Blue Drop Score 2012	%	NI	68.22%	NI	81.92%
Blue Drop Score 2011	%	NI	77.60%	NI	70.21%
System Design Capacity	kL/d	22 000	3 600	10 000	2 000
System Available Capacity	kL/d	22 000	3 600	10 000	2 000
System Input Value	kL/d	22 000	3 600	10 000	2 000
Capacity Utilisation	%	36.36%	NI	NI	NI
Resource Abstracted From		Goedertrouw, Mlalazi	Melmoth Dam	Tugela	Mlalazi
BDRR 2023	%	52.28%	43.57%	40.96%	31.70%
BDRR 2022	%	37.90%	36.10%	41.10%	19.70%

Key Performance Area	Weight	Fort Louis	Nkandla bulk	Nomponjwana	Catherine Booth WTW
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**46.06%**	**52.15%**	**44.53%**	**37.33%**
Blue Drop Score 2014	%	55.98%	90.92%	NI	45.98%
Blue Drop Score 2012	%	52.28%	84.07%	NI	33.48%
Blue Drop Score 2011	%	57.63%	57.63%	NI	55.35%
System Design Capacity	kL/d	850	3 800	1 500	5 500
System Available Capacity	kL/d	850	3 800	1 500	5 500
System Input Value	kL/d	850	3 800	1 500	5 500
Capacity Utilisation	%	0.00%	NI	NI	0.00%
Resource Abstracted From		Nsuze River	Mhlathuze	Mefule	Matigulu, Nembe
BDRR 2023	%	53.62%	35.89%	42.13%	59.59%
BDRR 2022	%	54.70%	23.00%	NI	NI

Technical Site Assessment: Greater Mthonjaneni WTW - 61%

The Regulator note the dire state of management and drinking water quality in the Khombe and Pikiliyeza water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

8.9 Msunduzi Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	97.94%
Blue Drop Score 2014	%	97.97%
Blue Drop Score 2012	%	95.38%
Blue Drop Score 2011	%	95.60%

Key Performance Area	Weight	Umsunduzi
Bulk/WSP		Umgeni Water
Blue Drop Score 2023	%	97.94%
Blue Drop Score 2014	%	97.97%
Blue Drop Score 2012	%	95.38%
Blue Drop Score 2011	%	95.60%
System Design Capacity	kL/d	535 000
System Available Capacity	kL/d	510 000
System Input Value	kL/d	223 000
Capacity Utilisation	%	96.84%
Resource Abstracted From		Midmar Dam
BDRR 2023	%	28.41%
BDRR 2022	%	100.00%

Technical Site Assessment: Midmar WTW – 95%

8.10 Newcastle Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	84.35%
Blue Drop Score 2014	%	89.06%
Blue Drop Score 2012	%	0.00%
Blue Drop Score 2011	%	0.00%

Key Performance Area	Weight	Charlestown	Newcastle
Bulk/WSP		-	uThukela Water
Blue Drop Score 2023	%	47.13%	85.05%
Blue Drop Score 2014	%	64.49%	90.06%
Blue Drop Score 2012	%	60.10%	97.00%
Blue Drop Score 2011	%	40.70%	75.90%
System Design Capacity	kL/d	2 000	130 000
System Available Capacity	kL/d	2 000	130 000
System Input Value	kL/d	2 000	106 450
Capacity Utilisation	%	17.50%	81.88%
Resource Abstracted From		Boreholes	Ntshingway dam
BDRR 2023	%	35.97%	28.38%
BDRR 2022	%	11.70%	54.10%

Technical Site Assessment: Ngagane WTW (uThukela Water) - 89%

8.11 Ugu District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	57.14%
Blue Drop Score 2014	%	66.29%
Blue Drop Score 2012	%	92.55%
Blue Drop Score 2011	%	92.82%

Key Performance Area	Weight	Bhobhoyi	Harding	KwaHlongwa	KwaLembe
Bulk/WSP		-	Umgeni Water	-	-
Blue Drop Score 2023	%	41.40%	55.51%	60.16%	46.68%
Blue Drop Score 2014	%	62.49%	54.20%	46.68%	55.43%
Blue Drop Score 2012	%	92.40%	91.30%	77.42%	80.70%
Blue Drop Score 2011	%	91.20%	95.30%	92.05%	93.43%
System Design Capacity	kL/d	81 000	26 800	250	750
System Available Capacity	kL/d	81 000	25 400	250	750
System Input Value	kL/d	81 000	1 183	250	750
Capacity Utilisation	%	100.00%	84.50%	100.00%	100.00%
Resource Abstracted From		Mzimkhulu, Mzimkulwana	Mzimkulwana	Malukoka	Mkomazi
BDRR 2023	%	49.41%	26.48%	21.23%	37.10%
BDRR 2022	%	35.20%	59.50%	27.11%	35.13%

Key Performance Area	Weight	KwaNdelu	KwaNyuswa 1	KwaNyuswa 2	Mhlabashane
Bulk/WSP		-	-	-	Umgeni Water
Blue Drop Score 2023	%	53.08%	50.05%	41.65%	82.52%
Blue Drop Score 2014	%	46.70%	56.08%	57.95%	0.00%
Blue Drop Score 2012	%	85.50%	72.20%	87.20%	NI
Blue Drop Score 2011	%	90.80%	92.10%	92.10%	NI
System Design Capacity	kL/d	1 400	250	750	4 000
System Available Capacity	kL/d	1 400	250	750	4 000
System Input Value	kL/d	1 400	250	750	7 240
Capacity Utilisation	%	100.00%	100.00%	100.00%	181.00%
Resource Abstracted From		Mzumbe	Mzimkulwana	Gilbert Eyles	Mhlabatshane Dam
BDRR 2023	%	29.26%	29.49%	47.64%	58.87%
BDRR 2022	%	19.66%	30.22%	23.62%	NI

Key Performance Area	Weight	Umtamvuna	Umtwalume	Umzinto	Vulamehlo
Bulk/WSP		-	Umgeni Water	Umgeni Water	-

Key Performance Area	Weight	Umtamvuna	Umtwalume	Umzinto	Vulamehlo
Blue Drop Score 2023	%	**42.83%**	**93.04%**	**82.61%**	**54.91%**
Blue Drop Score 2014	%	64.99%	83.52%	87.08%	62.49%
Blue Drop Score 2012	%	95.20%	95.20%	96.30%	87.00%
Blue Drop Score 2011	%	95.20%	95.20%	96.61%	93.40%
System Design Capacity	kL/d	30 000	38 000	36 000	4 500
System Available Capacity	kL/d	30 000	39 720	41 680	5 000
System Input Value	kL/d	30 000	33 000	13 440	4 500
Capacity Utilisation	%	62.58%	74.35%	63.77%	90.00%
Resource Abstracted From		Mtamvuna	Mtwalume, Nungwane	Mzinto	Mtwalume
BDRR 2023	%	69.47%	30.41%	31.66%	35.37%
BDRR 2022	%	75.93%	28.44%	27.93%	32.69%

Key Performance Area	Weight	Weza
Bulk/WSP		Umgeni Water
Blue Drop Score 2023	%	**62.78%**
Blue Drop Score 2014	%	50.25%
Blue Drop Score 2012	%	73.10%
Blue Drop Score 2011	%	92.70%
System Design Capacity	kL/d	29 600
System Available Capacity	kL/d	26 000
System Input Value	kL/d	5 600
Capacity Utilisation	%	211.90%
Resource Abstracted From		Weza
BDRR 2023	%	34.45%
BDRR 2022	%	71.22%

Technical Site Assessment: Bhoyboyi WTW – 61%

8.12 uMgungundlovu District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	96.44%
Blue Drop Score 2014	%	89.94%
Blue Drop Score 2012	%	92.42%
Blue Drop Score 2011	%	56.22%

Key Performance Area	Weight	Boreholes (Untreated)	Gomane Boreholes	Impendle Spring	Lidgetton West
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	76.30%	78.33%	76.85%	93.58%
Blue Drop Score 2014	%	41.10%	81.57%	69.31%	66.11%
Blue Drop Score 2012	%	69.90%	75.99%	75.91%	74.71%
Blue Drop Score 2011	%	NI	62.71%	52.49%	66.55%
System Design Capacity	kL/d	35	430	170	2 000
System Available Capacity	kL/d	478	430	225	2 000
System Input Value	kL/d	439	430	218	270
Capacity Utilisation	%	91.90%	95.35%	96.89%	13.50%
Resource Abstracted From		Ground water abstractions (Umgeni, Mooi, Mvoti Catchments)	Groundwater source	Ntshishini River catchment	Lion
BDRR 2023	%	16.20%	16.20%	20.11%	11.79%
BDRR 2022	%	21.70%	27.50%	54.70%	15.50%

Key Performance Area	Weight	Mpofana	Nzinga	Rosetta	UW-UMDM
Bulk/WSP		-	-	-	Umgeni Water
Blue Drop Score 2023	%	91.70%	77.28%	92.06%	97.30%
Blue Drop Score 2014	%	79.83%	70.86%	75.85%	95.69%
Blue Drop Score 2012	%	72.94%	73.14%	70.18%	98.79%
Blue Drop Score 2011	%	54.99%	51.86%	68.51%	91.12%
System Design Capacity	kL/d	7 000	253	320	535 000
System Available Capacity	kL/d	8 000	253	270	510 000
System Input Value	kL/d	6 240	253	270	66 590
Capacity Utilisation	%	78.00%	87.35%	89.70%	95.93%
Resource Abstracted From		Mooi River	Nzinga River	Mooi River (just below Spring Grove Dam)	Mgeni River
BDRR 2023	%	21.54%	19.51%	12.38%	28.35%
BDRR 2022	%	22.50%	21.20%	10.10%	50.20%

Technical Site Assessment: Impendle Spring Protection – 50%

8.13 City of uMhlathuze Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	83.70%
Blue Drop Score 2014	%	89.60%
Blue Drop Score 2012	%	92.94%
Blue Drop Score 2011	%	89.26%

Key Performance Area	Weight	Esikhaleni WTW	Mzingazi WTW	Ngwelezane WTW	Nsezi WTW (Mhlathuze Water)
Bulk/WSP		-	-	-	Mhlathuze Water
Blue Drop Score 2023	%	87.25%	73.01%	87.13%	93.23%
Blue Drop Score 2014	%	91.85%	85.45%	95.02%	95.38%
Blue Drop Score 2012	%	92.35%	89.91%	96.37%	98.39%
Blue Drop Score 2011	%	90.07%	89.28%	91.35%	88.90%
System Design Capacity	kL/d	36 000	65 000	8 000	205 000
System Available Capacity	kL/d	36 000	65 000	8 000	205 000
System Input Value	kL/d	28 199	52 030	6 361	45 546
Capacity Utilisation	%	78.33%	80.05%	79.51%	70.24%
Resource Abstracted From		Lake Cubhu	Lake Mzingazi	uMhlathuze River	Mhlathuze River
BDRR 2023	%	34.62%	41.27%	23.41%	26.81%
BDRR 2022	%	30.80%	28.50%	28.20%	42.00%

Technical Site Assessments: Mzingazi WTW (operated by City of uMhlathuze) - 64% and Nsezi WTW (operated by Mhlathuze Water) - 91%

8.14 uMkhanyakude District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	74.32%
Blue Drop Score 2014	%	57.87%
Blue Drop Score 2012	%	77.77%
Blue Drop Score 2011	%	32.45%

Key Performance Area	Weight	Enkanyezini	Hlabisa	Hluhluwe Phase 1	Hluhluwe Phase 2
Bulk/WSP		Novubu	Novubu	Novubu	Novubu
Blue Drop Score 2023	%	76.95%	59.80%	84.68%	62.21%
Blue Drop Score 2014	%	60.00%	63.00%	61.00%	58.00%
Blue Drop Score 2012	%	82.00%	82.00%	75.00%	73.00%
Blue Drop Score 2011	%	26.00%	28.00%	28.00%	28.00%
System Design Capacity	kL/d	500	800	10 000	1 800
System Available Capacity	kL/d	500	800	10 000	1 800
System Input Value	kL/d	369	800	8 630	2 032
Capacity Utilisation	%	73.80%	NI	86.30%	112.89%
Resource Abstracted From		Nkanini stream & boreholes	Mpelenyana stream & boreholes	Hluhluwe River (dam)	Hluhluwe River
BDRR 2023	%	15.76%	76.18%	24.84%	74.59%
BDRR 2022	%	94.20%	95.50%	94.90%	94.40%

Key Performance Area	Weight	Ingwavuma	Jozini New	Jozini Old	Makhonyeni
Bulk/WSP		Novubu	Novubu	Novubu	Novubu
Blue Drop Score 2023	%	57.58%	73.03%	62.61%	70.40%
Blue Drop Score 2014	%	61.00%	63.00%	67.00%	62.00%
Blue Drop Score 2012	%	72.00%	80.00%	62.00%	75.00%
Blue Drop Score 2011	%	NA	43.00%	47.00%	26.00%
System Design Capacity	kL/d	500	5 000	3 000	800
System Available Capacity	kL/d	500	5 000	3 000	800
System Input Value	kL/d	157	4 212	917	543
Capacity Utilisation	%	31.40%	84.24%	30.57%	67.88%
Resource Abstracted From		Ngwavuma River and Dam	Phongolo River and Jozini Dam	Phongolo River and Jozini Dam	Phongolo River and Jozini Dam
BDRR 2023	%	40.49%	64.28%	61.02%	26.07%
BDRR 2022	%	94.90%	95.60%	95.60%	94.90%

Key Performance Area	Weight	Malobeni	Manguzi	Manguzi Airfield	Mbazwana
Bulk/WSP		Novubu	Novubu	Novubu	Novubu

Key Performance Area	Weight	Malobeni	Manguzi	Manguzi Airfield	Mbazwana
Blue Drop Score 2023	%	**73.63%**	**54.93%**	**67.10%**	**69.98%**
Blue Drop Score 2014	%	64.00%	60.00%	40.00%	59.00%
Blue Drop Score 2012	%	70.00%	66.00%	NA	81.00%
Blue Drop Score 2011	%	44.00%	29.00%	NA	28.00%
System Design Capacity	kL/d	500	500	1 000	2 000
System Available Capacity	kL/d	500	500	1 000	2 000
System Input Value	kL/d	89	299	1 154	1 150
Capacity Utilisation	%	17.80%	59.80%	115.40%	57.50%
Resource Abstracted From		Phongolo River and Jozini Dam	Gezisa stream (conventional WTW); Shengeza stream (DAF system)	Boreholes	Lake Sibaya
BDRR 2023	%	18.56%	70.52%	27.51%	23.74%
BDRR 2022	%	94.90%	94.60%	94.80%	95.10%

Key Performance Area	Weight	Mjindi Central	Mkuze	Mpembeni	Mseleni
Bulk/WSP		Novubu	Novubu	Novubu	Novubu
Blue Drop Score 2023	%	**72.48%**	**64.19%**	**71.25%**	**71.10%**
Blue Drop Score 2014	%	64.00%	65.00%	22.00%	52.00%
Blue Drop Score 2012	%	61.00%	65.00%	NA	84.00%
Blue Drop Score 2011	%	27.00%	28.00%	NA	32.00%
System Design Capacity	kL/d	350	1 500	384	800
System Available Capacity	kL/d	350	1 500	384	800
System Input Value	kL/d	63	1 309	299	1 004
Capacity Utilisation	%	18.00%	87.27%	77.86%	125.50%
Resource Abstracted From		Phongolo River and Jozini Dam	Mkuse River & Blacky dam & augmented by Phongolo River	Borehole	Lake Sibaya
BDRR 2023	%	18.56%	56.95%	21.80%	26.52%
BDRR 2022	%	94.90%	96.10%	94.90%	94.80%

Key Performance Area	Weight	Mshudu	Mtubatuba	Nkolokotho	Nondubuya
Bulk/WSP		Novubu	Novubu	Novubu	Novubu
Blue Drop Score 2023	%	**73.55%**	**78.43%**	**65.73%**	**56.40%**
Blue Drop Score 2014	%	45.00%	58.00%	59.00%	60.00%
Blue Drop Score 2012	%	NA	82.00%	81.00%	77.00%
Blue Drop Score 2011	%	NA	46.00%	27.00%	23.00%
System Design Capacity	kL/d	1 000	20 000	5 000	300

Key Performance Area	Weight	Mshudu	Mtubatuba	Nkolokotho	Nondubuya
System Available Capacity	kL/d	1 000	20 000	5 000	300
System Input Value	kL/d	1 000	8 324	3 703	216
Capacity Utilisation	%	NI	41.62%	74.06%	72.00%
Resource Abstracted From		Borehole	Mfolozi river & 3 boreholes along river bank	uMfolozi river & Mbuku lake or Nkolokotho Dam	Phongolo River
BDRR 2023	%	29.05%	23.93%	65.31%	57.81%
BDRR 2022	%	95.50%	57.60%	94.90%	94.90%

Key Performance Area	Weight	Shemula	Thengane
Bulk/WSP		Novubu	Novubu
Blue Drop Score 2023	%	**74.63%**	**75.10%**
Blue Drop Score 2014	%	54.00%	51.00%
Blue Drop Score 2012	%	80.00%	NA
Blue Drop Score 2011	%	26.00%	NA
System Design Capacity	kL/d	20 000	1 000
System Available Capacity	kL/d	20 000	1 000
System Input Value	kL/d	16 285	861
Capacity Utilisation	%	81.43%	86.10%
Resource Abstracted From		Lower Phongolo river	Wellfield of 5 Boreholes
BDRR 2023	%	32.64%	20.16%
BDRR 2022	%	95.90%	95.50%

Technical Site Assessment: Mtubatuba WTW - 57%

8.15 uMzinyathi District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	31.59%
Blue Drop Score 2014	%	78.02%
Blue Drop Score 2012	%	93.45%
Blue Drop Score 2011	%	70.01%

Key Performance Area	Weight	Dundee	Fabeni	Keat`s Drift (Ethembeni)	Pomeroy
Bulk/WSP		uThukela Water	-	-	-
Blue Drop Score 2023	%	61.03%	21.00%	25.85%	15.35%
Blue Drop Score 2014	%	82.70%	71.81%	67.21%	76.19%
Blue Drop Score 2012	%	97.04%	89.65%	90.37%	NI
Blue Drop Score 2011	%	71.40%	65.06%	68.81%	61.51%
System Design Capacity	kL/d	16 000	500	500	500
System Available Capacity	kL/d	16 000	500	500	500
System Input Value	kL/d	9 522	500	500	500
Capacity Utilisation	%	59.51%	NI	NI	NI
Resource Abstracted From		Buffalo River & Tom Worthington Dam	Borehole Water	Mooi River	Borehole
BDRR 2023	%	48.48%	65.99%	45.90%	58.26%
BDRR 2022	%	48.50%	66.00%	45.90%	58.30%

Key Performance Area	Weight	Sampofu	Isandlwana	Nondweni	Nqutu (Vant`s Drift)
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	15.35%	15.35%	29.35%	29.80%
Blue Drop Score 2014	%	76.45%	70.01%	62.90%	76.29%
Blue Drop Score 2012	%	88.98%	91.88%	84.57%	92.74%
Blue Drop Score 2011	%	66.51%	62.09%	73.32%	69.84%
System Design Capacity	kL/d	3 000	450	2 000	12 000
System Available Capacity	kL/d	3 000	450	2 000	12 000
System Input Value	kL/d	3 000	450	2 000	8 000
Capacity Utilisation	%	NI	NI	NI	66.67%
Resource Abstracted From		Tugela River and Borehole	Manz Manyama River	Vovo River	Baffalo River/uMzinyathi
BDRR 2023	%	77.21%	72.18%	36.36%	43.27%
BDRR 2022	%	77.20%	72.20%	20.50%	41.80%

Key Performance Area	Weight	Qudeni	Amakhabaleni	Greytown	Muden
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**27.40%**	**15.35%**	**15.35%**	**15.35%**
Blue Drop Score 2014	%	73.20%	77.45%	78.25%	63.12%
Blue Drop Score 2012	%	90.82%	85.07%	92.73%	85.14%
Blue Drop Score 2011	%	NI	60.53%	70.86%	66.95%
System Design Capacity	kL/d	300	4 000	6 000	11 000
System Available Capacity	kL/d	300	2 000	6 000	3 000
System Input Value	kL/d	300	2 000	6 000	3 000
Capacity Utilisation	%	NI	NI	NI	NI
Resource Abstracted From		Kubazi river	Uthukela River	Lake Mathle	Muden Irrigation Canal
BDRR 2023	%	36.85%	65.81%	65.81%	68.65%
BDRR 2022	%	36.80%	62.40%	65.80%	55.00%

Key Performance Area	Weight	Kranskop
Bulk/WSP		-
Blue Drop Score 2023	%	**19.90%**
Blue Drop Score 2014	%	70.48%
Blue Drop Score 2012	%	87.00%
Blue Drop Score 2011	%	64.79%
System Design Capacity	kL/d	800
System Available Capacity	kL/d	800
System Input Value	kL/d	800
Capacity Utilisation	%	NI
Resource Abstracted From		Borehole abstraction
BDRR 2023	%	43.32%
BDRR 2022	%	43.30%

Technical Site Assessment: Vants Drift WTW - 80%

The Regulator notes the dire state of management and drinking water quality in the Fabeni, Keat`s Drift (Ethembeni), Pomeroy, Sampofu, Isandlwana, Nondweni, Vant`s Drift, Qudeni, Amakhabaleni, Greytown, Muden and Kranskop Thukela water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

8.16 uThukela District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	50.42%
Blue Drop Score 2014	%	34.50%
Blue Drop Score 2012	%	57.39%
Blue Drop Score 2011	%	55.29%

Key Performance Area	Weight	Colenso	Ezakheni	Ladysmith	Loskop
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	51.98%	48.05%	50.80%	48.05%
Blue Drop Score 2014	%	28.87%	31.00%	46.64%	24.90%
Blue Drop Score 2012	%	44.80%	45.93%	63.37%	68.81%
Blue Drop Score 2011	%	44.00%	51.55%	63.01%	42.10%
System Design Capacity	kL/d	1 200	32 000	23 000	8 000
System Available Capacity	kL/d	2 640	37 000	25 300	9 200
System Input Value	kL/d	2 300	36 000	31 304	3 250
Capacity Utilisation	%	87.12%	97.30%	122.53%	55.45%
Resource Abstracted From		Tugela	Tugela	Tugela	Njesuthi
BDRR 2023	%	48.53%	53.06%	51.59%	49.98%
BDRR 2022	%	55.60%	47.00%	56.70%	100.00%

Key Performance Area	Weight	Ekuvukeni Township and surrounding Rural areas	Tugela Estates	Bergville Town and Surrounding Rural Areas	Langkloof
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	52.50%	49.13%	52.60%	45.83%
Blue Drop Score 2014	%	24.66%	22.23%	26.10%	27.83%
Blue Drop Score 2012	%	62.19%	56.80%	53.58%	62.24%
Blue Drop Score 2011	%	58.69%	42.10%	56.64%	58.81%
System Design Capacity	kL/d	8 000	1 200	2 600	100
System Available Capacity	kL/d	10 000	1 200	2 400	100
System Input Value	kL/d	8 000	1 200	2 600	100
Capacity Utilisation	%	NI	NI	133.33%	NI
Resource Abstracted From		Sundays	Tugela	Tugela	Tugela
BDRR 2023	%	53.85%	49.15%	47.95%	44.80%
BDRR 2022	%	35.40%	28.90%	60.90%	42.40%

Key Performance Area	Weight	Moyeni/Zwelisha	Winterton Town, Khethani Township	Archie Rodel	George Cross
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**52.95%**	**52.40%**	**51.30%**	**52.30%**
Blue Drop Score 2014	%	25.09%	27.57%	37.40%	37.49%
Blue Drop Score 2012	%	42.04%	56.08%	64.29%	67.72%
Blue Drop Score 2011	%	59.49%	55.40%	60.54%	63.84%
System Design Capacity	kL/d	2 400	1 200	12 000	21 000
System Available Capacity	kL/d	2 500	1 200	12 000	21 000
System Input Value	kL/d	2 700	1 500	10 000	23 000
Capacity Utilisation	%	108.00%	125.00%	83.33%	109.52%
Resource Abstracted From		Tugela	Little Tugela	Boesmans	Wagendrift
BDRR 2023	%	47.95%	45.03%	45.87%	52.50%
BDRR 2022	%	61.80%	45.90%	65.90%	57.70%

Key Performance Area	Weight	Weenen 2	Weenen Town
Bulk/WSP		-	-
Blue Drop Score 2023	%	**49.68%**	**48.95%**
Blue Drop Score 2014	%	40.99%	40.99%
Blue Drop Score 2012	%	66.79%	66.79%
Blue Drop Score 2011	%	58.25%	58.25%
System Design Capacity	kL/d	5 000	1 500
System Available Capacity	kL/d	4 200	1 200
System Input Value	kL/d	3 000	1 250
Capacity Utilisation	%	71.43%	104.17%
Resource Abstracted From		Boesmans	Boesmans
BDRR 2023	%	42.76%	41.05%
BDRR 2022	%	62.50%	53.40%

Technical Site Assessment: Ladysmith WTW - 89%

8.17 Zululand District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	43.93%
Blue Drop Score 2014	%	51.18%
Blue Drop Score 2012	%	83.05%
Blue Drop Score 2011	%	72.13%

Key Performance Area	Weight	Babanango	Belgrade	Belgrade New	Bhokwe
Bulk/WSP		Zana Manzi (WSSA)	Zana Manzi (WSSA)	Zana Manzi (WSSA)	Zana Manzi (WSSA)
Blue Drop Score 2023	%	68.48%	65.94%	43.70%	54.38%
Blue Drop Score 2014	%	58.00%	55.00%	40.00%	NA
Blue Drop Score 2012	%	89.00%	92.00%	NA	NA
Blue Drop Score 2011	%	80.00%	80.00%	NA	NA
System Design Capacity	kL/d	330	1 100	4 000	300
System Available Capacity	kL/d	330	825	4 000	300
System Input Value	kL/d	368	867	2 366	110
Capacity Utilisation	%	111.52%	105.09%	59.15%	36.67%
Resource Abstracted From		Golokodo river and Babanango dam	Belgrade pond & Mozane River	Belgrade pond & Mozane River	Spring
BDRR 2023	%	32.79%	34.90%	48.01%	21.92%
BDRR 2022	%	40.90%	43.40%	48.30%	NA

Key Performance Area	Weight	Ceza	eDumbe	eMakhosini	Enyathi
Bulk/WSP		Zana Manzi (WSSA)	Zana Manzi (WSSA)	Zana Manzi (WSSA)	Zana Manzi (WSSA)
Blue Drop Score 2023	%	62.88%	67.85%	58.48%	57.08%
Blue Drop Score 2014	%	50.00%	71.00%	51.00%	56.00%
Blue Drop Score 2012	%	78.00%	94.00%	66.00%	75.00%
Blue Drop Score 2011	%	80.00%	79.00%	NA	NA
System Design Capacity	kL/d	400	2 400	700	1 000
System Available Capacity	kL/d	360	2 400	700	1 000
System Input Value	kL/d	479	2 459	498	309
Capacity Utilisation	%	133.06%	102.46%	71.14%	30.90%
Resource Abstracted From		Vungu River	eDumbe Dam	A well on bank of Mpembeni River	Spring tributary of Black uMfolozi river
BDRR 2023	%	34.05%	35.13%	40.01%	30.92%
BDRR 2022	%	50.80%	47.80%	45.40%	28.70%

Key Performance Area	Weight	Frischgewaagd Bilanyoni	Gumbi RSS	Itshelejuba Hospital	Khambi
Bulk/WSP		Zana Manzi (WSSA)	Zana Manzi (WSSA)	Zana Manzi (WSSA)	Zana Manzi (WSSA)
Blue Drop Score 2023	%	**74.13%**	**61.53%**	**62.24%**	**42.98%**
Blue Drop Score 2014	%	71.00%	51.00%	51.00%	66.00%
Blue Drop Score 2012	%	92.00%	NA	88.00%	84.00%
Blue Drop Score 2011	%	79.00%	84.00%	84.00%	NA
System Design Capacity	kL/d	10 000	500	500	500
System Available Capacity	kL/d	10 000	500	500	500
System Input Value	kL/d	2 156	269	500	466
Capacity Utilisation	%	21.56%	53.80%	NI	93.20%
Resource Abstracted From		Pongola River	Jozini Dam	Borehole	Sihlengeni River
BDRR 2023	%	20.71%	36.54%	35.38%	48.91%
BDRR 2022	%	41.70%	36.20%	30.00%	41.60%

Key Performance Area	Weight	Khangela Palace	Khiphunyawo	Kombuzi	Mandlakazi
Bulk/WSP		Zana Manzi (WSSA)	Zana Manzi (WSSA)	Zana Manzi (WSSA)	Zana Manzi (WSSA)
Blue Drop Score 2023	%	**65.94%**	**60.08%**	**55.45%**	**65.83%**
Blue Drop Score 2014	%	43.00%	66.00%	51.00%	48.00%
Blue Drop Score 2012	%	63.00%	75.00%	72.00%	84.00%
Blue Drop Score 2011	%	80.00%	61.00%	81.00%	80.00%
System Design Capacity	kL/d	150	370	200	10 000
System Available Capacity	kL/d	150	370	200	10 000
System Input Value	kL/d	59	400	119	4 908
Capacity Utilisation	%	39.33%	108.11%	59.50%	49.08%
Resource Abstracted From		Nkuzana river	Myokane river	Nkunzana river	Pongolapoort dam
BDRR 2023	%	28.37%	34.71%	37.81%	34.95%
BDRR 2022	%	48.60%	38.50%	35.80%	35.90%

Key Performance Area	Weight	Mountain View	Mpungamhlope	Msibi	Mvuzini
Bulk/WSP		Zana Manzi (WSSA)	Zana Manzi (WSSA)	Zana Manzi (WSSA)	Zana Manzi (WSSA)
Blue Drop Score 2023	%	**47.58%**	**70.43%**	**60.08%**	**67.68%**
Blue Drop Score 2014	%	64.00%	45.00%	53.00%	53.00%
Blue Drop Score 2012	%	82.00%	85.00%	80.00%	85.00%
Blue Drop Score 2011	%	75.00%	82.00%	73.00%	75.00%
System Design Capacity	kL/d	200	800	500	800
System Available Capacity	kL/d	200	800	500	800
System Input Value	kL/d	121	776	296	619

Key Performance Area	Weight	Mountain View	Mpungamhlope	Msibi	Mvuzini
Capacity Utilisation	%	60.50%	97.00%	59.20%	77.38%
Resource Abstracted From		Nthombothi River	White uMfolozi River	Myokane river	Mvunyani Dam, and Mvuzini River and Dam
BDRR 2023	%	50.17%	33.51%	37.81%	23.31%
BDRR 2022	%	41.30%	51.30%	44.60%	43.10%

Key Performance Area	Weight	Nkonjeni Hospital	Nkosentsha	Nongoma	Ophuzane
Bulk/WSP		Zana Manzi (WSSA)	Zana Manzi (WSSA)	Zana Manzi (WSSA)	Zana Manzi (WSSA)
Blue Drop Score 2023	%	64.64%	45.40%	68.11%	47.58%
Blue Drop Score 2014	%	54.00%	61.00%	65.00%	65.00%
Blue Drop Score 2012	%	79.00%	66.00%	94.00%	81.00%
Blue Drop Score 2011	%	82.00%	61.00%	81.00%	68.00%
System Design Capacity	kL/d	100	130	14 800	500
System Available Capacity	kL/d	100	130	14 800	500
System Input Value	kL/d	126	27	6 937	283
Capacity Utilisation	%	126.00%	20.77%	60.69%	56.60%
Resource Abstracted From		Nqabaneni Dam	Nkwazana river	Swart Mfolozi River & Vokwana dam or Vuna dam	Nsingane River
BDRR 2023	%	33.17%	47.96%	44.85%	50.17%
BDRR 2022	%	82.80%	36.30%	61.50%	41.60%

Key Performance Area	Weight	Osingisingini	Pongola	Purim RWS	Sidinsi
Bulk/WSP		Zana Manzi (WSSA)	Zana Manzi (WSSA)	Zana Manzi (WSSA)	Zana Manzi (WSSA)
Blue Drop Score 2023	%	48.03%	69.98%	58.40%	56.65%
Blue Drop Score 2014	%	43.00%	73.00%	64.00%	50.00%
Blue Drop Score 2012	%	76.00%	94.00%	80.00%	85.00%
Blue Drop Score 2011	%	75.00%	80.00%	77.00%	68.00%
System Design Capacity	kL/d	60	10 300	500	280
System Available Capacity	kL/d	60	10 300	500	280
System Input Value	kL/d	39	10 622	434	123
Capacity Utilisation	%	65.00%	103.13%	86.80%	43.93%
Resource Abstracted From		Unknown river	Bizane dam via Senekal boerdery irrigation channel and Pongola River	Mondlo Dam	Mona river
BDRR 2023	%	42.73%	36.53%	34.05%	34.34%
BDRR 2022	%	36.30%	35.90%	39.10%	37.20%

Key Performance Area	Weight	Sovane	Spekboom	Tholakele	Thulasizwe Hospital
Bulk/WSP		Zana Manzi (WSSA)	Zana Manzi (WSSA)	Zana Manzi (WSSA)	Zana Manzi (WSSA)
Blue Drop Score 2023	%	45.18%	41.65%	60.08%	64.21%
Blue Drop Score 2014	%	NA	43.00%	53.00%	62.00%
Blue Drop Score 2012	%	NA	81.00%	70.00%	85.00%
Blue Drop Score 2011	%	NA	72.00%	68.00%	80.00%
System Design Capacity	kL/d	200	1 200	500	200
System Available Capacity	kL/d	200	1 200	500	200
System Input Value	kL/d	101	821	291	95
Capacity Utilisation	%	50.50%	68.42%	58.20%	47.50%
Resource Abstracted From		Unknown river	Spekboom river	Ntombe River	Sihululu River
BDRR 2023	%	37.70%	63.68%	37.81%	28.37%
BDRR 2022	%	30.80%	64.30%	50.80%	36.30%

Key Performance Area	Weight	Ulundi Nkonjeni	Usuthu	Coronation	eMondlo
Bulk/WSP		Zana Manzi (WSSA)	Zana Manzi (WSSA)	Abaqulusi LM	Abaqulusi LM
Blue Drop Score 2023	%	68.15%	58.36%	26.10%	27.45%
Blue Drop Score 2014	%	69.00%	45.00%	18.00%	42.00%
Blue Drop Score 2012	%	88.00%	NA	71.00%	76.00%
Blue Drop Score 2011	%	81.00%	NA	51.00%	55.00%
System Design Capacity	kL/d	26 400	10 000	8 000	12 000
System Available Capacity	kL/d	26 400	10 000	8 000	10 800
System Input Value	kL/d	16 210	2 924	8 000	12 000
Capacity Utilisation	%	61.40%	29.24%	NI	NI
Resource Abstracted From		White uMfolozi River	Swart Mfolozi River	Boulders Dam	Mvunyana River
BDRR 2023	%	34.34%	31.87%	99.27%	97.44%
BDRR 2022	%	38.20%	NA	99.70%	98.20%

Key Performance Area	Weight	Hlobane	Louwsberg	Vryheid
Bulk/WSP		Abaqulusi LM	Abaqulusi LM	Abaqulusi LM
Blue Drop Score 2023	%	29.60%	25.50%	30.69%
Blue Drop Score 2014	%	27.00%	43.00%	31.00%
Blue Drop Score 2012	%	80.00%	67.00%	75.00%
Blue Drop Score 2011	%	67.00%	64.00%	67.00%
System Design Capacity	kL/d	4 500	1 100	61 500
System Available Capacity	kL/d	4 500	1 100	61 500
System Input Value	kL/d	4 500	1 100	61 500
Capacity Utilisation	%	NI	NI	0.00%

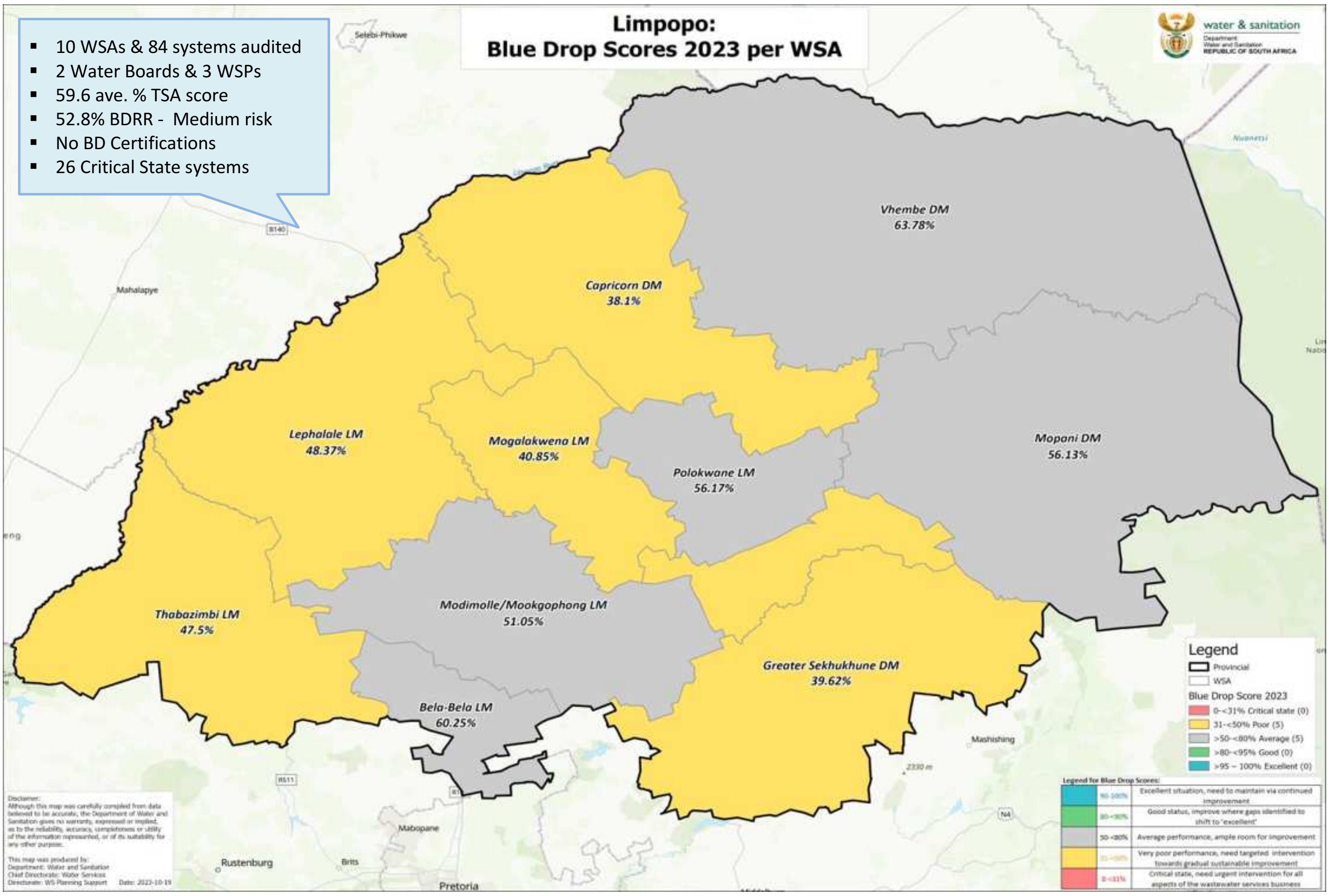
Key Performance Area	Weight	Hlobane	Louwsberg	Vryheid
Resource Abstracted From		Vaalbank dam	Mhulumbele River	Bloemveld dam, Wit Mfolozi River & Klipfontein dam
BDRR 2023	%	99.27%	99.20%	99.43%
BDRR 2022	%	99.80%	99.70%	100.00%

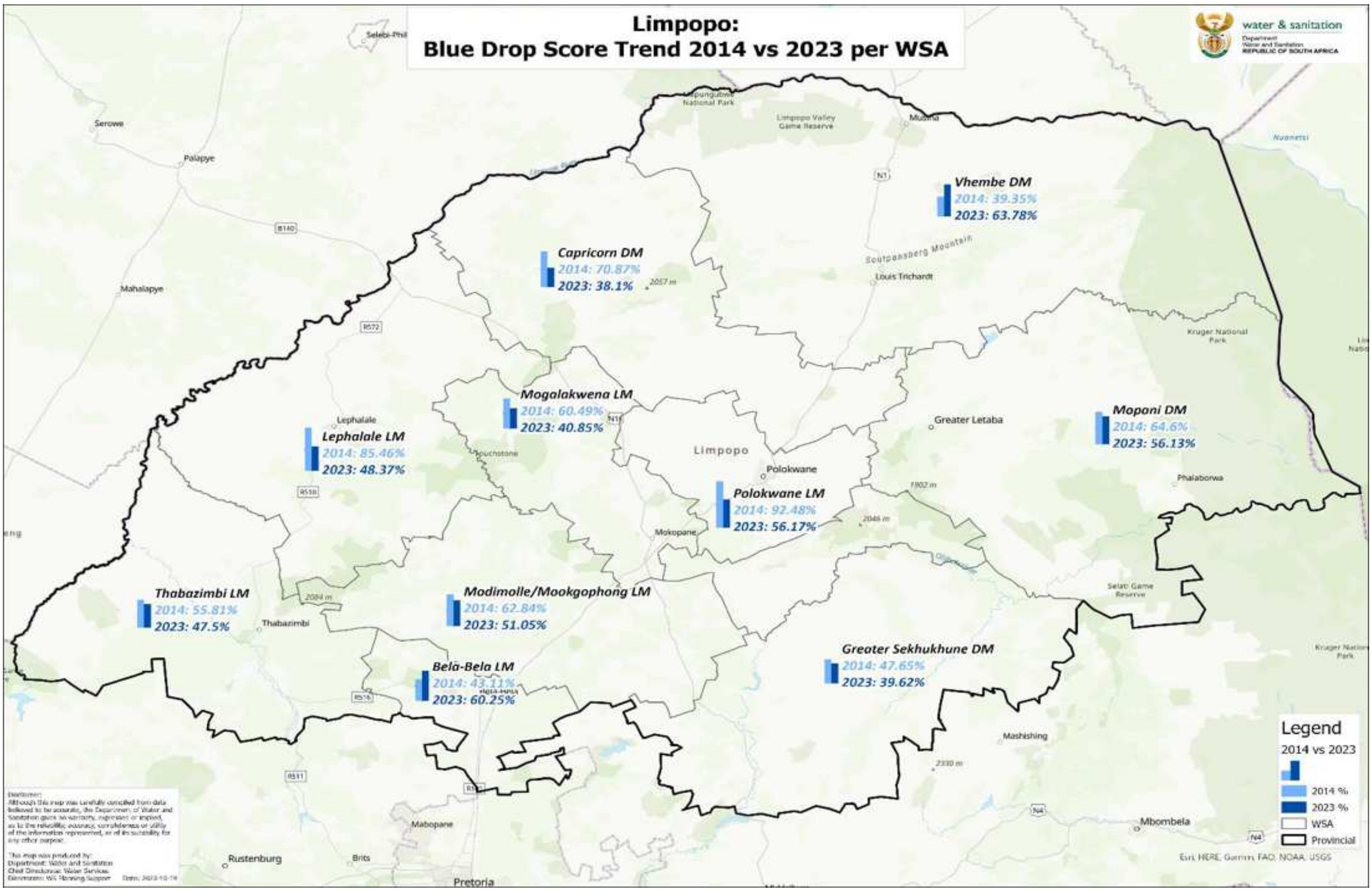
Technical Site Assessment: Ulundi-Nkonjeni WTW - 69%

The Regulator notes the dire state of management and drinking water quality in the Coronation, eMondlo, Hlobane, Louwsberg and Vryheid water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

Mbombela: The new Nelspruit clear water tank is well maintained, proud housekeeping

Grabouw WTW: Chemical dosing facility – accurate dosing and knowledgeable process controllers


Limpopo:
Blue Drop Scores 2023 per WSA
10 WSAs & 84 systems audited
2 Water Boards & 3 WSPs
59.6 ave. % TSA score
52.8% BDRR - Medium risk
No BD Certifications
26 Critical State systems
water & sanitation
Department Water and Sanitation REPUBLIC OF SOUTH AFRICA
Vhembe DM 63.78%
Capricorn DM 38.1%
Lephalale LM 48.37%
Mogalakwena LM 40.85%
Polokwane LM 56.17%
Mopani DM 56.13%
Modimolle/Mookgophong LM 51.05%
Thabazimbi LM 47.5%
Greater Sekhukhune DM 39.62%
Bela-Bela LM 60.25%
Legend
Provincial
WSA
Blue Drop Score 2023
0-<31% Critical state (0)
31-<50% Poor (5)
>50-<80% Average (5)
>80-<95% Good (0)
>95 – 100% Excellent (0)
Legend for Blue Drop Scores:
Excellent situation, need to maintain via continued improvement
Good status, improve where gaps identified to shift to 'excellent'
50-<80% Average performance, ample room for improvement
Very poor performance, need targeted intervention towards gradual sustainable improvement
Critical state, need urgent intervention for all aspects of the wastewater services business
Mahalapye
Rustenburg
Pretoria


Limpopo:
Blue Drop Score Trend 2014 vs 2023 per WSA
water & sanitation
Vhembe DM 2014: 39.35% 2023: 63.78%
Capricorn DM 2014: 70.87% 2023: 38.1%
Mogalakwena LM 2014: 60.49% 2023: 40.85%
Lephalale LM 2014: 85.46% 2023: 48.37%
Mopani DM 2014: 64.6% 2023: 56.13%
Polokwane LM 2014: 92.48% 2023: 56.17%
Thabazimbi LM 2014: 55.81% 2023: 47.5%
Modimolle/Mookgophong LM 2014: 62.84% 2023: 51.05%
Bela-Bela LM 2014: 43.11% 2023: 60.25%
Greater Sekhukhune DM 2014: 47.65% 2023: 39.62%
Legend
2014 vs 2023
2014 %
2023 %
WSA
Provincial
Esri, HERE, Garmin, FAO, NOAA, USGS
Mahalapye
Polokwane
Mokopane
Rustenburg
Pretoria
Mbombela

Provincial Synopsis

The Limpopo province provides drinking water to a total population of 3,391,492 persons in South Africa.

An audit attendance record of 100% of the 10 WSAs, with 84 water supply systems across the province, 2 Water Boards (Lepelle Northern Water and Magalies Water, and 3 Bulk Water Providers (EXXARO, Eskom and Public Works LP) affirms the province's commitment to the Blue Drop national incentive-based regulatory programme. The main Bulk Water Supplier is Lepelle Northern Water who supplies potable water to 24 water supply systems in 6 WSAs followed by Magalies Water who supplies potable water from the Vaalkop WTW in the Northwest province to 2 water supply systems in the Thabazimbi LM and from the Klipdrift WTW in the Gauteng province to 1 water supply system in the Bela Bela LM and Modimolle/Mookgophong LM respectively. EXXARO and Eskom supply potable water to 2 water supply systems in the Lephalale LM.

The Regulator determined that no water supply systems scored more than 95% when measured against the Blue Drop standards and thus did not qualify for the prestigious Blue Drop Certification. In 2014, 1 water supply system was awarded Blue Drop status. Using the 2014 audit results as comparative baseline, the province shows a decline in excellence for 2023.

Two (2) of 10 WSAs improved on their 2014 scores, namely Bela-Bela LM and Vhembe DM. The remaining 8 WSAs regressed to lower Blue Drop scores compared to their 2014 baselines. The Vhembe DM, Bela-Bela LM and Polokwane LM are the best performing WSAs in the province. The best technical site assessment scores of 86% for the Zeeland WTW in Lephalale LM, followed by the Doorndraai WTW and Khalavha WTW with a TSA score of 76% respectively. 26 water supply systems were identified to be in a critical state in the province compared with 22 water supply systems in 2014.

The province's overall Blue Drop performance is characterised by particular strengths when measured against the KPAs. Only Magalies Water stands out for its compliance, good practice and risk management practices that is fairly well embedded in the water supply business. The KPAs that require attention and are reflecting scores below 50% are KPA 2 DWQ Risk Management (29.8%), KPA 3 Financial Management (44.5%), and KPA 4 Technical Management (23.2%).

The provincial Blue Drop Risk Rating (BDRR) remained in the medium risk category but improved from 61.6% in 2022 (BD PAT) to 52.8% in 2023. 42 (of 84) water supply systems are situated in the low risk category, 25 WSSs in the medium risk category, 8 WSSs in the high risk category, and 9 WSSs in the critical risk category.

The Regulator is optimistic that the 2023 Blue Drop report provides an updated residual basis from where a positive trajectory for water services delivery and improved performance will follow in the next BD audit. Municipalities and their service providers are encouraged to start preparation for the next Blue Drop audit cycle, which is planned to cover the financial year 2023/24 and released in 2025. The 2023 Blue Drop status for WSAs in the province are summarised in the table below.

Table 126 - 2023 Blue Drop Summary

WSA Name	2014 BD Score (%)	2023 BD Score (%)	2023 BD Certified ≥95%	2023 Critical State (<31%)
Bela-Bela LM	43.1%	60.3%↑		Radium, Rapotokwane
Capricorn DM	70.9%	38.1%↓		Alldays, Botlokwa, Mogwadi and Senwabarwana
Greater Sekhukhune DM	47.7%	39.6%↓		Flag Boshielo, Kutullo, Magukubjane, Mahlokoena, Mapodile, Marishane, Masemola, Ngwaabe, Nkosini, Penge, Steelpoort, Tsakane and Vergelegen
Lephalale LM	85.5%	48.4%↓		
Modimolle/Mookgophong LM	62.8%	51.1%↓		Mookgophong, Mabaleng, Mabatlane and Roedtan
Mogalakwena LM	60.5%	40.9%↓		
Mopani DM	64.6%	56.1%↓		Drakensig
Polokwane LM	92.5%	56.2%↓		
Thabazimbi LM	55.8%	47.5%↓		Leeupoort and Rooiberg
Vhembe DM	39.4%	63.8%↑		
Totals	-	-	0	26

↑= improvement, ↓= regress, →= no change

The Department of Water and Sanitation acknowledges the excellence in water services management achieved for the Blue Drop Audit year of 2021-22. No Blue Drop Certificates are awarded in the Limpopo Province.

Background to Water Delivery and Distribution Infrastructure

The total volume of water treated in the province is 654,176 kl/d. Ten (10) WSA, 2 Water Boards (Lepelle Northern Water and Magalies Water, and 3 Bulk Water Providers (EXXARO, Eskom and Public Works LP) are responsible for water services through a water network comprising of:

- 85 WTWs and boreholes with the bulk of the water treated and supplied by Lepelle Northern Water from 17 WTWs to 24 WSSs in 6 WSAs with a total Average Daily Production of 340,865 kl/d
- 84 WSSs of which 30 WSSs in all 10 WSAs are provided with bulk potable water from Lepelle Northern Water, Magalies Water, EXXARO and Eskom)
- 116 pump stations, 3,568 km bulk water supply lines, 30,105 km reticulation pipe lines, and 1,154 reservoirs/towers (excluding 6 WSAs systems that provide no or partial verifiable data).

Table 127 - Summary of Capacities, Daily Production and SIV distribution according to plant sizes

	Micro Size Plants	Small Size Plants	Medium Size Plants	Large Size Plants	Macro Size Plants	Unknown (NI)*	Total
	<500 kl/day	500 - <2,000 kl/day	2,000 - <10,000 kl/day	10,000 - <25,000 kl/day	>25,000 kl/day		
No. of WTWs, Boreholes, Springs	7 (8%)	18 (21%)	33 (39%)	19 (22%)	8 (10%)		85
Total Design Capacity (kl/day)	1,520	18,328	157,973	255,560	412,700	None	846,081
Total Available Capacity (kl/day)	1,520	18,128	152,933	255,560	412,700	None	840,841
Average Daily Treatment Volume (kl/day)	174	8,180	97,694	127,264	420,864	33 NI	654,176
Total SIV (kl/day)	1,690	19,241	135,571	175,144	382,048		713,694
Design Capacity Utilisation (%)	11%	45%	62%	50%	102%		77%
Available Capacity Utilisation (%)	11%	45%	64%	50%	102%		78%

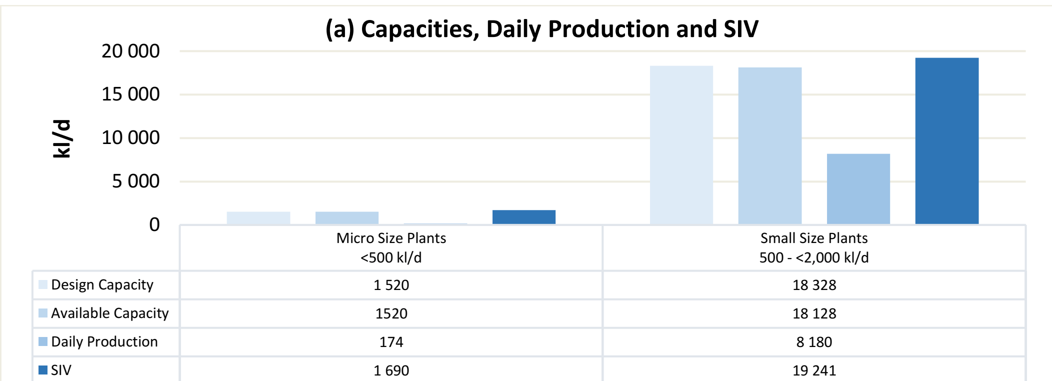
** "Unknown" means the number of WTWs with NI (No Information) on design capacity or available capacity or SIV*

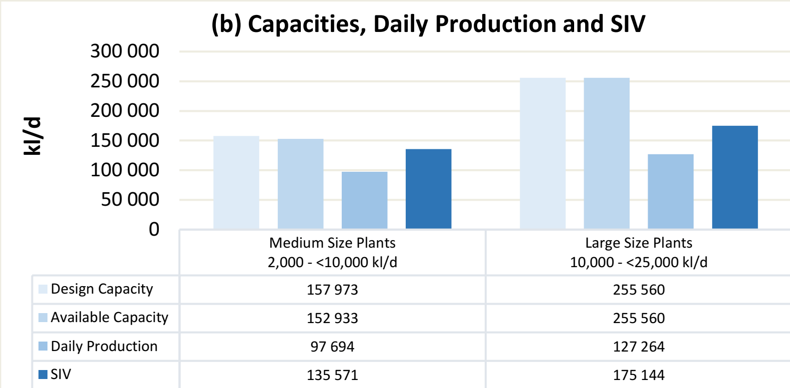
The audit verified a total installed design capacity of 846,081 kl/d and a total available design capacity of 840,841 kl/d with most of this capacity residing in the large and macro-sized water treatment plants.

Collectively, the 85 WTWs produce 654,176 kl/d and distributes 713,694 kl/d across the water networks. By comparing the available treatment capacity with the treated water volume, a spare treatment capacity of 186,665 kl/d is available (22%) to meet additional future demands.

However, the WUE for the province is slightly high (ave. 210 l/p/d) compared to the international WUE benchmark of 180 l/p/d, indicating a high ratio between effective water use and actual water abstraction.

Going forward, the province will have to dedicate significant resources to curb water losses and NRW.





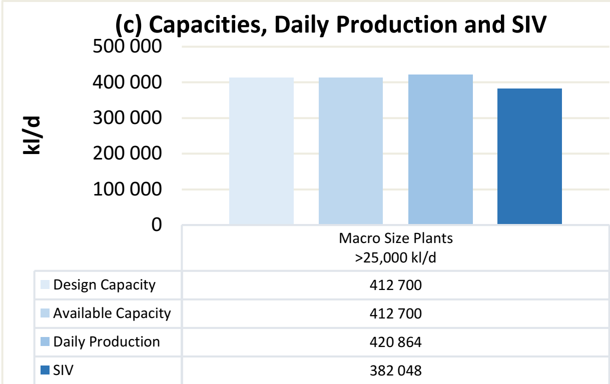


Figure 94 - Capacities, Daily Production and SIV Distribution - (a) micro to medium sized WTWs, (b) large WTWs, and (c) macro sized WTWs

In some cases, a Bulk Water Supplier supplies water across provincial borders and it is difficult to report accurately on design capacity and available capacity at provincial level, as the statistical data may become repetitive. Therefore, the reporting on the total system input volumes (SIV) would provide more accurate figures on the supply of treated water to the various water supply systems. The total SIV in the province is 713,694 kl/d and the average daily treatment volume is 654,176. kl/d and this indicates that the treated volume is less than the total SIV (92%) as 33 no. WTWs are not measuring their average daily treatment volumes, and 4 WSSs are receiving potable water from the Magalies Water Vaalkop WTW in the Northwest province and the Magalies Water Klipdrift WTW in the Gauteng province. The largest contributor to the total SIV for 24 WSSs is from Lepelle Northern Water with a total SIV contribution of 340,865 kl/d (48%). Diagnostic no. 2 to follow herein will unpack these statistics in more detail. The data shows that 7 WTW daily average treatment volumes exceeds the available design capacity. 4 WTWs have daily production volumes that exceed the authorised daily abstraction volumes. The water distribution infrastructure is summarised in the table below.

Table 128 - Summary of Water Distribution Reticulation Infrastructure

WSA & WB Name	# WSS with no WSP/WB	# WSS with WSP/WB	Water Distribution Infrastructure			
			# Pump Stations (#)	Bulk Water Supply Lines (km)	Reticulation pipe lines (km)	# Reservoirs/ Towers
Lepelle Northern Water	-	24	55	1,459	4,452	529
Bela-Bela LM	2	1	3	12	NI	7
Capricorn DM	4	3	NI	NI	NI	NI
Greater Sekhukhune DM	8	12	NI	NI	NI	NI
Lephalale LM		2	NI	NI	NI	NI
Modimolle/Mookgophong LM	4	1	7	607	NI	16
Mogalakwena LM		1	NI	NI	NI	NI
Mopani DM	15	3	39	835	4,774	292
Polokwane LM	3	4	4	195	1,101	158
Thabazimbi LM	4		3	NI	NI	2
Vhembe DM	15	2	5	460	19,779	150
Totals	**55**	**29**	**116**	**3,568**	**30,105**	**1,154**

Provincial Blue Drop Analysis

The 100% response from the 10 WSAs audited demonstrates a firm commitment to progressive water services management in the province. Local Government reforms resulted in the merging of Mookgophong LM and Modimolle LM into Modimolle-Mookgophong LM. Therefore, 10 WSAs were audited in 2023 compared to the 11 WSAs in 2014.

Table 129 - Blue Drop Comparative Analysis from 2012 to 2023

BLUE DROP COMPARATIVE ANALYSIS				
Performance Category	**2012**	**2014**	**2023**	**Performance trend 2014 and 2023**
Incentive-based indicators				
WSAs assessed (#)	11 (100%)	11 (100%)	10 (100%)	→
Water supply systems assessed (#)	64	74	84	↑
Blue Drop scores ≥50% (#)	47 (73%)	29 (39%)	44 (52%)	↑
Blue Drop scores <50% (#)	17 (27%)	45 (61%)	40 (48%)	↑
Blue Drop Certifications (#)	3	1	0	↓
Lowest Technical Site Assessment Score (%)	27%	29%	24%	↓

BLUE DROP COMPARATIVE ANALYSIS				
Performance Category	**2012**	**2014**	**2023**	**Performance trend 2014 and 2023**
Incentive-based indicators				
Highest Technical Site Assessment Score (%)	99%	100%	86%	↓

NA = Not Applied *NI = No Information* *↑= improvement, ↓= regress, →= no change*

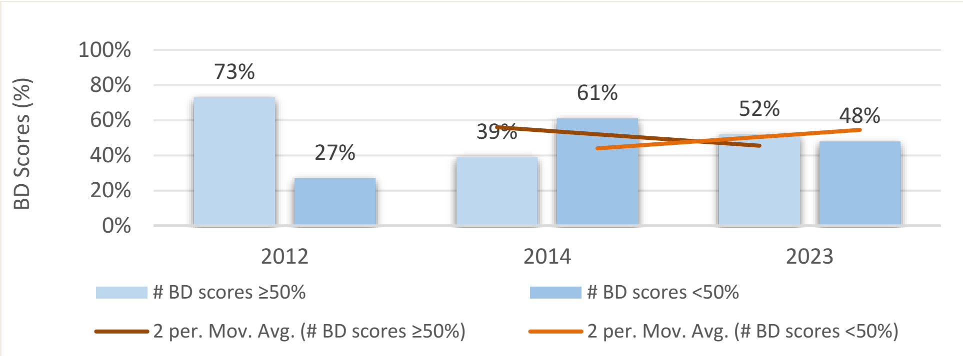


Figure 95 - Blue Drop trend analysis over the period 2012 to 2023, indicating the percentage BD scores above and below 50%

The trend analysis indicates that:

- The no. of systems audited has increased from the last BD audit in 2014
- The no. of systems with BD scores of ≥50% increased from 29 (39%) in 2014 to 44 (52%) in 2023
- This trend was reversed with no. of systems with a BD score of ≤50% decreasing from 45 (61%) in 2014 to 40 (48%) in 2023
- Blue Drop Certifications decreased from 1 award in 2014 to no awards in 2023
- The lowest TSA score decreased from 29% in 2014 to 24% in 2023, with the highest TSA score decreasing from 100% in 2014 to 86% in 2023
- The overall performance trend indicates some regression and some progression from 2014 to 2023
- This negative trajectory reinforces the need for regular audits to ensure timely turnaround and continued improvement
- The negative trend for the TSA scores and BD certifications implies that performance has declined in the absence of regulatory engagement of the BD audits between 2014 to 2023.

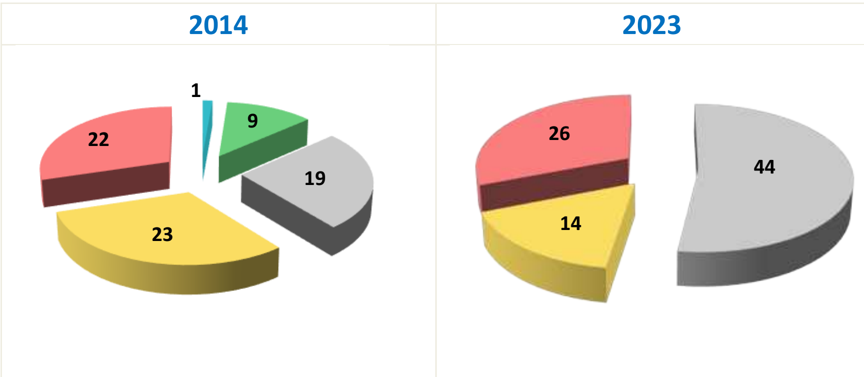


Figure 96 - No. WSSs in the Blue Drop score categories for 2014 and 2023 (graph legend to right)

≥95 – 100% Excellent	
≥80-<95% Good	
≥50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

Comparative analysis of the 2014 and 2023 blue drop scores, indicates that most of the system scores are in the >50-<80% (*Average Performance*) category, with the >31% (*Critical State*) being the next largest category. It is concerning that 26 systems in 2023 reside in *Critical State* (<31%).

In summary, trend analysis since 2014 to 2023 indicate as follows:

- Systems in a 'critical state' has increased from 22 systems in 2014 to 26 systems in 2023
- Systems in a 'poor state' decreased from 23 systems to 14 systems
- Systems in an 'average state' increased from 19 systems to 44 systems
- Systems in the 'good state' decreased from 9 systems (13%) to no systems (0%)
- Systems in 'excellent state' decreased from 1 (1%) to no systems (0%).

Provincial BDRR Analysis

The Blue Drop Risk Rating (BDRR) analysis assesses the risk across the entire water supply network. The BDRR formular was updated in 2021 to include an added risk indicator, i.e. 'E: Water Safety Plans', to address the risk assessment requirements outlined in SANS 241 of 2015. The BDRR now contains 5 risk indicators, i.e. design capacity (A), operational capacity (B), water quality compliance (C), technical capacity (D), and water safety plans (E). The results from the BDRR analyses are summarised in the table and figure following.

Table 130 - Municipal BDRR/BDRRmax Comparative Analysis from 2022 and 2023

BDRR/BDRR$_{max}$ COMPARATIVE ANALYSIS									
WSA Name	**# WSSs**	**# WBs/ WSPs**	**2022 (BD PAT)**	**2023 (BD Audit)**	**Performance Trend 2022 and 2023**	**BDRR Risk Category Split**			
						0-<50%	**50-<70%**	**70-<90%**	**90-100%**
Bela-Bela LM	3	1	40.1%	34.1%	↑	1	1	1	
Capricorn DM	7	3	71.4%	56.1%	↑	1	3	2	1
Greater Sekhukhune DM	20	12	65.9%	49.8%	↑	4	11	3	2
Lephalale LM	2	2	57.9%	46.2%	↑	1	1		
Modimolle/Mookgophong LM	5	1	81.6%	47.9%	↑	1			4
Mogalakwena LM	1	1	73.2%	52.0%	↑		1		
Mopani DM	18	3	49.4%	42.9%	↑	14	3	1	
Polokwane LM	7	4	40.8%	39.7%	↑	5	2		
Thabazimbi LM	4		87.4%	69.5%	↑		1	1	2
Vhembe DM	17	2	48.5%	35.1%	↑	15	2		
Totals & %BDRR/BDRR$_{max}$	**84**	**29**	**61.6%**	**52.8%**	↑	**42**	**25**	**8**	**9**

↑= improvement, ↓= regress, →= no change

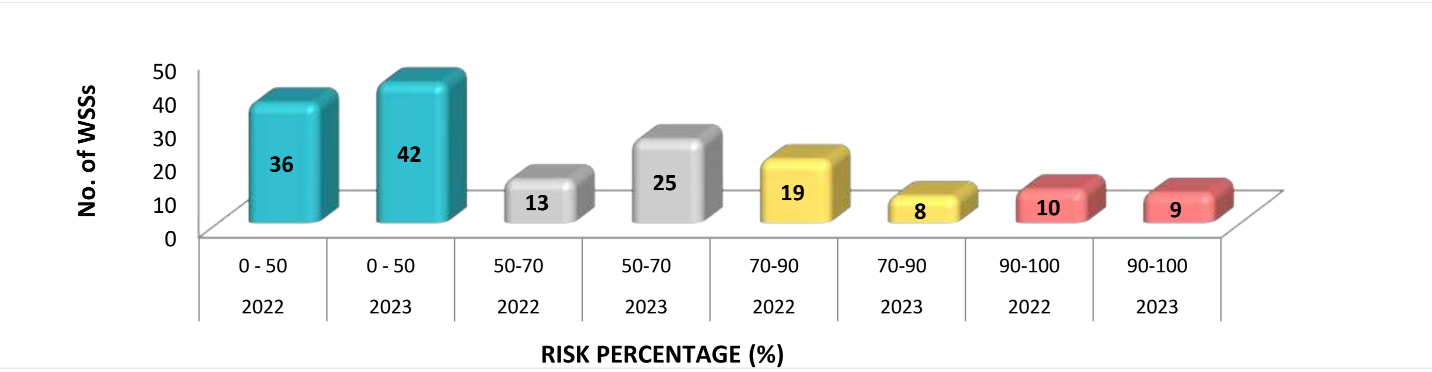


Figure 97 - a) WSS risk distribution and trends for 2022 and 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Trend analysis of the BDRR ratings for 2022 and 2023 indicates that:

- The 2023 audit cycle highlighted a progressive shift with an increase in the no. of low risk WSSs (36 to 42) and an increase in the medium risk WSSs (13 to 25), a decrease in the high risk WSSs (19 to 8) and a decrease in critical risk WSSs (10 to 9).

Regulatory Enforcement

Water supply systems which fail to achieve the minimum Blue Drop target of 31%, are placed under regulatory focus. The Regulator requires these WSAs to submit a detailed corrective action plan (CAP) within 20 working days from publishing of this report. 26 WSSs received Blue Drop scores below 31%, and hence are placed under **regulatory surveillance**, in accordance with the Water Services Act (108 0f 1997). DWS together with COGTA will through the grant allocation systems ensure priority is given to application of grants to rectify/restore the water services treatment and supply shortcomings identified in this report.

Table 131 - WSSs with <31% Blue Drop scores

WSA Name	2023 BD Score	WSSs with <31% score
Bela-Bela LM	**60.3%**	Radium, Rapotokwane
Capricorn DM	**38.1%**	Alldays, Botlokwa, Mogwadi and Senwabarwana
Greater Sekhukhune DM	**39.6%**	Flag Boshielo, Kutullo, Magukubjane, Mahlokoena, Mapodile, Marishane, Masemola, Ngwaabe, Nkosini, Penge, Steelpoort, Tsakane and Vergelegen
Modimolle/Mookgophong LM	**51.1%**	Mookgophong, Mabaleng, Mabatlane and Roedtan
Mopani DM	**56.1%**	Drakensig
Thabazimbi LM	**47.5%**	Leeupoort and Rooiberg

The following WSAs and their associated water treatment systems are in high and/or critical BDRR risk positions, which means that some or all the risk indicators are in a precarious state, i.e. operational capacity, design capacity utilisation, water quality compliance, technical capacity, and water safety plans. WTWs in high risk and critical risk positions pose a serious risk to public health. The following WSAs will be required to assess their risk contributors and to provide corrective measures in the above mentioned action plans to mitigate these risks.

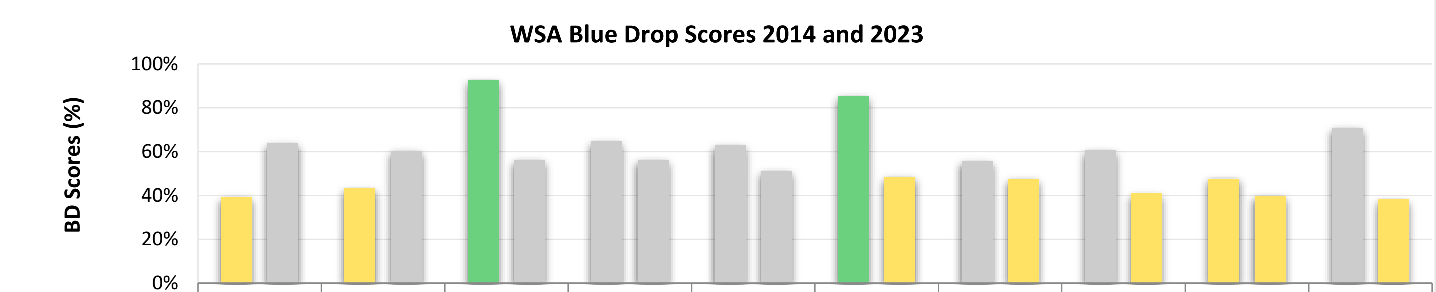
Table 132 - %BDRR/BDRR$_{max}$ scores and WSSs in critical and high-risk space

WSA Name	2023 Average %BDRR/BDRRmax	WSSs in critical and high-risk space	
		Critical Risk (90-100%)	High Risk (70-<90%)
Bela-Bela LM	34.1%		Rapotokwane
Capricorn DM	56.1%	Senwabarwana	Alldays, Mogwadi
Greater Sekhukhune DM	49.8%	Mahlokoena, Steelpoort	Flag Boshielo, Kutullo, Marble Hall
Modimolle/Mookgophong LM	47.9%	Mookgophong, Mabaleng, Mabatlane and Roedtan	
Mopani DM	42.9%		The Oaks
Thabazimbi LM	69.5%	Leeupoort and Rooiberg	Northam
Totals		**9 of 84 (11%)**	**8 of 84 (10%)**

Good practice risk management requires that the Water Safety Plans (WaSPs) are informed by meaningful Process and Condition Audits, supported by zealous implementation of corrective measures and ongoing monitoring of risk movement. With the exception of 17 water supply systems in 6 WSAs, the remaining water supply systems for 4 WSAs are in the low and medium risk positions.

Performance Barometer

The **Blue Drop Performance Barometer** presents the individual WSA Blue Drop Scores, which essentially reflects the level of mastery that a WSA has achieved in terms of its overall water services business. The bar chart below compares the 2014 and 2023 BD scores, ranked from highest to lowest performing WSA in 2023. Only Bela-Bela LM and Vhembe DM improved on their 2014 scores. The remaining 8 WSAs regressed to lower Blue Drop scores compared to their 2014 baselines.



	Vhembe DM	Bela-Bela LM	Polokwane LM	Mopani DM	Modimolle/Mookgophong LM	Lephalale LM	Thabazimbi LM	Mogalakwena LM	Greater Sekhukhune DM	Capricorn DM
2014 BD Score (%)	39,4%	43,1%	92,5%	64,6%	62,8%	85,5%	55,8%	60,5%	47,7%	70,9%
2023 BD Score (%)	63,8%	60,3%	56,2%	56,1%	51,1%	48,4%	47,5%	40,9%	39,6%	38,1%

Figure 98 - a) Blue Drop scores 2014 (bar left) and 2023 (bar right; b) Colour legend

≥95 – 100% Excellent
≥80-<95% Good
≥50-<80% Average
31-<50% Poor
0-<31% Critical state

The BDRR Risk Barometer expresses the level of risk that a WSA poses in respect of its water supply system. The schematic below presents the BDRR in ascending order – with the low-risk WSAs on the left and higher risk WSAs to the far right. The analysis reveals that there are 3 WSAs in the medium risk position. 7 WSAs are situated in the low risk positions.

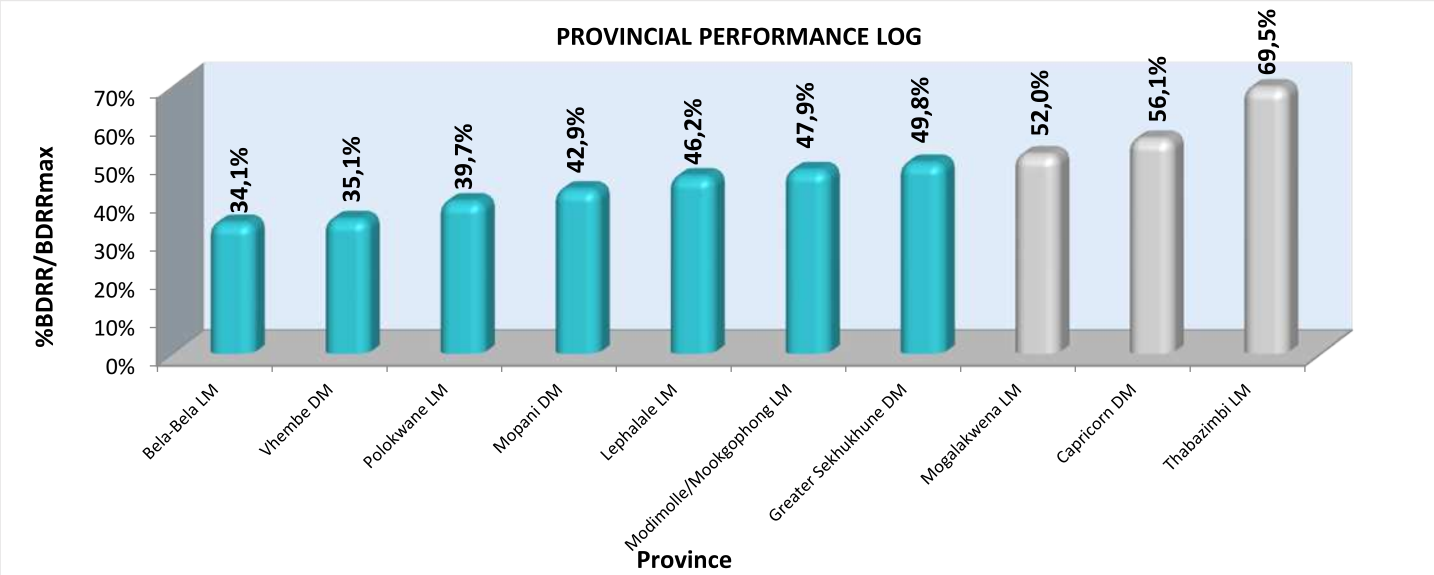


Figure 99 - a) %BDRR/BDRR$_{max}$ Risk Performance Profile/Log 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Provincial Best Performers

The **Vhembe District Municipality (Lepelle Northern Water)** is the **BEST PERFORMING WSA** in the province, based on the following record of excellence:

- ✓ 2023 Blue Drop Score of 63.8%
- ✓ 2014 Blue Drop Score of 39.4%
- ✓ Improvement on the BDRR from 48.5% in 2022 to 35.1% in 2023
- ✓ 15 systems (88%) in the low risk position
- ✓ TSA score of 76% for Khalavha WTW

The **Bela-Bela Local Municipality (Magalies Water)** is the second-best scoring WSA:

- ✓ 2023 Blue Drop Score of 43.1%
- ✓ 2014 Blue Drop Score of 60.3%
- ✓ Improvement on the BDRR from 40.1% in 2022 to 34.1% in 2023
- ✓ 1 system (33%) in low risk position
- ✓ TSA score of 69% for Bela Bela WTW

The **Polokwane Local Municipality (Lepelle Northern Water)** is the third-best scoring WSA:

- ✓ 2023 Blue Drop Score of 56.2%
- ✓ 2014 Blue Drop Score of 92.5%
- ✓ Improvement on the BDRR from 40.8% in 2022 to 39.7% in 2023
- ✓ 5 systems (71%) in low risk positions
- ✓ TSA score 61% for Ebenhezer WTW

KPA Diagnostics

The BD audit process collects a vast amount of data that yield valuable insight into the state of the water services delivery and water quality in each province. Five focus areas or 'diagnostics' have been configured from the 2021/22 audit data and are discussed below.

Table 133 - Summary of the key diagnostic themes and reference to the respective Blue Drop KPAs

Diagnostic #	Diagnostic Description	Diagnostic Reference
1	**Technical Competence**	KPA 1, 2 & Bonus
2	**Treatment Capacity and Flow Distribution**	KPA 4 & Generic Audit data set
3	**Drinking Water Quality (DWQ) Monitoring and Compliance**	KPA 2 & 4 & Bonus
4	**Technical Site Assessments**	TSA and 2023 Blue Drop Watch Report
5	**Operation, Maintenance and Refurbishment of Assets**	KPA 3 & 4

Diagnostic 1: Technical Competence

Aim: This focus area assesses the technical human resources capacity that is available to manage and operate water treatment processes and maintain the related water infrastructure. Theory advocates that a correlation exists between human resources capacity and capability (sufficient number of appropriately qualified staff) and a WSI's performance. Thus, it is hypothesised that high HR capacity would translate to compliant water treatment plants and functional water supply network. Blue Drop assesses technical compliance on two levels: i) WTW plant supervision and process control staff and ii) Technical, scientific and maintenance staff.

(i) Plant Supervisors and Process Controllers

Findings: According to regulations, water treatment plants are classified as Class A, B, C, D or E plants. Similarly, Process Controllers and Plant Supervisors are registered as Class I, II, III, IV, V or VI Process Controllers. Higher classed plants require a higher level of Process Controllers due to technology complexity and strict water quality standards. Technical compliance of PCs and Supervisors is determined against the Blue Drop standards, as defined by Reg. 2834 of the Water Act 1956 (Act 54 of 1956) for the erection, enlargement, operation, and registration of water care works and draft Reg. 813 of the Water Services Act (No 108 of 1997). Regulation 2834 has been replaced by Regulation 3630 in 2023 but will only come in effect during the next Blue Drop audit cycle.

Table 134 - No. compliant versus shortfall in Supervisor and Process Controller staff

WSA & WB Name	# WTWs	# WSSs	# Available Compliant Staff			Staff Shortfall		Ratio	2023 BD Score (%)
			PCs	Supervisor	Total	PCs	Supervisor		
Lepelle Northern Water	17	24	49	10	59	25	4	3.5	43.55% ave.
Bela-Bela LM	3	3	6	0	6	4	1	2.0	**60.3%**
Capricorn DM	4	7	0	0	0	8	1	0.0	**38.1%**
Greater Sekhukhune DM	11	20	13	0	13	23	2	1.2	**39.6%**
Lephalale LM	2	2	15	3	18	0	0	9.0	**48.4%**
Modimolle/Mookgophong LM	5	5	0	3	3	13	0	0.6	**51.1%**
Mogalakwena LM	None	1	0	0	0	7	0	0.0	**40.9%**
Mopani DM	17	18	49	8	57	16	0	3.4	**56.1%**
Polokwane LM	4	7	24	4	28	1	0	7.0	**56.2%**
Thabazimbi LM	3	4	1	0	1	5	1	0.3	**47.5%**
Vhembe DM	19	17	78	7	85	12	2	4.5	**63.8%**
Totals	**85**	**84**	**235**	**35**	**270**	**114**	**11**		

** Ratio depicts the no. of qualified staff divided by the no. of WTWs operated by this no. of staff. E.g., Bela Bela LM has 6 compliant Sups + PCs, divided by 3 WTWs = 2.0 qualified staff per WTW*

*** NB: The Supervisor totals will be inflated as it is not possible to differentiate between which Supervisors are shared/ roaming with other Class C to E WTWs*

Note: "Compliant staff" means qualified and registered staff that meets the BD standard for a particular Class Works. "Staff shortfall" means staff that do not meet the BD standard for a particular Class of works (+1 for a shift) and/or staffing gaps exist at the respective WTWs.

Competent human resources are vital enablers in ensuring efficient and sustainable management of water services and delivery of safe water quality to consumers. For the province in general, the operational competencies are found to be excellent for the Supervisory staff and predominantly excellent for the PCs in Lephalale LM and Polokwane LM as illustrated in the table above.

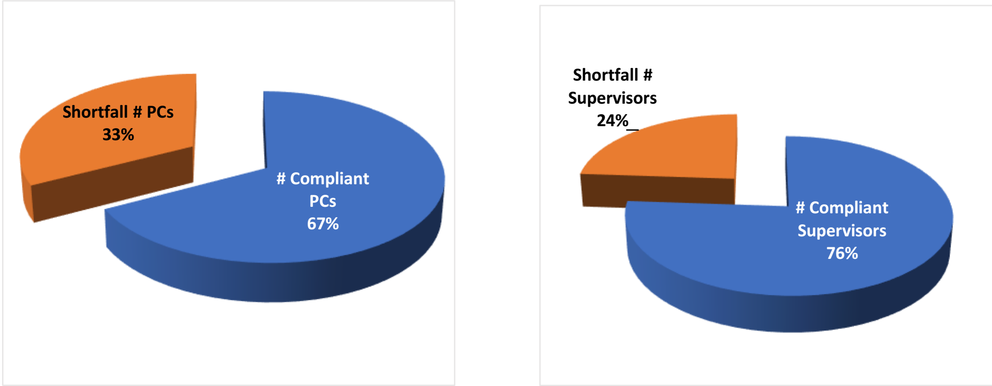


Figure 100 - Schematic illustration of compliant and shortfall of Supervisors (a) and Process Controllers (b)

Plant Supervisors: The pie charts indicate that 76% (35 of 46) of Plant Supervisors complies with the Blue Drop standard, with 11 shortfalls.

Process Controllers: Similarly, 67% (235 of 349) of the PC staff complies with the required standards, noting a zero shortfall for Lephalale LM only. There is a 33% (114 of 349) shortfall in Process Controllers with the highest shortfall in Lepelle Northern Water, Greater Sekhukhune DM, Modimolle/Mookgophong LM, Mopani DM and Vhembe DM.

Blue Drop standards require of Class A and B plants to employ dedicated Supervisors per WTW and Process Controllers per shift per works, whereas Class C to E plants may share Supervisory staff across works. Shifts have been introduced to ensure optimal operations while addressing security risks, particularly as it relates to theft and vandalism. Telemetry also reduces the requirement for on-site staff during night shifts, but these relaxations have to be done within the DWS regulatory guidelines.

The Regulator expects correlation between the competence of an operational team and the performance of a WTW, as measured by the BD score. The data indicates as follows:

- Lepelle Northern Water and 7 WSAs have qualified PCs in place, with the exception of WTWs in 3 WSAs
- Lepelle Northern Water and 5 WSAs have qualified Supervisors in place
- Lepelle Northern Water and 9 WSAs have shortfalls in qualified Process Controllers and Lepelle Northern Water and 5 WSAs have shortfalls in qualified Supervisors.

It is expected that a correlation would exist between the competence of an operational team and the performance of a water treatment works, as measured by the BD score. The results from the ratio analysis indicate high ratios (≥2.0) for Lepelle Northern Water and 5 WSAs with WTWs.

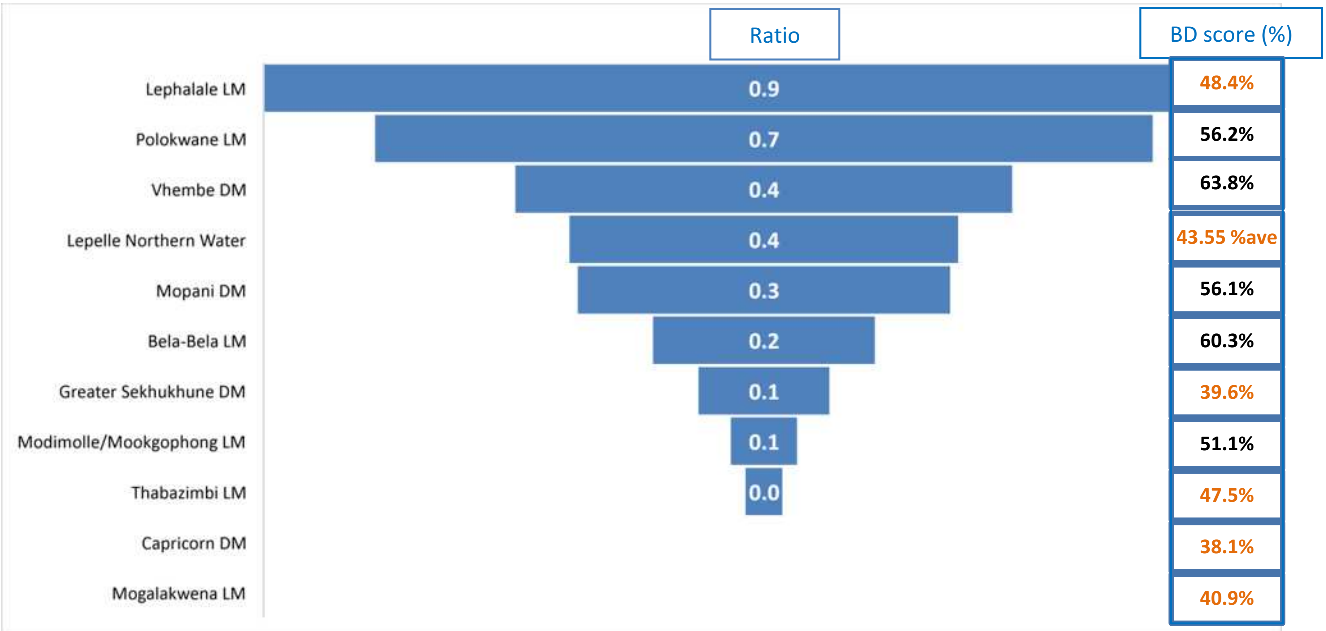


Figure 101 - Ratio of compliant operational staff to no. of WTWs and Comparison of Ratios with BD scores

Overall, the comparative bar chart confirms a reasonably close correlation from Lephalale LM to Beal Bela LM with high ratios (ranging from 2.0 to 9.0) and poor to average BD scores (ranging from 43.6% to 63.8%). No extreme variations are noted when comparing the ratios against the BD scores respectively.

(ii) Technical, Scientific and Maintenance staff

In addition to operational capacity (above), good management practice also requires access to qualified engineers, technicians, technologists, MISA appointees, scientists, and maintenance capability (below). Such competencies could reside in-house or accessible through term contracts and external specialists.

Table 135 - Summary of the maintenance capacity and no. of qualified and shortfall of Engineering, Technical and Scientific staff

WSA & WB Name	# WTWs	# WSSs	Maintenance Arrangement
Lepelle Northern Water	17	24	Internal+Specific Outsourcing
Bela-Bela LM	3	3	Internal+Specific Outsourcing; Internal Team (only)
Capricorn DM	4	7	Internal+Specific Outsourcing; Internal Team (only)
Greater Sekhukhune DM	11	20	Internal+Term Contract; No Capacity; Internal+Specific Outsourcing; Internal Team (only); Partial Capacitated
Lephalale LM	2	2	Internal Team (Only)
Modimolle/Mookgophong LM	5	5	Internal+Specific Outsourcing; Internal Team (only); Partial Capacitated
Mogalakwena LM	None	1	No Capacity; Internal+Specific Outsourcing
Mopani DM	17	18	No Capacity; Internal+Specific Outsourcing; Internal Team (only)
Polokwane LM	4	7	Internal+Specific Outsourcing: Internal+Term Contract
Thabazimbi LM	3	4	Internal Team (Only); Internal+Specific Outsourcing
Vhembe DM	19	17	Internal Team (Only); Internal+Term Contract; Internal+Specific Outsourcing
Totals	**85**	**84**	

WSA & WB Name	# WTWs	# WSSs	Qualified Technical Staff (#)					Technical Shortfall (#)	Qualified Scientists (#)	Scientists Shortfall (#)	Ratio*	2023 BD Score (%)
			Technicians	Technologists	Engineers	MISA appointees	Total					
Lepelle Northern Water	17	24	5	3	2	0	**10**	0	9	0	0.4	43.55% ave.
Bela-Bela LM	3	3	2	0	0	0	**2**	2	0	2	0.7	**60.3%**
Capricorn DM	4	7	0	0	0	0	**0**	4	0	2	0.0	**38.1%**
Greater Sekhukhune DM	11	20	0	0	0	0	**0**	4	0	2	0.0	**39.6%**
Lephalale LM	2	2	2	4	4	0	**10**	0	3	0	5.0	**48.4%**
Modimolle/Mookgophong LM	5	5	0	1	0	0	**1**	3	0	2	0.2	**51.1%**
Mogalakwena LM**	None	1	0	0	0	0	**0**	4	0	2	0.0	**40.9%**
Mopani DM	17	18	1	2	1	0	**4**	0	0	2	0.2	**56.1%**
Polokwane LM	4	7	0	3	0	0	**3**	1	0	2	0.4	**56.2%**
Thabazimbi LM	3	4	2	0	0	0	**2**	2	0	2	0.5	**47.5%**
Vhembe DM	19	17	1	1	1	0	**3**	1	2	0	0.2	**63.8%**
Totals	**85**	**84**	**13**	**14**	**8**	**0**	**35**	**21**	**14**	**16**		

* The single number ratio depicts the no. of qualified technical staff divided by the no. of WSSs that have access to the staff. E.g., Bela Bela LM has 2 qualified staff, divided by 3 WSSs = 0.7 qualified staff per WSS

** There is no WTW, but the LM is required to monitor the DWQ in the distribution network

Note 1: "Qualified Technical Staff" means staff appointed in positions to support water services, and who has the required qualifications. "Technical Shortfall" is calculated based on a minimum requirement of at least 3 Engineers or more than 1 of each of Engineers, Technologists & Technicians; and at least one 1 Candidate Scientist and 1 Professional Scientist per WSI.

Note 2: "Qualified Scientists" means professional registered scientists (SACNASP) and candidate scientists appointed in positions to support water services. "Scientists shortfall" means that the WSA does not have at least one qualified SACNASP registered scientist and at least one 1 candidate scientist in their employ or contracted.

In terms of maintenance capacity, all the municipalities in the province have a reasonable contingent of qualified technical and maintenance staff. The maintenance staff comprises of a collective of in-house, contracted, or outsourced personnel. The data indicates that:

- Lepelle Northern Water have internal maintenance teams supplement with specific outsourced services
- 8 of 10 (80%) WSAs have in-house maintenance teams
- 3 of 10 (30%) WSAs have internal maintenance teams supplemented with term contracts
- 9 of 10 (90%) WSAs have internal maintenance teams supplement with specific outsourced services
- 4 WSAs have systems with no capacity and partial capacity.

In general, the province presents a strong case for qualified professional technical staff as follows:

- A total of 35 qualified staff comprised of 8 Engineers, 14 Technologists, 13 Technicians, no MISA appointees (qualified); and 14 SACNASP registered scientists
- A total shortfall of 37 persons is identified, consisting of 21 technical staff and 16 scientists
- 8 WSAs have a total shortfall of 21 qualified technical staff with the highest indicated for Capricorn DM, Greater Sekhukhune DM and Mogalakwena LM (4 each)
- Lepelle Northern Water and 8 WSAs have access to credible laboratories that comply with the Blue Drop standards.

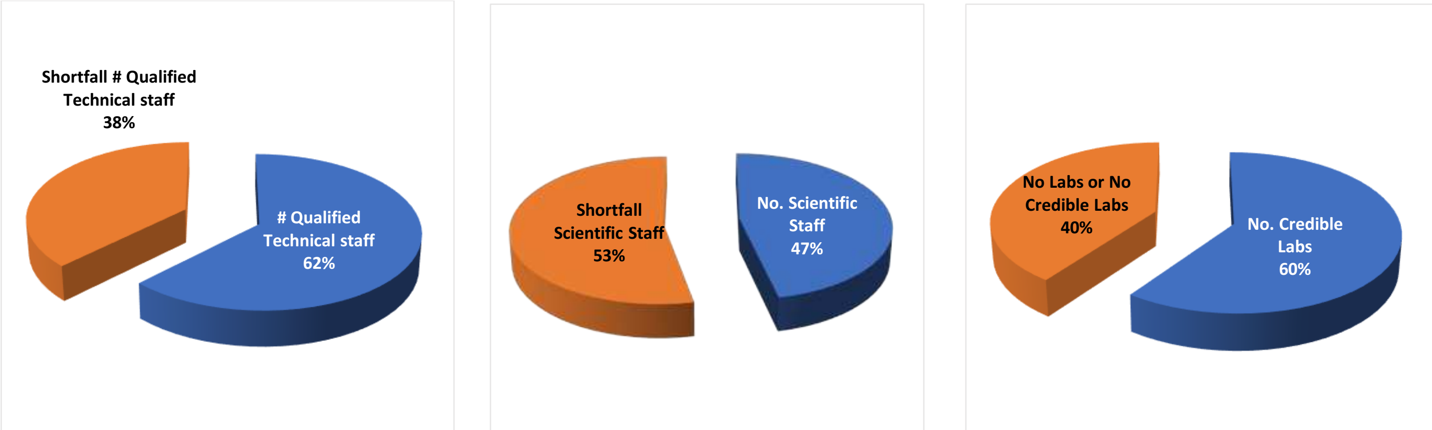


Figure 102 - Graphic illustration of the number and %: a) qualified engineering/technical staff; b) professional scientists; c) access to credible laboratory services that complies with Blue Drop standards

Ratio analysis has been done to determine the number of qualified technical and scientific staff assigned per WSS. It is expected that a higher ratio would correspond with well-performing and maintained water supply systems, as represented by the BD score.

The schematic on the following page does not show a strong correlation between high ratios and high BD scores. Lephalale LM has a high ratio but a poor BD score. Lepelle Northern Water and the remaining WSAs have poor to average BD scores and rations <1.0. No firm correlation can be drawn between technical capacity and water supply performance.

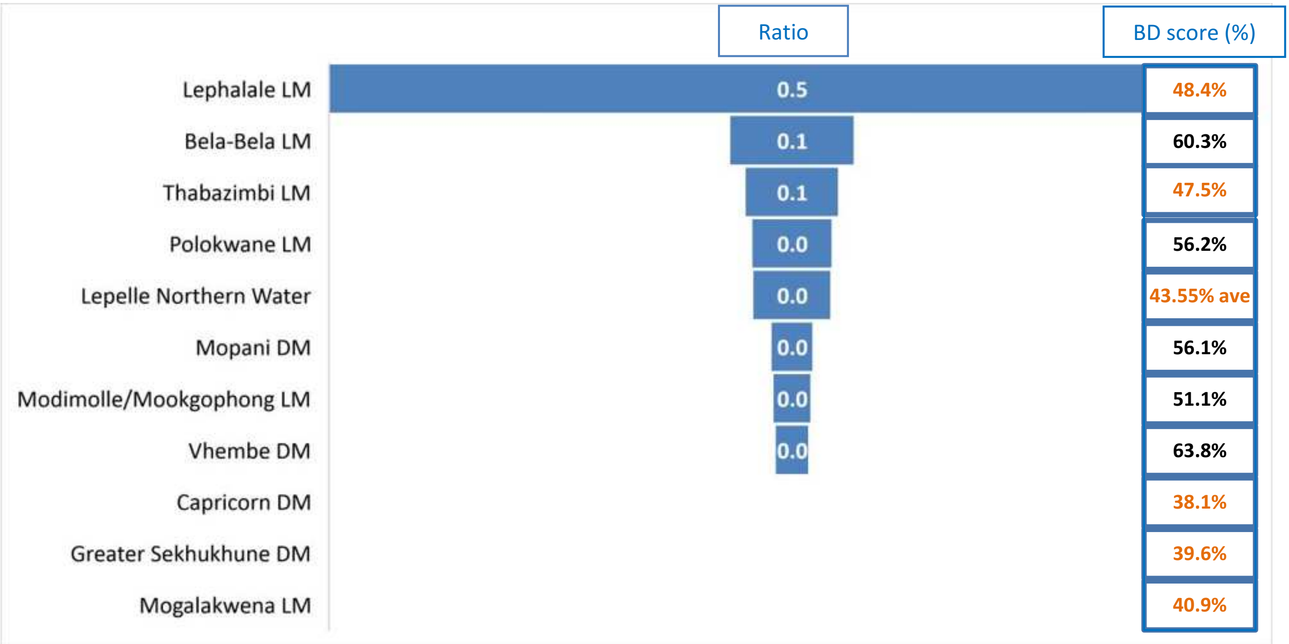


Figure 103 - Ratio of compliant technical staff to no. of WSSs and Comparison of Ratios with BD scores

Overall, the results highlight the inter-dependency between technical capacity and performance. One of the options to enhance operational capacity is through dedicated training programmes. The Blue Drop audit incentivises training of operational staff over the 2-year period prior to the audit date. The results are summarised as follows:

Table 136 - No. of WTWs with operational staff sent on training over the past 2 years and vice versa

WSA & WB Name	# WTWs	# WTW staff attending training	# WTW without training
Lepelle Northern Water	17	3	14
Bela-Bela LM	3		3
Capricorn DM	4		4
Greater Sekhukhune DM	11		11
Lephalale LM	2	1	1
Modimolle/Mookgophong LM	5		5
Mogalakwena LM	None		
Mopani DM	17	15	2
Polokwane LM	4		4
Thabazimbi LM	3	2	1
Vhembe DM	19		19
Totals	**85**	**21 (24%)**	**64 (76%)**

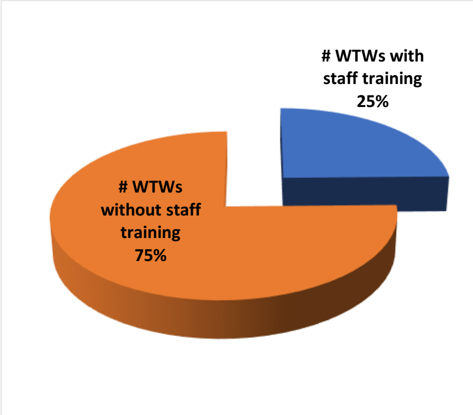


Figure 104 - %WTWs that have trained operational staff over the past two years

The results confirm that Lepelle Northern Water and 3 WSAs had their operational staff attend training over the past 2 years. 21 of 85 WTWs had their operational staff attend training over the past 2 years. Investment in human capital through technical skills development is likely to mitigate some of the water quality failures and lower performances noted, and municipalities and water boards should prioritise ongoing skills development of technical staff and appointment of qualified staff that are legible for registration.

Diagnostic 2: Treatment Capacity and Flow Distribution

Aim: Diagnostic 2 deals with design and flow related dynamics, comprising of: i) design capacity and operational flow, ii) raw water abstraction, and iii) WUE and SIV.

(i) Design Capacity and Operational Flow

This diagnostic assesses the status of plant design capacity and daily water production at the WTWs, as well as SIVs as measured at the outflow from the WTW or inflow to the water distribution network. A capable WTW requires adequate installed design capacity and functional equipment to operate optimally. If the WTW design capacity is exceeded by the average daily production (treatment) volume, the WTW will not be able to deliver SANS compliant water quality. The available design capacity is typically exceeded when the water demand exceeds the installed design capacity, or when unit processes or equipment are dysfunctional, or when electrical supply problems render treatment and pumping of water defective. Typically, the production volume and SIV is the same if 1 WTW supplies 1 WSS, but different if multiple supply systems are feeding from a singular WTW.

Findings: Analysis of the design capacity and average daily production/ treatment volume indicate a total design capacity of 846,081 kl/d for the province, with a total average daily treatment (operational) volume of 654,176 kl/d. Theoretically, this implies that 77% of the design capacity is used with 23% available to meet additional water demand. However, the full 846,081 kl/d is not available as some infrastructure is dysfunctional, leaving 840,841 kl/d available. The reduced capacity means that the province is slightly closer to its total available capacity (78%) with a 22% surplus available. The capacity differential (difference between the installed and available capacity) will not constrain or impede any further social and economic development in the drainage areas. WSAs do report and have knowledge of their installed and available capacities, and a higher figure than 22% surplus available cannot be expected.

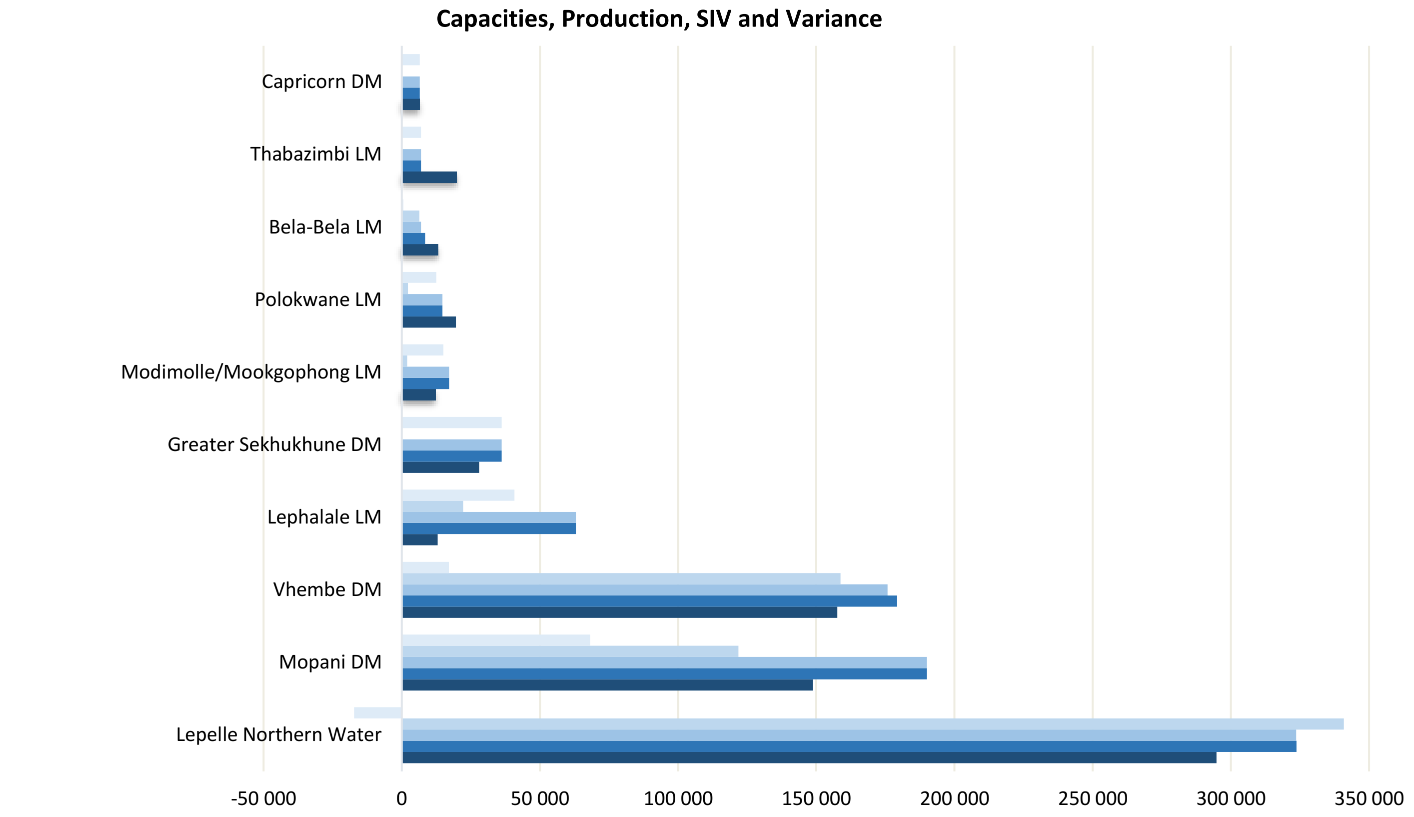
All the WSAs have their full installed capacity available. For the province in general, 26 WTWs are operating within their design capacities with the exception of 7 WTWs that exceed their total design capacity (%). This risk is currently mitigated through operational optimisation and preventative maintenance regimes.

Table 137 - Summary of WTWs design and available capacities, average daily production, % available capacity, and total SIV towards the WSSs

WSA & WB Name	# WTWs	# WSSs	Design Capacity (kl/d)	Available Design Capacity (kl/d)	Average Daily Production (kl/d)	Available Variance* (kl/d)	% Use Available Capacity	Total SIV towards the WSS (kl/d)
Lepelle Northern Water	17	24	323,800	323,600	340,865	-17,265	105%	294,847
Bela-Bela LM	3	3	8,470	6,970	6,347	623	91%	13,131
Capricorn DM	4	7	6,500	6,500	0	6,500	0%	6,500
Greater Sekhukhune DM	11	20	36,150	36,150	0	36,150	0%	28,036
Lephalale LM	2	2	63,000	63,000	22,200	40,800	35%	13,000
Modimolle/Mookgophong LM	5	5	17,100	17,100	2,000	15,100	12%	12,300
Mogalakwena LM	None	1						

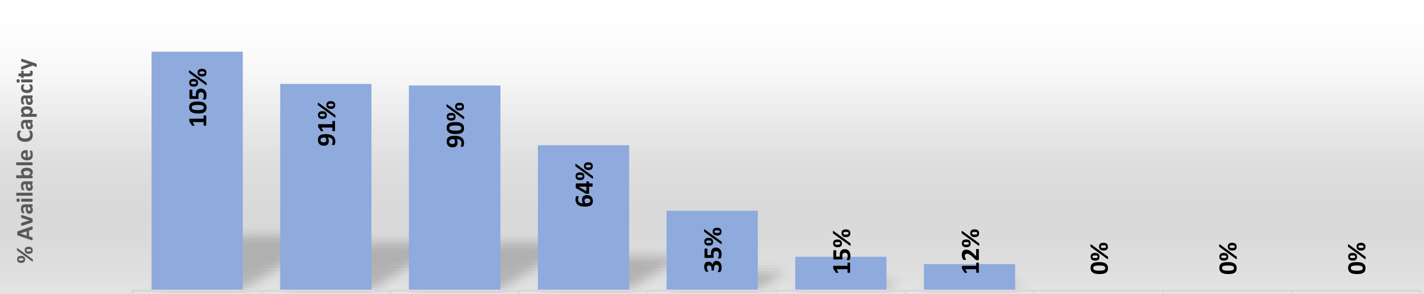
WSA & WB Name	# WTWs	# WSSs	Design Capacity (kl/d)	Available Design Capacity (kl/d)	Average Daily Production (kl/d)	Available Variance* (kl/d)	% Use Available Capacity	Total SIV towards the WSS (kl/d)
Mopani DM	17	18	190,000	190,000	121,784	68,216	64%	148,832
Polokwane LM	4	7	14,760	14,760	2,209	12,551	15%	19,547
Thabazimbi LM	3	4	7,000	7,000	0	7,000	0%	19,937
Vhembe DM	19	17	179,301	175,761	158,771	16,990	90%	157,564
Totals	**85**	**84**	**846,081**	**840,841**	**654,176**	**186,665**	**78%**	**713,694**

* Difference between the available design capacity and the average daily production



	Lepelle Northern Water	Mopani DM	Vhembe DM	Lephalale LM	Greater Sekhukhune DM	Modimolle/Mookgophong LM	Polokwane LM	Bela-Bela LM	Thabazimbi LM	Capricorn DM
Available Variance (kl/d)	-17 265	68 216	16 990	40 800	36 150	15 100	12 551	623	7 000	6 500
Ave. Daily Production (kl/d)	340 865	121 784	158 771	22 200	0	2 000	2 209	6 347	0	0
Available Design Capacity (kl/d)	323 600	190 000	175 761	63 000	36 150	17 100	14 760	6 970	7 000	6 500
Design Capacity (kl/d)	323 800	190 000	179 301	63 000	36 150	17 100	14 760	8 470	7 000	6 500
Total SIV (kl/d)	294 847	148 832	157 564	13 000	28 036	12 300	19 547	13 131	19 937	6 500

Figure 105 - Design and available capacity, average daily production, available variance and total SIV for the WTWs



	Lepelle Northern Water	Bela-Bela LM	Vhembe DM	Mopani DM	Lephalale LM	Polokwane LM	Modimolle/Mookgophong LM	Capricorn DM	Greater Sekhukhune DM	Thabazimbi LM
% AC	105%	91%	90%	64%	35%	15%	12%	0%	0%	0%

Figure 106 - % available capacity

(ii) Raw Water Abstraction

This diagnostic takes a snapshot view of the status of water abstraction authorisations from natural water resources across the province. As per the National Water Act (Act no 36 of 1998), Water Use Authorisation (WUA) mandate the maximum abstraction volumes of raw water, and the installation and monitoring of abstraction, inflow, and outflow meters, whilst the BD audit requires WSAs to report the flows on IRIS and to calibrate meters annually. Any defects in terms of abstracting water from a resource without an authorisation, or exceeding the authorised volume, or reporting inaccurate volumes, or not monitoring abstraction against authorised volumes, are considered to be a regulatory risk and contravention of the law.

Findings: Data pertaining to the daily abstraction volumes (kl/d) (Authorised), average daily treatment volumes (kl/d), the names of the WTWs exceeding/with no Daily Abstraction Volumes (Authorised) and Average Daily Treatment Volumes (Authorised) is captured in the tables below.

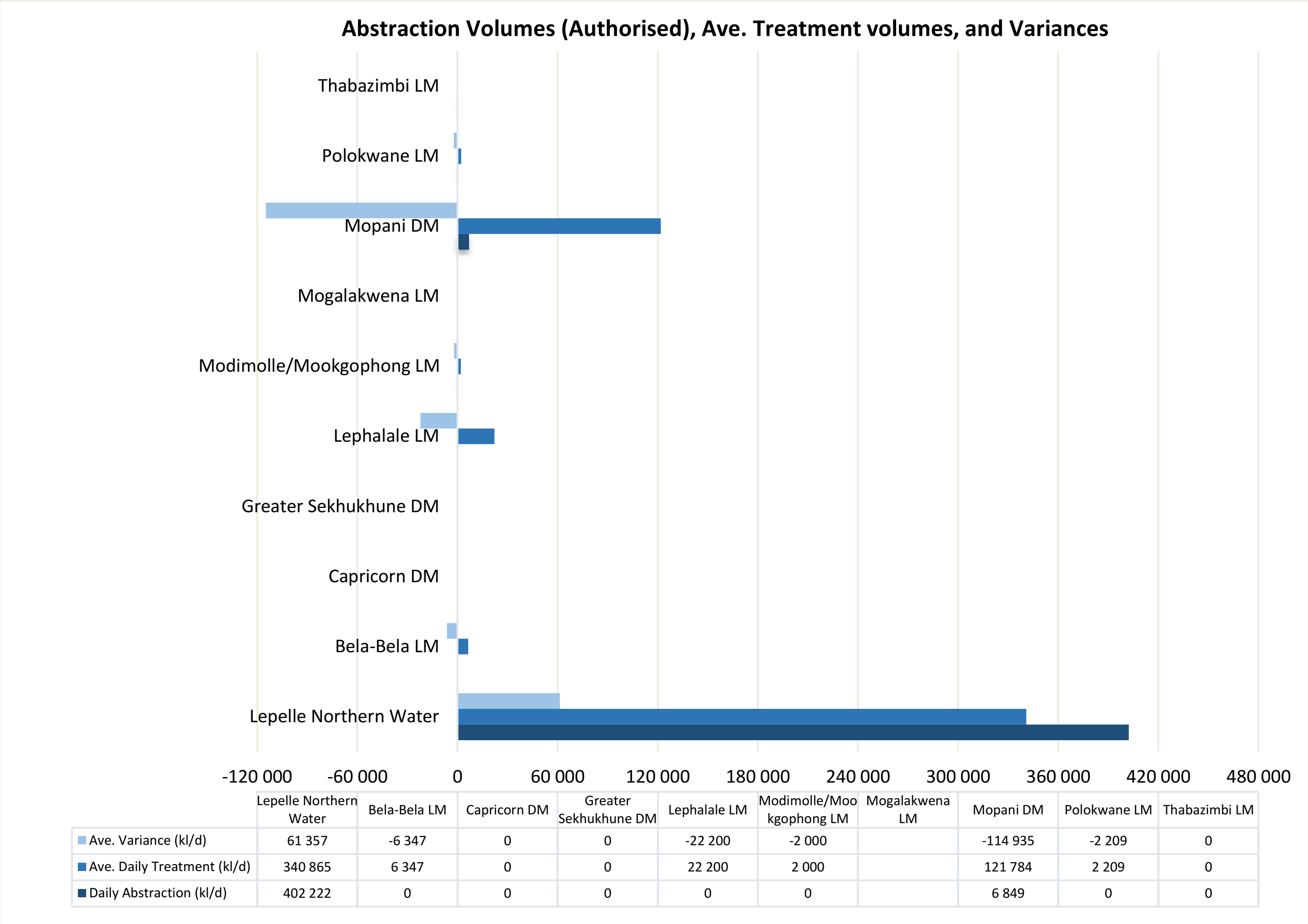
Table 138 - Summary of Abstraction Volumes (Authorised), Average Daily Treatment Volumes, Variances & WTWs listed For Enforcement Action

WSA & WB Name	# WTWs	# WSSs	Daily Abstraction Volumes (Authorised) (kl/d)	Average Daily Treatment Volume (kl/d)	Average Variance (kl/d) [+ or Minus]
Lepelle Northern Water	17	24	402,222	340,865	61,357
Bela-Bela LM	3	3	0	6,347	-6,347
Capricorn DM	4	7	0	0	0
Greater Sekhukhune DM	11	20	0	0	0
Lephalale LM	2	2	0	22,200	-22,200
Modimolle/Mookgophong LM	5	5	0	2,000	-2,000
Mogalakwena LM	None	1			
Mopani DM	17	18	6,849	121,784	-114,935
Polokwane LM	4	7	0	2,209	-2,209
Thabazimbi LM	3	4	0	0	0
Vhembe DM	19	17	99,976	158,771	-58,795
Totals	**85**	**84**	**509,047**	**654,176**	**-145,129**

WSA & WB Name	WTW exceeding the Daily Abstraction Volumes (Authorised)	WTW with no Daily Abstraction Volumes (Authorised)
Lepelle Northern Water	2 WTWs	9 WTWs
Bela-Bela LM		All 3 WTWS
Capricorn DM		4 WTWs
Greater Sekhukhune DM		11 WTWs
Lephalale LM		Both WTWs
Modimolle/Mookgophong LM		All 5 WTWS
Mopani DM		16 WTWs
Polokwane LM		4 WTWS
Thabazimbi LM		All 3 WTWS
Vhembe DM	2 WTWs	13 WTWs
Totals	**4**	**66**

WTWs that exceed the Daily Abstraction Volumes (Authorised) and WTWs with no Daily Abstraction Volumes (Authorised) are reflected in the 2nd table above. WTWs that are not complying with the regulations will be required to show correction in the next Blue Drop audit cycle. The results conclude that 4 WTWs are exceeding the permitted abstraction limits and 19 WTWs provided authorised water use abstraction volumes. The Daily Abstraction Volumes (Authorised) are not known for 66 water treatment systems resulting in negative average variances that skew the data sets. Negative average variance could be clearly attributed to 6 WSAs for over abstraction.

For future BD audits, WSA/WSPs will be required to provide 'actual' abstraction volumes so that a comparative analysis can be undertaken of the 'actual' abstraction volume versus the authorised water use abstraction volumes (maximum). This would require that the WSAs and WSPs/WBs monitor and record all critical path flows (abstraction, raw and final).



	Lepelle Northern Water	Bela-Bela LM	Capricorn DM	Greater Sekhukhune DM	Lephalale LM	Modimolle/Mookgophong LM	Mogalakwena LM	Mopani DM	Polokwane LM	Thabazimbi LM
Ave. Variance (kl/d)	61 357	-6 347	0	0	-22 200	-2 000		-114 935	-2 209	0
Ave. Daily Treatment (kl/d)	340 865	6 347	0	0	22 200	2 000		121 784	2 209	0
Daily Abstraction (kl/d)	402 222	0	0	0	0	0		6 849	0	0

Figure 107 - Abstraction Volumes (Authorised), Average Daily Treatment Volumes, and Variances

(iii) Water Use Efficiency and System Input Value

The Department is committed to consider issues related to water scarcity and security, aiming to ensure there is sufficient water for the population, the economy, and the environment by increasing water use efficiency across all sectors. Water use for services sectors is specifically dealing with the quantity of water used directly by the consumer through the public distribution network and industries connected to the network. This diagnostic assesses the water use efficiency (i.e., the average daily consumption in litres per person per day) and the individual and collective performance of the water supply systems. WUE indicates how effective water is used by consumers, i.e. the process between effective water use and actual water abstraction. This concept is closely related to the Department's No Drop Certification assessment, whereby WUE, NRW and water losses are targeted as part of Water Conservation and Water Demand Management strategies by municipalities.

Findings: Both the Blue Drop audit and No Drop audit requires an IWA water balance to determine the SIV into each water supply system, and to identify and quantify possible losses from abstraction to the end-of-use point. 21 WSSs in 5 WSAs have full water balances in place. 42 WSSs in 7 WSAs have partial water balances in place, and 5 WSAs with a total of 21 WSSs do not have water balances in place.

WUE is calculated based on the SIV contributions, population served, and the average daily consumption, as summarised in the following table.

Table 139 - Summary of total SIV, total population served, average daily consumption, WUE status and performance trend

WSA & WB Name	# WSSs	Total Population	Total SIV (kl/d)	2023 WUE (l/p/d)	2023 Blue Drop WUE Range and Performance	
Bela-Bela LM	3	60,882	13,131	216	>200-250	Average
Capricorn DM	7	289,097	29,520	102	<150	Excellent
Greater Sekhukhune DM	20	330,850	91,290	276	>250-300	Poor
Lephalale LM	2	40,530	13,000	321	>300	Extremely High
Modimolle/Mookgophong LM	5	131,622	12,300	93	<150	Excellent
Mogalakwena LM	1	39,733	10,108	254	>250-300	Poor

WSA & WB Name	# WSSs	Total Population	Total SIV (kl/d)	2023 WUE (l/p/d)	2023 Blue Drop WUE Range and Performance	
Mopani DM	18	781,372	214,564	275	>250-300	Poor
Polokwane LM	7	498,999	99,495	199	>150-200	Good
Thabazimbi LM	4	57,609	19,937	346	>300	Extremely High
Vhembe DM	17	1,160,798	210,349	181	>150-200	Good
Totals	**84**	**3,391,492**	**713,694**	**210**		

WUE (l/cap/day) performance categories

Colour	WUE Range	Performance
	>300	Extremely high per capita water use
	>250-300	Poor per capita water use
	>200-250	Average per capita water use with potential for marked improvement
	>150-200	Good per capita water use but some improvement may be possible subject to economic benefits
	<150	Excellent per capita water use management

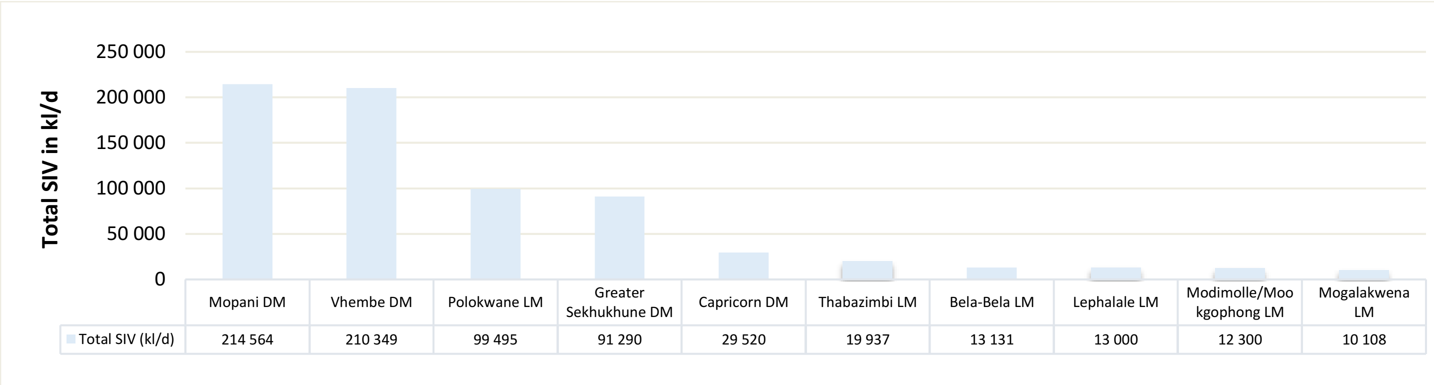


Figure 108 - Total SIV towards the WSSs

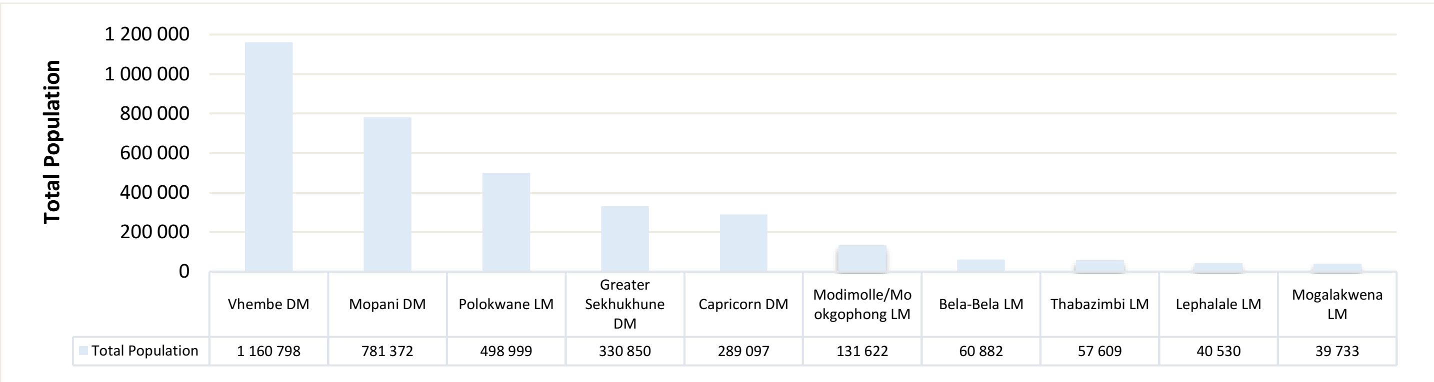


Figure 109 - Total Population served

For the province, 713,694 kl/d water is supplied to 3,391,492 consumers. Comparatively, Mopani DM distributes 30% of the total provincial SIV, followed by Vhembe DM (29%) and Greater Sekhukhune DM (13%). An average 210 litre of water is used per person per day, which implies an average per capita water use. Results from the diagnostic data show that 2 WSAs have WUEs of more than 300 l/c/d, which is regarded as extremely high according to national benchmarks. 3 WSAs have WUE between 250–300 l/c/d, which is regarded as poor. No Drop Certification is specifically tasked with plans to curb water losses and improve NRW through water accounting assessments and water conservation and demand management.

Diagnostic 3: Drinking Water Quality (DWQ) Monitoring and Compliance

Aim: Blue Drop audits values the principles of “To measure is to know” and “To know is to manage”. The primary objective of a water treatment plant is to produce final water quality that is safe for human consumption at the end of the distribution network. This standard can only be measured and achieved if operational and compliance monitoring and DWQ compliance is executed at the correct frequency, sample point, and determinand type. This diagnostic assesses the i) operational and compliance monitoring status, ii) drinking water quality compliance, and iii) risk defined compliance and laboratory credibility.

(i) Drinking water operational and compliance monitoring

Findings: A minimum level of 90% operational monitoring compliance is applied as benchmark, to give weight to the importance of sampling and monitoring of the raw water, process unit water, and final water across the treatment stream. Compliance monitoring is also informed by SANS 241:2015 and the requirement for risk-informed monitoring through the WaSP process at both the WTW final and distribution network. DWQ compliance is calculated against the population size and the mandatory limits set by SANS 241:2015 and the Blue Drop standards, as calculated and reported from data loaded in the IRIS.

Table 140 - Summary of the KPA 2 WTW operational and WSS compliance monitoring status

WSA & WB Name	# WTWs	# WSSs	WTW Operational monitoring [KPA 2 sub-KPA 2.b)]		WSS Compliance monitoring [KPA 2 sub-KPA 2.c)]	
			Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]	Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]
Lepelle Northern Water	17	24	10	7	-	24
Bela-Bela LM	3	3		3		3
Capricorn DM	4	7		4		7
Greater Sekhukhune DM	11	20		11		20
Lephalale LM	2	2		2		2
Modimolle/ Mookgophong LM	5	5		5		5
Mogalakwena LM	None	1				1
Mopani DM	17	18	10	7		18
Polokwane LM	4	7	2	2		7
Thabazimbi LM	3	4		3		4
Vhembe DM	19	17	13	6	2	15
Totals	**85**	**84**	**35 (44%)**	**50 (56%)**	**2 (2%)**	**82 (98%)**

The performance recorded in the table above stems from performance data as measured against the Blue Drop Standard expressed in KPA 2 and sub-KPAs 2.b) and 2.c). Overall, an unsatisfactory sampling and analysis regime is observed for both operational (56%) and compliance (98%) monitoring.

The data indicates that 35 of 85 WTWs (44%) are on par with good practice for operational monitoring of the raw and final water and the respective process units at the WTW. Lepelle Northern Water, Mopani DM and Vhembe DM and are doing fairly well, whilst the remaining WSAs fail to meet the Blue Drop standard. In terms of compliance monitoring, 2 WSSs (2%) are on par with good compliance monitoring practices, and 82 WSSs (98%) are failing the Blue Drop standard.

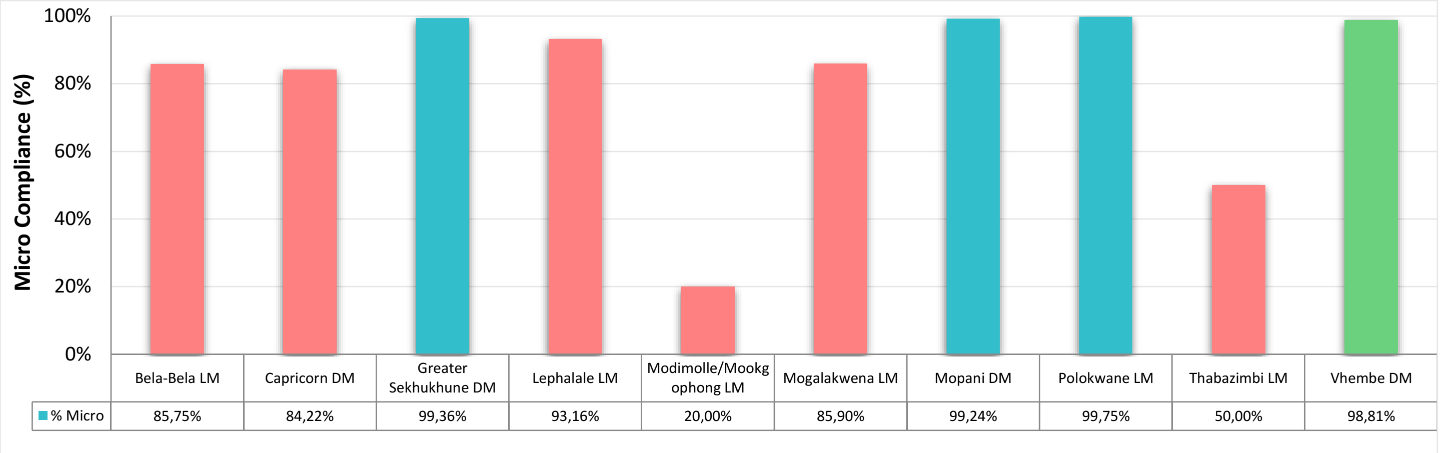
The latter observation is noted with deep concern. Compliance monitoring is a legal requirement and the only means to measure the DWQ performance of a water supply system. Operational monitoring is the cornerstone of day-to-day process adjustments and optimisation to ensure that the water treatment is efficient and delivers quality final water. The results indicate that 50 WTWs and 82 WSSs are not achieving regulatory and industry standards.

(ii) Drinking water quality compliance

Findings: DWQ compliance is measured against the requirements of SANS 241:2015 under KPA 5 of the Blue Drop audit. The tables following summarises the results of the DWQ status for Microbiological and Chemical Compliance, which also carries the highest Blue Drop score weighting of 35%.

Table 141 - Provincial Summary of the DWQ Status for Microbiological Compliance

WSA Name	# WSSs	Population	% Ave. Micro Compliance	# WSS Micro Performance Status		
				Excellent	Good	Unacceptable
Bela-Bela LM	3	60,882	85.75%	1		2
Capricorn DM	7	289,097	84.22%		2	5
Greater Sekhukhune DM	20	330,850	99.36%	19		1
Lephalale LM	2	40,530	93.16%		1	1
Modimolle/Mookgophong LM	5	131,622	20.00%	1		4
Mogalakwena LM	1	39,733	85.90%			1
Mopani DM	18	781,372	99.24%	16	1	1
Polokwane LM	7	498,999	99.75%	7		
Thabazimbi LM	4	57,609	50.00%	2		2
Vhembe DM	17	1,160,798	98.81%	13	3	1
Totals	**84**	**3,391,492**	**81.62%**	**59**	**7**	**18**



MICRO: Population <100,000		
Colour	Status	Percentage
	Excellent	>97%
	Good	>96 - <97%
	Unacceptable	<96%

MICRO: Population >100,000		
Colour	Status	Percentage
	Excellent	>99%
	Good	>98 - <99%
	Unacceptable	<98%

Figure 110 - Provincial Microbiological Drinking Water Quality Status

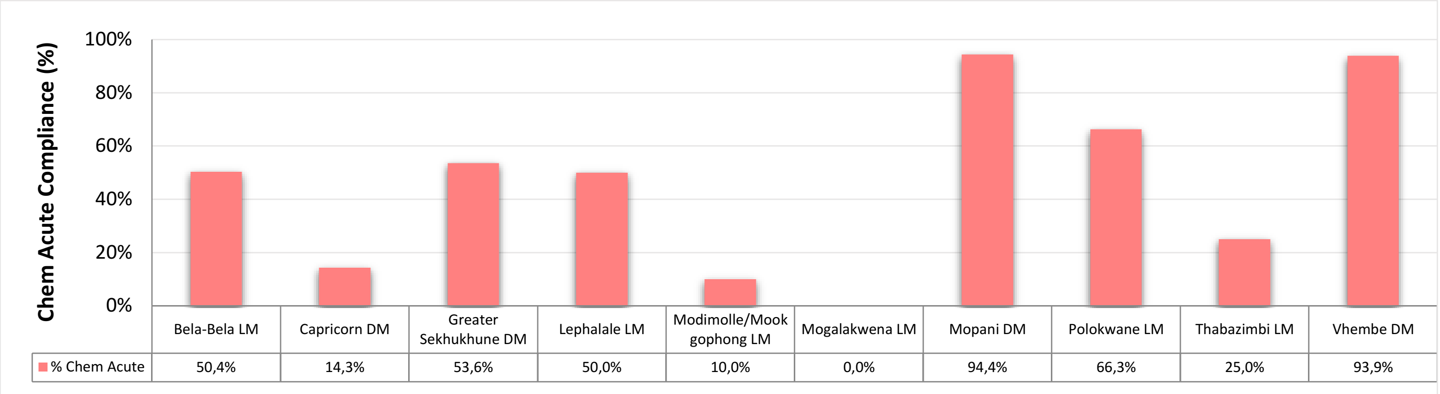
Out of the 84 WSSs, 66 (79%) systems achieved excellent and good microbiological quality, whilst 18 (21%) systems have an unacceptable microbiological water quality status. The water in these systems <u>pose a serious acute health risk</u> to the community. Failure to produce water that meets microbiological compliance standards can be linked back to poor operations, defective infrastructure, inadequate dosing rates, absence of disinfection chemicals, lack of monitoring, lack of operating and chemistry knowledge, and several other root causes.

WSIs that are not monitoring the final water quality at the outlet of the treatment plant or at specific end use points are required to develop a monitoring programme and resume with compliance monitoring as a matter of urgency.

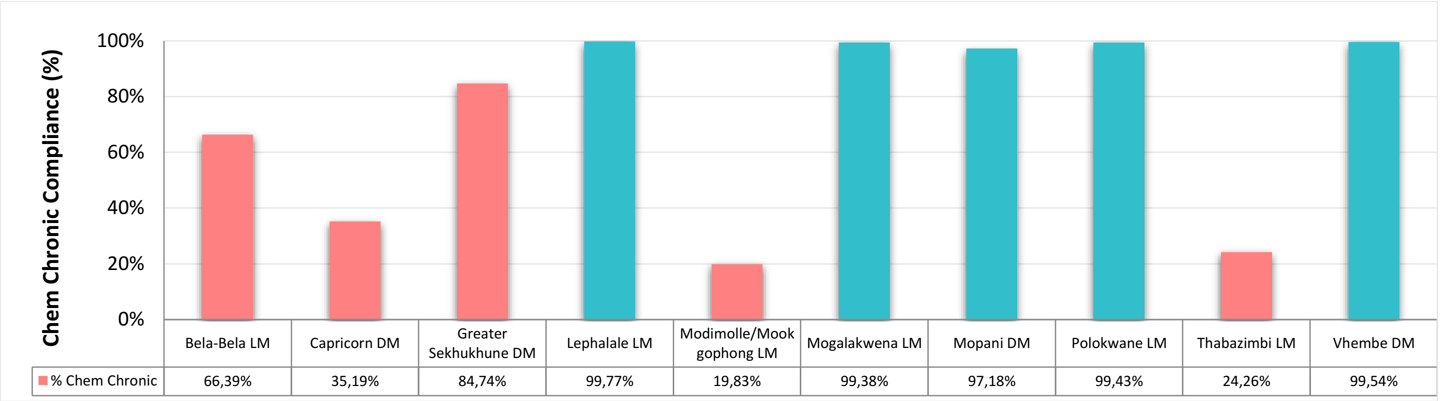
Table 142 - Provincial Summary of the DWQ Status for Chemical Acute Health and Chronic Health Compliance

WSA Name	# WSSs	Population	% Ave. Chem Acute Health Compliance	# WSS Chem Acute Health Performance Status			% Ave. Chem Chronic Health Compliance	# WSS Chem Chronic Health Performance Status		
				Excellent	Good	Unacceptable		Excellent	Good	Unacceptable
Bela-Bela LM	3	60,882	50.4%	1		2	66.4%	2		1
Capricorn DM	7	289,097	14.3%	1		6	35.2%	1		6
Greater Sekhukhune DM	20	330,850	53.6%	7		13	84.7%	14		6
Lephalale LM	2	40,530	50.0%			2	99.8%	2		
Modimolle/Mookgophong LM	5	131,622	10.0%			5	19.8%	1		4
Mogalakwena LM	1	39,733	0.0%			1	99.4%	1		
Mopani DM	18	781,372	94.4%	16		2	97.2%	17		1
Polokwane LM	7	498,999	66.3%	1	1	5	99.4%	7		
Thabazimbi LM	4	57,609	25.0%			4	24.3%			4
Vhembe DM	17	1,160,798	93.9%	14	1	2	99.5%	17		
Totals	**84**	**3,391,492**	**63.5%**	**40**	**2**	**42**	**80.6%**	**62**	**0**	**22**

Chemical acute health compliance shows that 40 (48%) systems have excellent and 2 (2%) systems have good water quality, whilst 42 (50%) systems have an unacceptable chemical acute health compliance. Chemical chronic health compliance shows that 62 (74%) systems have excellent, whilst 22 systems in Capricorn DM, Greater Sekhukhune DM, Modimolle/Mookgophong LM and Thabazimbi LM have an unacceptable chemical chronic health compliance.



CHEM Acute Health: Population <100,000			CHEM Acute Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	≥97%		Excellent	≥99%
	Good	≥95 - <97%		Good	≥97 - <99%
	Unacceptable	<95%		Unacceptable	<97%



CHEM Chronic Health: Population <100,000			CHEM Chronic Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	≥95%		Excellent	≥97%
	Good	≥93 - <95%		Good	≥95 - <97%
	Unacceptable	<93%		Unacceptable	<95%

Figure 111 - Provincial Chemical Acute Health and Chronic Health Drinking Water Quality Status

The Water Services Act upholds standards regarding the monitoring and reporting on drinking water quality and issuance of advisory notices to the public when significant DWQ failures are observed. The audit process applies a penalty when DWQ failures are noticed without issuing such Water Quality Alert Notices to forewarn consumers of the status of (unsafe) water quality and to advise communities to source alternative water sources or methods to disinfect water used for drinking water purposes.

The following table reflects the compliance status of the WSAs as regards the issuing of these notices for DWQ failures.

Table 143 - Summary of Penalties Applied to WSSs for not Issuing Advisory Notices

WSA Name	# WSS	# WSS No Penalty Applied	# WSS Partial Penalty Applied	WSS Names Partial Penalty	# WSS Full Penalty Applied	WSS Names Full Penalty
Bela-Bela LM	3		2	Bela Bela/Magalies, Radium	1	Rapotokwane
Capricorn DM	7		7	Alldays, Botlokwa, Lebowakgomo, Mogwadi, Olifantspoort, Senwabarwana, Zebidiela		
Greater Sekhukhune DM	20	14	3	Ngwaabe, Penge, Tubatse	3	Flag Boshielo, Kutullo, Marble Hall
Lephalale LM	2	1	1	Lephalale		
Modimolle/ Mookgophong LM	5		1	Drakensig	4	LIM365:Mabaleng Res (B/H MM 006007/2010)-2 No, Mookgophong, Roedtan
Mogalakwena LM	1		1	Mokopane Mahwelereng		
Mopani DM	18	17	1	Drakensig		
Polokwane LM	7	7				

WSA Name	# WSS	# WSS No Penalty Applied	# WSS Partial Penalty Applied	WSS Names Partial Penalty	# WSS Full Penalty Applied	WSS Names Full Penalty
Thabazimbi LM	4				4	Leeupoort, Northam, Rooiberg, The Greater Thabazimbi-Magalies
Vhembe DM	17	17				
Totals	**84**	**56**	**16**		**12**	

No penalties were applied to 56 (67%) WSSs in 5 WSAs. Partial penalties were applied to 16 (19%) WSSs in 7 WSAs and full penalties were applied to 12 (14%) WSSs in 4 WSAs.

(iii) Risk defined compliance and laboratory credibility

Findings: Risk-defined compliance standards aim to determine the compliance (to SANS 241) of those parameters that have been found to pose a risk in a specific WSS and need to be included in the routine monitoring programme or frequency as prescribed by SANS 241. The province achieved an average Annual Risk Defined Compliance of 70.7%. Excellent risk defined compliance was achieved by 25 (30%) systems, good compliance for 4 (5%) systems and bad compliance for 55 (65%) systems with most of these systems residing in Greater Sekhukhune DM, Mopani DM and Vhembe DM.

Table 144 - Summary of the DWQ Compliance for Risk Defined Compliance

WSA Name	# WSSs	Population	Ave. % Risk Defined Compliance	# WSS Performance Status		
				Excellent	Good	Bad
Bela-Bela LM	3	60,882	47.07%			3
Capricorn DM	7	289,097	86.00%	3		4
Greater Sekhukhune DM	20	330,850	81.88%	9		11
Lephalale LM	2	40,530	88.70%			2
Modimolle/Mookgophong LM	5	131,622	18.20%			5
Mogalakwena LM	1	39,733	86.93%			1
Mopani DM	18	781,372	91.01%	6	3	9
Polokwane LM	7	498,999	93.26%	3		4
Thabazimbi LM	4	57,609	26.24%			4
Vhembe DM	17	1,160,798	88.02%	4	1	12
Totals	**84**	**3,391,492**	**70.7%**	**25**	**4**	**55**

The aim of operational determinand compliance is to determine the efficiency of the water treatment process, by monitoring those parameters which are used to control the treatment process. Although not necessarily a health risk, these parameters provide good information on the integrity of the WTW. The province achieved an average % Actual Operational Determinand Compliance of 25%. Excellent operational determinand compliance was achieved by 23 (27%) WTWs, good compliance for 3 (4%) WTWs and bad compliance for 59 (69%) WTWs with most of these WTWs residing in Lepelle Northern Water, Greater Sekhukhune and Vhembe DM.

Table 145 - Summary of the Treatment (Operational) Efficiency Index

WSA & WB Name	# WTWs	Population	Ave. % Actual Operational Determinand Compliance	# WTW Performance Status		
				Excellent	Good	Bad
Lepelle Northern Water	17	1,214,023	74%	7	1	9
Bela-Bela LM	3	60,882	28%			3
Capricorn DM	4	96,355	0%			4
Greater Sekhukhune DM	11	102,839	0%			11
Lephalale LM	2	40,530	0%			2
Modimolle/ Mookgophong LM	5	131,622	0%			5
Mogalakwena LM	None					
Mopani DM	17	701,648	80%	11	2	4
Polokwane LM	4	108,999	0%			4
Thabazimbi LM	3	57,609	0%			3
Vhembe DM	19	876,985	70%	5		14
Totals	**85**	**3,391,492**	**25%**	**23**	**3**	**59**

The data confirms that Lepelle Northern Water and 8 (80%) WSAs in the province have access to credible laboratories for compliance and operational analysis. These in-house or contracted laboratories are accredited with SANAS or have Proficiency Testing Schemes with SABS or have inter-laboratory quality checks in place to ensure that suitable analytical methods are applied and that quality assurance processes are followed to ensure credible water quality results. The province is predominantly meeting the regulatory expectation for the WSIs having access to credible analytical services for compliance and operational monitoring.

Diagnostic 4: Technical Site Assessments

Aim: The Blue Drop process makes provision for a Technical Site Assessment (TSA) in order to verify the desktop evidence through field-based inspections. This assessment includes a physical inspection of the entire water treatment plant with all its process units, as well as the reservoir and spot checks of a pumpstation and pipelines. The technical assessment is coupled with an asset condition check to determine an approximate cost (VROOM) to restore existing infrastructure to functional status for the treatment facility (only).

Findings: The results of the province's TSAs are summarised in the table below. A deviation of 10% between the BD and TSA score indicate a misalignment between the administrative aspects and the work on the ground. The Regulator regards a WTW with a TSA score of >80% to have an acceptable level of process control and functional equipment, and a TSA score of 90% as an excellent system that complies with most of the Blue Drop TSA standards. A TSA score of <30% indicates that the treatment facility and network fails in most regards, and is evident of dysfunctional infrastructure, failed process control, absence of record keeping and monitoring, and poor water quality.

The VROOM cost presents a ''Very Rough Order of Measurement" cost to return a WTWs functionality to its original design. More detail can be found in the Blue Drop Watch Report 2023.

Table 146 - %TSA and %BD score, and VROOM cost estimates total and split for civil, mechanical, and electrical

WSA & WB Name	TSA Name	%TSA	2023 BD Score (%)	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Lepelle Northern Water	Doorndraai	76.0%	40.9%	144,000	336,000	-	480,000
Lepelle Northern Water	Ebenhezer (Polokwane)	61.0%	**56.2%**	2,704,000	21,632,000	2,704,000	27,040,000
Bela-Bela LM	Bela Bela	69.0%	**60.3%**	672,000	5,376,000	672,000	6,720,000
Capricorn DM	Mogwadi	59.0%	38.1%	784,000	980,000	196,000	1,960,000
Greater Sekhukhune DM	Groblersdal	50.0%	39.6%	5,413,650	11,910,030	4,330,920	21,654,600
Lephalale LM	Zeeland	86.0%	48.4%	2,120,000	16,960,000	2,120,000	21,200,000
Modimolle/Mookgophong LM	Donkerpoort	34.0%	**51.1%**	19,910,000	9,050,000	7,240,000	36,200,000
Mopani DM	Giyani	62.0%	**56.1%**	2,605,700	20,845,600	2,605,700	26,057,000
Polokwane LM	Molepo	59.0%	**56.2%**	3,312,000	4,554,000	414,000	8,280,000
Thabazimbi LM	Thabazimbi Chlorination Plant	24.0%	47.5%	170,720	21,340	21,340	213,400
Vhembe DM	Khalavha	76.0%	**63.8%**	98,000	686,000	196,000	980,000
			Totals	**R37,934,070**	**R92,350,970**	**R20,499,960**	**R150,785,000**
			% Split of Cost Items	**25%**	**61%**	**14%**	**100%**

A deviation of >10% between the BD and TSA score is noted for 6 WSAs. A deviation of >20% between the BD and TSA score is noted for 4 WSAs. For the individual WTWs assessed in the province, a total budget of R150.8m is estimated, with the bulk of the work (86%) going towards restoration of mechanical equipment (61%) and civil infrastructure (25%).

Diagnostic 5: Operation, Maintenance and Refurbishment of Assets

Aim: Insufficient financial resources are often cited as a root cause to dysfunctional or non-compliant water treatment works and water networks. Knowledge and monitoring of fiscal spending are therefore a critical part of water services management and municipal governance of public assets. This diagnostic investigates the status of financial information as pertaining to O&M budgets and expenditure, asset figures, and capital funding.

Findings: A substantial amount of financial information was presented during the audit process. Unfortunately, the evidence was presented in different formats, levels of detail, or absent for some WSAs. It was observed that WSA teams with financial officials that were present during the audits performed better and had a better understanding of the water services challenges experienced by their technical peers.

Discrepancies observed included amongst others - generic or non-ringfenced budgets, contract lump sums for service providers presented as budgets, outdated or incomplete asset registers, and some cost drivers which were lacking. As data credibility presents a significant challenge, the Regulator grouped data into different certainty levels, as summarised at the end of this Diagnostic.

The result of each financial portfolio is discussed hereunder.

NOTE: The Regulator regards the financial and asset information with low confidence. Not all WSAs submitted verifiable information or complete financial data sets for the audit year in question**.**

Capital, O&M Budget and Actual, and Asset Value

The capital budgets, O&M budgets, O&M actual expenditure, and current asset values are summarised below.

Table 147 - Summary of the capital budgets, O&M budgets, O&M actual expenditure, and current asset values

WSA & WB Name	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
Lepelle Northern Water	NI	R259,296,232	R300,230,989	116%	R3,990,225,544
Bela-Bela LM	NI	R41,355,491	R31,363,084	76%	R3,469,723,153
Capricorn DM	NI	NI	NI	NI	NI
Greater Sekhukhune DM	NI	NI	NI	NI	R1,803,521,458
Lephalale LM	NI	R63,437,030	R9,692,000	15%	R14,900,000
Modimolle/ Mookgophong LM	R81,500,001	R54,299,914	R77,618,776	143%	R131,999,466
Mogalakwena LM	NI	NI	NI	NI	NI
Mopani DM	NI	R147,551,751	R147,982,855	100%	NI
Polokwane LM	NI	NI	NI	NI	R34,271,699
Thabazimbi LM	NI	NI	NI	NI	NI
Vhembe DM	R1,352,458,975	R243,573,581	R152,523,176	63%	R2,507,627,024
Totals	**R1,433,958,976**	**R809,513,999**	**R719,410,880**	**88.9%**	**R11,952,268,344**

The Regulatory Comments following in this Chapter list the capital projects with secured funding for each municipality and/or its bulk water provider (WSP). The capital lists are deemed to be a definitive means to address water service inadequacies and ensuring water infrastructure investment. A total capital budget of R1.434b has been reported for the refurbishment and upgrades of water supply system infrastructure for 2 of 10 WSAs. The largest capital budgets are observed for Vhembe DM (R1.352b) followed by Modimolle/ Mookgophong LM (R81.5m).

For the 2021/22 fiscal year, the total O&M budget reported for the province was R809.5m, of which R719.4m (89%) has been expended. The highest over-expenditure of 143% by Modimolle/ Mookgophong LM and the lowest under expenditure by Lephalale LM (15%) was observed. The provincial figures exclude 5 WSAs who had no financial information.

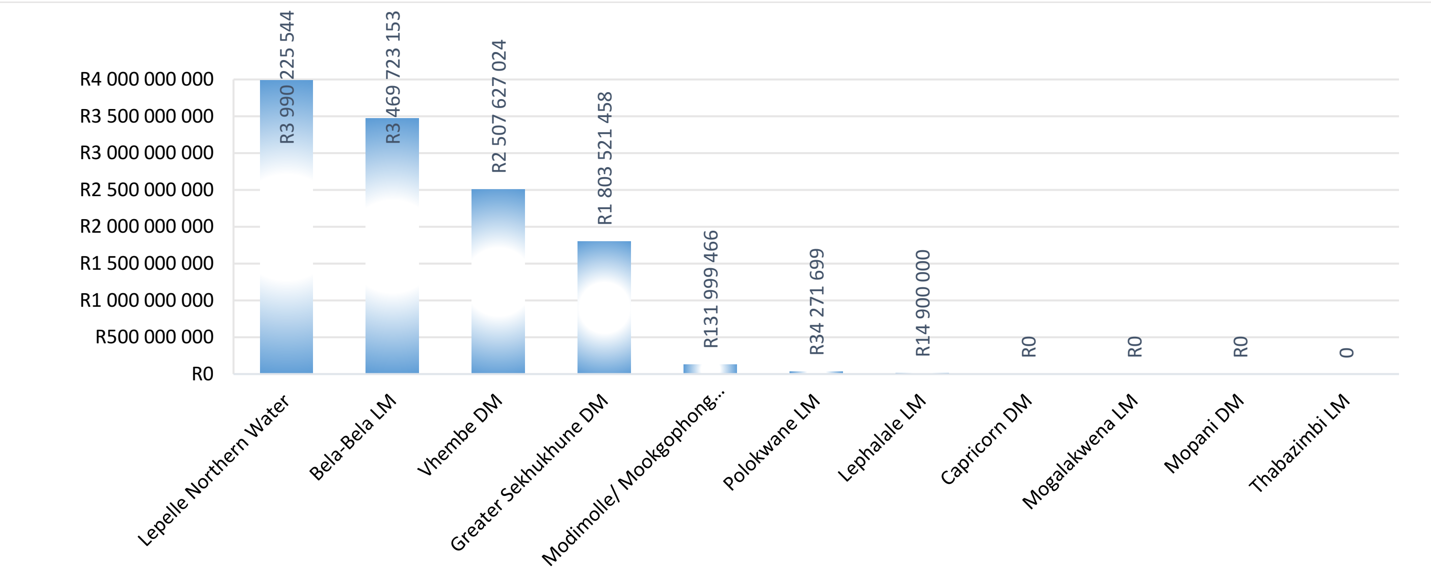


Figure 112 - Total current asset value reported

The total current asset value for water infrastructure (networks, pump stations, treatment plants) is reportedly R11.95b (excluding 4 WSAs with no information). The highest asset values are observed for Lepelle Northern Water (R3.99b), followed by Bela-Bela LM (R3.47b), Vhembe DM (R2.51b) and Greater Sekhukhune DM (R1.8b).

O&M Cost Benchmarking

By combining the SALGA and WRC WATCOST models, an estimation of the maintenance cost required per asset type can be done, i.e. civil, buildings, pipelines, mechanical, electrical, and instrumentation.

Table 148 - SALGA-WRC annual maintenance budget guideline and cost estimation

Description	% of Current Asset Value	Asset Value Estimate	Modified SALGA Maintenance Guideline	Annual Maintenance Budget Guideline
Current Asset Value estimate	**100%**	**R11,952,268,344**	**15.75%**	**R258,168,996**
Broken down into:				
1. Civil Structures	46%	R5,498,043,438	0.50%	R27,490,217
2. Buildings	3%	R358,568,050	1.50%	R5,378,521
3. Pipelines	6%	R717,136,101	0.75%	R5,378,521
4. Mechanical Equipment	30%	R3,585,680,503	4.00%	R143,427,220
5. Electrical Equipment	11%	R1,314,749,518	4.00%	R52,589,981
6. Instrumentation	4%	R478,090,734	5.00%	R23,904,537
Totals	**100%**	**R11,952,268,344**	**15.75%**	**R258,168,996**
			Minus 20% P&Gs and 10% Installation	**R77,450,699**
			Total	**R180,718,297**

The model estimates that R258m (2.16%) is required per year to maintain the assets valued at R11.95b. Notably, this maintenance estimate assumes that all assets are functional. In cases where Blue Drop Certification is not being achieved, it can be assumed that some form of inefficiency or constraint is being experienced, and national benchmarks closer to 7% of the asset value is advocated (R836m).

The table below indicates the SALGA maintenance cost estimation in relation to the O&M budget, and O&M actual expended.

Table 149 - O&M cost estimates by the SALGA versus actual budget and expenditure figures

Cost Reference	O&M Cost Estimate	Period	% of Asset Value
Modified SALGA	R258,168,996	Annually, estimation	2.16%
O&M Budget	R809,513,999	Actual for 2021/22	6.8%
O&M Spend	R719,410,880	Actual for 2021/22	6.0%

In addition, the table below indicates the Blue Drop audit findings on the water supply operations cost determination and water supply O&M budget status.

Table 150 - BD Audit Water Supply Operations Cost Determination and Water Supply O&M Budget status

WSA & WB Name	Water Supply Operations Cost Determination	Water Supply O&M Budget status
Lepelle Northern Water	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET; WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Bela-Bela LM	DETERMINED OF THE WHOLE SYSTEM; NO PROOF	SYSTEM SPECIFIC BUT INCLUDES WATER & SANITATION; NO PROOF
Capricorn DM	NO PROOF (0% SCORE)	NO PROOF
Greater Sekhukhune DM	NO PROOF (0% SCORE); NOT SYSTEM SPECIFIC (GLOBAL); DETERMINED OF THE WHOLE SYSTEM	NO PROOF; WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY; SYSTEM SPECIFIC BUDGET
Lephalale LM	NOT SYSTEM SPECIFIC (GLOBAL); DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY; SYSTEM SPECIFIC BUDGET
Modimolle/ Mookgophong LM	NOT SYSTEM SPECIFIC (GLOBAL)	BUDGET IS NOT RINGFENCED FOR WATER ONLY
Mogalakwena LM	NO PROOF (0% SCORE)	NO PROOF
Mopani DM	NO PROOF (0% SCORE); NOT SYSTEM SPECIFIC (GLOBAL); DETERMINED OF THE WHOLE SYSTEM	NO PROOF; WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY; SYSTEM SPECIFIC BUDGET
Polokwane LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Thabazimbi LM	NO PROOF (0% SCORE)	NO PROOF
Vhembe DM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY

From the tables above, the cost dynamics can be summarised as follows:

- The SALGA estimations for maintenance budgets is about 31.9% (Modified SALGA divided by O&M Budget) of the actual reported budgets for the 2021/22 fiscal year
- The actual O&M budget (31.9%) does not appear to be adequate when compared with the SALGA guideline (2.16%) or with the government benchmark (7%)
- These figures are impacted by some of the WSAs who did not provide budget and expenditure figures, and by some inaccurate asset values and where no asset values were provided for
- Lastly, the municipalities presents budget and expenditure data at different levels (table above) i.e. financial figures are not always ringfenced per water supply system – thus rendering provincial summaries to be indicative).

9.1 Lepelle Northern Water

Introduction

Lepelle Northern Water (LNW) was established in terms of the Water Services Act No. 108 of 1997. As bulk supplier, it provides water services to water services authorities and industries within the Limpopo Province.

LNW is actively involved in schemes serving more than 3 million people as well as some major industrial users. LNW plans to progressively increase the number of people it serves in consultation with the WSAs in its service area.

LNW's area of supply covers approximately 64 % of the square kilometres within the 125 754 square kilometres of Limpopo Province's surface. The bulk supplier is currently providing bulk water in 42 % of its mandated 80 000 square kilometres which is equivalent to about 56% of the province. In so doing, it assists the following Water Services Authorities:

- Polokwane Local Municipality
- Capricorn District Municipality
- Sekhukhune District Municipality
- Mopani District Municipality
- Mogalakwena Local Municipality

To fulfil its obligation in its area of responsibility, Lepelle Northern Water operates 18 treatment systems, varying from treatment plants to boreholes. The total design capacity of the treatment systems is said to be 316 300 kL/d. For the 2021/2022 year of assessment the design capacity was fully utilised with 316 101 kL/d supplied.

Regulator's Comment

The Inspectors visited the Lepelle Northern Water offices in Polokwane in December 2022 to assess all the management systems and information available. The requested information was shared in a professional and transparent manner by scientific and technical staff.

During assessments at Water Services Authorities (WSAs) as well as during the Confirmation Assessments, staff of Lepelle Northern Water played a critical role to assist the WSAs in providing required information. In this regard Lepelle Northern Water is encouraged to practise basic and sound business principles in the management of water and to transfer these skills to the WSA.

Blue Drop Findings

- Lepelle Northern Water demonstrated sufficient potential in their technical, scientific, financial and management capacity to provide a sustainable bulk water service. Introducing proper supervision and performance management will activate a top performer.
- One area that needs specific attention will be the continuous update of the Water Safety Plan, its links to the budget, the Water Services Development Plan and IDP.
- Although maintenance is budgeted for, it seems as if most of the money is used for reactive maintenance. The WSP is encouraged to implement a special project to prioritise preventative maintenance and, in so doing to save on overall maintenance cost.
- Associated with the above will be the implementation of the water conservation and demand plan, with special attention given to water losses on the plants. This is of paramount importance, given the full use of the design capacity indicated above.
- Despite several challenges indicated identified during the assessment, Lepelle Northern Waters' internal records indicated that it was still able to produce drinking water that complied to the four quality criteria of SANS 241:2015 as follow:

    - Chronic health - 99.5%
    - Acute health - 99.3%
    - Operational - 93.4%
    - Microbiological - 98.7%

Technical Site Inspection

Two of the 18 treatment facilities operated by Lepelle Northern Water were visited. The Inspectors were guided through both plants in a friendly and professional manner by well-informed staff. The ***Ebenezer WTW*** obtained a TSA score of 58 % and ***Doorndraai WTW*** a score of 75 %.

Grounds at both the treatment facilities is well maintained but absence of the link between the budget, the expenditure, preventative maintenance plan and asset register is clear (as noted during the Blue Drop Assessment) when looking at the condition of infrastructure.

It was clear from the site visits that the plants are operated to achieve the required final drinking water standards but that it is based on institutional memory and not on documented standard operating procedures. This may explain the high-risk conditions at the chlorination facilities or the inability of operation staff to apply Jar Test results on the plant. The latter having budget and quality implications.

Refer to the Blue Drop Watch Report 2023 for more detail.

An example of infrastructure maintenance failure at Doorndraai plant contributing to water losses

Filter renovation required at Ebenhezer and Doorndraai water treatment plants

Chemical dosing units at both treatment plants with chemical dosing rates not verified

Basic routine and preventative maintenance at palnts needs dedicated attention

Final water pumps at both plants visited are in operational conditions

Water treatment plants are equiped with laboratory equipment to optimise processes but are rarely used for that purpose

9.2 Bela Bela Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	60.25%
Blue Drop Score 2014	%	43.11%
Blue Drop Score 2012	%	71.21%
Blue Drop Score 2011	%	71.07%

Key Performance Area	Weight	Bela Bela	Radium	Rapotokwane
Bulk/WSP		Magalies Water	-	-
Blue Drop Score 2023	%	66.28%	19.00%	16.40%
Blue Drop Score 2014	%	65.70%	28.60%	30.33%
Blue Drop Score 2012	%	74.88%	38.59%	69.72%
Blue Drop Score 2011	%	78.67%	38.95%	48.45%
System Design Capacity	kL/d	49 000	1 000	470
System Available Capacity	kL/d	47 500	1 000	1 000
System Input Value	kL/d	11 500	847	784
Capacity Utilisation	%	93.44%	84.70%	0.00%
Resource Abstracted From		Roodeplaat Dam; Plat River	Borehole	Borehole
BDRR 2023	%	33.26%	50.72%	81.94%
BDRR 2022	%	38.20%	44.70%	98.40%

Technical Site Assessment: Bela Bela WTW - 69%

The Regulator notes the dire state of management and drinking water quality in the Radium and Rapotokwane water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

9.3 Capricorn District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	38.10%
Blue Drop Score 2014	%	70.87%
Blue Drop Score 2012	%	71.99%
Blue Drop Score 2011	%	86.85%

Key Performance Area	Weight	Alldays	Botlokwa	Lebowakgomo	Mogwadi
Bulk/WSP		-	-	Lepelle Northern Water	-
Blue Drop Score 2023	%	19.15%	21.18%	47.89%	4.75%
Blue Drop Score 2014	%	N/A	29.99%	70.43%	33.44%
Blue Drop Score 2012	%	N/A	54.55%	n/a	N/A
Blue Drop Score 2011	%	N/A	N/A	n/a	N/A
System Design Capacity	kL/d	1 000	1 500	60 000	2 000
System Available Capacity	kL/d	1 000	1 500	0	2 000
System Input Value	kL/d	1 000	1 500	3 837	2 000
Capacity Utilisation	%	NI	NI	NI	NI
Resource Abstracted From		Boreholes	Borehole water	Olifants River	Boreholes
BDRR 2023	%	72.97%	57.12%	49.39%	74.94%
BDRR 2022	%	82.10%	53.00%	62.40%	53.00%

Key Performance Area	Weight	Olifantspoort	Senwabarwana	Zebidiela
Bulk/WSP		Lepelle Northern Water	-	Lepelle Northern Water
Blue Drop Score 2023	%	44.37%	12.00%	47.16%
Blue Drop Score 2014	%	69.11%	31.10%	77.31%
Blue Drop Score 2012	%	76.05%	N/A	N/A
Blue Drop Score 2011	%	87.13%	N/A	N/A
System Design Capacity	kL/d	60 000	2 000	60 000
System Available Capacity	kL/d	0	0	0
System Input Value	kL/d	17 265	2 000	1 918
Capacity Utilisation	%	NI	NI	NI
Resource Abstracted From		Olifants River	Boreholes	Olifants River
BDRR 2023	%	53.67%	98.64%	62.04%
BDRR 2022	%	54.50%	89.20%	84.10%

Technical Site Assessment: Mogwadi WTW (Reverse Osmosis) - 58%

The Regulator notes the dire state of management and drinking water quality in the Alldays, Botlokwa, Mogwadi and Senwabarwana water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

9.4 Greater Sekhukhune District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	39.62%
Blue Drop Score 2014	%	47.65%
Blue Drop Score 2012	%	59.93%
Blue Drop Score 2011	%	59.05%

Key Performance Area	Weight	Burgersfort	Fetakgomo	Flag Boshielo	Groblersdal
Bulk/WSP		Lepelle Northern Water	Lepelle Northern Water	Lepelle Northern Water	-
Blue Drop Score 2023	%	43.43%	58.53%	27.47%	33.43%
Blue Drop Score 2014	%	75.50%	N/A	69.97%	30.37%
Blue Drop Score 2012	%	80.54%	N/A	63.93%	40.34%
Blue Drop Score 2011	%	87.62%	N/A	66.45%	66.35%
System Design Capacity	kL/d	15 500	60 000	12 000	1 870
System Available Capacity	kL/d	15 500	60 000	12 000	18 700
System Input Value	kL/d	8 881	27 836	14 500	10 586
Capacity Utilisation	%	121.01%	103.98%	NI	NI
Resource Abstracted From		Steelpoort	Olifants River	Olifants River	Olifants River
BDRR 2023	%	42.95%	41.57%	77.20%	42.97%
BDRR 2022	%	24.30%	59.30%	65.60%	43.10%

Key Performance Area	Weight	Hlogotlou	Kutullo	Magukubjane	Mahlokoena
Bulk/WSP		Lepelle Northern Water	Lepelle Northern Water	-	Lepelle Northern Water
Blue Drop Score 2023	%	42.91%	18.95%	24.85%	21.74%
Blue Drop Score 2014	%	38.48%	N/A	25.29%	N/A
Blue Drop Score 2012	%	47.40%	N/A	55.61%	N/A
Blue Drop Score 2011	%	45.39%	N/A	41.99%	N/A
System Design Capacity	kL/d	2 900	100	900	100
System Available Capacity	kL/d	2 900	100	900	100
System Input Value	kL/d	2 542	100	900	100
Capacity Utilisation	%	0.00%	NI	NI	NI
Resource Abstracted From		Motsephiri	Steelpoort	NI	NI
BDRR 2023	%	50.93%	83.56%	46.51%	86.09%
BDRR 2022	%	39.30%	NA	NI	NI

Key Performance Area	Weight	Mapodile	Marble Hall	Marishane	Masemola
Bulk/WSP		Lepelle Northern Water	Lepelle Northern Water	-	-
Blue Drop Score 2023	%	30.66%	33.56%	27.25%	15.88%

Key Performance Area	Weight	Mapodile	Marble Hall	Marishane	Masemola
Blue Drop Score 2014	%	31.23%	73.43%	19.88%	21.62%
Blue Drop Score 2012	%	N/A	84.26%	37.78%	45.03%
Blue Drop Score 2011	%	N/A	72.61%	N/A	44.04%
System Design Capacity	kL/d	1 000	3 000	150	2 000
System Available Capacity	kL/d	800	3 000	150	2 000
System Input Value	kL/d	1 148	2 957	150	2 000
Capacity Utilisation	%	143.50%	NI	NI	NI
Resource Abstracted From		Nadimeng	Loskop Dam	NI	NI
BDRR 2023	%	29.60%	74.11%	27.79%	54.06%
BDRR 2022	%	100.00%	75.90%	96.90%	72.10%

Key Performance Area	Weight	Ngwaabe	Nkosini	Penge	Roosenekal
Bulk/WSP		Lepelle Northern Water	-	-	-
Blue Drop Score 2023	%	**27.87%**	**17.50%**	**25.75%**	**32.83%**
Blue Drop Score 2014	%	N/A	N/A	37.98%	43.20%
Blue Drop Score 2012	%	N/A	N/A	42.90%	39.00%
Blue Drop Score 2011	%	N/A	N/A	29.80%	52.40%
System Design Capacity	kL/d	12 000	500	2 000	500
System Available Capacity	kL/d	12 000	500	2 000	500
System Input Value	kL/d	1 982	500	2 000	500
Capacity Utilisation	%	NI	NI	NI	NI
Resource Abstracted From		de Hoop Dam	NI	NI	Tonteldoos River
BDRR 2023	%	45.76%	50.54%	32.19%	24.70%
BDRR 2022	%	53.50%	95.90%	28.92%	NI

Key Performance Area	Weight	Steelpoort	Tsakane	Tubatse	Vergelegen
Bulk/WSP		Lepelle Northern Water	Lepelle Northern Water	Lepelle Northern Water	-
Blue Drop Score 2023	%	**26.46%**	**26.31%**	**32.36%**	**22.55%**
Blue Drop Score 2014	%	44.59%	N/A	17.68%	25.24%
Blue Drop Score 2012	%	N/A	N/A	n/a	43.43%
Blue Drop Score 2011	%	N/A	N/A	30.49%	52.54%
System Design Capacity	kL/d	3 000	100	15 000	5 000
System Available Capacity	kL/d	3 000	100	15 000	5 000
System Input Value	kL/d	1 789	100	7 719	5 000
Capacity Utilisation	%	NI	18.00%	14.74%	NI
Resource Abstracted From		Steelpoort	Tsakane	Steelpoort	NI
BDRR 2023	%	88.60%	65.55%	27.87%	56.95%

Key Performance Area	Weight	Steelpoort	Tsakane	Tubatse	Vergelegen
BDRR 2022	%	NI	NI	70.20%	63.00%

Technical Site Assessment: Groblersdal WTW – 50%

The Regulator notesthe dire state of management and drinking water quality in the Flag Boshielo, Kutullo, Magukubjane, Mahlokoena, Mapodile, Marishane, Masemola, Ngwaabe, Nkosini, Penge, Steelpoort, Tsakane and Vergelegen water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

9.5 Lephalale Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	48.37%
Blue Drop Score 2014	%	85.46%
Blue Drop Score 2012	%	92.84%
Blue Drop Score 2011	%	82.63%

Key Performance Area	Weight	Matimba	Zeeland
Bulk/WSP		ESKOM	EXXARO
Blue Drop Score 2023	%	60.17%	43.12%
Blue Drop Score 2014	%	82.84%	87.52%
Blue Drop Score 2012	%	88.34%	95.82%
Blue Drop Score 2011	%	77.41%	88.63%
System Design Capacity	kL/d	23 000	40 000
System Available Capacity	kL/d	23 000	40 000
System Input Value	kL/d	4 000	9 000
Capacity Utilisation	%	57.39%	22.50%
Resource Abstracted From		Mokolo Dam	Hans Strijdom
BDRR 2023	%	31.62%	54.63%
BDRR 2022	%	82.10%	53.10%

Technical Site Assessment: Zeeland WTW – 86%

9.6 Modimolle-Mookgopong Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	51.05%
Blue Drop Score 2014	%	62.84%
Blue Drop Score 2012	%	70.10%
Blue Drop Score 2011	%	81.70%

Key Performance Area	Weight	Modimolle	Mookgophong	Mabaleng	Mabatlane
Bulk/WSP		Magalies Water	-	-	-
Blue Drop Score 2023	%	68.19%	15.78%	18.83%	17.83%
Blue Drop Score 2014	%	66.43%	26.40%	32.80%	34.00%
Blue Drop Score 2012	%	73.96%	31.73%	43.28%	31.78%
Blue Drop Score 2011	%	95.01%	24.79%	34.00%	48.45%
System Design Capacity	kL/d	52 000	5 000	500	1 300
System Available Capacity	kL/d	52 000	5 000	500	1 300
System Input Value	kL/d	8 200	2 000	500	1 300
Capacity Utilisation	%	70.98%	NI	NI	NI
Resource Abstracted From		Donkerpoort Dam; Pienaars river (Roodeplaat Dam)	Welgevonden Dam	Borehole	Borehole
BDRR 2023	%	40.92%	97.93%	100.00%	100.00%
BDRR 2022	%	79.30%	91.70%	99.70%	100.00%

Key Performance Area	Weight	Roedtan
Bulk/WSP		-
Blue Drop Score 2023	%	15.35%
Blue Drop Score 2014	%	NI
Blue Drop Score 2012	%	NI
Blue Drop Score 2011	%	NI
System Design Capacity	kL/d	300
System Available Capacity	kL/d	300
System Input Value	kL/d	300
Capacity Utilisation	%	NI
Resource Abstracted From		Borehole
BDRR 2023	%	100.00%
BDRR 2022	%	99.70%

Technical Site Assessment: Donkerpoort WTW - 34%

The Regulator notes the dire state of management and drinking water quality in the Mookgophong, Mabaleng, Mabatlane and Roedtan water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

9.7 Mogalakwena Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	40.85%
Blue Drop Score 2014	%	60.49%
Blue Drop Score 2012	%	0.00%
Blue Drop Score 2011	%	0.00%

Key Performance Area	Weight	Mokopane Mahwelereng
Bulk/WSP		Lepelle Northern Water
Blue Drop Score 2023	%	40.85%
Blue Drop Score 2014	%	9.07%
Blue Drop Score 2012	%	N/A
Blue Drop Score 2011	%	N/A
System Design Capacity	kL/d	12 000
System Available Capacity	kL/d	12 000
System Input Value	kL/d	10 108
Capacity Utilisation	%	85.71%
Resource Abstracted From		Doorndraai dam
BDRR 2023	%	51.98%
BDRR 2022	%	73.20%

Technical Site Assessment: Doorndraai WTW - 75%

9.8 Mopani District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	56.13%
Blue Drop Score 2014	%	64.60%
Blue Drop Score 2012	%	79.21%
Blue Drop Score 2011	%	63.87%

Key Performance Area	Weight	Drakensig	Giyani	Greater Tzaneen	Letsitele
Bulk/WSP		Public Works LP	-	-	-
Blue Drop Score 2023	%	23.83%	54.44%	64.31%	61.84%
Blue Drop Score 2014	%	26.09%	32.51%	77.39%	73.44%
Blue Drop Score 2012	%	NI	65.48%	95.10%	95.02%
Blue Drop Score 2011	%	NI	41.85%	95.08%	95.05%
System Design Capacity	kL/d	12 500	36 700	15 000	1 800
System Available Capacity	kL/d	12 500	36 700	15 000	1 800
System Input Value	kL/d	12 500	29 901	17 415	787
Capacity Utilisation	%	NI	81.47%	119.62%	43.72%
Resource Abstracted From		Mohlabetsi	Hudson Ntsanwisi	Groot Letaba	Groot Letaba
BDRR 2023	%	52.04%	47.32%	40.29%	14.99%
BDRR 2022	%	74.60%	33.70%	25.00%	18.70%

Key Performance Area	Weight	Mapuve	Middle Letaba	Modjadi	Nkambako
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	65.23%	61.38%	54.33%	59.17%
Blue Drop Score 2014	%	29.33%	32.40%	76.37%	32.19%
Blue Drop Score 2012	%	63.17%	66.18%	92.88%	67.39%
Blue Drop Score 2011	%	24.00%	48.38%	61.97%	27.33%
System Design Capacity	kL/d	4 000	36 000	12 000	12 000
System Available Capacity	kL/d	4 000	36 000	12 000	12 000
System Input Value	kL/d	2 549	22 900	7 506	4 513
Capacity Utilisation	%	NI	63.61%	62.56%	37.61%
Resource Abstracted From		Middel-Letaba	Middle Letaba Dam	Molototsi	Groot Letaba
BDRR 2023	%	41.67%	47.23%	43.61%	37.62%
BDRR 2022	%	73.30%	64.90%	32.00%	95.60%

Key Performance Area	Weight	Nkowankowa	Nondweni	Phalaborwa, Lulekani and Namakgale	Politsi and Modjadji Kloof
Bulk/WSP		-	-	Lepelle Northern Water	Lepelle Northern Water
Blue Drop Score 2023	%	59.60%	60.41%	57.68%	61.34%
Blue Drop Score 2014	%	46.73%	46.73%	80.20%	76.21%
Blue Drop Score 2012	%	66.27%	66.27%	92.63%	92.88%
Blue Drop Score 2011	%	30.43%	30.43%	80.47%	68.55%
System Design Capacity	kL/d	24 000	4 700	76 000	5 500
System Available Capacity	kL/d	24 000	4 700	76 000	5 500
System Input Value	kL/d	20 939	3 605	59 521	6 211
Capacity Utilisation	%	87.25%	76.70%	104.65%	121.02%
Resource Abstracted From		Groot Letaba	NI	Olifants River	Molototsi
BDRR 2023	%	30.13%	45.26%	38.84%	31.31%
BDRR 2022	%	38.30%	56.60%	43.70%	32.00%

Key Performance Area	Weight	Semarela	Thabina	Thapane	The Oaks
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	52.08%	61.95%	48.25%	37.78%
Blue Drop Score 2014	%	N/A	28.09%	38.27%	26.09%
Blue Drop Score 2012	%	N/A	64.41%	65.68%	N/A
Blue Drop Score 2011	%	N/A	7.75%	38.50%	N/A
System Design Capacity	kL/d	1 000	12 000	8 000	1 000
System Available Capacity	kL/d	1 000	12 000	8 000	1 000
System Input Value	kL/d	65	12 000	2 062	3 609
Capacity Utilisation	%	6.40%	NI	25.78%	360.90%
Resource Abstracted From		Semarela river	Thabina	Thapane River	Olifants
BDRR 2023	%	36.20%	61.51%	27.60%	72.67%
BDRR 2022	%	33.30%	77.20%	28.20%	36.50%

Key Performance Area	Weight	Tours	Zava
Bulk/WSP		-	-
Blue Drop Score 2023	%	51.96%	52.70%
Blue Drop Score 2014	%	36.91%	N/A
Blue Drop Score 2012	%	80.49%	N/A
Blue Drop Score 2011	%	29.55%	N/A
System Design Capacity	kL/d	9 000	300
System Available Capacity	kL/d	9 000	300

Key Performance Area	Weight	Tours	Zava
System Input Value	kL/d	8 325	156
Capacity Utilisation	%	92.50%	52.00%
Resource Abstracted From		Tours	Groot Letaba
BDRR 2023	%	48.05%	39.88%
BDRR 2022	%	78.80%	75.40%

Technical Site Assessment: Giyani WTW – 62%

The Regulator notes the dire state of management and drinking water quality in the Drakensig water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

9.9 Polokwane Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	56.17%
Blue Drop Score 2014	%	92.48%
Blue Drop Score 2012	%	86.52%
Blue Drop Score 2011	%	92.61%

Key Performance Area	Weight	Chuenemaja	City Polokwane	Mankweng Area	Mashashane
Bulk/WSP		Lepelle Northern Water	Lepelle Northern Water	Lepelle Northern Water	-
Blue Drop Score 2023	%	56.83%	55.45%	57.72%	38.28%
Blue Drop Score 2014	%	88.09%	95.00%	86.07%	55.03%
Blue Drop Score 2012	%	87.29%	92.03%	80.89%	91.60%
Blue Drop Score 2011	%	81.44%	95.05%	95.15%	72.55%
System Design Capacity	kL/d	60 000	130 000	52 000	1 460
System Available Capacity	kL/d	60 000	130 000	52 000	1 460
System Input Value	kL/d	1 001	53 618	8 119	1 460
Capacity Utilisation	%	101.39%	93.07%	96.32%	NI
Resource Abstracted From		Tudumo	Olifantsriver; Ebenezer dam	Ebenezer dam	Hout
BDRR 2023	%	41.83%	40.18%	37.05%	45.63%
BDRR 2022	%	44.30%	36.20%	38.00%	86.70%

Key Performance Area	Weight	Molepo	Moletjie Area	Seshego
Bulk/WSP		-	-	Lepelle Northern Water
Blue Drop Score 2023	%	51.66%	53.61%	59.13%
Blue Drop Score 2014	%	85.38%	85.26%	86.81%
Blue Drop Score 2012	%	82.02%	73.79%	87.12%
Blue Drop Score 2011	%	79.89%	76.57%	89.65%
System Design Capacity	kL/d	6 000	3 400	63 900
System Available Capacity	kL/d	6 000	3 400	63 900
System Input Value	kL/d	6 000	1 393	27 904
Capacity Utilisation	%	NI	40.97%	99.04%
Resource Abstracted From		Molepo Dam	Hout	Seshego
BDRR 2023	%	37.03%	21.78%	38.39%
BDRR 2022	%	19.90%	18.80%	44.10%

Technical Site Assessment: Molepo WTW – 59%

9.10 Thabazimbi Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	47.50%
Blue Drop Score 2014	%	55.81%
Blue Drop Score 2012	%	54.33%
Blue Drop Score 2011	%	14.32%

Key Performance Area	Weight	Greater Thabazimbi	Northam	Leeupoort	Rooiberg
Bulk/WSP		Magalies Water	Magalies Water	-	-
Blue Drop Score 2023	%	50.83%	55.55%	4.70%	4.20%
Blue Drop Score 2014	%	59.27%	62.19%	37.66%	22.06%
Blue Drop Score 2012	%	58.48%	62.90%	20.18%	20.18%
Blue Drop Score 2011	%	13.69%	12.78%	21.28%	13.68%
System Design Capacity	kL/d	280 000	270 000	1 000	1 000
System Available Capacity	kL/d	270 000	270 000	1 000	1 000
System Input Value	kL/d	12 364	5 573	1 000	1 000
Capacity Utilisation	%	49.58%	83.24%	NI	NI
Resource Abstracted From		Vaalkop Dam & Borehole	Vaalkop Dam	Borehole	Borehole
BDRR 2023	%	65.80%	73.05%	100.00%	100.00%
BDRR 2022	%	92.90%	81.70%	89.20%	89.20%

Technical Site Assessment: Thabazimbi Chlorination Plant - 24%

The Regulator notes the dire state of management and drinking water quality in the Leeupoort and Rooiberg water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

9.11 Vhembe District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	63.78%
Blue Drop Score 2014	%	39.35%
Blue Drop Score 2012	%	74.85%
Blue Drop Score 2011	%	45.06%

Key Performance Area	Weight	Damani	Dzindi	Dzingahe	Elim
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	74.55%	62.58%	67.03%	57.05%
Blue Drop Score 2014	%	43.61%	43.61%	43.61%	28.12%
Blue Drop Score 2012	%	71.21%	71.21%	71.21%	53.79%
Blue Drop Score 2011	%	51.65%	51.65%	51.65%	29.73%
System Design Capacity	kL/d	12 000	5 200	3 000	2 160
System Available Capacity	kL/d	12 000	5 200	260	2 160
System Input Value	kL/d	10 000	5 200	260	2 160
Capacity Utilisation	%	83.33%	100.00%	100.00%	100.00%
Resource Abstracted From		Mvuwe/Damani Dam which is fed from Mbwedi River	Dzidi River	Mutshundudi River	Borehole Supply System
BDRR 2023	%	33.71%	28.26%	12.83%	28.64%
BDRR 2022	%	34.00%	34.00%	34.00%	73.20%

Key Performance Area	Weight	Luphephe-Nwanedi	Makhado	Malamulele	Musina
Bulk/WSP		-	-	Lepelle Northern Water	-
Blue Drop Score 2023	%	60.73%	64.33%	70.43%	52.20%
Blue Drop Score 2014	%	32.92%	29.00%	41.00%	59.00%
Blue Drop Score 2012	%	77.17%	71.00%	78.00%	77.00%
Blue Drop Score 2011	%	50.10%	45.00%	37.00%	32.00%
System Design Capacity	kL/d	2 400	10 360	76 000	9 000
System Available Capacity	kL/d	2 400	10 360	76 000	9 000
System Input Value	kL/d	2 400	9 000	35 279	9 000
Capacity Utilisation	%	100.00%	86.87%	95.45%	100.00%
Resource Abstracted From		Lupepe River	Albasini	Luvuvhu	Boreholes
BDRR 2023	%	27.57%	28.68%	37.16%	28.48%
BDRR 2022	%	24.10%	39.40%	68.20%	36.50%

Key Performance Area	Weight	Mutale	Mutshedzi	Ndzelele	Thohoyandou
Bulk/WSP		-	-	-	Lepelle Northern Water

Key Performance Area	Weight	Mutale	Mutshedzi	Ndzelele	Thohoyandou
Blue Drop Score 2023	%	**68.48%**	**63.88%**	**52.85%**	**56.10%**
Blue Drop Score 2014	%	33.00%	42.00%	22.00%	43.61%
Blue Drop Score 2012	%	77.00%	72.00%	44.00%	71.21%
Blue Drop Score 2011	%	50.00%	46.00%	12.00%	51.65%
System Design Capacity	kL/d	8 640	17 000	7 000	60 000
System Available Capacity	kL/d	8 640	17 000	7 000	60 000
System Input Value	kL/d	7 750	13 000	7 000	33 506
Capacity Utilisation	%	89.78%	76.47%	100.00%	91.67%
Resource Abstracted From		Mutale	Mutshedzi Dam	Nzhellele Weir	Luvuvhu River
BDRR 2023	%	29.72%	31.07%	52.05%	34.57%
BDRR 2022	%	44.50%	31.50%	45.00%	34.00%

Key Performance Area	Weight	Tshakhuma	Tshedza	Tshifhire Murunwa	Vondo
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**57.90%**	**56.18%**	**54.75%**	**65.77%**
Blue Drop Score 2014	%	43.61%	38.00%	27.00%	43.61%
Blue Drop Score 2012	%	71.21%	68.00%	72.00%	71.21%
Blue Drop Score 2011	%	51.65%	39.00%	44.00%	51.65%
System Design Capacity	kL/d	6 000	1 468	2 073	54 000
System Available Capacity	kL/d	5 200	1 468	2 073	54 000
System Input Value	kL/d	3 959	1 725	1 960	53 800
Capacity Utilisation	%	99.29%	117.51%	94.55%	99.67%
Resource Abstracted From		Tshakhuma Dam;	Mutshedzi River	Tshikhwikhwikhwi River	Phiphindi Dam
BDRR 2023	%	59.89%	27.64%	29.38%	35.84%
BDRR 2022	%	34.00%	49.90%	42.00%	34.00%

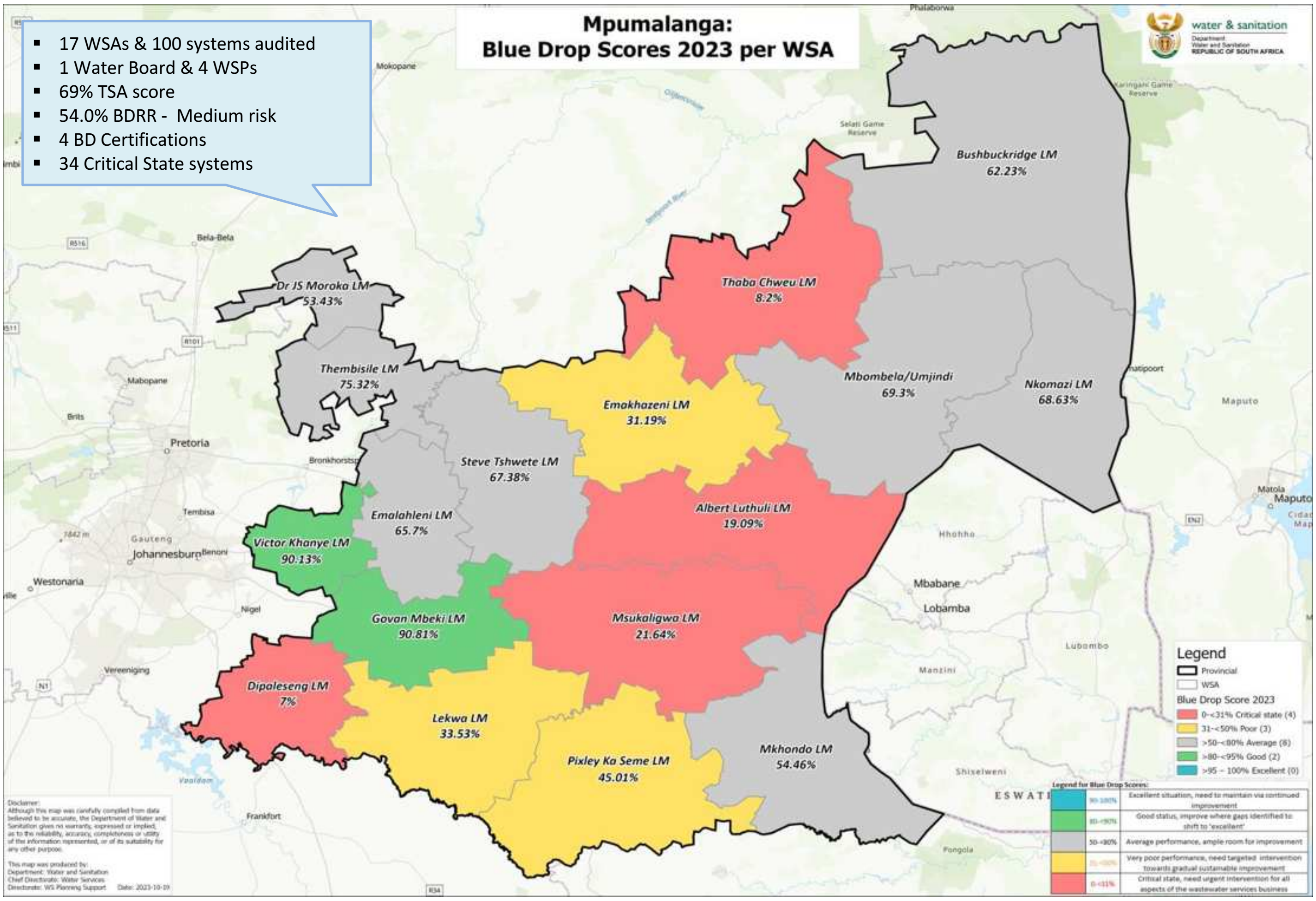
Key Performance Area	Weight	Xikundu
Bulk/WSP		-
Blue Drop Score 2023	%	**65.73%**
Blue Drop Score 2014	%	41.20%
Blue Drop Score 2012	%	78.39%
Blue Drop Score 2011	%	36.93%
System Design Capacity	kL/d	23 000
System Available Capacity	kL/d	23 000
System Input Value	kL/d	14 350
Capacity Utilisation	%	62.39%

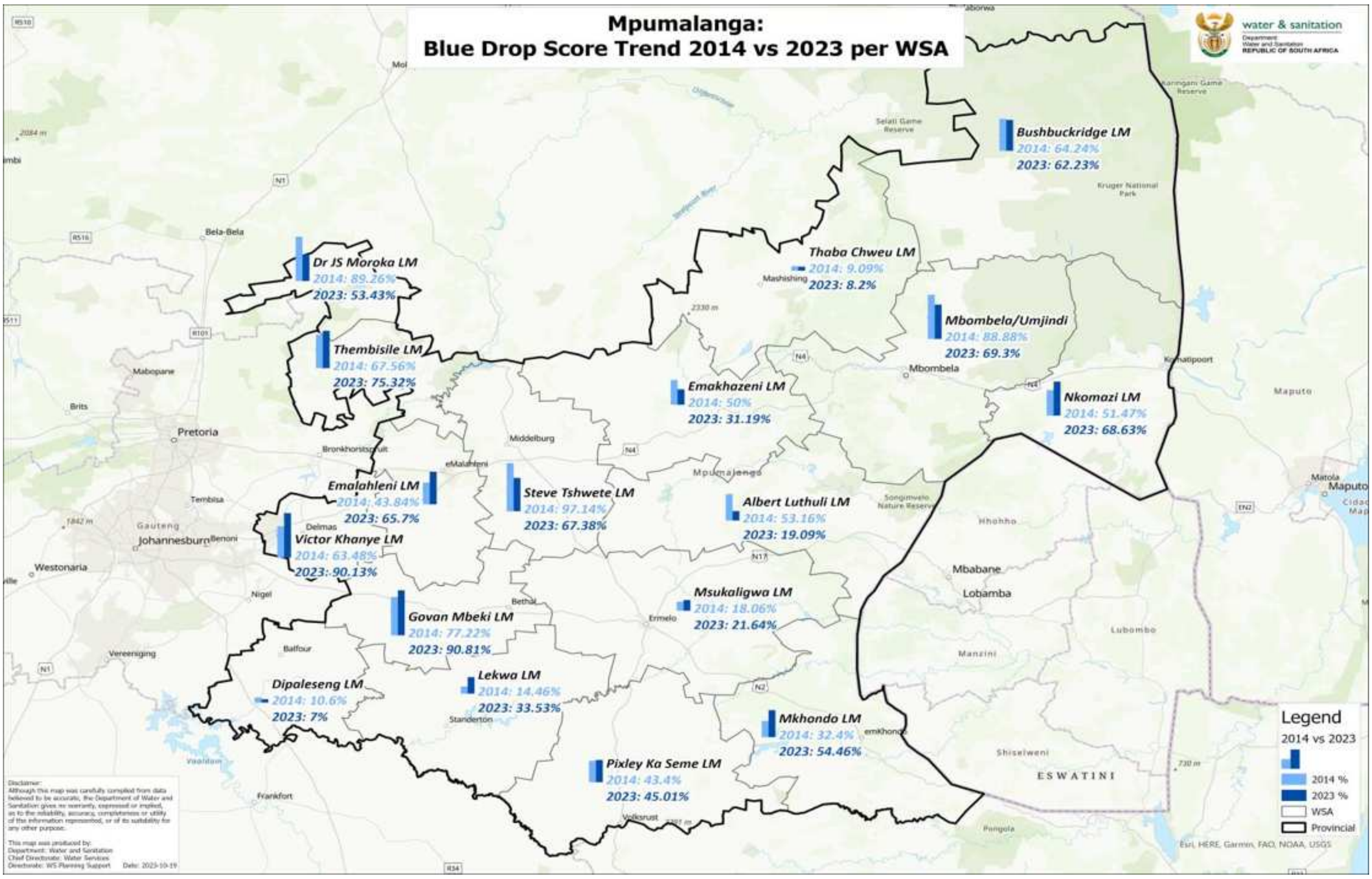
Key Performance Area	Weight	Xikundu
Resource Abstracted From		Luvuvhu
BDRR 2023	%	34.14%
BDRR 2022	%	68.20%

Technical Site Assessment: Khalavha Water Purification Plant - 76%

Swartland booster pumpstation and water network: Secured and well maintained

Theewaterskloof: Grabouw WTW clarifiers, routine monitoring to ensure optimal clarification


Mpumalanga:
Blue Drop Scores 2023 per WSA
17 WSAs & 100 systems audited
1 Water Board & 4 WSPs
69% TSA score
54.0% BDRR - Medium risk
4 BD Certifications
34 Critical State systems
Bushbuckridge LM 62.23%
Thaba Chweu LM 8.2%
Dr JS Moroka LM 53.43%
Thembisile LM 75.32%
Emakhazeni LM 31.19%
Mbombela/Umjindi 69.3%
Nkomazi LM 68.63%
Steve Tshwete LM 67.38%
Albert Luthuli LM 19.09%
Emalahleni LM 65.7%
Victor Khanye LM 90.13%
Govan Mbeki LM 90.81%
Msukaligwa LM 21.64%
Dipaleseng LM 7%
Lekwa LM 33.53%
Pixley Ka Seme LM 45.01%
Mkhondo LM 54.46%
Legend
Provincial
WSA
Blue Drop Score 2023
0-<31% Critical state (4)
31-<50% Poor (3)
>50-<80% Average (8)
>80-<95% Good (2)
>95 - 100% Excellent (0)


Mpumalanga:
Blue Drop Score Trend 2014 vs 2023 per WSA
Bushbuckridge LM 2014: 64.24% 2023: 62.23%
Thaba Chweu LM 2014: 9.09% 2023: 8.2%
Dr JS Moroka LM 2014: 89.26% 2023: 53.43%
Mbombela/Umjindi 2014: 88.88% 2023: 69.3%
Thembisile LM 2014: 67.56% 2023: 75.32%
Emakhazeni LM 2014: 50% 2023: 31.19%
Nkomazi LM 2014: 51.47% 2023: 68.63%
Emalahleni LM 2014: 43.84% 2023: 65.7%
Steve Tshwete LM 2014: 97.14% 2023: 67.38%
Albert Luthuli LM 2014: 53.16% 2023: 19.09%
Victor Khanye LM 2014: 63.48% 2023: 90.13%
Msukaligwa LM 2014: 18.06% 2023: 21.64%
Govan Mbeki LM 2014: 77.22% 2023: 90.81%
Lekwa LM 2014: 14.46% 2023: 33.53%
Dipaleseng LM 2014: 10.6% 2023: 7%
Mkhondo LM 2014: 32.4% 2023: 54.46%
Pixley Ka Seme LM 2014: 43.4% 2023: 45.01%
Legend
2014 vs 2023
2014 %
2023 %
WSA
Provincial

Provincial Synopsis

The Mpumalanga province provides drinking water to a total population of 4,770,957 persons in South Africa.

An audit attendance record of 100% of the 17 WSAs, with 100 water supply systems across the province, 1 Water Board (Rand Water) and 4 Water Service Providers (Sembcorp-Silulumanzi, Eskom, Glencore, and Anglo operations/Nu Water systems) and affirms the province's commitment to the Blue Drop national incentive-based regulatory programme. The main Bulk Water Supplier is Rand Water who supplies potable water to 13 water supply systems in 4 WSAs.

The Regulator determined that 4 water supply systems scored more than 95% when measured against the Blue Drop standards and thus qualified for the prestigious Blue Drop Certification. In 2014, 9 water supply systems were awarded Blue Drop status. Using the 2014 audit results as comparative baseline, the province shows a decline in excellence for 2023.

Nine (9) of 17 WSAs improved on their 2014 scores as seen in the table below. The remaining 8 WSAs regressed to lower Blue Drop scores compared to their 2014 baselines. The Govan Mbeki LM (Rand Water), Victor Khanye LM (Rand Water) and Thembisile LM (Rand Water) are the best performing WSAs in the province. However, Mbombela/Umjindi achieved Blue Drop Certifications for 4 water supply systems in total. The Blue Drop scores of these top WSA performers were supported by excellent technical site assessment scores of 92% for the Nelspruit (New) WTW in Mbombela/Umjindi, followed by the Bundu WTW in Thembisile LM with a TSA score of 88%. 34 water supply systems were identified to be in a critical state in the province compared with 23 water supply systems in 2014.

The province's overall Blue Drop performance is characterised by particular strengths when measured against the KPAs. The water supply systems operated by Rand Water and the respective Water Service Provider and Nkomazi LM stand out for its compliance, good practice and risk management practices that are well embedded in the water supply business. The KPAs that require attention and are reflecting scores below 50% are KPA 3 Financial Management (49%), KPA 4 Technical Management (35.3%) and KPA 5 Drinking Water Quality Compliance (43.3%).

The provincial Blue Drop Risk Rating (BDRR) remained in the medium risk category but improved slightly from 54.8% in 2022 (BD PAT) to 54.0% in 2023. 52 (of 100) water supply systems are situated in the low risk category, 16 WSSs in the medium risk category, 23 WSSs in the high risk category, and 9 WSSs in the critical risk category.

The Regulator is optimistic that the 2023 Blue Drop report provides an updated residual basis from where a positive trajectory for water services delivery and improved performance will follow in the next BD audit. Municipalities and their service providers are encouraged to start preparation for the next Blue Drop audit cycle, which is planned to cover the financial year 2023/24 and released in 2025. The 2023 Blue Drop status for WSAs in the province are summarised in the table below.

Table 151 - 2023 Blue Drop Summary

WSA Name	2014 BD Score (%)	2023 BD Score (%)	2023 BD Certified ≥95%	2023 Critical State (<31%)
Albert Luthuli LM	53.2%	19.1%↓		All 8 WSSs
Bushbuckridge LM	64.2%	62.2%↓		
Dipaleseng LM	10.6%	7.0%↓		Greater Dipaleseng
Dr JS Moroka LM	89.3%	53.4%↓		
Emakhazeni LM	50.0%	31.2%↓		Belfast, Dullstroom
Emalahleni LM	43.8%	65.7%↑		
Govan Mbeki LM	77.2%	90.8%↑		
Lekwa LM	14.5%	33.5%↑		
Mbombela/Umjindi	88.9%	69.3%↓	Karino, Matsulu, Nelspruit, Primkop	Elandshoek, Hazyview, White River, White River Country & Golf Estates, Mjindini Trust-Madakwa, Rimers-Suid Kaap, Sheba, Mjejane, Legogote, Nyongane River, Dwaleni, Mshadza
Mkhondo LM	32.4%	54.5%↑		Rural WSS
Msukaligwa LM	18.1%	21.6%↑		Breyten, Davel, Douglas dam, Lothair, South works (noitgedacht farm)
Nkomazi LM	51.5%	68.6%↑		
Pixley Ka Seme LM	43.4%	45.0%↑		
Steve Tshwete LM	97.1%	67.4%↓		
Thaba Chweu LM	9.1%	8.2%↓		Coromandel, Graskop, Lydenburg, Sabie
Thembisile LM	67.6%	75.3%↑		Langkloof
Victor Khanye LM	63.5%	90.1%↑		
Totals	-	-	4	34

↑= improvement, ↓= regress, →= no change

The Department of Water and Sanitation acknowledges the excellence in water services management achieved for the Blue Drop Audit year of 2021-22. Four (4) Blue Drop Certificates are awarded in the Mpumalanga Province to the water supply systems of Mbombela/Umjindi:

Province	2023 Blue Drop Certified Systems
Mpumalanga	Mbombela-Umjindi LM (Rand Water) ○ Karino Water Treatment Works ○ Matsulu ○ Nelspruit Supply System ○ Primkop WTW

Background to Water Delivery and Distribution Infrastructure

The total volume of water treated in the province is 713,159 kl/d. 17 WSAs, 1 Water Board (Rand Water) and 4 Water Service Providers (Sembcorp-Silulumanzi, Eskom, Glencore and Anglo operations/Nu Water systems) are responsible for water services through a water network comprising of:

- 107 WTWs with the bulk of the water treated and supplied by Emalahleni LM, Mbombela/Umjindi, Bushbuckridge LM and Nkomazi LM with a total of 63 WTWs with a total Average Daily Production of 554,585 kl/d supplying potable water to 52 WSSs
- 6 WSSs in Govan Mbeki LM, Victor Khanye LM and Thembisile LM are provided with bulk water supply from the Rand Water WTWs located in Gauteng
- 272 pump stations, 2,075 km bulk water supply lines, 9,088 km reticulation pipe lines, and 640 reservoirs/ towers (excluding all the systems that were unable to provide data).

Table 152 - Summary of Capacities, Daily Production and SIV distribution according to plant sizes

	Micro Size Plants	Small Size Plants	Medium Size Plants	Large Size Plants	Macro Size Plants	Unknown (NI)*	Total
	<500 kl/day	500 - <2,000 kl/day	2,000 - <10,000 kl/day	10,000 - <25,000 kl/day	>25,000 kl/day		
No. of WTWs, Boreholes, Springs	7 (7%)	20 (19%)	54 (50%)	16 (15%)	10 (9%)		107
Total Design Capacity (kl/day)	1,639	20,140	233,200	243,960	574,000	None	1,072,939
Total Available Capacity (kl/day)	1,668	20,840	229,033	219,635	556,000	None	1,027,176
Average Daily Treatment Volume (kl/day)	2,609	6,421	134,831	124,663	444,635	23 NI	713,159
Total SIV (kl/day)	2,779	11,029	191,666	205,362	622,421		1,033,257
Design Capacity Utilisation (%)	159%	32%	58%	51%	77%		66%
Available Capacity Utilisation (%)	156%	31%	59%	57%	80%		69%

** "Unknown" means the number of WTWs with NI (No Information) on design capacity or available capacity or SIV*

The audit verified a total installed design capacity of 1,072,939 kl/d and a total available design capacity of 1,027,176. kl/d with most of this capacity residing in the medium to macro-sized water treatment plants. Collectively, the 107 WTWs produce 713,159 kl/d and distributes 1,033,257 kl/d across the water networks. The larger SIV total is due to Rand Water supplying potable water from their WTWs in Gauteng to 4 WSAs in the Mpumalanga province. By comparing the available treatment capacity with the treated water volume, a spare treatment capacity of 314,017 kl/d is available (31%) to meet additional future demands. However, the WUE for the province is fairly high (ave. 231 l/p/d) compared to the international WUE benchmark of 180 l/p/d, indicating a high ratio between effective water use and actual water abstraction. Going forward, the province will have to dedicate significant resources to curb water losses and NRW.

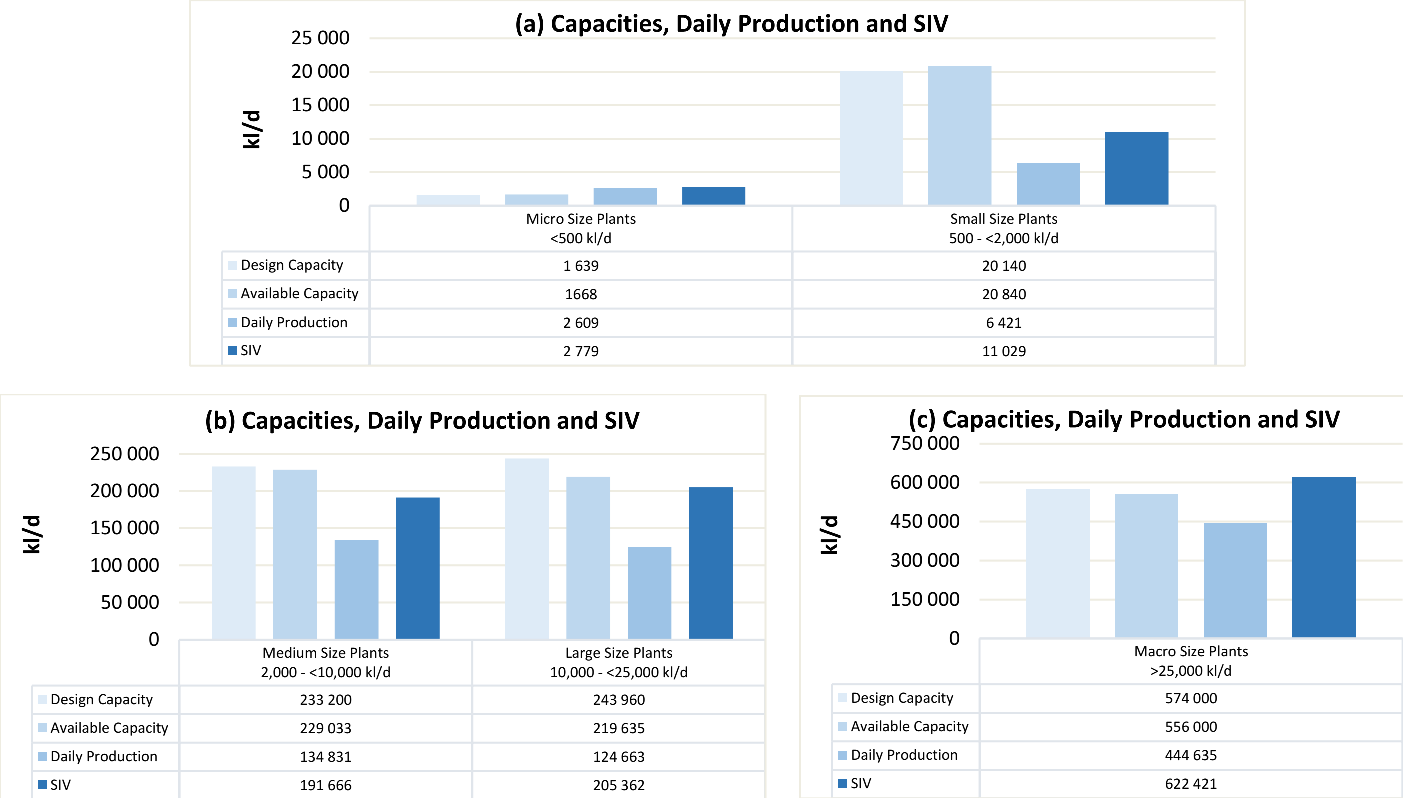


Figure 113 - Capacities, Daily Production and SIV Distribution - (a) micro to medium sized WTWs, (b) large WTWs, and (c) macro sized WTWs

In some cases, a Bulk Water Supplier supplies water across provincial borders and it is difficult to report accurately on design capacity and available capacity at provincial level, as the statistical data may become repetitive. Therefore, the reporting on the total system input volumes (SIV) would provide more accurate figures on the supply of treated water to the various water supply systems. The total SIV in the province is 1,033,257 kl/d and the average daily treatment volume is 713,159 kl/d and this indicates that the treated volume is less than the total SIV (69%) as some WTWs are not measuring their average daily treatment volumes and also that Rand Water is supplying potable water from their WTWs in Gauteng to 4 WSAs in the Mpumalanga province. The largest contributors to the total SIV are Emalahleni LM, Mbombela/Umjindi, Bushbuckridge LM and Nkomazi LM with a total Average Daily Production of 554,585 kl/d supplying potable water to 52 WSSs. Diagnostic no. 2 to follow herein will unpack these statistics in more detail. The data shows that the daily average treatment volume for 13 WTWs exceeds the available design capacity. 15 of the systems have daily production volumes that exceed the authorised daily abstraction volumes.

The water distribution infrastructure is summarised in the table below.

Table 153 - Summary of Water Distribution Reticulation Infrastructure

WSA Name	# WSS with no WSP/WB	# WSS with WSP/WB	Water Distribution Infrastructure			
			# Pump Stations (#)	Bulk Water Supply Lines (km)	Reticulation pipe lines (km)	# Reservoirs/ Towers
Albert Luthuli LM	8		13	704	0	35
Bushbuckridge LM	12		23	429	721	147
Dipaleseng LM	1		NI	NI	NI	NI
Dr JS Moroka LM	1		4	28	NI	4
Emakhazeni LM	4		11	NI	NI	12
Emalahleni LM	3	3	37	90	444	26
Govan Mbeki LM		1	12	61	1,224	26
Lekwa LM	2		7	NI	NI	5
Mbombela/Umjindi	12	6	47	381	1,427	167
Mkhondo LM	5		13	123	1,441	18
Msukaligwa LM	5		8	66	207	14
Nkomazi LM	16		43	430	502	86
Pixley Ka Seme LM	4		17	NI	NI	15
Steve Tshwete LM	6		19	139	1,040	15
Thaba Chweu LM	4		7	NI	NI	12
Thembisile LM	2	3	9	225	1,328	50
Victor Khanye LM		2	2	28	753	8
Totals	**85**	**15**	**272**	**2,705**	**9,088**	**640**

Provincial Blue Drop Analysis

The 100% response from the 17 WSAs audited demonstrates a firm commitment to progressive water services management in the province. Local government reforms resulted in the merging of Umjindi LM and Mbombela into Mbombela/Umjindi LM. Therefore, 17 WSAs were audited in 2023 compared to the 18 WSAs in 2014.

Table 154 - Blue Drop Comparative Analysis from 2012 to 2023

BLUE DROP COMPARATIVE ANALYSIS				
Performance Category	**2012**	**2014**	**2023**	**Performance trend 2014 and 2023**
Incentive-based indicators				
WSAs assessed (#)	18 (100%)	18 (100%)	17 (100%)	→
Water supply systems assessed (#)	91	100	100	→
Blue Drop scores ≥50% (#)	35 (38%)	49 (49%)	55 (55%)	↑
Blue Drop scores <50% (#)	65 (72%)	51 (51%)	45 (45%)	↑
Blue Drop Certifications (#)	10	9	4	↓
Lowest Technical Site Assessment Score (%)	23%	27%	48%	↑
Highest Technical Site Assessment Score (%)	90%	97%	92%	↓

NA = Not Applied   NI = No Information   ↑= improvement, ↓= regress, →= no change

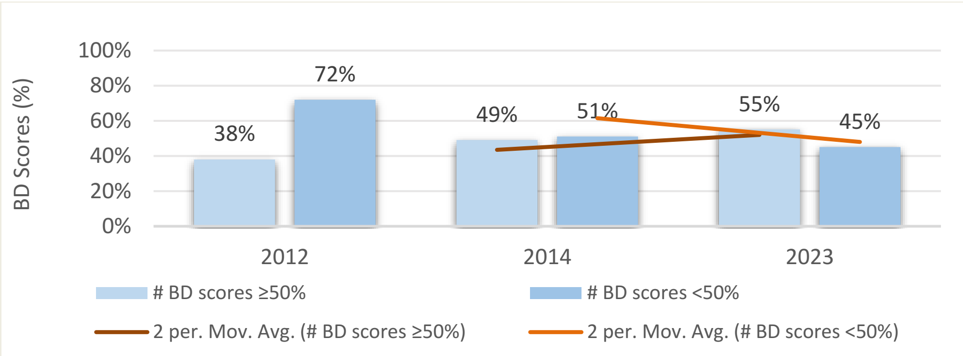


Figure 114 - Blue Drop trend analysis over the period 2012 to 2023, indicating the percentage BD scores above and below 50%

The trend analysis indicates that:

- The no. of systems audited has remained the same from the last BD audit in 2014
- The no. of systems with BD scores of ≥50% increased from 49 (49%) in 2014 to 55 (55%) in 2023
- This trend was reversed with no. of systems with a BD score of ≤50% decreasing from 51 (51%) in 2014 to 45 (45%) in 2023
- Blue Drop Certifications decreased from 9 awards in 2014 to 4 awards in 2023
- The lowest TSA score increased from 27% in 2014 to 48% in 2023, with the highest TSA score decreasing from 97% in 2014 to 92% in 2023
- The overall performance trend indicates a progression from 2014 to 2023
- Despite this positive trend, this trajectory still reinforces the need for regular audits to ensure timely turnaround and continued improvement for many of the systems
- The positive trend implies that performance has increased marginally despite the absence of regulatory engagement of the BD audits between 2014 to 2023.

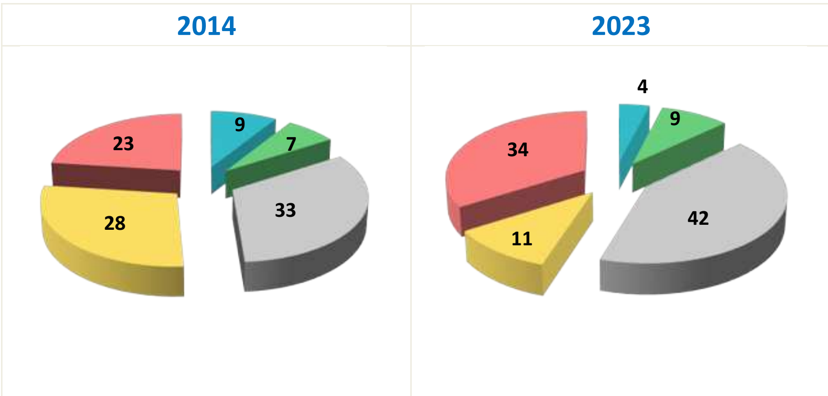


Figure 115 - No. WSSs in the Blue Drop score categories for 2014 and 2023 (graph legend to right)

≥95 – 100% Excellent	
≥80-<95% Good	
≥50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

Comparative analysis of the 2014 and 2023 blue drop scores, indicates that most of the system scores are in the >50-<80% (*Average Performance*) category, with the <31% (*Critical Performance*) being the next largest category. It is concerning that 34 systems in 2023 reside in *Critical Performance* category.

In summary, trend analysis since 2014 to 2023 indicate as follows:

- Systems in a 'critical state' increased from 23 systems to 34 systems
- Systems in a 'poor state' decreased from 28 systems to 11 systems
- Systems in an 'average state' increased from 33 systems to 42 systems
- Systems in the 'excellent and good state' decreased from 16 systems (16%) to 13 systems (13%).

Provincial BDRR Analysis

The Blue Drop Risk Rating (BDRR) analysis assesses the risk across the entire water supply network. The BDRR formular was updated in 2021 to include an added risk indicator, i.e. 'E: Water Safety Plans', to address the risk assessment requirements outlined in SANS 241 of 2015. The BDRR now contains 5 risk indicators, i.e. design capacity (A), operational capacity (B), water quality compliance (C), technical capacity (D), and water safety plans (E). The results from the BDRR analyses are summarised in the table and figure following.

Table 155 - Municipal BDRR/BDRRmax Comparative Analysis from 2022 and 2023

BDRR/BDRR$_{max}$ COMPARATIVE ANALYSIS									
WSA Name	# WSSs	# WBs/ WSPs	2022 (BD PAT)	2023 (BD Audit)	Performance Trend 2022 and 2023	BDRR Risk Category Split			
						0-<50%	50-<70%	70-<90%	90-100%
Albert Luthuli LM	8		63.9%	78.5%	↓			7	1
Bushbuckridge LM	12		38.6%	36.4%	↑	12			
Dipaleseng LM	1		97.0%	100.0%	↓				1
Dr JS Moroka LM	1		37.2%	64.2%	↓		1		
Emakhazeni LM	4		40.9%	54.6%	↓	2	1	1	
Emalahleni LM	6	3	52.6%	54.2%	↓	4	2		
Govan Mbeki LM	1	1	40.8%	32.4%	↑	1			
Lekwa LM	2		60.5%	80.9%	↓		1	1	
Mbombela/Umjindi	18	6	95.2%	47.4%	↑	6	1	5	6
Mkhondo LM	5		37.9%	44.4%	↓	3	2		
Msukaligwa LM	5		52.3%	76.3%	↓		1	4	
Nkomazi LM	16		47.5%	46.3%	↑	13	3		
Pixley Ka Seme LM	4		59.1%	56.8%	↑	1	2	1	
Steve Tshwete LM	6		33.4%	37.8%	↓	5	1		
Thaba Chweu LM	4		87.1%	86.5%	↑			3	1
Thembisile LM	5	3	53.7%	42.5%	↑	3	1	1	
Victor Khanye LM	2	2	34.5%	30.4%	↑	2			
Totals & %BDRR/BDRR$_{max}$	**100**	**15**	**54.8%**	**54.0%**	↑	**52**	**16**	**23**	**9**

↑= improvement, ↓= regress, →= no change

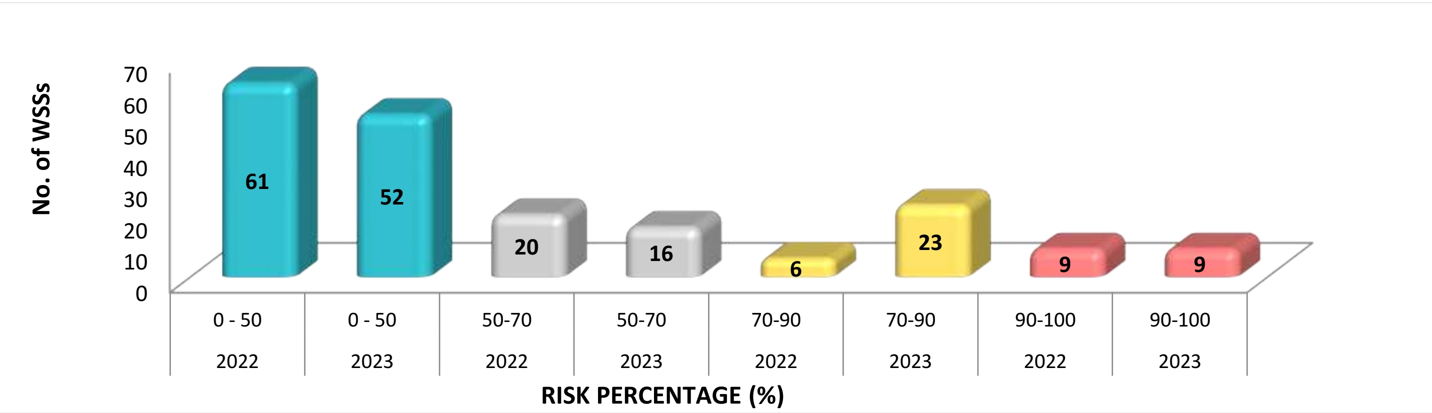


Figure 116 - a) WSS risk distribution and trends for 2022 and 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Trend analysis of the BDRR ratings for 2022 and 2023 indicates that:

- The 2023 audit cycle highlighted a slightly progressive shift with a decrease in the no. of low risk WSSs (61 to 52), a decrease in the medium risk WSSs (20 to 16), and an increase in the high risk WSSs (6 to 23).

Regulatory Enforcement

Water supply systems which fail to achieve the minimum Blue Drop target of 31%, are placed under regulatory focus. The Regulator requires these WSAs to submit a detailed corrective action plan (CAP) within 20 working days from publishing of this report. 34 WSSs received Blue Drop scores below 31%, hence are placed under **regulatory surveillance**, in accordance with the Water Services Act (108 0f 1997). DWS together with COGTA will through the grant allocation systems ensure priority is given to application of grants to rectify/restore the water services treatment and supply shortcomings identified in this report.

Table 156 - WSSs with <31% Blue Drop scores

WSA Name	2023 BD Score	WSSs with <31% score
Albert Luthuli LM	**19.1%**	All 8 WSSs
Dipaleseng LM	**7.0%**	Greater Dipaleseng
Emakhazeni LM	**31.2%**	Belfast, Dullstroom
Mbombela/Umjindi	**69.3%**	Elandshoek, Hazyview, White River, White River Country & Golf Estates, Mjindini Trust-Madakwa, Rimers-Suid Kaap, Sheba, Mjejane, Legogote, Nyongane River, Dwaleni, Mshadza
Mkhondo LM	**54.5%**	Rural WSS
Msukaligwa LM	**21.6%**	Breyten, Davel, Douglas dam, Lothair, South works (noitgedacht farm)
Thaba Chweu LM	**8.2%**	Coromandel, Graskop, Lydenburg, Sabie
Thembisile LM	**75.3%**	Langkloof

The following WSAs and their associated water treatment systems are in high and/or critical BDRR risk positions, which means that some or all the risk indicators are in a precarious state, i.e. operational capacity, design capacity utilisation, water quality compliance, technical capacity, and water safety plans. WTWs in high risk and critical risk positions pose a serious risk to public health. The following WSAs will be required to assess their risk contributors and to provide corrective measures in the above-mentioned action plans to mitigate these risks.

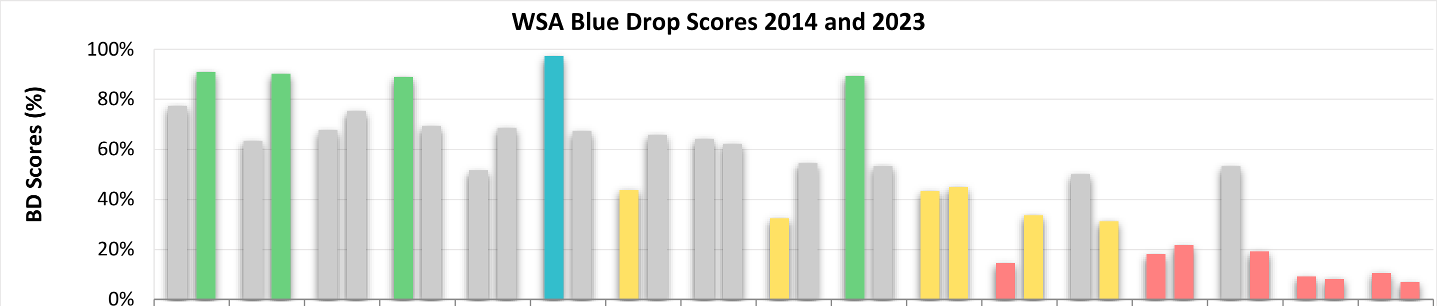
Table 157 - %BDRR/BDRR$_{max}$ scores and WSSs in critical and high-risk space

WSA Name	2023 Average %BDRR/BDRRmax	WSSs in critical and high-risk space	
		Critical Risk (90-100%)	**High Risk (70-<90%)**
Albert Luthuli LM	78.5%	Rudimentary Boreholes	All remaining 7 plants
Dipaleseng LM	100.0%	The Greater Dipaleseng LM	
Emakhazeni LM	54.6%		Dullstroom
Lekwa LM	80.9%		Standerton
Mbombela/Umjindi	47.4%	Mjejane, Legogote, Nyongane River Scheme, Dwaleni, Mshadza, Sheba	Elandshoek, New Hazyview, Mjindini Trust-Madakwa, White River, White River Country Estates
Msukaligwa LM	76.3%		Davel, Douglas dam, Lothair, South works (noitgedacht farm)
Pixley Ka Seme LM	56.8%		Amersfoort
Thaba Chweu LM	86.5%	Coromandel	Graskop, Lydenburg, Sabie
Thembisile LM	42.5%		Langkloof
Totals		**9 of 100 (9%)**	**23 of 100 (23%)**

Good practice risk management requires that the Water Safety Plans (WaSPs) are informed by meaningful Process and Condition Audits, supported by zealous implementation of corrective measures and ongoing monitoring of risk movement. 9 (of 100) WSSs in 4 WSAs are in critical risk positions followed by 23 (of 100) WSSs in high risk positions in 8 WSAs. Most of these water supply systems are in Albert Luthuli LM and Mbombela/Umjindi.

Performance Barometer

The **Blue Drop Performance Barometer** presents the individual WSA Blue Drop Scores, which essentially reflects the level of mastery that a WSA has achieved in terms of its overall water services business. The bar chart below compares the 2014 and 2023 BD scores, ranked from highest to lowest performing WSA in 2023. The Govan Mbeki LM and Victor Khanye LM are commended for their good performance and improving their municipal blue drop scores. 9 WSAs improved on their 2014 scores and 8 WSAs regressed to lower Blue Drop scores compared to their 2014 baseline. The blue drop scores for Mbombela/Umjindi, Steve Tshwete LM and Dr JS Moroka LM regressed from excellent and good performances in 2014 to average performances in 2023.



	Govan Mbeki LM	Victor Khanye LM	Thembisile LM	Mbombela/ Umjindi	Nkomazi LM	Steve Tshwete LM	Emalahleni LM	Bushbuckridge LM	Mkhondo LM	Dr JS Moroka LM	Pixley Ka Seme LM	Lekwa LM	Emakhazeni LM	Msukaligwa LM	Albert Luthuli LM	Thaba Chweu LM	Dipaleseng LM
2014 BD Score (%)	77,2%	63,5%	67,6%	88,9%	51,5%	97,1%	43,8%	64,2%	32,4%	89,3%	43,4%	14,5%	50,0%	18,1%	53,2%	9,1%	10,6%
2023 BD Score (%)	90,8%	90,1%	75,3%	69,3%	68,6%	67,4%	65,7%	62,2%	54,5%	53,4%	45,0%	33,5%	31,2%	21,6%	19,1%	8,2%	7,0%

Figure 117 - a) Blue Drop scores 2014 (bar left) and 2023 (bar right); b) Colour legend

>95 – 100% Excellent	
>80-<95% Good	
>50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

The BDRR Risk Barometer expresses the level of risk that a WSA poses in respect of its water supply system. The schematic below presents the BDRR in ascending order – with the low-risk WSAs on the left and higher risk WSAs to the far right. The analysis reveals that there are 4 medium risk WSAs, 4 high risk WSAs and 1 critical risk WSA in the province. 8 WSAs are situated in the low risk positions despite.

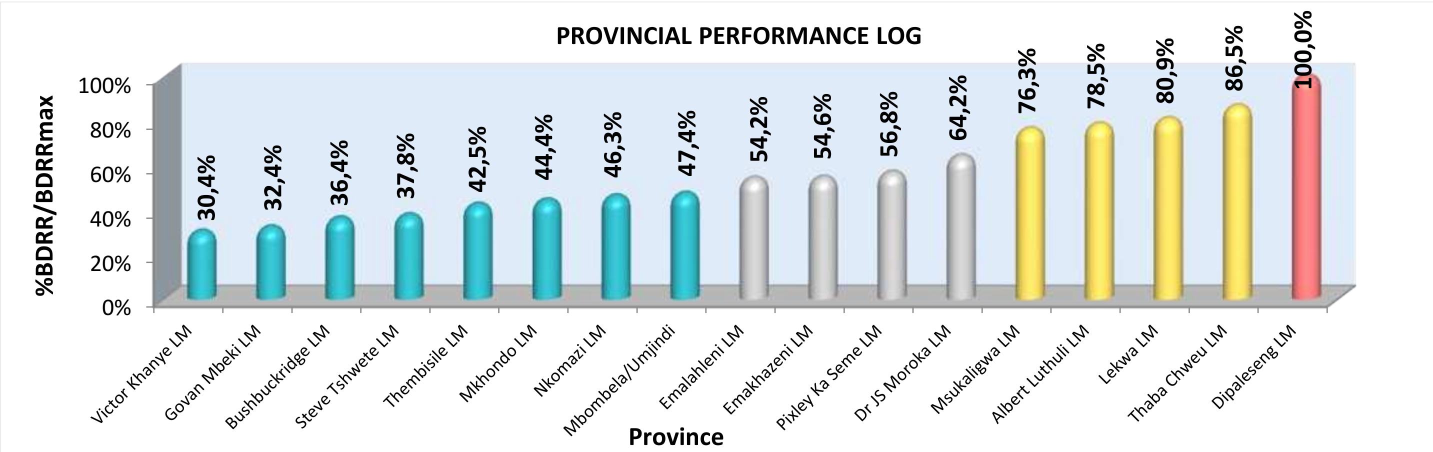


Figure 118 - a) %BDRR/BDRR$_{max}$ Risk Performance Profile/Log 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Provincial Best Performers

The **Govan Mbeki Local Municipality (Rand Water)** is the **BEST PERFORMING WSA** in the province, based on the following record of excellence:
- ✓ 2023 Blue Drop Score of 90.8%
- ✓ 2014 Blue Drop Score of 77.2%
- ✓ Improvement on the BDRR from 40.8% in 2022 to 32.4% in 2023
- ✓ 1 system (100%) in the low risk position
- ✓ No TSA undertaken there is no WTW in the municipality

The **Victor Khanye Local Municipality (Rand Water)** is the second-best scoring WSA:
- ✓ 2023 Blue Drop Score of 90.1%
- ✓ 2014 Blue Drop Score of 63.5%
- ✓ Improvement on the BDRR from 34.5% in 2022 to 30.4% in 2023
- ✓ 2 systems (100%) in low risk position
- ✓ TSA score of 64% for Delmas

The **Thembisile Local Municipality (Rand Water)** is the third-best scoring WSA:
- ✓ 2023 Blue Drop Score of 75.3%
- ✓ 2014 Blue Drop Score of 67.6%
- ✓ Improvement on the BDRR from 53.7% in 2022 to 42.5% in 2023
- ✓ 3 systems (60%) in low risk positions
- ✓ TSA score 88% for Bundu

KPA Diagnostics

The BD audit process collects a vast amount of data that yield valuable insight into the state of the water services delivery and water quality in each province. Five focus areas or 'diagnostics' have been configured from the 2021/22 audit data and are discussed below.

Table 158 - Summary of the key diagnostic themes and reference to the respective Blue Drop KPAs

Diagnostic #	Diagnostic Description	Diagnostic Reference
1	**Technical Competence**	KPA 1, 2 & Bonus
2	**Treatment Capacity and Flow Distribution**	KPA 4 & Generic Audit data set
3	**Drinking Water Quality (DWQ) Monitoring and Compliance**	KPA 2 & 4 & Bonus
4	**Technical Site Assessments**	TSA and 2023 Blue Drop Watch Report
5	**Operation, Maintenance and Refurbishment of Assets**	KPA 3 & 4

Diagnostic 1: Technical Competence

Aim: This focus area assesses the technical human resources capacity that is available to manage and operate water treatment processes and maintain the related water infrastructure. Theory advocates that a correlation exists between human resources capacity and capability (sufficient number of appropriately qualified staff) and a WSI's performance. Thus, it is hypothesised that high HR capacity would translate to compliant water treatment plants and functional water supply network. Blue Drop assesses technical compliance on two levels: i) WTW plant supervision and process control staff and ii) Technical, scientific and maintenance staff.

(i) Plant Supervisors and Process Controllers

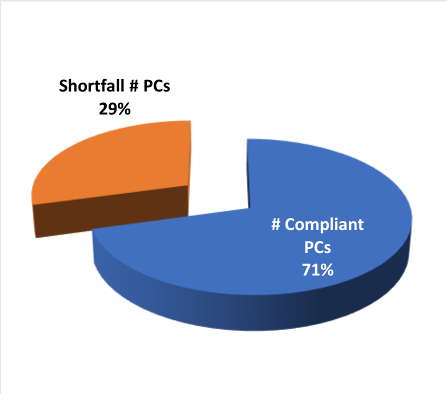
Findings: According to regulations, water treatment plants are classified as Class A, B, C, D or E plants. Similarly, Process Controllers and Plant Supervisors are registered as Class I, II, III, IV, V or VI Process Controllers. Higher classed plants require a higher level of Process Controllers due to technology complexity and strict water quality standards. Technical compliance of PCs and Supervisors is determined against the Blue Drop standards, as defined by Reg. 2834 of the Water Act 1956 (Act 54 of 1956) for the erection, enlargement, operation, and registration of water care works and draft Reg. 813 of the Water Services Act (No 108 of 1997). Regulation 2834 has been replaced by Regulation 3630 in 2023 but will only come in effect during the next Blue Drop audit cycle.

Table 159 - No. compliant versus shortfall in Supervisor and Process Controller staff

WSA WB Name	# WTWs	# WSSs	# Available Compliant Staff			Staff Shortfall		Ratio*	2023 BD Score (%)
			PCs	Supervisor	Total	PCs	Supervisor		
Albert Luthuli LM	8	8	43	3	46	5	1	5.8	19.1%
Bushbuckridge LM	12	12	44	21	65	12	0	5.4	62.2%
Dipaleseng LM	1	1	1	0	1	3	1	1.0	7.0%
Dr JS Moroka LM	1	1	5	2	7	0	0	7.0	53.4%
Emakhazeni LM	4	4	8	4	12	8	0	3.0	31.2%
Emalahleni LM	7	6	24	5	29	9	2	4.1	65.7%
Govan Mbeki LM**	None	1							90.8%
Lekwa LM	2	2	2	0	2	4	2	1.0	33.5%
Mbombela/Umjindi	22	18	51	36	87	35	2	4.0	69.3%
Mkhondo LM	5	5	5	2	7	13	0	1.4	54.5%
Msukaligwa LM	5	5	7	2	9	13	1	1.8	21.6%
Nkomazi LM	22	16	79	45	124	12	0	5.6	68.6%
Pixley Ka Seme LM	4	4	21	0	21	1	1	5.3	45.0%
Steve Tshwete LM	7	6	17	22	39	9	0	5.6	67.4%
Thaba Chweu LM	4	4	5	0	5	6	1	1.3	8.2%
Thembisile LM	2	5	3	0	3	2	1	1.5	75.3%
Victor Khanye LM	1	2	4	1	5	0	0	5.0	90.1%
Totals	**107**	**100**	**319**	**143**	**462**	**132**	**12**		

** Ratio depicts the no. of qualified staff divided by the no. of WTWs operated by this no. of staff. E.g., Bushbuckridge has 65 compliant Sups + PCs, divided by 12 WTWs = 5.4 qualified staff per WTW*
*** Govan Mbeki LM receives water from the Rand Water WTWs - it has no WTW*
NB: The Supervisor totals will be inflated as it is not possible to differentiate between which Supervisors are shared/ roaming with other Class C to E WTWs
Note: "Compliant staff" means qualified and registered staff that meets the BD standard for a particular Class Works. "Staff shortfall" means staff that do not meet the BD standard for a particular Class of works (+1 for a shift) and/or staffing gaps exist at the respective WTWs.

Competent human resources are vital enablers in ensuring efficient and sustainable management of water services and delivery of safe water quality to consumers. For the province in general, the operational competencies are found to be excellent for the Supervisory staff and predominantly excellent for the PCs in Dr JS Moroka LM and Victor Khanye LM, with the exception being for PC staff shortages in 15 of the municipalities.



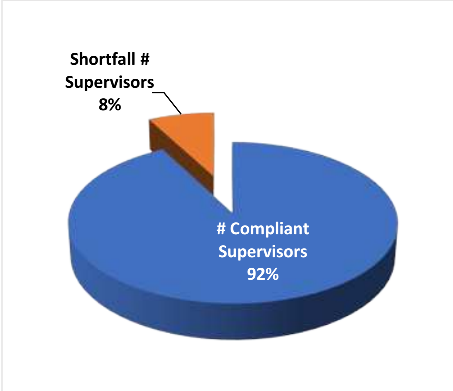


Figure 119 - Schematic illustration of compliant and shortfall of Supervisors (a) and Process Controllers (b)

Plant Supervisors: The pie charts indicate that 92% (143 of 155) of the Supervisors complies with the BD standard, with 12 shortfalls.

Process Controllers: Similarly, 71% (319 of 451) of the PC staff complies with the required standards, noting a zero shortfall for Dr JS Moroka LM and Victor Khanye LM. There is a 29% (132 of 451) shortfall in Process Controllers with the highest shortfall in Mbombela/Umjindi.

Blue Drop standards require of Class A and B plants to employ dedicated Supervisors per WTW and Process Controllers per shift per works, whereas Class C to E plants may share Supervisory staff across works. Shifts have been introduced to ensure optimal operations while addressing security risks, particularly as it relates to theft and vandalism. Telemetry also reduces the requirement for on-site staff during night shifts, but these relaxations have to be done within the DWS regulatory guidelines.

The Regulator expects correlation between the competence of an operational team and the performance of a WTW, as measured by the BD score. The data indicates as follows:

- All the WSAs have qualified PCs in place but only 2 WSAs do not have shortfalls in qualified PC staff
- 12 WSAs have qualified Supervisors per WTW. The Supervisor totals will be inflated as it is not possible to differentiate between what Supervisors are shared/ roaming with other Class C to E WTWs
- 8 WSAs have shortfalls in qualified Supervisors and 15 WSAs have shortfalls in qualified Process Controllers.

It is expected that a correlation would exist between the competence of an operational team and the performance of a water treatment works, as measured by the BD score. The results from the ratio analysis indicate high ratios ($\geq$3.0) for 10 WSAs with WTWs.

Overall, the comparative bar chart on the following page confirms a reasonably close correlation between high ratios (ranging from 3.0 to 7.0) and average BD scores with anomalies for Albert Luthuli LM, Pixley ka Seme LM and Emakhazeni LM that have a high number of qualified PCs per WTW. In contrast, low ratios and low BD scores are reflected in the bottom half of the schematic.

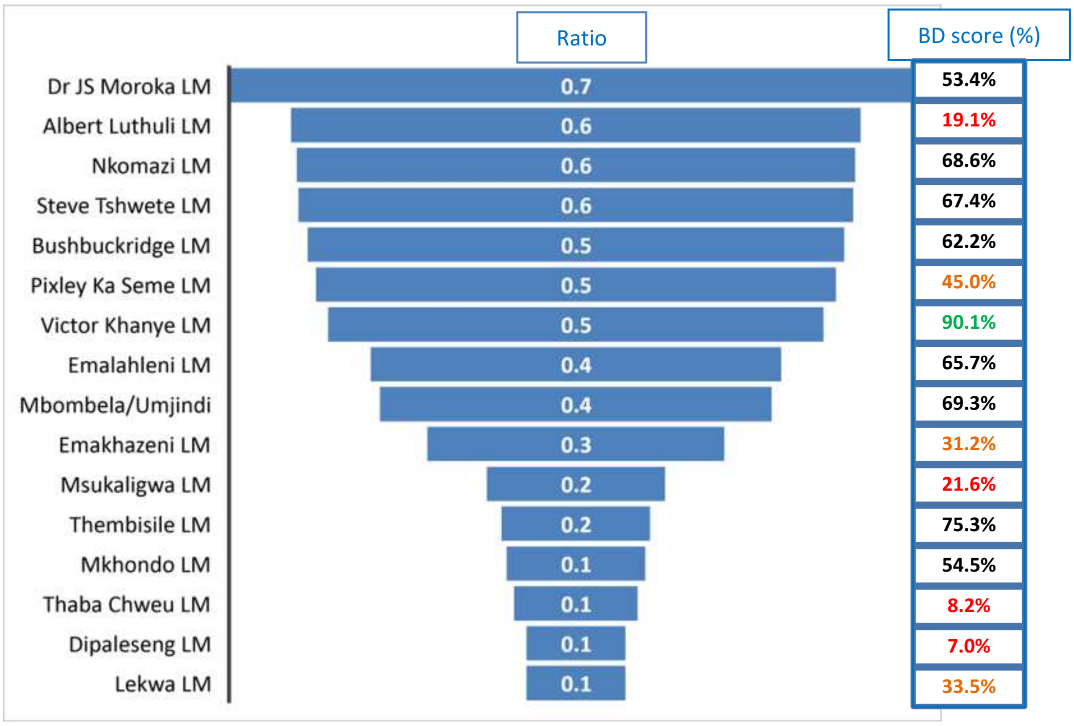


Figure 120 - Ratio of compliant operational staff to no. of WTWs and Comparison of Ratios with BD scores

(ii) Technical, Scientific and Maintenance staff

In addition to operational capacity (above), good management practice also requires access to qualified engineers, technicians, technologists, MISA appointees, scientists, and maintenance capability (below). Such competencies could reside in-house or accessible through term contracts and external specialists.

Table 160 - Summary of the maintenance capacity and no. of qualified and shortfall of Engineering, Technical and Scientific staff

WSA Name	# WTWs	# WSSs	Maintenance Arrangement
Albert Luthuli LM	8	8	Internal+Specific Outsourcing; Internal Team (only)
Bushbuckridge LM	12	12	Internal+Specific Outsourcing
Dipaleseng LM	1	1	No Capacity
Dr JS Moroka LM	1	1	Internal+Term Contract
Emakhazeni LM	4	4	Internal+Specific Outsourcing; Internal+Term Contract
Emalahleni LM	7	6	Internal+Specific Outsourcing
Govan Mbeki LM	None	1	Internal+Specific Outsourcing; Internal Team (only)
Lekwa LM	2	2	Internal+Specific Outsourcing
Mbombela/Umjindi	22	18	Internal+Specific Outsourcing; Internal Team (only); Internal+Term Contract; No Capacity
Mkhondo LM	5	5	Internal+Specific Outsourcing
Msukaligwa LM	5	5	Internal+Specific Outsourcing
Nkomazi LM	22	16	Internal+Specific Outsourcing
Pixley Ka Seme LM	4	4	Internal+Specific Outsourcing
Steve Tshwete LM	7	6	Internal+Term Contract
Thaba Chweu LM	4	4	Internal+Specific Outsourcing
Thembisile LM	2	5	Internal+Specific Outsourcing; Internal+Term Contract
Victor Khanye LM	1	2	Internal+Specific Outsourcing; Internal+Term Contract
Totals	**107**	**100**	

WSA Name	# WTWs	# WSSs	Qualified Technical Staff (#)					Technical Shortfall (#)	Qualified Scientists (#)	Scientists Shortfall (#)	Ratio*	2023 BD Score (%)
			Technicians	Technologists	Engineers	MISA appointees	Total					
Albert Luthuli LM	8	8	1	1	0	0	**2**	2	0	2	0.3	**19.1%**
Bushbuckridge LM	12	12	9	2	0	0	**11**	1	1	1	0.9	**62.2%**
Dipaleseng LM	1	1	0	0	0	0	**0**	4	0	2	0.0	**7.0%**
Dr JS Moroka LM	1	1	2	2	1	0	**5**	0	1	1	5.0	**53.4%**

WSA Name	# WTWs	# WSSs	Qualified Technical Staff (#)					Technical Shortfall (#)	Qualified Scientists (#)	Scientists Shortfall (#)	Ratio*	2023 BD Score (%)
			Technicians	Technologists	Engineers	MISA appointees	Total					
Emakhazeni LM	4	4	0	3	0	1	**4**	2	0	2	1.0	31.2%
Emalahleni LM	7	6	14	22	11	0	**47**	0	2	0	7.8	**65.7%**
Govan Mbeki LM**	None	1	2	3	0	0	**5**	1	1	1	5.0	90.8%
Lekwa LM	2	2	2	1	1	0	**4**	0	0	2	2.0	33.5%
Mbombela/Umjindi	22	18	2	8	2	0	**12**	0	1	1	0.7	**69.3%**
Mkhondo LM	5	5	1	1	0	1	**3**	2	0	2	0.6	**54.5%**
Msukaligwa LM	5	5	1	1	0	0	**2**	2	0	2	0.4	21.6%
Nkomazi LM	22	16	2	2	1	0	**5**	0	0	2	0.3	**68.6%**
Pixley Ka Seme LM	4	4	1	2	0	1	**4**	1	0	2	1.0	45.0%
Steve Tshwete LM	7	6	3	5	0	0	**8**	1	0	2	1.3	**67.4%**
Thaba Chweu LM	4	4	1	1	1	0	**3**	1	0	2	0.8	8.2%
Thembisile LM	2	5	3	1	0	0	**4**	1	1	1	0.8	**75.3%**
Victor Khanye LM	1	2	2	0	0	0	**2**	2	0	2	1.0	90.1%
Totals	**107**	**100**	**46**	**55**	**17**	**3**	**121**	**20**	**7**	**27**		

* The single number ratio depicts the no. of qualified technical staff divided by the no. of WSSs that have access to the staff. E.g., Emakhazeni LM has 4 qualified staff, divided by 4 WSSs = 1.0 qualified staff per WSS
** Govan Mbeki LM has no WTW, but they still have technical staff for the distribution system
Note 1: "Qualified Technical Staff" means staff appointed in positions to support water services, and who has the required qualifications. "Technical Shortfall" is calculated based on a minimum requirement of at least 3 Engineers or more than 1 of each of Engineers, Technologists & Technicians; and at least one 1 Candidate Scientist and 1 Professional Scientist per WSI.
Note 2: "Qualified Scientists" means professional registered scientists (SACNASP) and candidate scientists appointed in positions to support water services. "Scientists shortfall" means that the WSA does not have at least one qualified SACNASP registered scientist and at least one 1 candidate scientist in their employ or contracted.

In terms of maintenance capacity, all the municipalities in the province have a reasonable contingent of qualified technical and maintenance staff. The maintenance staff comprises of a collective of in-house, contracted, or outsourced personnel. The data indicates that:

- 3 of 17 (18%) WSAs have in-house maintenance teams
- 6 of 17 (35%) WSAs have internal maintenance teams supplemented with term contracts
- 14 of 17 (82%) WSAs have internal maintenance teams supplement with specific outsourced services
- 2 of 17 (12%) WSAs have some of their WSSs as having no maintenance capacity.

In general, the province presents a strong case for qualified professional technical staff as follows:

- A total of 121 qualified staff comprised of 17 Engineers, 55 Technologists, 46 Technicians, 3 MISA appointees (qualified); and 7 SACNASP registered scientists are assigned to 6 WSAs only
- A total shortfall of 47 persons is identified, consisting of 20 technical staff and 27 scientists
- 12 WSAs have a total shortfall of 20 qualified technical staff - the highest indicated for Dipaleseng LM (4), and 5 WSAs (2 each)
- 14 WSAs have access to credible laboratories that comply with the Blue Drop standards.

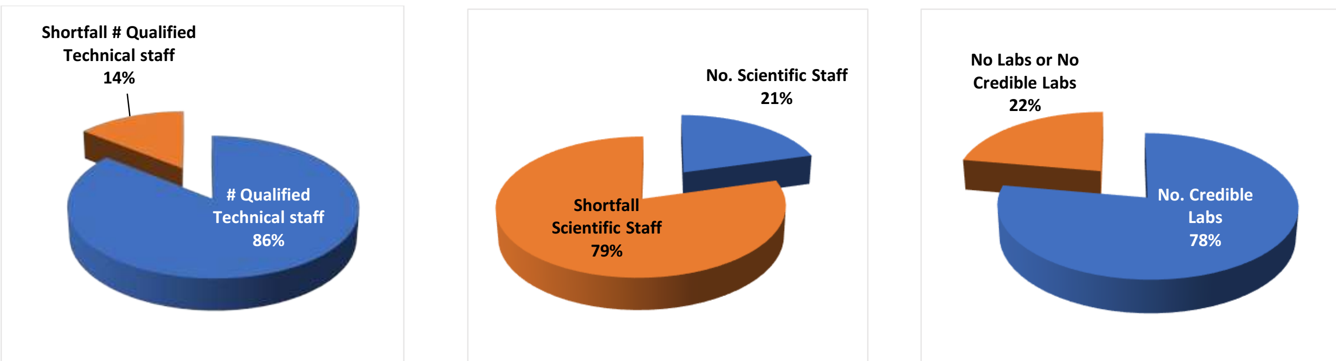


Figure 121 - Graphic illustration of the number and %: a) qualified engineering/technical staff; b) professional scientists; c) access to credible laboratory services that complies with Blue Drop standards

Ratio analysis has been done to determine the number of qualified technical and scientific staff assigned per WSS. It is expected that a higher ratio would correspond with well-performing and maintained water supply systems, as represented by the BD score.

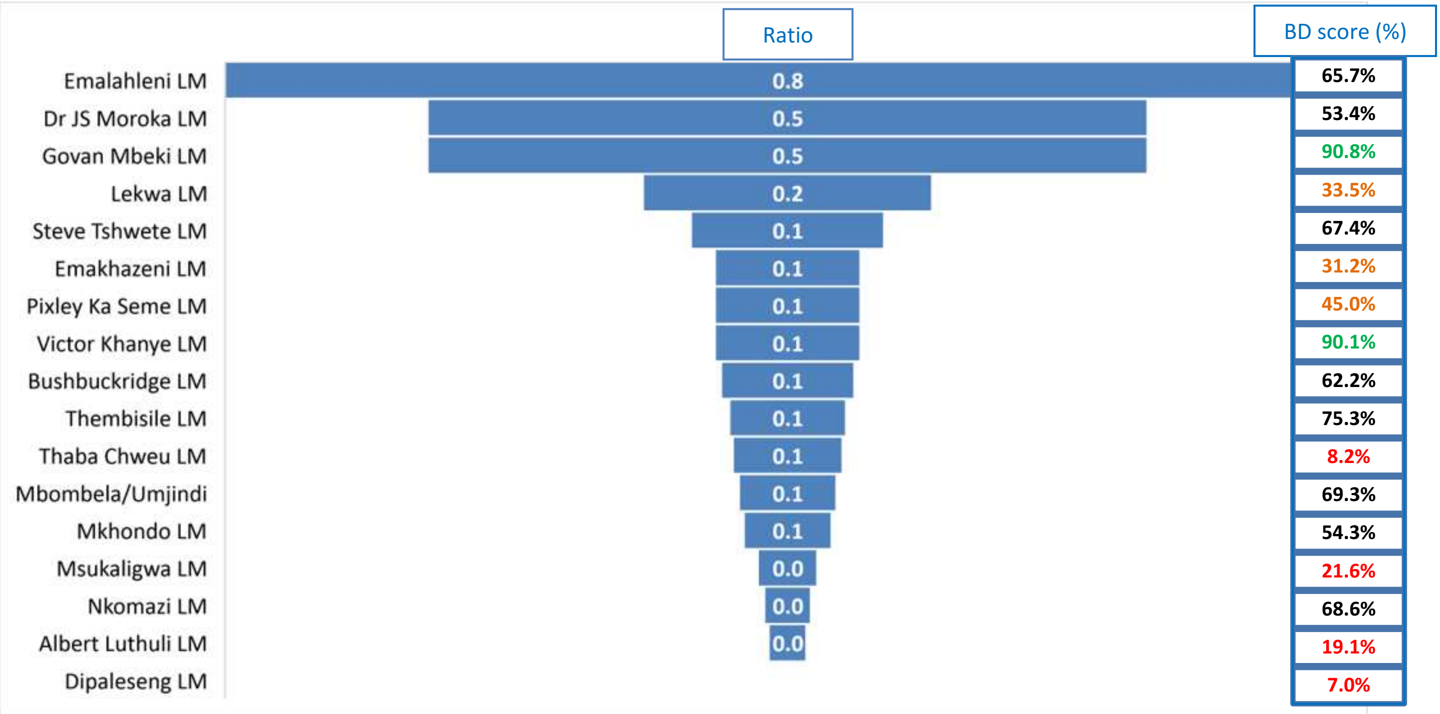


Figure 122 - Ratio of compliant technical staff to no. of WSSs and Comparison of Ratios with BD scores

The schematic above does show some correlation between high ratios (>2.0) and average-to-high BD scores for the top five in the schematic above with the exception of Lekwa LM. In contrast, some of the WSAs in the bottom half of the schematic show a correlation between lower ratios and low BD scores but 3 WSAs show average BD scores for lower ratios.

Unlike the Green Drop 2022 diagnostics, no firm correlation can be drawn between technical capacity and water supply performance, mostly as result of the complexity of the WSA/Bulk Water Provider arrangement. However, it is observed that the involvement of Rand Water in the supply of potable water to its various WSAs does have a positive impact on the municipal BD scores particularly in the case of the Govan Mbeki LM, Thembisile LM and Victor Khanye LM.

Overall, the results highlight the inter-dependency between technical capacity and performance. One of the options to enhance operational capacity is through dedicated training programmes. The Blue Drop audit incentivises training of operational staff over the 2-year period prior to the audit date. The results are summarised as follows:

Table 161 - No. of WTWs with operational staff sent on training over the past 2 years and vice versa

WSA Name	# WTWs	# WTW staff attending training	# WTW without training
Albert Luthuli LM	8		8
Bushbuckridge LM	12	3	9
Dipaleseng LM	1		1
Dr JS Moroka LM	1		1
Emakhazeni LM	4		4
Emalahleni LM	7	5	2
Govan Mbeki LM	None		
Lekwa LM	2	1	1
Mbombela/Umjindi	22	15	7
Mkhondo LM	5		5
Msukaligwa LM	5		5
Nkomazi LM	22	12	10
Pixley Ka Seme LM	4	4	
Steve Tshwete LM	7	5	2
Thaba Chweu LM	4		4
Thembisile LM	2		2
Victor Khanye LM	1		1
Totals	**107**	**45 (42%)**	**62 (58%)**

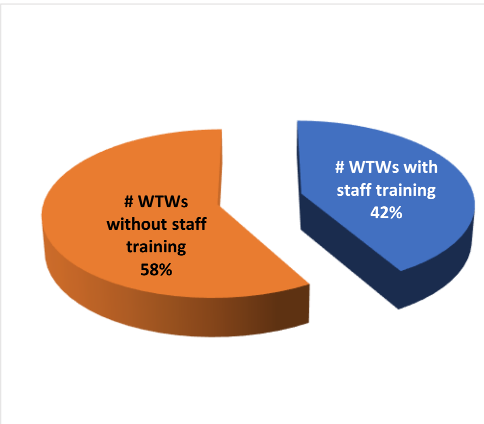


Figure 123 - %WTWs that have trained operational staff over the past two years

The results confirm that 7 WSAs had their operational staff attend training over the past 2 years. Only 45 of 107 (42%) WTWs had their operational staff attend training over the past 2 years.

Investment in human capital through technical skills development is likely to mitigate some of the water quality failures and lower performances noted, and municipalities and water boards should prioritise ongoing skills development of technical staff and appointment of qualified staff that are legible for registration.

Diagnostic 2: Treatment Capacity and Flow Distribution

Aim: Diagnostic 2 deals with design and flow related dynamics, comprising of: i) design capacity and operational flow, ii) raw water abstraction, and iii) WUE and SIV.

(i) Design Capacity and Operational Flow

This diagnostic assesses the status of plant design capacity and daily water production at the WTWs, as well as SIVs as measured at the outflow from the WTW or inflow to the water distribution network. A capable WTW requires adequate installed design capacity and functional equipment to operate optimally. If the WTW design capacity is exceeded by the average daily production (treatment) volume, the WTW will not be able to deliver SANS compliant water quality. The available design capacity is typically exceeded when the water demand exceeds the installed design capacity, or when unit processes or equipment are dysfunctional, or when electrical supply problems render treatment and pumping of water defective. Typically, the production volume and SIV is the same if 1 WTW supplies 1 WSS, but different if multiple supply systems are feeding from a singular WTW.

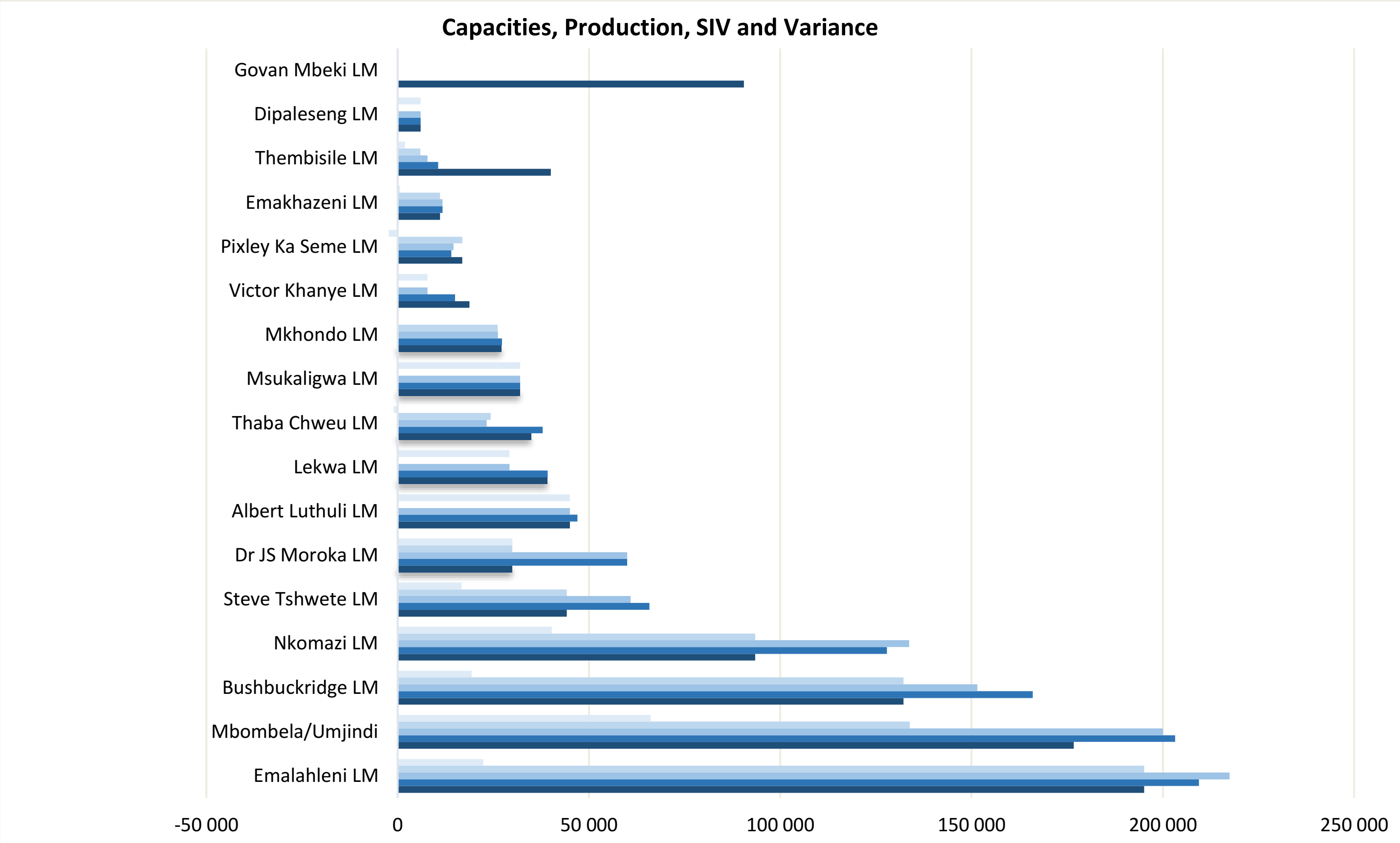
Findings: Analysis of the design capacity and average daily production/ treatment volume indicate a total design capacity of 1,072,939 kl/d for the province, with a total average daily treatment (operational) volume of 713,159 kl/d. Theoretically, this implies that 66% of the design capacity is used with 34% available to meet additional water demand. However, the full 1,072,939 kl/d is not available as some infrastructure is dysfunctional, leaving 1,027,176 kl/d available. The reduced capacity means that the province is closer to its total available capacity (69%) with a 31% surplus available. The capacity differential (difference between the installed and available capacity) will not constrain or impede any further social and economic development in the drainage areas. WSAs do report or have knowledge of their installed and available capacities, and a higher figure than 31% surplus available cannot be expected.

For the province in general, most of the WTWs are operating within their design capacities with the exception of 13 WTWs that exceeds their total design capacity (%). This risk is currently mitigated through operational optimisation and preventative maintenance regimes.

Table 162 - Summary of WTWs design and available capacities, average daily production, % available capacity, and total SIV towards the WSSs

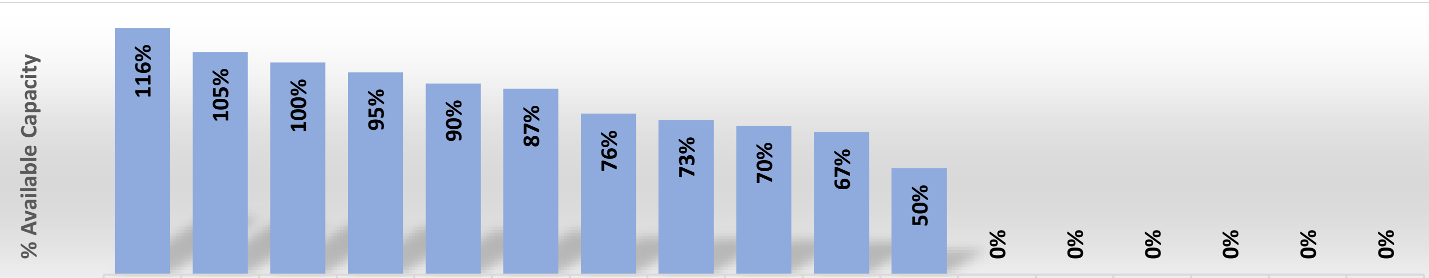
WSA Name	# WTWs	# WSSs	Design Capacity (kl/d)	Available Design Capacity (kl/d)	Average Daily Production (kl/d)	Available Variance* (kl/d)	% Use Available Capacity	Total SIV towards the WSS (kl/d)
Albert Luthuli LM	8	8	47,000	45,000	0	45,000	0%	45,050
Bushbuckridge LM	12	12	166,000	151,500	132,196	19,304	87%	132,196
Dipaleseng LM	1	1	6,000	6,000	0	6,000	0%	6,000
Dr JS Moroka LM	1	1	60,000	60,000	30,000	30,000	50%	30,000
Emakhazeni LM	4	4	11,700	11,700	11,108	592	95%	11,108
Emalahleni LM	7	6	209,460	217,460	195,097	22,363	90%	195,097
Govan Mbeki LM	None	1						90,525
Lekwa LM	2	2	39,200	29,200	0	29,200	0%	39,200
Mbombela/Umjindi	22	18	203,220	200,020	133,872	66,148	67%	176,744
Mkhondo LM	5	5	27,240	26,240	26,137	103	100%	27,177
Msukaligwa LM	5	5	32,000	32,000	0	32,000	0%	32,000
Nkomazi LM	22	16	127,850	133,700	93,421	40,280	70%	93,420
Pixley Ka Seme LM	4	4	14,000	14,600	16,909	-2,309	116%	16,909
Steve Tshwete LM	7	6	65,769	60,881	44,170	16,711	73%	44,170
Thaba Chweu LM	4	4	37,900	23,300	24,350	-1,050	105%	34,900
Thembisile LM	2	5	10,600	7,800	5,900	1,900	76%	40,026
Victor Khanye LM	1	2	15,000	7,775	0	7,775	0%	18,735
Totals	**107**	**100**	**1,072,939**	**1,027,176**	**713,159**	**314,017**	**69%**	**1,033,257**

* Difference between the available design capacity and the average daily production



	Emalahleni LM	Mbombela/ Umjindi	Bushbuckridge LM	Nkomazi LM	Steve Tshwete LM	Dr JS Moroka LM	Albert Luthuli LM	Lekwa LM	Thaba Chweu LM	Msukaligwa LM	Mkhondo LM	Victor Khanye LM	Pixley Ka Seme LM	Emakhazeni LM	Thembisile LM	Dipaleseng LM	Govan Mbeki LM
Available Variance (kl/d)	22 363	66 148	19 304	40 280	16 711	30 000	45 000	29 200	-1 050	32 000	103	7 775	-2 309	592	1 900	6 000	
Ave. Daily Production (kl/d)	195 097	133 872	132 196	93 421	44 170	30 000	0	0	24 350	0	26 137	0	16 909	11 108	5 900	0	
Available Design Capacity (kl/d)	217 460	200 020	151 500	133 700	60 881	60 000	45 000	29 200	23 300	32 000	26 240	7 775	14 600	11 700	7 800	6 000	
Design Capacity (kl/d)	209 460	203 220	166 000	127 850	65 769	60 000	47 000	39 200	37 900	32 000	27 240	15 000	14 000	11 700	10 600	6 000	
Total SIV (kl/d)	195 097	176 744	132 196	93 420	44 170	30 000	45 050	39 200	34 900	32 000	27 177	18 735	16 909	11 108	40 026	6 000	90 525

Figure 124 - Design and available capacity, average daily production, available variance and total SIV for the WTWs



	Pixley Ka Seme LM	Thaba Chweu LM	Mkhondo LM	Emakhazeni LM	Emalahleni LM	Bushbuckridge LM	Thembisile LM	Steve Tshwete LM	Nkomazi LM	Mbombela/ Umjindi	Dr JS Moroka LM	Albert Luthuli LM	Dipaleseng LM	Lekwa LM	Msukaligwa LM	Victor Khanye LM	Victor Khanye LM
% AC	116%	105%	100%	95%	90%	87%	76%	73%	70%	67%	50%	0%	0%	0%	0%	0%	0%

Figure 125 - % available capacity

(ii) Raw Water Abstraction

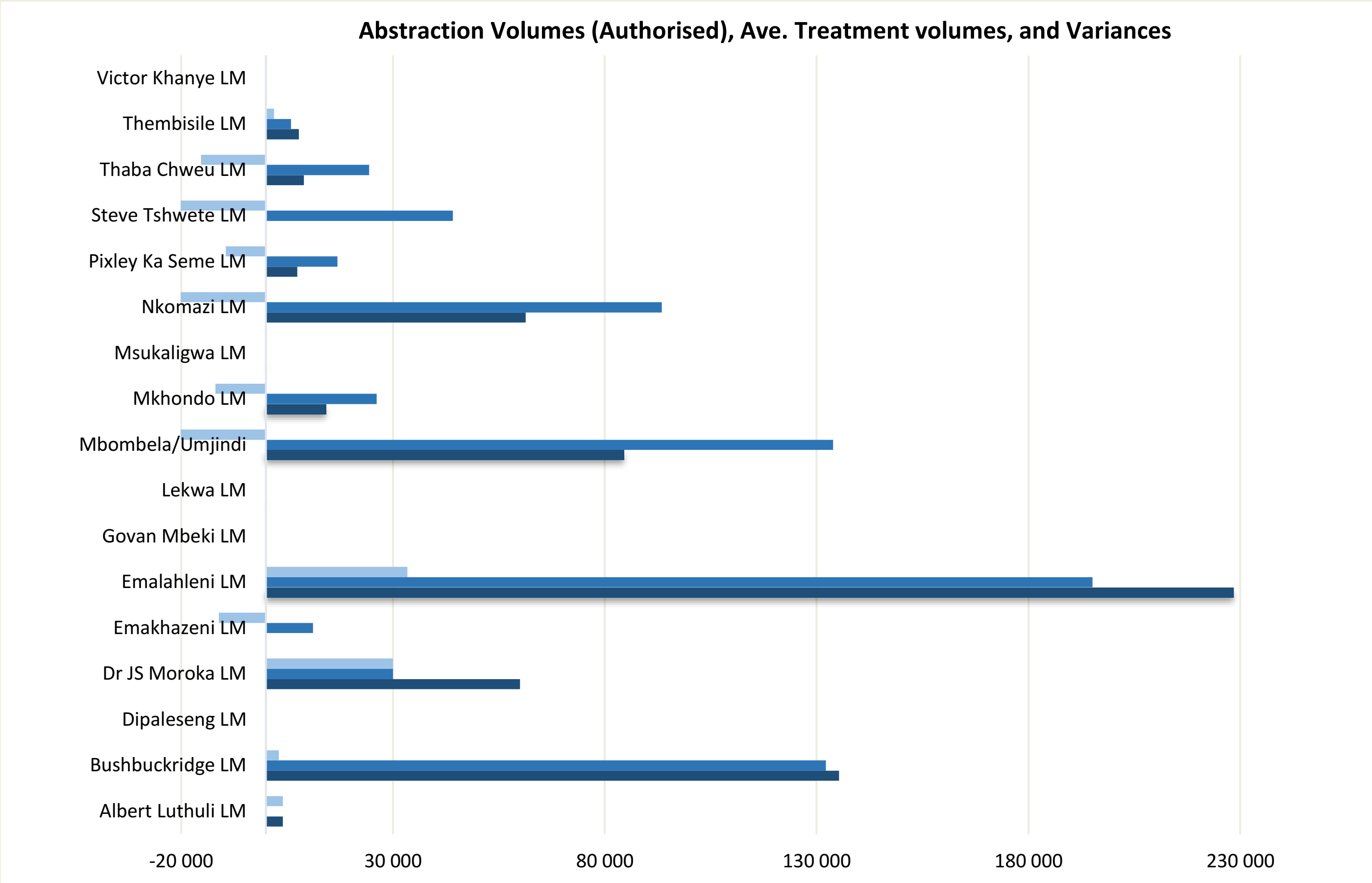
This diagnostic takes a snapshot view of the status of water abstraction authorisations from natural water resources across the province. As per the National Water Act (Act no 36 of 1998), Water Use Authorisation (WUA) mandate the maximum abstraction volumes of raw water, and the installation and monitoring of abstraction, inflow and outflow meters, whilst the BD audit requires WSAs to report the flows on IRIS and to calibrate meters annually. Any defects in terms of abstracting water from a resource without an authorisation, or exceeding the authorised volume, or reporting inaccurate volumes, or not monitoring abstraction against authorised volumes, are considered to be a regulatory risk and contravention of the law.

Findings: Data pertaining to the daily abstraction volumes (kl/d) (Authorised), average daily treatment volumes (kl/d), the names of the WTWs exceeding/with no Daily Abstraction Volumes (Authorised) and Average Daily Treatment Volumes (Authorised) is captured in the tables below.

Table 163 - Summary of Abstraction Volumes (Authorised), Average Daily Treatment Volumes, Variances & WTWs listed For Enforcement Action

WSA Name	# WTWs	# WSSs	Daily Abstraction Volumes (Authorised) (kl/d)	Average Daily Treatment Volume (kl/d)	Average Variance (kl/d) [+ or Minus]
Albert Luthuli LM	8	8	4,000	0	4,000
Bushbuckridge LM	12	12	135,262	132,196	3,066
Dipaleseng LM	1	1	0	0	0
Dr JS Moroka LM	1	1	60,000	30,000	30,000
Emakhazeni LM	4	4	0	11,108	-11,108
Emalahleni LM	7	6	228,509	195,097	33,412
Govan Mbeki LM	None	1			
Lekwa LM	2	2	0	0	0
Mbombela/Umjindi	22	18	84,599	133,872	-49,272
Mkhondo LM	5	5	14,247	26,137	-11,890
Msukaligwa LM	5	5	0	0	0
Nkomazi LM	22	16	61,340	93,421	-32,081
Pixley Ka Seme LM	4	4	7,430	16,909	-9,479
Steve Tshwete LM	7	6	0	44,170	-44,170
Thaba Chweu LM	4	4	9,000	24,350	-15,350
Thembisile LM	2	5	7,800	5,900	1,900
Victor Khanye LM	1	2	0	0	0
Totals	**107**	**100**	**612,188**	**713,159**	**-100,971**

WSA Name	WTW exceeding the Daily Abstraction Volumes (Authorised)	WTW with no Daily Abstraction Volumes (Authorised)
Albert Luthuli LM		6 of 7
Bushbuckridge LM	2 of 12	
Dipaleseng LM		1 of 1
Emakhazeni LM		4 of 4
Emalahleni LM	2 of 7	
Lekwa LM		2 of 2
Mbombela/Umjindi	3 of 22	16 of 22
Mkhondo LM		3 of 5
Msukaligwa LM		5 of 5
Nkomazi LM	6 of 22	8 of 22
Pixley Ka Seme LM	2 of 4	1 of 4
Thaba Chweu LM		3 of 4
Victor Khanye LM		1 of 1
Totals	**15**	**50**



	Albert Luthuli LM	Bushbuckridge LM	Dipaleseng LM	Dr JS Moroka LM	Emakhazeni LM	Emalahleni LM	Govan Mbeki LM	Lekwa LM	Mbombela/ Umjindi	Mkhondo LM	Msukaligwa LM	Nkomazi LM	Pixley Ka Seme LM	Steve Tshwete LM	Thaba Chweu LM	Thembisile LM	Victor Khanye LM
Ave. Variance (kl/d)	4 000	3 066	0	30 000	-11 108	33 412		0	-49 272	-11 890	0	-32 081	-9 479	-44 170	-15 350	1 900	0
Ave. Daily Treatment (kl/d)	0	132 196	0	30 000	11 108	195 097		0	133 872	26 137	0	93 421	16 909	44 170	24 350	5 900	0
Daily Abstraction (kl/d)	4 000	135 262	0	60 000	0	228 509		0	84 599	14 247	0	61 340	7 430	0	9 000	7 800	0

Figure 126 - Abstraction Volumes (Authorised), Average Daily Treatment Volumes, and Variances

WTWs that exceed the Daily Abstraction Volumes (Authorised) and WTWs with no Daily Abstraction Volumes (Authorised) are reflected in the 2nd table above. WTWs that are not complying with the regulations will be required to show correction in the next Blue Drop audit cycle. The results conclude that 15 WTWs are exceeding the permitted abstraction limits. The Daily Abstraction Volumes (Authorised) are not known for 50 water treatment systems resulting in negative average variances that skew the data sets.

For future BD audits, WSA/WSPs will be required to provide 'actual' abstraction volumes so that a comparative analysis can be undertaken of the 'actual' abstraction volume versus the authorised water use abstraction volumes (maximum). This would require that the WSAs and WSPs/WBs monitor and record all critical path flows (abstraction, raw and final).

(iii) Water Use Efficiency and System Input Value

The Department is committed to consider issues related to water scarcity and security, aiming to ensure there is sufficient water for the population, the economy, and the environment by increasing water use efficiency across all sectors. Water use for services sectors is specifically dealing with the quantity of water used directly by the consumer through the public distribution network and industries connected to the network.

This diagnostic assesses the water use efficiency (i.e., the average daily consumption in litres per person per day) and the individual and collective performance of the water supply systems. WUE indicates how effective water is used by consumers, i.e. the process between effective water use and actual water abstraction. This concept is closely related to the Department's No Drop Certification assessment, whereby WUE, NRW and water losses are targeted as part of Water Conservation and Water Demand Management strategies by municipalities.

Findings: Both the Blue Drop audit and No Drop audit requires an IWA water balance to determine the SIV into each water supply system, and to identify and quantify possible losses from abstraction to the end-of-use point. Dr JS Moroka LM, Govan Mbeki LM, Victor Khanye LM and Mbombela/Umjindi have full water balances in place for 13 WSSs in total. 52 WSSs in 7 WSAs have partial water balances in place, and 10 WSAs with a total of 35 WSSs do not have water balances in place.

WUE is calculated based on the SIV contributions, population served, and the average daily consumption, as summarised in the following table.

Table 164 - Summary of total SIV, total population served, average daily consumption, WUE status and performance trend

WSA Name	# WSSs	Total Population	Total SIV (kl/d)	2023 WUE (l/p/d)	2023 Blue Drop WUE Range and Performance	
Albert Luthuli LM	8	227,686	45,050	198	>150-200	Good
Bushbuckridge LM	12	922,078	132,196	143	<150	Excellent
Dipaleseng LM	1	41,666	6,000	144	<150	Excellent
Dr JS Moroka LM	1	265,828	30,000	113	<150	Excellent
Emakhazeni LM	4	43,083	11,108	258	>250-300	Poor
Emalahleni LM	6	449,825	195,097	434	>300	Extremely High
Govan Mbeki LM	1	343,157	90,525	264	>250-300	Poor
Lekwa LM	2	104,155	39,200	376	>300	Extremely High
Mbombela/Umjindi	18	841,433	176,744	210	>200-250	Average
Mkhondo LM	5	256,919	27,177	106	<150	Excellent
Msukaligwa LM	5	166,545	32,000	192	>150-200	Good
Nkomazi LM	16	471,891	93,420	198	>150-200	Good
Pixley Ka Seme LM	4	92,312	16,909	183	>150-200	Good
Steve Tshwete LM	6	199,416	44,170	221	>200-250	Average
Thaba Chweu LM	4	94,116	34,900	371	>300	Extremely High
Thembisile LM	5	187,007	40,026	214	>200-250	Average
Victor Khanye LM	2	63,840	18,735	293	>250-300	Poor
Totals	**100**	**4,770,957**	**1,033,257**	**231**		

WUE (l/cap/day) performance categories

Colour	WUE Range	Performance
	>300	Extremely high per capita water use
	>250-300	Poor per capita water use
	>200-250	Average per capita water use with potential for marked improvement
	>150-200	Good per capita water use but some improvement may be possible subject to economic benefits
	<150	Excellent per capita water use management

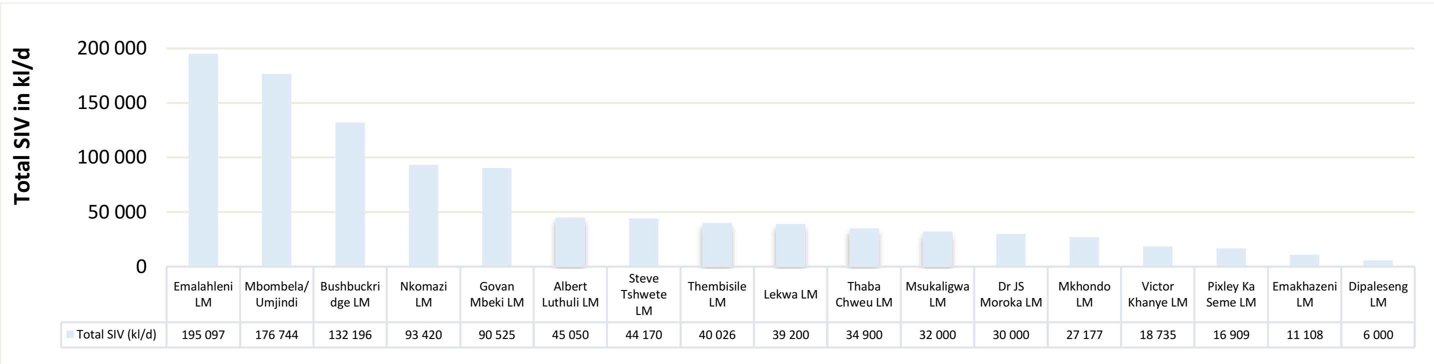


Figure 127 - Total SIV towards the WSSs

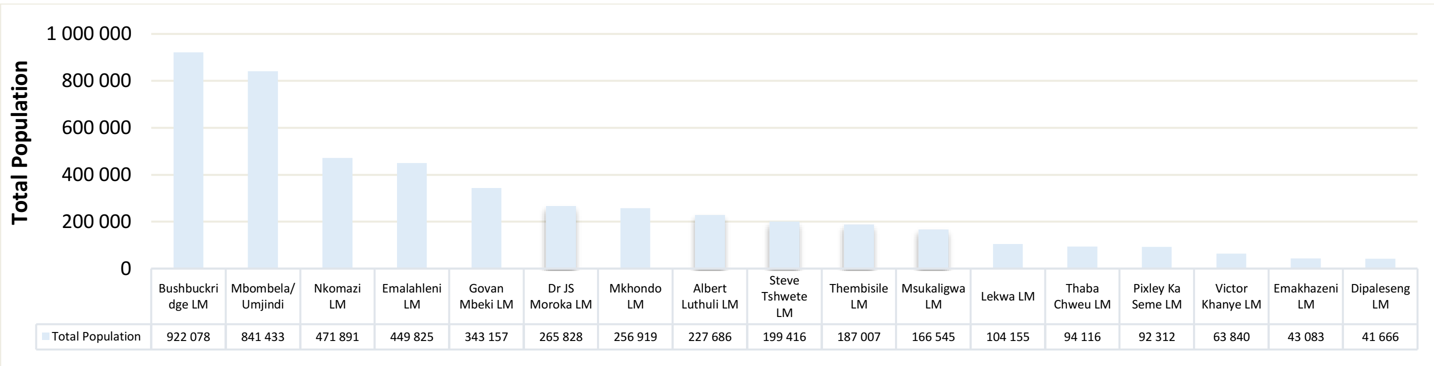


Figure 128 - Total Population served

For the province, 1,033,257 kl/d water is supplied to 4,770,957 consumers. Comparatively, Emalahleni LM distributes 19% of the total provincial SIV, followed by Mbombela/Umjindi (17%) and Bushbuckridge LM (13%). An average 231 litre of water is used per person per day, which implies a fairly high (average) per capita water use. Results from the diagnostic data show that the Emalahleni LM, Lekwa LM and Thaba Chweu LM have WUEs of more than 300 l/c/d, which is regarded as extremely high according to national benchmarks. 3 WSAs have WUEs between 250–300 l/c/d, which is regarded as poor. No Drop Certification is specifically tasked with plans to curb water losses and improve NRW through water accounting assessments and water conservation and demand management.

Diagnostic 3: Drinking Water Quality (DWQ) Monitoring and Compliance

Aim: Blue Drop audits values the principles of "To measure is to know" and "To know is to manage". The primary objective of a water treatment plant is to produce final water quality that is safe for human consumption at the end of the distribution network. This standard can only be measured and achieved if operational and compliance monitoring and DWQ compliance is executed at the correct frequency, sample point, and determinand type. This diagnostic assesses the i) operational and compliance monitoring status, ii) drinking water quality compliance, and iii) risk defined compliance and laboratory credibility.

(i) Drinking water operational and compliance monitoring

Findings: A minimum level of 90% operational monitoring compliance is applied as benchmark, to give weight to the importance of sampling and monitoring of the raw water, process unit water, and final water across the treatment stream. Compliance monitoring is also informed by SANS 241:2015 and the requirement for risk-informed monitoring through the WaSP process at both the WTW final and distribution network. DWQ compliance is calculated against the population size and the mandatory limits set by SANS 241:2015 and the Blue Drop standards, as calculated and reported from data loaded in the IRIS.

Table 165 - Summary of the KPA 2 WTW operational and WSS compliance monitoring status

WSA Name	# WTWs	# WSSs	WTW Operational monitoring [KPA 2 sub-KPA 2.b)]		WSS Compliance monitoring [KPA 2 sub-KPA 2.c)]	
			Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]	Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]
Albert Luthuli LM	8	8		8		8
Bushbuckridge LM	12	12	12		8	4
Dipaleseng LM	1	1		1		1
Dr JS Moroka LM	1	1	1			1
Emakhazeni LM	4	4		4		4
Emalahleni LM	7	6	7		4	2
Govan Mbeki LM	None	1	None	None	1	
Lekwa LM	2	2		2		2
Mbombela/Umjindi	22	18	7	15	6	12
Mkhondo LM	5	5	4	1	1	4
Msukaligwa LM	5	5		5		5
Nkomazi LM	22	16	22		16	
Pixley Ka Seme LM	4	4	1	3		4
Steve Tshwete LM	7	6	4	3		6
Thaba Chweu LM	4	4		4		4
Thembisile LM	2	5	1	1		5
Victor Khanye LM	1	2		1	2	
Totals	**107**	**100**	**59 (55%)**	**48 (45%)**	**38 (38%)**	**62 (62%)**

The performance recorded in the table above stems from performance data as measured against the Blue Drop Standard expressed in KPA 2 and sub-KPAs 2.b) and 2.c). Overall, an unsatisfactory sampling and analysis regime is observed for both operational (45%) and compliance (62%) monitoring.

The data indicates that 59 of 107 WTWs (55%) are on par with good practice for operational monitoring of the raw and final water and the respective process units at the WTW. Five WSAs are doing really well, whilst 11 WSAs fail to meet the Blue Drop standard. In terms of compliance monitoring, 38 WSSs (38%) are on par with good compliance monitoring practices, and 62 WSSs (62%) are failing the Blue Drop standard.

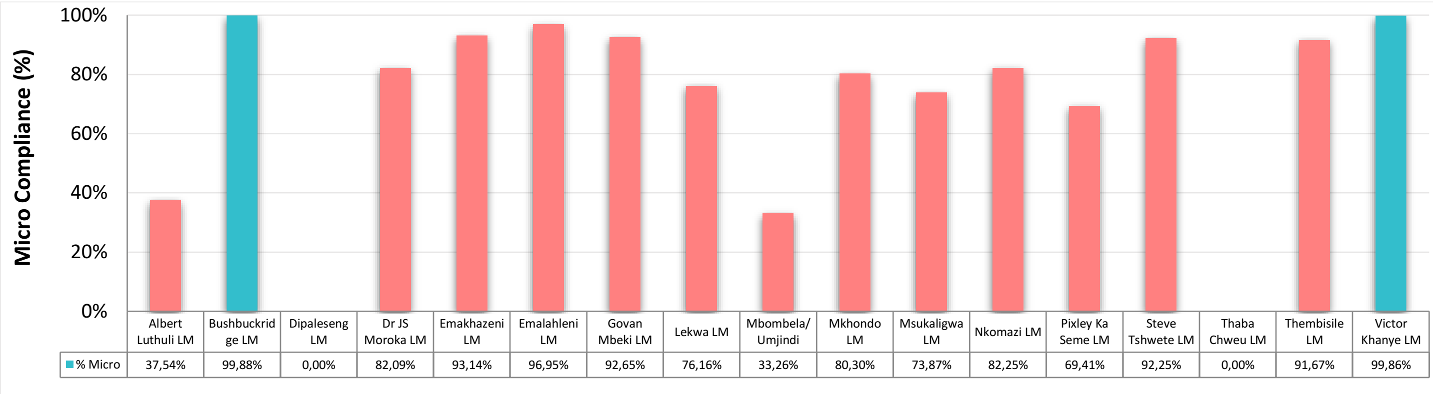
The latter observation is noted with concern. Compliance monitoring is a legal requirement and the only means to measure the DWQ performance of a water supply system. Operational monitoring is the cornerstone of day-to-day process adjustments and optimisation to ensure that the water treatment is efficient and delivers quality final water. The results indicate that 48 WTWs and 62 WSSs are not achieving regulatory and industry standards.

(ii) Drinking water quality compliance

Findings: DWQ compliance is measured against the requirements of SANS 241:2015 under KPA 5 of the Blue Drop audit. The tables following summarises the results of the DWQ status for Microbiological and Chemical Compliance, which also carries the highest Blue Drop score weighting of 35%.

Table 166 - Provincial Summary of the DWQ Status for Microbiological Compliance

WSA Name	# WSSs	Population	% Ave. Micro Compliance	# WSS Micro Performance Status		
				Excellent	Good	Unacceptable
Albert Luthuli LM	8	227,686	37.54%			8
Bushbuckridge LM	12	922,078	99.88%	12		
Dipaleseng LM	1	41,666	0.00%			1
Dr JS Moroka LM	1	265,828	82.09%			1
Emakhazeni LM	4	43,083	93.14%	2		2
Emalahleni LM	6	449,825	96.95%	3		3
Govan Mbeki LM	1	343,157	99.82%	1		
Lekwa LM	2	104,155	76.16%	1		1
Mbombela/Umjindi	18	841,433	33.26%	6		12
Mkhondo LM	5	256,919	80.30%			5
Msukaligwa LM	5	166,545	73.87%			5
Nkomazi LM	16	471,891	82.25%	2	1	13
Pixley Ka Seme LM	4	92,312	69.41%			4
Steve Tshwete LM	6	199,416	92.25%	3		3
Thaba Chweu LM	4	94,116	0.00%			4
Thembisile LM	5	187,007	91.67%	3		2
Victor Khanye LM	2	63,840	99.86%	2		
Totals	**100**	**4,770,957**	**71.08%**	**35**	**1**	**64**



MICRO: Population <100,000		
Colour	Status	Percentage
	Excellent	≥97%
	Good	≥96 - <97%
	Unacceptable	<96%

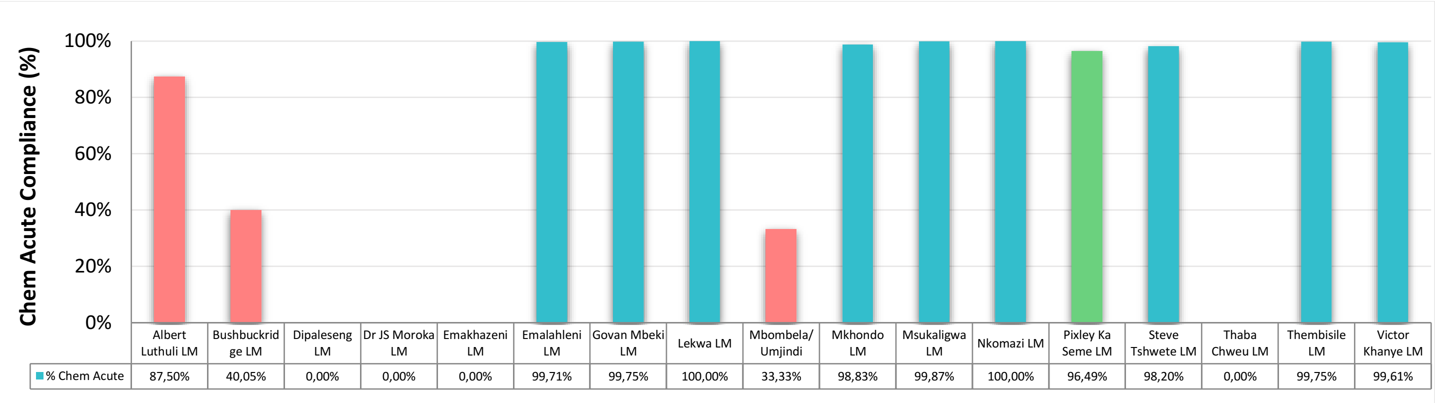
MICRO: Population >100,000		
Colour	Status	Percentage
	Excellent	≥99%
	Good	≥98 - <99%
	Unacceptable	<98%

Figure 129 - Provincial Microbiological Drinking Water Quality Status

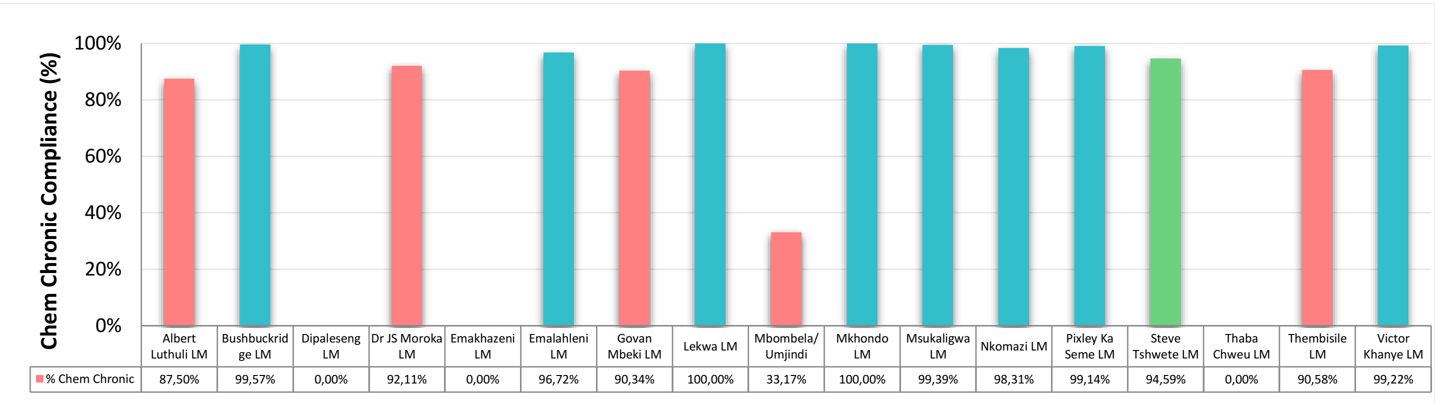
Out of the 100 WSSs, 36 (36%) systems achieved excellent and good microbiological quality, whilst 64 (64%) systems have an unacceptable microbiological water quality status. The water in these systems pose a serious acute health risk to the community. Failure to produce water that meets microbiological compliance standards can be linked back to poor operations, defective infrastructure, inadequate dosing rates, absence of disinfection chemicals, lack of monitoring, lack of operating and chemistry knowledge, and several other root causes. WSIs that are not monitoring the final water quality at the outlet of the treatment plant or at specific end use points are required to develop a monitoring programme and resume with compliance monitoring as a matter of urgency.

Table 167 - Provincial Summary of the DWQ Status for Chemical Acute Health and Chronic Health Compliance

WSA Name	# WSSs	Population	% Ave. Chem Acute Health Compliance	# WSS Chem Acute Health Performance Status			% Ave. Chem Chronic Health Compliance	# WSS Chem Chronic Health Performance Status		
				Excellent	Good	Unacceptable		Excellent	Good	Unacceptable
Albert Luthuli LM	8	227,686	87.5%	7		1	87.5%	7		1
Bushbuckridge LM	12	922,078	40.0%	3		9	99.6%	12		
Dipaleseng LM	1	41,666	0.0%			1	0.0%			1
Dr JS Moroka LM	1	265,828	0.0%			1	92.1%			1
Emakhazeni LM	4	43,083	0.0%			4	0.0%			4
Emalahleni LM	6	449,825	99.7%	6			96.7%	5	1	
Govan Mbeki LM	1	343,157	99.8%	1			90.3%			1
Lekwa LM	2	104,155	100.0%	2			100.0%	2		
Mbombela/Umjindi	18	841,433	33.3%	6		12	33.2%	5		13
Mkhondo LM	5	256,919	98.8%	4	1		100.0%	5		
Msukaligwa LM	5	166,545	99.9%	5			99.4%	5		
Nkomazi LM	16	471,891	100.0%	16			98.3%	15	1	
Pixley Ka Seme LM	4	92,312	96.5%	2		2	99.1%	4		
Steve Tshwete LM	6	199,416	98.2%	5		1	94.6%	4	1	1
Thaba Chweu LM	4	94,116	0.0%			4	0.0%			4
Thembisile LM	5	187,007	99.8%	5			90.6%	3		2
Victor Khanye LM	2	63,840	99.6%	2			99.2%	2		
Totals	**100**	**4,770,957**	**67.8%**	**64**	**1**	**35**	**75.3%**	**69**	**3**	**28**



CHEM Acute Health: Population <100,000			CHEM Acute Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	>97%		Excellent	>99%
	Good	>95 - <97%		Good	>97 - <99%
	Unacceptable	<95%		Unacceptable	<97%



CHEM Chronic Health: Population <100,000			CHEM Chronic Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	>95%		Excellent	>97%
	Good	>93 - <95%		Good	>95 - <97%
	Unacceptable	<93%		Unacceptable	<95%

Figure 130 - Provincial Chemical Acute Health and Chronic Health Drinking Water Quality Status

Chemical acute health compliance shows that 64 (64%) systems have excellent, and 1 (1%) system has good water quality, whilst 35 (35%) systems for 7 WSAs have an unacceptable chemical acute health compliance. Chemical chronic health compliance shows that 69 (69%) systems have excellent, and 3 (3%) systems have good water quality, whilst 28 (28%) systems for 8 WSAs have an unacceptable chemical chronic health compliance.

The Water Services Act upholds standards regarding the monitoring and reporting on drinking water quality and issuance of advisory notices to the public when significant DWQ failures are observed. The audit process applies a penalty when DWQ failures are noticed without issuing such Water Quality Alert Notices to forewarn consumers of the status of (unsafe) water quality and to advise communities to source alternative water sources or methods to disinfect water used for drinking water purposes.

The following table reflects the compliance status of the WSAs as regards the issuing of these notices for DWQ failures.

Table 168 - Summary of Penalties Applied to WSSs for not Issuing Advisory Notices

WSA Name	# WSS	# WSS No Penalty Applied	# WSS Partial Penalty Applied	WSS Names Partial Penalty	# WSS Full Penalty Applied	WSS Names Full Penalty
Albert Luthuli LM	8		4	Badplaas, Bettysgoed, Ekulindeni, Elukwatini	4	Carolina, Empuluzi/ Mayflower, Fernie, Rudimentary Boreholes
Bushbuckridge LM	12	7	5	Edinburg, Marite, Sandriver, Sehlare, Thulamahashi		
Dipaleseng LM	1				1	The Greater Dipaleseng LM
Dr JS Moroka LM	1		1	Weltervreden		
Emakhazeni LM	4		3	Belfast, Dullstroom, Entokozweni	1	Emgwenya
Emalahleni LM	6	4	2	Point B Blended, Witbank		
Govan Mbeki LM	1		1	The Greater Govan Mbeki LM		
Lekwa LM	2	1	1	Standerton		
Mbombela/Umjindi	18	6			12	12 WSSs (excl. Silulumanzi)
Mkhondo LM	5	2	3	Amsterdam, Mkhondo 1, Rural WSS		
Msukaligwa LM	5		5	All 5 WSSs		
Nkomazi LM	16	3	13	13 WSSs		
Pixley Ka Seme LM	4		4	All 4 WSSs		
Steve Tshwete LM	6	5	1	Borehole:Doornkop #2		
Thaba Chweu LM	4				4	All 4 WSSs
Thembisile LM	5	3	2	Bomandu, Langkloof		
Victor Khanye LM	2	2				
Totals	**100**	**33**	**45**		**22**	

No penalties were applied to 33 (33%) WSSs in 9 WSAs, partial penalties were applied to 45 (45%) WSSs in 13 WSAs, and full penalties were applied to 22 (22%) WSSs in 5 WSAs.

(iii) Risk defined compliance and laboratory credibility

Findings: Risk-defined compliance standards aim to determine the compliance (to SANS 241) of those parameters that have been found to pose a risk in a specific WSS and need to be included in the routine monitoring programme or frequency as prescribed by SANS 241. The province achieved an average Annual Risk Defined Compliance of 71%, with the best performances coming from Govan Mbeki LM and Victor Khanye LM, and the worst performances coming from Albert Luthuli LM, Bushbuckridge LM, Emalahleni LM, Mbombela/Umjindi, Nkomazi LM, Msukaligwa LM and Thaba Chweu LM. Excellent risk defined compliance was achieved by 22 (22%) systems, good compliance for 3 (3%) systems and bad compliance for 75 (75%) systems.

Table 169 - Summary of the DWQ Compliance for Risk Defined Compliance

WSA Name	# WSSs	Population	Ave. % Risk Defined Compliance	# WSS Performance Status		
				Excellent	Good	Bad
Albert Luthuli LM	8	227,686	47.76%			8
Bushbuckridge LM	12	922,078	92.12%	4	1	7
Dipaleseng LM	1	41,666	0.00%			1
Dr JS Moroka LM	1	265,828	76.74%			1
Emakhazeni LM	4	43,083	89.26%	2		2
Emalahleni LM	6	449,825	88.54%			6
Govan Mbeki LM	1	343,157	99.08%	1		
Lekwa LM	2	104,155	80.76%		1	1
Mbombela/Umjindi	18	841,433	31.62%	6		12
Mkhondo LM	5	256,919	78.85%	1		4
Msukaligwa LM	5	166,545	79.56%			5

WSA Name	# WSSs	Population	Ave. % Risk Defined Compliance	# WSS Performance Status		
				Excellent	Good	Bad
Nkomazi LM	16	471,891	75.20%			16
Pixley Ka Seme LM	4	92,312	86.02%			4
Steve Tshwete LM	6	199,416	91.05%	2	1	3
Thaba Chweu LM	4	94,116	0.00%			4
Thembisile LM	5	187,007	92.22%	4		1
Victor Khanye LM	2	63,840	97.31%	2		
Totals	**100**	**4,770,957**	**70.95%**	**22**	**3**	**75**

The aim of operational determinand compliance is to determine the efficiency of the water treatment process, by monitoring those parameters which are used to control the treatment process. Although not necessarily a health risk, these parameters provide good information on the integrity of the WTW. The province achieved an average % Actual Operational Determinand Compliance of 51%, the best performances coming from the Dr JS Moroka LM, Bushbuckridge LM and Nkomazi LM, and the worst performances coming from the Albert Luthuli LM, Emakhazeni LM, Lekwa LM, Mbombela/Umjindi, Msukaligwa LM, Pixley Ka Seme LM and Thaba Chweu LM. Excellent risk defined compliance was achieved by 35 (33%) systems, good compliance for 18 (17%) systems and bad compliance for 54 (50%) systems with most of these systems residing in Albert Luthuli LM and Mbombela/Umjindi.

Table 170 - Summary of the Treatment (Operational) Efficiency Index

WSA Name	# WTWs	Population	Ave. % Actual Operational Determinand Compliance	# WTW Performance Status		
				Excellent	Good	Bad
Albert Luthuli LM	8	227,686	0%			8
Bushbuckridge LM	12	922,078	91%	5	5	2
Dipaleseng LM	1	41,666	0%			1
Dr JS Moroka LM	1	265,828	100%	1		
Emakhazeni LM	4	43,083	0%			4
Emalahleni LM	7	449,825	96%	4	2	1
Govan Mbeki LM	None	343,157	100%			
Lekwa LM	2	104,155	0%			2
Mbombela/Umjindi	22	841,433	26%	5		17
Mkhondo LM	5	256,919	76%	2	2	1
Msukaligwa LM	5	166,545	0%			5
Nkomazi LM	22	471,891	96%	13	9	
Pixley Ka Seme LM	4	92,312	68%			4
Steve Tshwete LM	7	199,416	50%	4		3
Thaba Chweu LM	4	94,116	0%			4
Thembisile LM	2	187,007	87%	1		1
Victor Khanye LM	1	63,840	80%			1
Totals	**107**	**4,770,957**	**51%**	**35**	**18**	**54**

The data confirms that 14 (78%) WSSs in the province have access to credible laboratories for compliance and operational analysis. These in-house or contracted laboratories are accredited with SANAS or have Proficiency Testing Schemes with SABS or have inter-laboratory quality checks in place to ensure that suitable analytical methods are applied and that quality assurance processes are followed to ensure credible water quality results. The province is mostly meeting the regulatory expectation for the WSIs having access to credible analytical services for compliance and operational monitoring.

Diagnostic 4: Technical Site Assessments

Aim: The BD process makes provision for a Technical Site Assessment (TSA) in order to verify the desktop evidence through field-based inspections. This assessment includes a physical inspection of the entire water treatment plant with all its process units, as well as the reservoir and spot checks of a pumpstation and pipelines. The technical assessment is coupled with an asset condition check to determine an approximate cost (VROOM) to restore existing infrastructure to functional status for the treatment facility (only).

Findings: The results of the province's TSAs are summarised in the table below. A deviation of 10% between the BD and TSA score indicate a misalignment between the administrative aspects and the work on the ground. The Regulator regards a WTW with a TSA score of >80% to have an acceptable level of process control and functional equipment, and a TSA score of 90% as an excellent system that complies with most of the Blue Drop TSA standards. A TSA score of <30% indicates that the treatment facility and network fails in most regards, and is evident of dysfunctional infrastructure, failed process control, absence of record keeping and monitoring, and poor water quality.

The VROOM cost presents a ''Very Rough Order of Measurement" cost to return a WTWs functionality to its original design. More detail can be found in the Blue Drop Watch Report 2023.

Table 171 - %TSA and %BD score, and VROOM cost estimates total and split for civil, mechanical, and electrical

WSA Name	TSA Name	%TSA	2023 BD Score (%)	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Albert Luthuli LM	Carolina	61	19.1%	2,351,250	1,496,250	427,500	4,275,000
Bushbuckridge LM	Inyaka	84	62.2%	350,000	650,000	0	1,000,000
Dipaleseng LM	Fortuna	52	7.0%	324,390	702,845	54,065	1,081,300
Dr JS Moroka LM	Weltevreden	86	53.4%	6,120,000	4,080,000	0	10,200,000
Emakhazeni LM	Belfast	68	31.2%	1,246,000	2,136,000	178,000	3,560,000
Emalahleni LM	Witbank	78	65.7%	13,230,000	4,725,000	945,000	18,900,000
Govan Mbeki LM	No TSA (Rand Water)						
Lekwa LM	Standerton	51	33.5%	13,616,000	13,616,000	6,808,000	34,040,000
Mbombela/Umjindi	Nelspruit (New)	92	69.3%	512,820	2,051,280	0	2,564,100
Mbombela/Umjindi	White River Country Estate	67	69.3%	267,850	241,065	26,785	535,700
Mkhondo LM	Piet Retief	70	54.5%	915,200	281,600	211,200	1,408,000
Msukaligwa LM	Ermelo North	51	21.6%	3,906,000	7,161,000	1,953,000	13,020,000
Nkomazi LM	Driekoppies	77	68.6%	2,904,000	1,452,000	484,000	4,840,000
Pixley Ka Seme LM	Volksrust	55	45.0%	2,486,000	1,130,000	904,000	4,520,000
Steve Tshwete LM	Vaalbank	87	67.4%	1,215,000	1,080,000	405,000	2,700,000
Thaba Chweu LM	Lydenburg	48	8.2%	544,500	396,000	49,500	990,000
Thembisile LM	Bundu	88	75.3%	3,000,000	800,000	200,000	4,000,000
Victor Khanye LM	Delmas	64	90.1%	176,440	1,146,860	441,100	1,764,400
			Totals	**R53,165,450**	**R43,145,900**	**R13,087,150**	**R109,398,500**
			% Split of Cost Items	**49%**	**39%**	**12%**	**100%**

A deviation of >10% between the BD and TSA score is noted for 14 WSAs. A deviation of >20% between the BD and TSA score is noted for 9 WSAs. For the individual WTWs assessed in the province, a total budget of R109.4m is estimated, with the bulk of the work (88%) going towards restoration of mechanical equipment (39%) and civil infrastructure (49%).

Diagnostic 5: Operation, Maintenance and Refurbishment of Assets

Aim: Insufficient financial resources are often cited as a root cause to dysfunctional or non-compliant water treatment works and water networks. Knowledge and monitoring of fiscal spending are therefore a critical part of water services management and municipal governance of public assets. This diagnostic investigates the status of financial information as pertaining to O&M budgets and expenditure, asset figures, and capital funding.

Findings: A substantial amount of financial information was presented during the audit process. Unfortunately, the evidence was presented in different formats, levels of detail, or absent for some WSAs. It was observed that WSA teams with financial officials that were present during the audits performed better and had a better understanding of the water services challenges experienced by their technical peers. Discrepancies observed included amongst others - generic or non-ringfenced budgets, contract lump sums for service providers presented as budgets, outdated or incomplete asset registers, and some cost drivers which were lacking. As data credibility presents a significant challenge, the Regulator grouped data into different certainty levels, as summarised at the end of this Diagnostic.

The result of each financial portfolio is discussed hereunder.

NOTE: The Regulator regards the financial and asset information with low confidence. Not all WSAs submitted verifiable information or complete financial data sets for the audit year in question.

Capital, O&M Budget and Actual, and Asset Value

The capital budgets, O&M budgets, O&M actual expenditure, and current asset values are summarised below.

Table 172 - Summary of the capital budgets, O&M budgets, O&M actual expenditure, and current asset values

WSA Name	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
Albert Luthuli LM	NI	NI	NI	NI	NI
Bushbuckridge LM	NI	R190,278,112	NI	NI	NI
Dipaleseng LM	NI	R8,865,428	R13,112,521	148%	R106,324,978

WSA Name	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
Dr JS Moroka LM	NI	R25,497,630	R28,495,532	112%	R1,321,267,971
Emakhazeni LM	NI	R19,681,868	R19,611,652	100%	R1,723,356,056
Emalahleni LM	R271,759,082	R836,195,211	R988,236,026	118%	R2,392,724,268
Govan Mbeki LM	R4,100,000	R356,628,995	R394,625,151	111%	R990,804,363
Lekwa LM	R12,105,356	R151,101,043	R149,018,393	99%	R225,957,857
Mbombela/Umjindi	R32,040,000	R71,411,314	R109,487,998	153%	R1,604,547,358
Mkhondo LM	R25,685,415	R21,486,202	R40,169,758	187%	R1,059,315,417
Msukaligwa LM	NI	NI	NI	NI	NI
Nkomazi LM	R128,000,000	R132,369,168	R175,803,976	133%	R13,455,144,248
Pixley Ka Seme LM	R9,530,000	NI	NI	NI	NI
Steve Tshwete LM	R122,377,332	R100,812,388	R36,346,368	36%	R241,631,810
Thaba Chweu LM	NI	NI	NI	NI	NI
Thembisile LM	R101,658,984	R204,199,603	R2,643,585	1%	R788,473,612
Victor Khanye LM	NI	R185,412,910	R133,406,188	72%	R24,387,933
Totals	**R707,256,169**	**R2,303,939,872**	**R2,090,957,148**	**90.8%**	**R23,933,935,871**

The Regulatory Comments following in this Chapter list the capital projects with secured funding for each municipality and/or its bulk water provider (WSP). The capital lists are deemed to be a definitive means to address water service inadequacies and ensuring water infrastructure investment. A total capital budget of R707.3m has been reported for the refurbishment and upgrades of water supply system infrastructure for 8 of 17 WSAs. The largest capital budgets are observed for Emalahleni LM (R271.8m), Nkomazi LM (R128m), Steve Tshwete LM (R122.4m), and Thembisile LM (R101.7m).

For the 2021/22 fiscal year, the total O&M budget reported for the province was R2.3b, of which R2.09b (91%) has been expended. There is over-expenditure of 7 WSAs ranging from 111% to 187% and there is under expenditure by Steve Tshwete LM (36%) and Victor Khanye LM (72%) was observed (It should be noted that the Engwenyameni/Klipfontein system failed to provide budget expenditure skewing the %expended for the WSA). The provincial figures exclude 5 WSAs who had no and partial financial information.

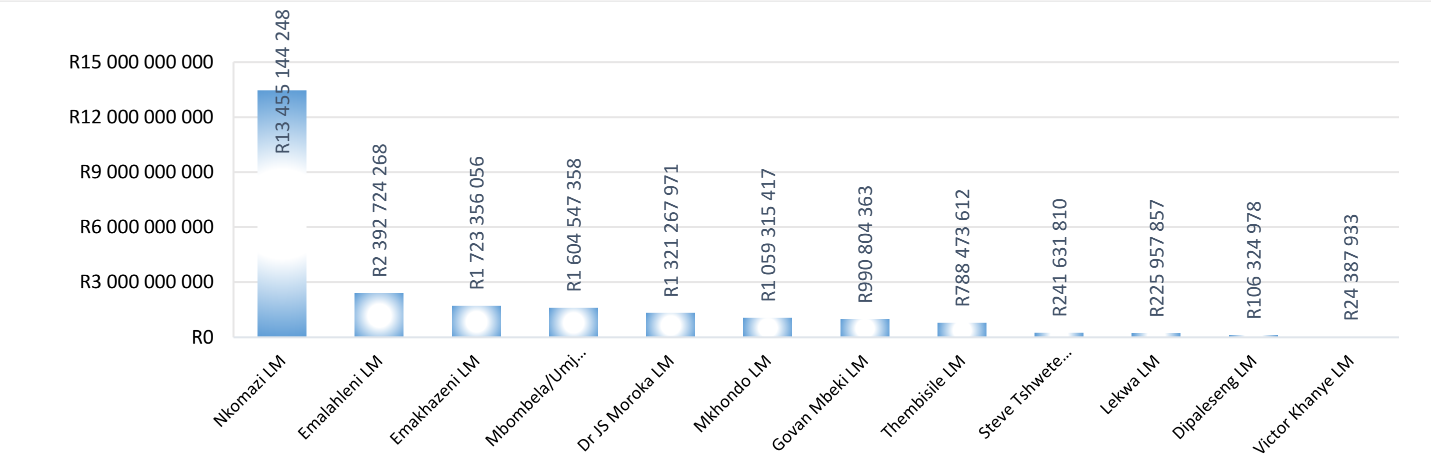


Figure 131 - Total current asset value reported

The total current asset value for water infrastructure (networks, pump stations, treatment plants) is reportedly R23.933b (excluding 5 WSAs with no information). The highest asset values are observed for Nkomazi LM (R13.45b), followed by Emalahleni LM (R2.39b), Emakhazeni LM (R1.72b) and Mbombela/Umjindi (R1.6b).

O&M Cost Benchmarking

By combining the SALGA and WRC WATCOST models, an estimation of the maintenance cost required per asset type can be done, i.e. civil, buildings, pipelines, mechanical, electrical, and instrumentation.

Table 173 - SALGA-WRC annual maintenance budget guideline and cost estimation

Description	% of Current Asset Value	Asset Value Estimate	Modified SALGA Maintenance Guideline	Annual Maintenance Budget Guideline
Current Asset Value estimate	**100%**	**R23,933,935,871**	**15.75%**	**R516,973,015**
Broken down into:				
1. Civil Structures	46%	R11,009,610,501	0.50%	R55,048,053
2. Buildings	3%	R718,018,076	1.50%	R10,770,271

Description	% of Current Asset Value	Asset Value Estimate	Modified SALGA Maintenance Guideline	Annual Maintenance Budget Guideline
Current Asset Value estimate	**100%**	**R23,933,935,871**	**15.75%**	**R516,973,015**
3. Pipelines	6%	R1,436,036,152	0.75%	R10,770,271
4. Mechanical Equipment	30%	R7,180,180,761	4.00%	R287,207,230
5. Electrical Equipment	11%	R2,632,732,946	4.00%	R105,309,318
6. Instrumentation	4%	R957,357,435	5.00%	R47,867,872
Totals	**100%**	**R23,933,935,871**	**15.75%**	**R516,973,015**
			Minus 20% P&Gs and 10% Installation	**R155,091,904**
			Total	**R361,881,110**

The model estimates that R517m (2.16%) is required per year to maintain the assets valued at R23.933b. Notably, this maintenance estimate assumes that all assets are functional. In cases where Blue Drop Certification is not being achieved, it can be assumed that some form of inefficiency or constraint is being experienced, and national benchmarks closer to 7% of the asset value is advocated (R1.675b).

The table below indicates the SALGA maintenance cost estimation in relation to the O&M budget, and O&M actual expended.

Table 174 - O&M cost estimates by the SALGA versus actual budget and expenditure figures

Cost Reference	O&M Cost Estimate	Period	% of Asset Value
Modified SALGA	R516,973,015	Annually, estimation	2.16%
O&M Budget	R2,303,939,872	Actual for 2021/22	9.6%
O&M Spend	R2,090,957,148	Actual for 2021/22	8.7%

In addition, the table below indicates the Blue Drop audit findings on the water supply operations cost determination and water supply O&M budget status.

Table 175 - BD Audit Water Supply Operations Cost Determination and Water Supply O&M Budget status

WSA Name	Water Supply Operations Cost Determination	Water Supply O&M Budget status
Albert Luthuli LM	NO PROOF (0% SCORE)	NO PROOF
Bushbuckridge LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Dipaleseng LM	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
Dr JS Moroka LM	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
Emakhazeni LM	DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Emalahleni LM	DETERMINED OF THE WHOLE SYSTEM; NOT SYSTEM SPECIFIC (GLOBAL); NO PROOF (0% SCORE)	SYSTEM SPECIFIC BUDGET, WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY, NO PROOF
Govan Mbeki LM	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
Lekwa LM	DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Mbombela/Umjindi	NO PROOF (0% SCORE), DETERMINED OF THE WHOLE SYSTEM	NO PROOF, SYSTEM SPECIFIC BUDGET
Mkhondo LM	DETERMINED OF THE WHOLE SYSTEM	BUDGET IS NOT RINGFENCED FOR WATER ONLY
Msukaligwa LM	NO PROOF (0% SCORE)	NO PROOF
Nkomazi LM	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
Pixley Ka Seme LM	NO PROOF (0% SCORE)	NO PROOF
Steve Tshwete LM	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
Thaba Chweu LM	NOT SYSTEM SPECIFIC (GLOBAL)	NO PROOF
Thembisile LM	DETERMINED OF THE WHOLE SYSTEM, NOT SYSTEM SPECIFIC (GLOBAL)	SYSTEM SPECIFIC BUDGET, WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Victor Khanye LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY

From the tables above, the cost dynamics can be summarised as follows:

- The SALGA estimations for maintenance budgets is about 22.4% (Modified SALGA divided by O&M Budget) of the actual reported budgets for the 2021/22 fiscal year
- The actual O&M budget (9.6%) does not appear to be adequate when compared with the SALGA guideline (2.16%) or with the government benchmark (7%)
- These figures are impacted by some of the WSAs who did not provide budget and expenditure figures, and by some inaccurate asset values and where no asset values were provided for
- Lastly, the municipalities presents budget and expenditure data at different levels (table above) i.e. financial figures are not always ringfenced per water supply system – thus rendering provincial summaries to be indicative).

10.1 Bushbuckridge Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	62.23%
Blue Drop Score 2014	%	64.24%
Blue Drop Score 2012	%	30.80%
Blue Drop Score 2011	%	29.89%

Key Performance Area	Weight	Acornhoek	Dingleydale	Edinburg	Hoxani
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	59.73%	53.41%	59.46%	67.54%
Blue Drop Score 2014	%	65.91%	NI	57.95%	68.45%
Blue Drop Score 2012	%	47.36%	NI	26.39%	33.59%
Blue Drop Score 2011	%	NA	NI	NA	NA
System Design Capacity	kL/d	106 000	1 500	3 000	35 000
System Available Capacity	kL/d	106 000	1 500	3 000	27 000
System Input Value	kL/d	52 371	176	1 954	22 854
Capacity Utilisation	%	93.81%	11.73%	65.13%	84.64%
Resource Abstracted From		Maxhleco Dam	Casteel Dam via canal	Edinburg Dam	Sabie River
BDRR 2023	%	40.23%	30.61%	35.98%	27.47%
BDRR 2022	%	36.50%	35.00%	42.40%	NI

Key Performance Area	Weight	Inyaka	Marite	Sandriver	Sehlare
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	64.29%	58.36%	46.13%	55.26%
Blue Drop Score 2014	%	65.82%	6.77%	47.64%	63.23%
Blue Drop Score 2012	%	46.85%	13.36%	19.41%	40.01%
Blue Drop Score 2011	%	NA	32.15%	NA	NA
System Design Capacity	kL/d	100 000	103 000	1 000	1 500
System Available Capacity	kL/d	100 000	103 000	1 000	1 500
System Input Value	kL/d	33 653	12 791	407	578
Capacity Utilisation	%	96.46%	92.96%	40.70%	38.53%
Resource Abstracted From		Inyaka Dam fed by Ngwaretse & Ngwaretsane Rivers	Marite dam	nwandlamuhari river	Nwandlamuhari river
BDRR 2023	%	33.29%	44.52%	35.25%	34.02%
BDRR 2022	%	30.10%	46.50%	30.60%	21.10%

Key Performance Area	Weight	Sigagule	Thorndale	Thulamahashi	Zoeknog
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	59.56%	50.88%	64.48%	51.03%
Blue Drop Score 2014	%	13.28%	7.12%	63.93%	NI
Blue Drop Score 2012	%	13.81%	12.91%	43.34%	NI
Blue Drop Score 2011	%	31.32%	25.00%	NA	NI
System Design Capacity	kL/d	1 500	1 500	109 000	3 000
System Available Capacity	kL/d	500	500	106 000	1 500
System Input Value	kL/d	183	76	6 608	545
Capacity Utilisation	%	36.60%	15.20%	90.04%	36.33%
Resource Abstracted From		Sigagule Dam	Thorndale dam	Mutlumuvi river	Mutlvmuvi river
BDRR 2023	%	36.29%	33.78%	30.78%	38.21%
BDRR 2022	%	38.00%	35.10%	30.30%	36.10%

Technical Site Assessment: Inyaka Network and WTW – 84%

10.2 Chief Albert Luthuli Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	19.09%
Blue Drop Score 2014	%	53.16%
Blue Drop Score 2012	%	18.40%
Blue Drop Score 2011	%	9.78%

Key Performance Area	Weight	Badplaas	Bettysgoed	Carolina	Ekulindeni
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**19.75%**	**18.85%**	**21.20%**	**18.00%**
Blue Drop Score 2014	%	62.79%	45.46%	71.17%	46.43%
Blue Drop Score 2012	%	33.73%	0.00%	25.44%	23.63%
Blue Drop Score 2011	%	9.78%	9.78%	9.78%	9.78%
System Design Capacity	kL/d	3 000	4 000	4 500	4 000
System Available Capacity	kL/d	3 000	4 000	4 500	4 000
System Input Value	kL/d	3 000	4 000	4 500	4 000
Capacity Utilisation	%	NI	NI	NI	NI
Resource Abstracted From		Seekoeispruit	Lusushwana River	Boesmanspruit Dam	Komati River
BDRR 2023	%	74.11%	72.33%	62.71%	80.62%
BDRR 2022	%	55.00%	36.80%	60.10%	61.70%

Key Performance Area	Weight	Elukwatini	Empuluzi/Mayflower	Fernie	Rudimentary Boreholes
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**21.35%**	**19.75%**	**12.55%**	**4.10%**
Blue Drop Score 2014	%	51.53%	50.05%	47.98%	NI
Blue Drop Score 2012	%	19.13%	19.13%	0.00%	NI
Blue Drop Score 2011	%	9.78%	9.78%	9.78%	NI
System Design Capacity	kL/d	16 800	8 700	5 000	1 000
System Available Capacity	kL/d	16 800	6 700	0	1 000
System Input Value	kL/d	16 800	6 700	5 000	1 050
Capacity Utilisation	%	NI	NI	NI	NI
Resource Abstracted From		Tweespruit, a tributary of the Komati River, and the Komati River	Mpuluzi River	Methula River	Groundwater abstraction
BDRR 2023	%	76.26%	69.22%	70.26%	100.00%
BDRR 2022	%	64.90%	71.50%	60.10%	100.00%

Technical Site Assessment: Carolina WTW – 61%

The Regulator notes the dire state of management and drinking water quality in the Badplaas, Bettysgoed, Carolina, Ekulindeni, Elukwatini, Empuluzi/Mayflower, Fernie and Rudimentary Boreholes water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

10.3 Dipaleseng Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	**%**	**7.00%**
Blue Drop Score 2014	**%**	**10.60%**
Blue Drop Score 2012	**%**	**40.70%**
Blue Drop Score 2011	**%**	**6.95%**

Key Performance Area	Weight	Greater Dipaleseng
Bulk/WSP		-
Blue Drop Score 2023	%	**7.00%**
Blue Drop Score 2014	%	10.60%
Blue Drop Score 2012	%	40.70%
Blue Drop Score 2011	%	6.95%
System Design Capacity	kL/d	6 000
System Available Capacity	kL/d	6 000
System Input Value	kL/d	6 000
Capacity Utilisation	%	NI
Resource Abstracted From		Haarhoff Dam
BDRR 2023	%	100.00%
BDRR 2022	%	97.00%

Technical Site Assessment: Fortuna WTW – 52%

The Regulator notes the dire state of management and drinking water quality in the Greater Dipaleseng water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

10.4 Dr JS Moroka Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	53.43%
Blue Drop Score 2014	%	89.26%
Blue Drop Score 2012	%	92.64%
Blue Drop Score 2011	%	84.42%

Key Performance Area	Weight	Weltervreden
Bulk/WSP		-
Blue Drop Score 2023	%	53.43%
Blue Drop Score 2014	%	89.26%
Blue Drop Score 2012	%	92.64%
Blue Drop Score 2011	%	84.42%
System Design Capacity	kL/d	60 000
System Available Capacity	kL/d	60 000
System Input Value	kL/d	30 000
Capacity Utilisation	%	50.00%
Resource Abstracted From		Elands Weir
BDRR 2023	%	64.19%
BDRR 2022	%	37.20%

Technical Site Assessment: Weltevreden WTW – 86%

10.5 Emakhazeni Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	31.19%
Blue Drop Score 2014	%	50.00%
Blue Drop Score 2012	%	79.83%
Blue Drop Score 2011	%	83.72%

Key Performance Area	Weight	Belfast (Belfast WTP)	Dullstroom (Dullstroom WTP)	Emgwenya (Waterval Boven WTP)	Entokozweni (Machadodorp WTP)
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**27.03%**	**25.88%**	**34.28%**	**37.98%**
Blue Drop Score 2014	%	56.97%	44.56%	46.74%	48.01%
Blue Drop Score 2012	%	89.15%	81.57%	68.44%	64.51%
Blue Drop Score 2011	%	84.95%	83.41%	80.42%	84.95%
System Design Capacity	kL/d	4 000	2 000	3 000	2 700
System Available Capacity	kL/d	4 000	2 000	3 000	2 700
System Input Value	kL/d	3 800	1 920	2 850	2 538
Capacity Utilisation	%	95.00%	96.00%	95.00%	94.00%
Resource Abstracted From		Belfast Dam main source. Small supply from Kraaispruit	Dullstroom Dorpsdam	Elands River	Elands River
BDRR 2023	%	63.85%	77.24%	49.10%	30.10%
BDRR 2022	%	40.50%	30.30%	33.10%	58.10%

Technical Site Assessment: Belfast WTW – 68%

The Regulator notes the dire state of management and drinking water quality in the Belfast and Dullstroom water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

10.6 Emalahleni Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	65.70%
Blue Drop Score 2014	%	43.84%
Blue Drop Score 2012	%	37.50%
Blue Drop Score 2011	%	46.90%

Key Performance Area	Weight	Kendal	Kriel/Ganala	Phola/Ogies	Point B Blended
Bulk/WSP		ESKOM	-	Glencore	Anglo Operations, Nu Water Systems
Blue Drop Score 2023	%	84.16%	73.57%	69.24%	61.42%
Blue Drop Score 2014	%	73.11%	44.45%	NI	NI
Blue Drop Score 2012	%	NI	57.00%	NI	NI
Blue Drop Score 2011	%	NI	61.22%	NI	NI
System Design Capacity	kL/d	20 160	15 000	9 600	20 050
System Available Capacity	kL/d	20 160	15 000	17 600	70 000
System Input Value	kL/d	13 640	9 898	12 624	42 564
Capacity Utilisation	%	67.66%	65.99%	71.73%	63.24%
Resource Abstracted From		Rietfontein	Usuthu Government Water Scheme	Affected underground mine water from ATC, Boschmans and Witcons	Groundwater from various mining collieries (Anglo); Witbank Dam (NuWater)
BDRR 2023	%	27.16%	26.39%	44.32%	56.70%
BDRR 2022	%	22.50%	44.20%	NI	NI

Key Performance Area	Weight	Rietspruit	Witbank
Bulk/WSP		-	-
Blue Drop Score 2023	%	70.52%	63.91%
Blue Drop Score 2014	%	33.35%	40.33%
Blue Drop Score 2012	%	31.53%	46.64%
Blue Drop Score 2011	%	41.78%	46.05%
System Design Capacity	kL/d	4 700	90 000
System Available Capacity	kL/d	4 700	90 000
System Input Value	kL/d	2 431	113 940
Capacity Utilisation	%	51.72%	126.60%
Resource Abstracted From		Olifants	Witbank
BDRR 2023	%	24.99%	65.55%
BDRR 2022	%	35.90%	54.50%

Technical Site Assessment: Witbank WTW - 78%

10.7 Govan Mbeki Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	90.81%
Blue Drop Score 2014	%	77.22%
Blue Drop Score 2012	%	77.55%
Blue Drop Score 2011	%	77.59%

Key Performance Area	Weight	Greater Govan Mbeki
Bulk/WSP		Rand Water
Blue Drop Score 2023	%	90.81%
Blue Drop Score 2014	%	77.22%
Blue Drop Score 2012	%	77.55%
Blue Drop Score 2011	%	77.59%
System Design Capacity	kL/d	5 427 000
System Available Capacity	kL/d	5 427 000
System Input Value	kL/d	90 525
Capacity Utilisation	%	86.37%
Resource Abstracted From		Vaal Dam
BDRR 2023	%	32.35%
BDRR 2022	%	40.80%

Technical Site Assessment: There are no WTWs to assess.

10.8 Lekwa Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	33.53%
Blue Drop Score 2014	%	14.46%
Blue Drop Score 2012	%	34.74%
Blue Drop Score 2011	%	10.48%

Key Performance Area	Weight	Morgenzon WTW	Standerton WTW
Bulk/WSP		-	-
Blue Drop Score 2023	%	50.80%	32.50%
Blue Drop Score 2014	%	14.46%	20.97%
Blue Drop Score 2012	%	29.26%	35.45%
Blue Drop Score 2011	%	18.85%	9.92%
System Design Capacity	kL/d	2 200	37 000
System Available Capacity	kL/d	2 200	27 000
System Input Value	kL/d	2 200	37 000
Capacity Utilisation	%	NI	NI
Resource Abstracted From		Blesbokspruit	Vaal
BDRR 2023	%	50.18%	80.70%
BDRR 2022	%	40.80%	62.50%

Technical Site Assessment: Standerton WTW – 55%

10.9 Mbombela Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	69.30%
Blue Drop Score 2014	%	88.88%
Blue Drop Score 2012	%	87.68%
Blue Drop Score 2011	%	74.99%

Key Performance Area	Weight	Elandshoek	Hazyview	White River	White River Country & Golf Estates
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	20.45%	28.51%	27.40%	21.63%
Blue Drop Score 2014	%	71.47%	83.28%	75.33%	84.90%
Blue Drop Score 2012	%	50.04%	87.97%	90.06%	91.54%
Blue Drop Score 2011	%	74.61%	60.96%	81.76%	61.82%
System Design Capacity	kL/d	1 000	6 000	6 000	1 000
System Available Capacity	kL/d	1 000	6 000	6 000	1 000
System Input Value	kL/d	214	3 917	13 634	332
Capacity Utilisation	%	21.40%	65.28%	75.00%	33.23%
Resource Abstracted From		Natural springs	Sabie River	Longmere and Witklip Dams	Longmere Dam
BDRR 2023	%	85.08%	87.69%	84.59%	83.06%
BDRR 2022	%	20.30%	27.40%	24.20%	16.20%

Key Performance Area	Weight	Mjindini Trust - Madakwa	Rimers - Suid Kaap	Sheba	Mjejane
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	16.76%	16.35%	16.20%	0.00%
Blue Drop Score 2014	%	13.23%	18.99%	10.81%	42.47%
Blue Drop Score 2012	%	58.40%	76.08%	72.11%	74.00%
Blue Drop Score 2011	%	42.83%	60.43%	56.33%	NA
System Design Capacity	kL/d	2 120	20 000	500	2 000 000
System Available Capacity	kL/d	2 120	20 000	500	800
System Input Value	kL/d	872	14 615	262	800
Capacity Utilisation	%	57.58%	3.57%	52.41%	NI
Resource Abstracted From		NI	NI	NI	NI
BDRR 2023	%	81.30%	65.85%	93.06%	100.00%
BDRR 2022	%	40.40%	45.10%	53.50%	97.80%

Key Performance Area	Weight	Legogote	Nyongane River	Dwaleni	Mshadza
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Blue Drop Score 2014	%	71.80%	70.70%	60.75%	60.48%
Blue Drop Score 2012	%	66.70%	59.28%	59.58%	57.91%
Blue Drop Score 2011	%	11.14%	12.56%	0.00%	8.95%
System Design Capacity	kL/d	2 000	14 000	2 000	2 000
System Available Capacity	kL/d	2 000	0	2 000	2 000
System Input Value	kL/d	2 000	14 000	2 000	2 000
Capacity Utilisation	%	NI	NI	NI	NI
Resource Abstracted From		NI	NI	NI	NI
BDRR 2023	%	100.00%	100.00%	100.00%	100.00%
BDRR 2022	%	95.50%	95.90%	94.40%	94.40%

Key Performance Area	Weight	Karino	Matsulu	Nelspruit	Primkop
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**96.64%**	**97.89%**	**97.27%**	**96.23%**
Blue Drop Score 2014	%	95.81%	96.68%	97.13%	95.06%
Blue Drop Score 2012	%	98.25%	96.22%	99.15%	97.97%
Blue Drop Score 2011	%	N/A	95.56%	96.11%	91.13%
System Design Capacity	kL/d	3 600	12 000	74 000	1 000
System Available Capacity	kL/d	3 600	12 000	74 000	1 000
System Input Value	kL/d	2 842	15 903	49 926	908
Capacity Utilisation	%	78.94%	132.53%	68.07%	90.80%
Resource Abstracted From		Crocodile River	Crocodile River	Crocodile River	Crocodile River, Primkop Dam
BDRR 2023	%	20.80%	29.92%	30.95%	17.71%
BDRR 2022	%	25.80%	33.60%	40.40%	20.60%

Key Performance Area	Weight	Kanyamazane	Nsikazi South
Bulk/WSP		-	-
Blue Drop Score 2023	%	**86.29%**	**90.03%**
Blue Drop Score 2014	%	89.87%	89.87%
Blue Drop Score 2012	%	84.61%	84.61%
Blue Drop Score 2011	%	71.75%	71.75%
System Design Capacity	kL/d	6 000	48 000
System Available Capacity	kL/d	4 000	48 000
System Input Value	kL/d	2 800	49 719

Key Performance Area	Weight	Kanyamazane	Nsikazi South
Capacity Utilisation	%	70.00%	103.58%
Resource Abstracted From		Crocodile River	Crocodile River
BDRR 2023	%	19.91%	38.30%
BDRR 2022	%	25.30%	38.90%

Technical Site Assessment: White River Country Estate WTW - 66% and Nelspruit New WTW - 92%

The Regulator notes the dire state of management and drinking water quality in the Elandshoek, Hazyview, White River, White River Country & Golf Estates, Mjindini Trust, Madakwa, Rimers, Suid Kaap, Sheba, Mjejane, Legogote, Nyongane River, Dwaleni and Mshadza water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

10.10 Mkhondo Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	54.46%
Blue Drop Score 2014	%	32.40%
Blue Drop Score 2012	%	11.30%
Blue Drop Score 2011	%	5.05%

Key Performance Area	Weight	Amsterdam Water Supply System	Mkhondo Water Supply System No. 1	Mkhondo Water Supply System No. 2	Rural Water Supply System
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	50.40%	52.78%	56.93%	29.85%
Blue Drop Score 2014	%	38.05%	30.71%	30.71%	NI
Blue Drop Score 2012	%	13.61%	13.61%	13.61%	NI
Blue Drop Score 2011	%	5.46%	5.46%	5.46%	NI
System Design Capacity	kL/d	6 300	6 000	6 400	0
System Available Capacity	kL/d	6 300	6 400	6 000	1 040
System Input Value	kL/d	5 800	6 653	5 684	1 040
Capacity Utilisation	%	92.06%	103.95%	94.73%	NI
Resource Abstracted From		Gabosch Dam in the Gabosch (Thole) River	Assegaai	Assegaai	Groundwater
BDRR 2023	%	58.56%	41.79%	33.78%	61.47%
BDRR 2022	%	39.20%	44.90%	44.90%	48.10%

Key Performance Area	Weight	Saul Mkhize Water Supply System
Bulk/WSP		-
Blue Drop Score 2023	%	60.23%
Blue Drop Score 2014	%	NI
Blue Drop Score 2012	%	NI
Blue Drop Score 2011	%	NI
System Design Capacity	kL/d	7 500
System Available Capacity	kL/d	6 500
System Input Value	kL/d	8 000
Capacity Utilisation	%	123.08%
Resource Abstracted From		Heyshope
BDRR 2023	%	43.78%
BDRR 2022	%	24.00%

Technical Site Assessment: Mkhondo 2 WTW – 70%

The Regulator notes the dire state of management and drinking water quality in the Rural Water Supply System. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

10.11 Msukaligwa Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	21.64%
Blue Drop Score 2014	%	18.06%
Blue Drop Score 2012	%	21.20%
Blue Drop Score 2011	%	10.59%

Key Performance Area	Weight	Breyten water treatment works	Davel water treatment works	Douglas dam water works	Lothair water treatment works
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	24.73%	20.35%	21.85%	24.73%
Blue Drop Score 2014	%	17.02%	17.75%	17.02%	15.10%
Blue Drop Score 2012	%	19.90%	19.90%	21.40%	NI
Blue Drop Score 2011	%	NI	NI	0.00%	NI
System Design Capacity	kL/d	3 000	1 000	14 000	1 000
System Available Capacity	kL/d	3 000	1 000	14 000	1 000
System Input Value	kL/d	3 000	1 000	14 000	1 000
Capacity Utilisation	%	NI	NI	NI	NI
Resource Abstracted From		Jericho Dam which is in the Usutu Vaal Government WSS	Government WSS (Davel WTW located on divide between Olifants and Vaal)	Willem Brummer	Umpuluzi
BDRR 2023	%	60.93%	58.24%	68.65%	62.41%
BDRR 2022	%	62.40%	28.70%	54.20%	58.20%

Key Performance Area	Weight	South works (Noitgedacht farm)
Bulk/WSP		-
Blue Drop Score 2023	%	20.55%
Blue Drop Score 2014	%	20.43%
Blue Drop Score 2012	%	NI
Blue Drop Score 2011	%	10.59%
System Design Capacity	kL/d	13 000
System Available Capacity	kL/d	13 000
System Input Value	kL/d	13 000
Capacity Utilisation	%	NI
Resource Abstracted From		Usutu Vaal Government WSS
BDRR 2023	%	79.10%
BDRR 2022	%	49.20%

Technical Site Assessment: Ermelo North WTW - 55%

The Regulator notes the dire state of management and drinking water quality in the Breyten, Davel, Douglas, Lothair and South works (Noitgedacht farm) water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

10.12 Nkomazi Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	68.63%
Blue Drop Score 2014	%	51.47%
Blue Drop Score 2012	%	17.20%
Blue Drop Score 2011	%	59.48%

Key Performance Area	Weight	Driekoppies/ Shoemansdal/ Buffelspruit/ Shongwe	Fig Tree/ Masibekele	Hectorspruit	Komatipoort
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	68.74%	68.65%	77.19%	78.92%
Blue Drop Score 2014	%	56.65%	42.61%	49.45%	47.95%
Blue Drop Score 2012	%	21.61%	11.21%	15.71%	17.36%
Blue Drop Score 2011	%	70.48%	32.44%	60.73%	61.42%
System Design Capacity	kL/d	29 000	16 000	2 000	6 000
System Available Capacity	kL/d	32 000	16 000	2 000	6 000
System Input Value	kL/d	27 827	7 988	1 315	5 275
Capacity Utilisation	%	114.57%	50.74%	65.75%	87.92%
Resource Abstracted From		Mlumati	Komati, Komati	Crocodile	Komati
BDRR 2023	%	57.62%	40.12%	23.86%	26.89%
BDRR 2022	%	64.90%	42.90%	33.60%	40.10%

Key Performance Area	Weight	Langeloop	Low Creek	Madadeni	Magudu
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	64.47%	66.20%	67.27%	72.94%
Blue Drop Score 2014	%	45.10%	45.45%	43.92%	48.70%
Blue Drop Score 2012	%	17.29%	11.81%	9.81%	9.81%
Blue Drop Score 2011	%	65.98%	40.24%	53.34%	59.59%
System Design Capacity	kL/d	2 000	1 000	2 000	2 000
System Available Capacity	kL/d	2 900	1 000	2 000	2 000
System Input Value	kL/d	2 780	1 256	1 986	1 422
Capacity Utilisation	%	95.86%	159.45%	99.30%	71.10%
Resource Abstracted From		Mlumati	Lows Creek River;	Komati	Komati
BDRR 2023	%	37.32%	57.19%	33.35%	28.17%
BDRR 2022	%	54.20%	34.20%	31.40%	38.60%

Key Performance Area	Weight	Malalane	Marloth Park	Mbuzini	Naas/Block C
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	66.70%	79.82%	67.60%	68.07%
Blue Drop Score 2014	%	47.12%	57.10%	54.55%	33.10%
Blue Drop Score 2012	%	14.36%	17.36%	15.11%	NI
Blue Drop Score 2011	%	56.70%	56.70%	46.68%	NI
System Design Capacity	kL/d	6 000	3 500	2 000	8 000
System Available Capacity	kL/d	6 000	3 500	2 000	10 000
System Input Value	kL/d	2 415	1 450	1 612	6 952
Capacity Utilisation	%	40.25%	41.43%	80.60%	69.52%
Resource Abstracted From		Crocodile	Crocodile	Mbuzini Dam	Komati
BDRR 2023	%	30.33%	17.00%	32.21%	34.72%
BDRR 2022	%	37.20%	29.60%	28.50%	56.50%

Key Performance Area	Weight	Ntunda	Nyathi	Sibange	Tonga
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	65.57%	67.67%	68.77%	65.91%
Blue Drop Score 2014	%	40.31%	68.76%	59.91%	47.21%
Blue Drop Score 2012	%	NI	17.66%	NI	NI
Blue Drop Score 2011	%	NI	56.57%	NI	NI
System Design Capacity	kL/d	1 000	12 000	350	35 000
System Available Capacity	kL/d	1 000	12 000	300	35 000
System Input Value	kL/d	184	9 890	1 426	19 642
Capacity Utilisation	%	18.40%	82.42%	475.33%	56.66%
Resource Abstracted From		Komati	Mlumati	Komati	Komati
BDRR 2023	%	28.23%	37.77%	33.56%	58.86%
BDRR 2022	%	33.30%	51.90%	37.00%	49.50%

Technical Site Assessment: Driekoppies WTW – 71%

10.13 Pixley ka Seme Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	45.01%
Blue Drop Score 2014	%	43.40%
Blue Drop Score 2012	%	40.70%
Blue Drop Score 2011	%	46.09%

Key Performance Area	Weight	Amersfoort	Volksrust WTW	Vukuzakhe	Wakkerstroom
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**46.88%**	**45.48%**	**44.08%**	**38.33%**
Blue Drop Score 2014	%	41.53%	43.62%	43.62%	39.73%
Blue Drop Score 2012	%	42.11%	40.16%	40.16%	37.61%
Blue Drop Score 2011	%	65.61%	32.48%	33.56%	51.50%
System Design Capacity	kL/d	4 000	4 000	4 000	2 000
System Available Capacity	kL/d	4 600	4 000	4 000	2 000
System Input Value	kL/d	6 125	3 700	5 940	1 144
Capacity Utilisation	%	133.15%	92.50%	148.50%	57.20%
Resource Abstracted From		Rietspruit	Mahawane Dam	Mahawane Dam	Martins Dam Wakkerstroom River
BDRR 2023	%	74.20%	50.92%	48.20%	51.15%
BDRR 2022	%	65.10%	58.40%	47.80%	71.20%

Technical Site Assessment: Volksrust WTW - 55%

10.14 Steve Tshwete Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	67.38%
Blue Drop Score 2014	%	97.14%
Blue Drop Score 2012	%	97.35%
Blue Drop Score 2011	%	96.60%

Key Performance Area	Weight	Bankfontein-Somaphepa (borehole)	Doornkop #2Kwa-Mapimpane (borehole)	Hendrina	Mafube-Sikhululiwe (borehole)
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	34.17%	42.92%	60.98%	58.72%
Blue Drop Score 2014	%	77.24%	88.79%	99.07%	76.52%
Blue Drop Score 2012	%	NA	97.66%	98.25%	NA
Blue Drop Score 2011	%	NA	97.98%	97.96%	NA
System Design Capacity	kL/d	230	176	5 000	43
System Available Capacity	kL/d	225	260	1 533	43
System Input Value	kL/d	225	260	1 488	144
Capacity Utilisation	%	100.00%	100.00%	97.06%	334.88%
Resource Abstracted From		Borehole - in community	Borehole - in community	Nooitgedagt Dam	Borehole
BDRR 2023	%	53.05%	43.33%	27.77%	17.94%
BDRR 2022	%	15.70%	13.90%	22.90%	17.00%

Key Performance Area	Weight	Middelburg-Mhluzi (Vaalbank WTW)	Presidentsrus
Bulk/WSP		-	-
Blue Drop Score 2023	%	67.96%	69.58%
Blue Drop Score 2014	%	97.63%	82.41%
Blue Drop Score 2012	%	98.25%	NA
Blue Drop Score 2011	%	97.53%	96.18%
System Design Capacity	kL/d	60 000	320
System Available Capacity	kL/d	58 500	320
System Input Value	kL/d	41 849	204
Capacity Utilisation	%	72.02%	63.75%
Resource Abstracted From		Klein - Olifants, Middelburg	Olifants River
BDRR 2023	%	38.63%	17.56%
BDRR 2022	%	32.80%	19.50%

Technical Site Assessment: Vaalbank WTW – 87%

10.15 Thaba Chweu Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	8.20%
Blue Drop Score 2014	%	9.09%
Blue Drop Score 2012	%	19.03%
Blue Drop Score 2011	%	59.40%

Key Performance Area	Weight	Coromandel	Graskop	Lydenburg	Sabie
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	10.30%	7.20%	11.40%	7.20%
Blue Drop Score 2014	%	9.21%	8.63%	10.41%	8.84%
Blue Drop Score 2012	%	19.26%	19.26%	21.74%	19.26%
Blue Drop Score 2011	%	57.85%	57.10%	59.15%	59.80%
System Design Capacity	kL/d	400	6 500	11 000	20 000
System Available Capacity	kL/d	400	6 500	9 000	7 400
System Input Value	kL/d	400	6 500	8 000	20 000
Capacity Utilisation	%	87.50%	61.54%	88.89%	162.16%
Resource Abstracted From		Spekboom	Mac Mac river	Spekboom	Sabie river
BDRR 2023	%	93.06%	89.15%	84.37%	86.73%
BDRR 2022	%	85.20%	81.10%	84.40%	91.00%

Technical Site Assessment: Lydenburg WTW – 48%

The Regulator notes the dire state of management and drinking water quality in the Coromandel, Graskop, Lydenburg and Sabie water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

10.16 Thembisile Hani Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	75.32%
Blue Drop Score 2014	%	67.56%
Blue Drop Score 2012	%	78.30%
Blue Drop Score 2011	%	27.77%

Key Performance Area	Weight	Thembalethu	Engwenyameni (Klipfontein)	Kwaggafontein	Bomandu previously known as Machipe (Goederede)
Bulk/WSP		Rand Water	Rand Water	Rand Water	-
Blue Drop Score 2023	%	84.76%	82.06%	83.36%	46.13%
Blue Drop Score 2014	%	69.87%	65.02%	67.76%	59.70%
Blue Drop Score 2012	%	70.91%	70.91%	70.91%	78.78%
Blue Drop Score 2011	%	27.77%	27.77%	27.77%	NA
System Design Capacity	kL/d	5 427 000	5 427 000	5 427 000	10 000
System Available Capacity	kL/d	5 427 000	5 427 000	5 427 000	7 500
System Input Value	kL/d	15 145	152	16 229	7 500
Capacity Utilisation	%	86.35%	86.35%	86.35%	74.67%
Resource Abstracted From		Vaal	Vaal	Vaal	Moses
BDRR 2023	%	35.57%	48.37%	43.54%	69.08%
BDRR 2022	%	53.80%	46.00%	61.20%	100.00%

Key Performance Area	Weight	Langkloof
Bulk/WSP		-
Blue Drop Score 2023	%	19.90%
Blue Drop Score 2014	%	30.64%
Blue Drop Score 2012	%	70.91%
Blue Drop Score 2011	%	27.77%
System Design Capacity	kL/d	600
System Available Capacity	kL/d	300
System Input Value	kL/d	1 000
Capacity Utilisation	%	100.00%
Resource Abstracted From		Langkloof Boreholes 1, 2 and 3
BDRR 2023	%	75.54%
BDRR 2022	%	75.10%

Technical Site Assessment: Bundu WTW – 88%

The Regulator notes the dire state of management and drinking water quality in the Langkloof water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

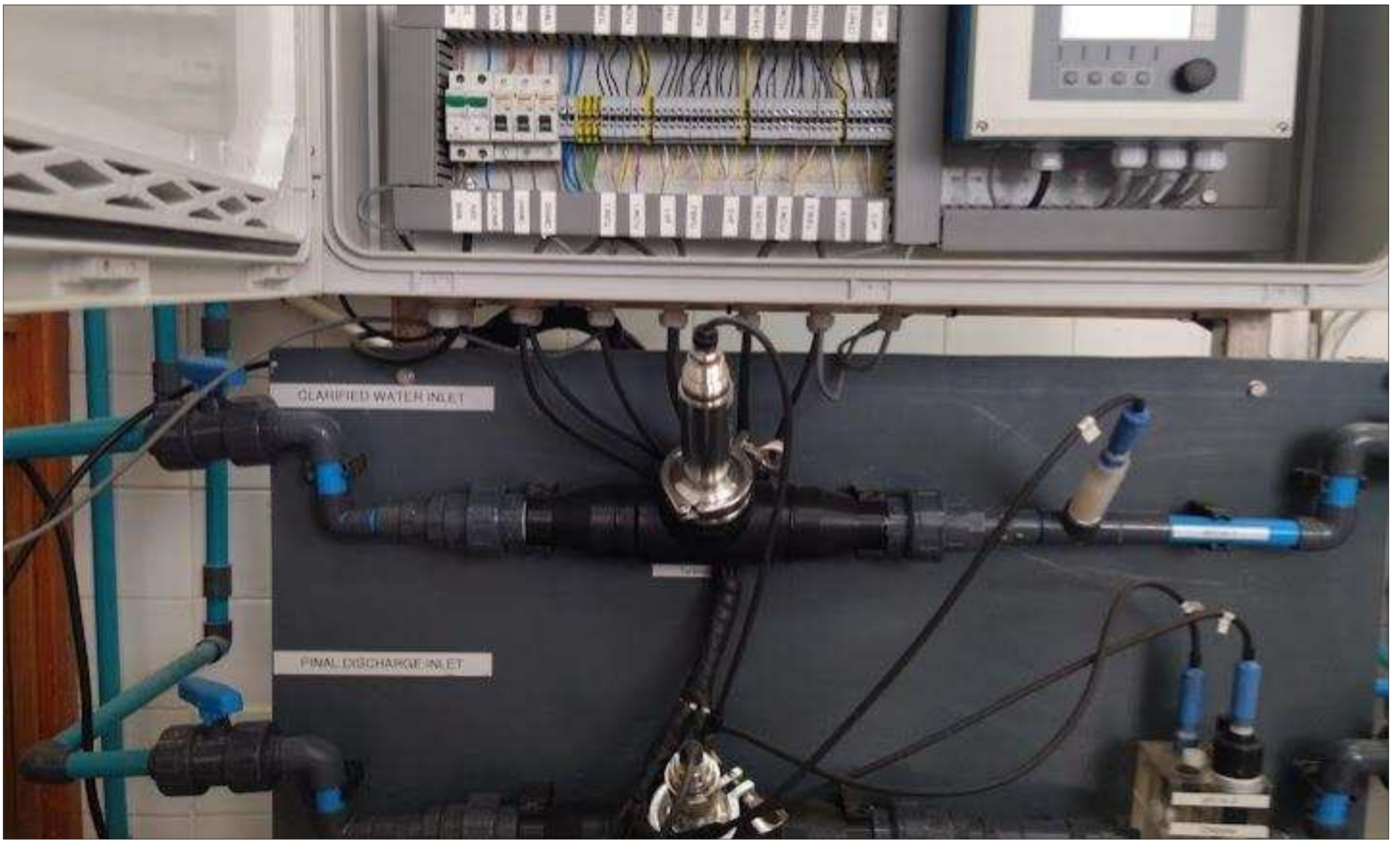
10.17 Victor Khanye Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	90.13%
Blue Drop Score 2014	%	63.48%
Blue Drop Score 2012	%	0.00%
Blue Drop Score 2011	%	0.00%

Key Performance Area	Weight	Vicktor Khanye	Delmas
Bulk/WSP		Rand Water	Rand Water
Blue Drop Score 2023	%	90.76%	89.90%
Blue Drop Score 2014	%	63.48%	82.68%
Blue Drop Score 2012	%	N/A	N/A
Blue Drop Score 2011	%	N/A	N/A
System Design Capacity	kL/d	5 442 000	5 427 000
System Available Capacity	kL/d	5 434 775	5 427 000
System Input Value	kL/d	5 000	13 735
Capacity Utilisation	%	86.88%	86.28%
Resource Abstracted From		Vaal Dam	Vaal Dam
BDRR 2023	%	30.29%	30.59%
BDRR 2022	%	38.90%	34.50%

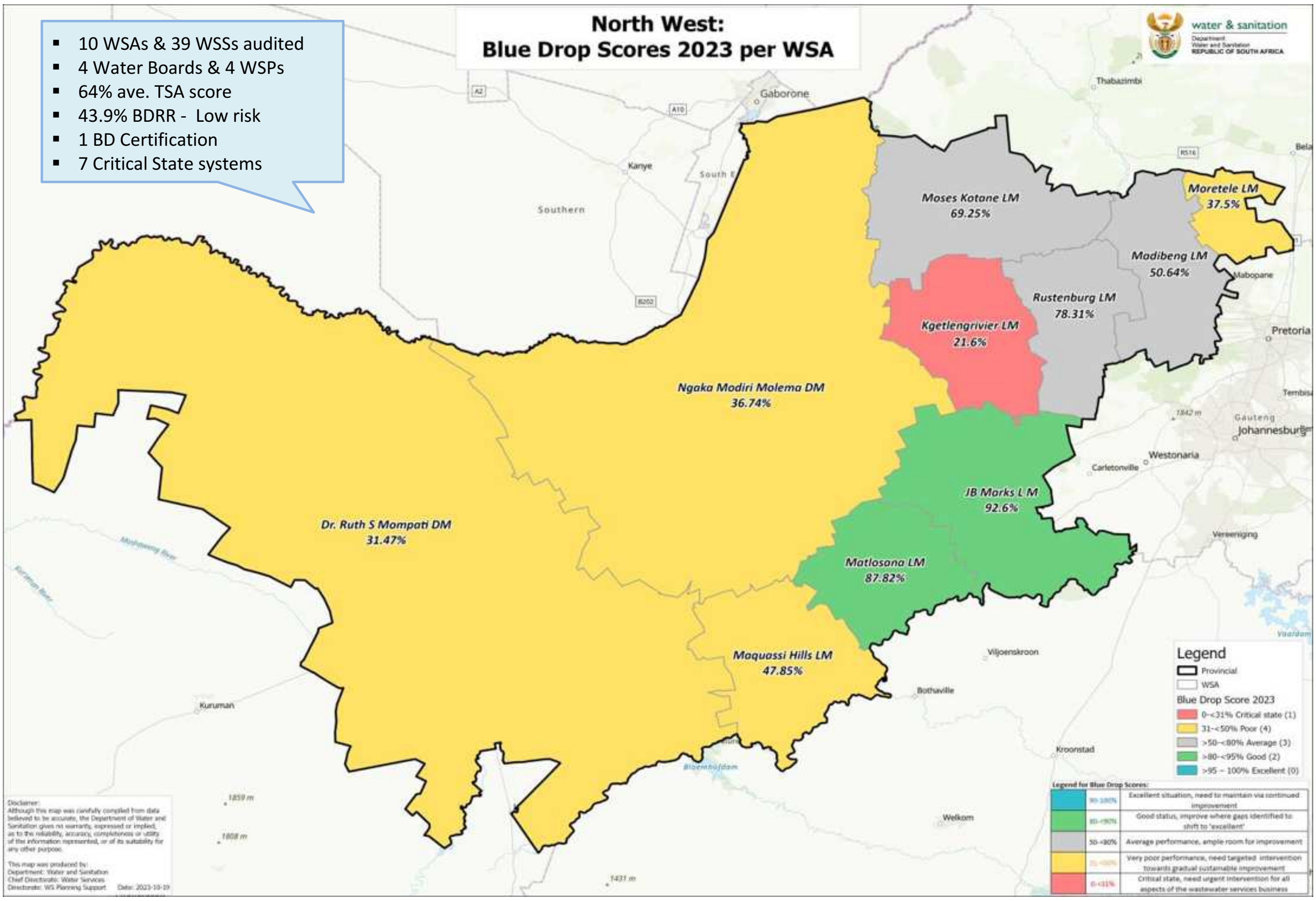
Technical Site Assessment: Delmas – 64%

Withoogte clarification: Continuous strive to achieve SANS241 compliance



Withoogte WTW: Inline operational water quality monitoring

11. NORTH WEST PROVINCE: MUNICIPAL WATER MANAGEMENT PERFORMANCE



Provincial Synopsis

The North West province provides drinking water to a total population of 2,206,785 persons in South Africa.

An audit attendance record of 100% of the 10 WSAs, with 39 water supply systems across the province, 4 Water Boards (Rand Water, Magalies Water, Bloem Water and Sedibeng Water), Bulk Water Providers (Midvaal Water and City of Tshwane MM) and WSPs (WSSA and Rustenburg Water Services Trust) affirms the province's commitment to the Blue Drop national incentive-based regulatory programme. Bloem Water has taken over the Sedibeng Water Balkfontein WTW in the Free State and supplies potable water to two water supply systems in the Maquassi Hills LM. It must be noted that Sedibeng Water was still in operation during the blue drop audit period and Bloem Water was not responsible for the respective systems over the audit period. Bloem Water has recently undergone a name change to Vaal Central Water (Government Gazette no. 48954 dated 13 July 2023). The Rand Water Vereeniging and Zuikerbosch WTWs in Gauteng supplies potable water to two water supply systems in the Madibeng LM and Rustenburg LM respectively. Magalies Water supplies potable water to 5 and 1 water supply systems in the Rustenburg LM and Moses Kotane LM respectively. Midvaal Water is the sole bulk water provider in the Matlosana LM. The City of Tshwane MM Temba WTW is the sole bulk water supplier to the Moretele LM.

The Regulator determined that only one water supply system scored more than 95% when measured against the Blue Drop standards and thus qualified for the prestigious Blue Drop Certification. In 2014, one water supply system was awarded Blue Drop status. Using the 2014 audit results as comparative baseline, the province shows no change in excellence for 2023.

Five (5) of 10 WSAs improved on their 2014 scores. The remaining 5 WSAs regressed to lower Blue Drop scores compared to their 2014 baselines. The JB Marks L M, Matlosana LM and Rustenburg LM are the best performing WSAs in the province with only the JB Marks LM achieving one Blue Drop Certification for the Potchefstroom water supply system. The Blue Drop scores of these top WSA performers were supported by excellent technical site assessment scores of 95% for the Midvaal Water Company WTW, followed by the Potchefstroom WTW with a TSA score of 94%. 7 water supply systems were identified to be in a critical state in the province compared with 32 water supply systems in 2014.

The province's overall Blue Drop performance is characterised by particular strengths when measured against the KPAs. Rand Water, Magalies Water and Midvaal Water stand out for its compliance, good practice and risk management practices that are well embedded in the water supply business. The KPAs that require attention in the province and are reflecting scores below 50% are KPA 3 Financial Management (48.9%) and KPA 4 Technical Management (30.1%).

The provincial Blue Drop Risk Rating (BDRR) improved from 63.5% in 2022 (BD PAT) to 43.9% in 2023. 26 (of 39) water supply systems are situated in the low risk category, 6 WSSs in the medium risk category, 6 WSSs in the high risk category, and 1 WSS in the critical risk category.

The Regulator is optimistic that the 2023 Blue Drop report provides an updated residual basis from where a positive trajectory for water services delivery and improved performance will follow in the next BD audit. Municipalities and their service providers are encouraged to start preparation for the next Blue Drop audit cycle, which is planned to cover the financial year 2023/24 and released in 2025. The 2023 Blue Drop status for WSAs in the province are summarised in the table below.

Table 176 - 2023 Blue Drop Summary

WSA Name	2014 BD Score (%)	2023 BD Score (%)	2023 BD Certified ≥95%	2023 Critical State (<31%)
Dr. Ruth S Mompati DM	30.14%	31.47%↑		Bogosing, Majeakgoro, Pudimoe, Schweizer Reneke
JB Marks LM	97.20%	92.60%↓	Potchefstroom	
Kgetlengrivier LM	17.62%	21.60%↑		Koster, Swartruggens
Madibeng LM	58.38%	50.64%↓		
Maquassi Hills LM	62.74%	47.85%↓		
Matlosana LM	77.29%	87.82%↑		
Moretele LM	57.49%	37.50%↓		
Moses Kotane LM	56.61%	69.25%↑		
Ngaka Modiri Molema DM	27.05%	36.74%↑		Ratlou: Kraaipan Cluster B/H
Rustenburg LM	86.15%	78.31%↓		
Totals	-	-	1	7

↑= improvement, ↓= regress, →= no change

The Department of Water and Sanitation acknowledges the excellence in water services management achieved for the Blue Drop Audit year of 2021-22. One (1) Blue Drop Certificate is awarded in the North West Province to Potchefstroom water supply system in the JB Marks LM:

Province	2023 Blue Drop Certified Systems
North West	JB Marks LM ○ Potchefstroom

Background to Water Delivery and Distribution Infrastructure

The total volume of water treated in the province is 566,880 kl/d. Ten (10) WSAs, 4 Water Boards (Rand Water, Magalies Water, Bloem Water and Sedibeng Water), Bulk Water Providers (Midvaal Water and City of Tshwane MM) and WSPs (WSSA and Rustenburg Water Services Trust) are responsible for water services through a water network comprising of:

- 33 WTWs and boreholes with the bulk of the water treated and supplied by the Magalies Water Vaalkop WTW and Midvaal Water Company WTW to 3 WSAs and 6 WSSs with a total Average Daily Production of 354,746 kl/d
- 39 WSSs of which 11 WSSs in 6 WSAs are supplied with bulk potable water from Rand Water (Gauteng), Magalies Water, Bloem Water (Sedibeng Water) (Free State), Midvaal Water and City of Tshwane MM (Gauteng)
- 177 pump stations, 825 km bulk water supply lines, 1,989 km reticulation pipe lines, and 311 reservoirs/ towers (excluding Magalies Water, Midvaal Water and 5 WSAs that were unable to provide data for the bulk and reticulation water supply lines).

Table 177 - Summary of Capacities, Daily Production and SIV distribution according to plant sizes

	Micro Size Plants	Small Size Plants	Medium Size Plants	Large Size Plants	Macro Size Plants	Unknown (NI)*	Total
	<500 kl/day	500 - <2,000 kl/day	2,000 - <10,000 kl/day	10,000 - <25,000 kl/day	>25,000 kl/day		
No. of WTWs, Boreholes, Springs	4 (12%)	8 (24%)	9 (28%)	6 (18%)	6 (18%)		33
Total Design Capacity (kl/day)	1,059	8,292	42,800	90,400	813,600	None	956,151
Total Available Capacity (kl/day)	1,059	7,608	42,500	86,400	743,600	None	881,167
Average Daily Treatment Volume (kl/day)	1,531	5,163	19,006	56,434	484,746	4 NI	566,880
Total SIV (kl/day)	1,531	5,171	27,006	64,434	406,029		504,171
Design Capacity Utilisation (%)	145%	62%	44%	62%	60%		59%
Available Capacity Utilisation (%)	145%	68%	45%	65%	65%		64%

** "Unknown" means the number of WTWs with NI (No Information) on design capacity or available capacity or SIV*

The audit verified a total installed design capacity of 956,151 kl/d and a total available design capacity of 881,167 kl/d with most of this capacity residing in the macro-sized water treatment plants.

Collectively, the 33 WTWs produce 566,880 kl/d and distributes 504,171 kl/d across the water networks. By comparing the available treatment capacity with the treated water volume, a spare treatment capacity of 314,287 kl/d is available (36%) to meet additional future demands. However, the WUE for the province is slightly high (ave. 228 l/p/d) compared to the international WUE benchmark of 180 l/p/d, indicating a high ratio between effective water use and actual water abstraction. Going forward, the province will have to dedicate significant resources to curb water losses and NRW.

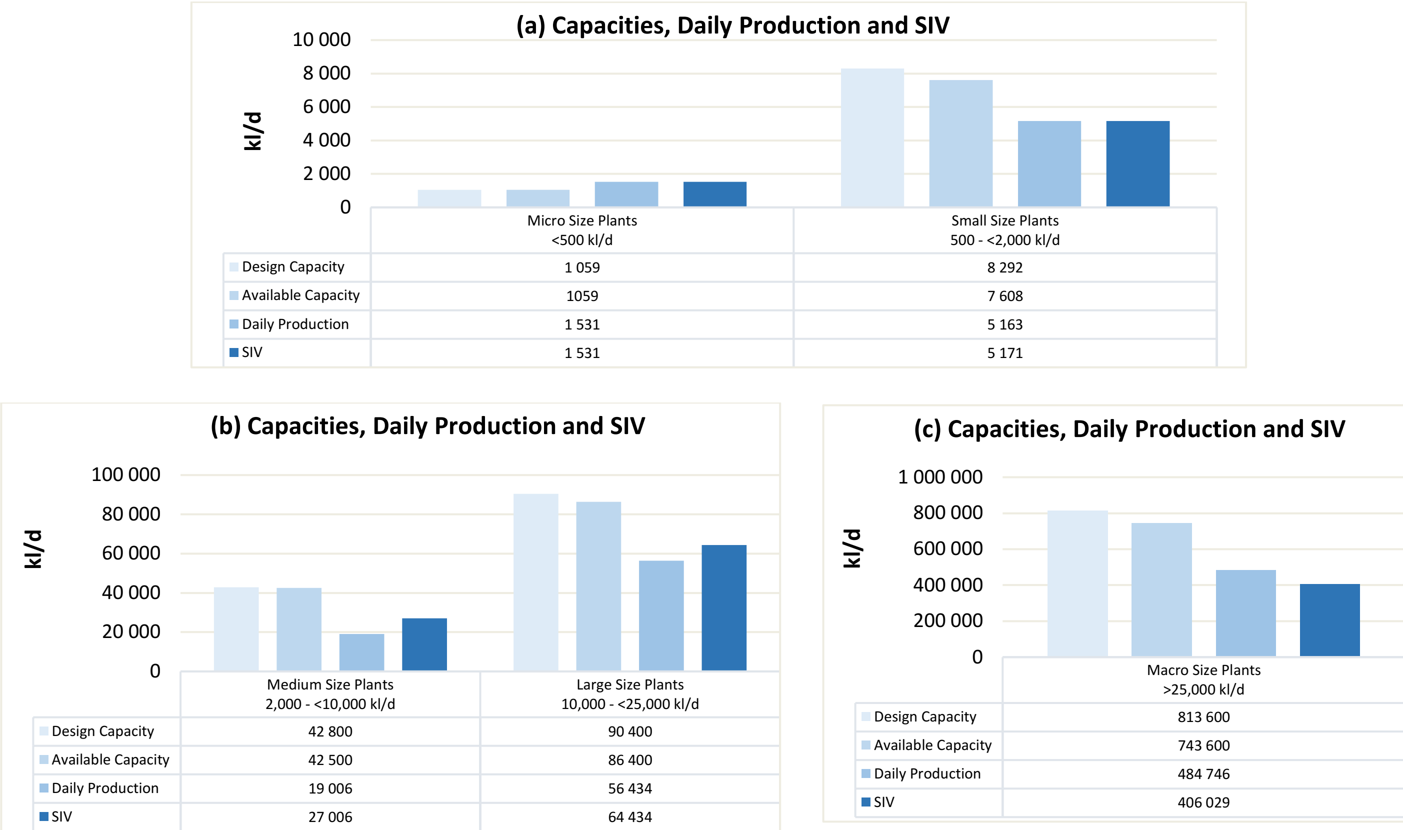


Figure 132 - Capacities, Daily Production and SIV Distribution - (a) micro to medium sized WTWs, (b) large WTWs, and (c) macro sized WTWs

In some cases, a Bulk Water Supplier supplies water across provincial borders and it is difficult to report accurately on design capacity and available capacity at provincial level, as the statistical data may become repetitive. Therefore, the reporting on the total system input volumes (SIV) would provide more accurate figures on the supply of treated water to the various water supply systems. The total SIV in the province is 504,171 kl/d and the average daily treatment volume is 566,880 kl/d and this indicates that the treated volume is more than the total SIV (112%) despite only 4 WTWs not measuring their average daily treatment volumes and noting that the Magalies Water Vaalkop WTW supplies bulk water to WSAs in the Limpopo province. The largest contributors to the total SIV is Magalies Water Vaalkop WTW and Midvaal Water Company WTW to 6 WSSs with a total SIV contribution of 354,746 kl/d (70%). Diagnostic no. 2 to follow herein will unpack these statistics in more detail. The data shows that only 1 WTW daily average treatment volume exceeds the available design capacity. 5 WTWs have daily production volumes that exceed the authorised daily abstraction volumes.

The water distribution infrastructure is summarised in the table below.

Table 178 - Summary of Water Distribution Reticulation Infrastructure

WSA & WB/WSP Name	# WSS with no WSP/WB	# WSS with WSP/WB	Water Distribution Infrastructure			
			# Pump Stations (#)	Bulk Water Supply Lines (km)	Reticulation pipe lines (km)	# Reservoirs/ Towers
Magalies Water - Vaalkop	-	5 in NW	NI	NI	NI	12
Midvaal Water	-	1	6	NI	NI	10
Dr. Ruth S Mompati DM	6	1	56	NI	NI	39
JB Marks LM	8		17	100	549	32
Kgetlengrivier LM	2		1	NI	NI	8
Madibeng LM	2	1	4	36	NI	21
Maquassi Hills LM		2	3	NI	NI	5
Matlosana LM		1	17	NI	NI	17
Moretele LM		1	3	NI	NI	10
Moses Kotane LM	3	1	24	688	1,440	102
Ngaka Modiri Molema DM	5		42	NI	NI	20
Rustenburg LM	1	5	4	1	NI	35
Totals	**27**	**12**	**177**	**825**	**1,989**	**311**

Provincial Blue Drop Analysis

The 100% response from the 10 WSAs audited demonstrates a firm commitment to progressive water services management in the province. Local Government reforms resulted in the merging of Ventersdorp LM and Tlokwe LM into JB Marks LM. Therefore, 10 WSAs were audited in 2023 compared to the 11 WSAs in 2014.

Table 179 - Blue Drop Comparative Analysis from 2012 to 2023

BLUE DROP COMPARATIVE ANALYSIS				
Performance Category	**2012**	**2014**	**2023**	**Performance trend 2014 and 2023**
Incentive-based indicators				
WSAs assessed (#)	11 (100%)	11 (100%)	10 (100%)	→
Water supply systems assessed (#)	50	95	39	↓
Blue Drop scores ≥50% (#)	19 (38%)	37 (39%)	19 (49%)	↑
Blue Drop scores <50% (#)	31 (62%)	58 (61%)	20 (51%)	↑
Blue Drop Certifications (#)	3	1	1	→
Lowest Technical Site Assessment Score (%)	49%	25%	18%	↓
Highest Technical Site Assessment Score (%)	96%	98%	94%	↓

NA = Not Applied NI = No Information ↑= improvement, ↓= regress, →= no change (Note: The performance trend is based on the % not the #)

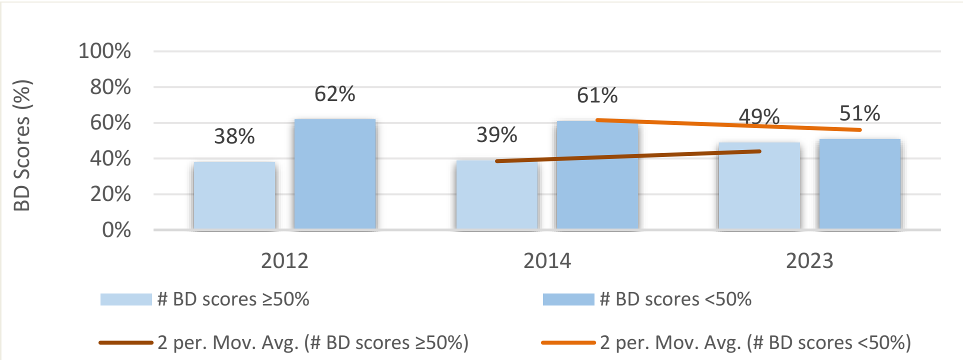
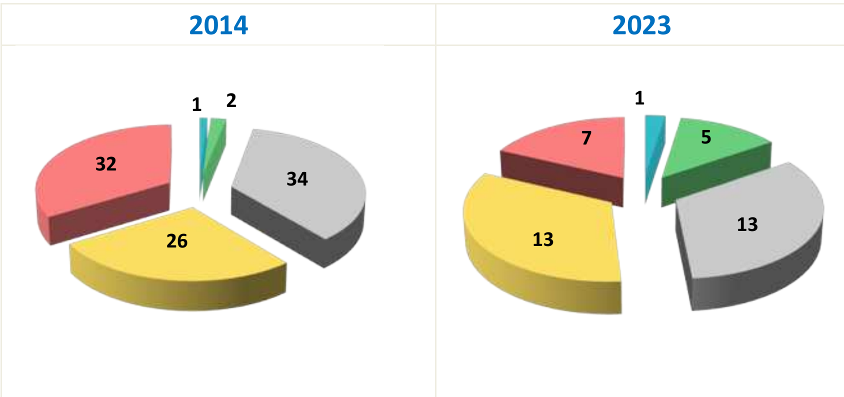


Figure 133 - Blue Drop trend analysis over the period 2012 to 2023, indicating the percentage BD scores above and below 50%

The trend analysis indicates that:

- The no. of systems audited has decreased significantly from the last BD audit in 2014. The main reason for this can be attributed to the large no. of 'untreated' borehole systems registered on IRIS for WSAS in the North West province that were removed from IRIS during the 2021-22 BD audit (Dr Ruth S Mompati DM and the Sedibeng Water systems were collectively reduced from 103 systems to 26 systems overall)
- The no. of systems with BD scores of ≥50% increased from 39% in 2014 to 49% in 2023
- This trend was reversed with no. of systems with a BD score of ≤50% decreasing from 61% in 2014 to 51% in 2023
- Blue Drop Certifications remained the same with 1 award in 2014 and 1 award in 2023
- The lowest TSA score decreased from 25% in 2014 to 18% in 2023, with the highest TSA score decreasing from 98% in 2014 to 94% in 2023
- The overall performance trend indicates an overall progression from 2014 to 2023
- This trajectory still reinforces the need for regular audits to ensure timely turnaround and continued improvement
- The trend also implies that performance has shown some improvement despite the absence of regulatory engagement of the BD audits between 2014 to 2023.



≥95 – 100% Excellent	
≥80-<95% Good	
≥50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

Figure 134 - No. WSSs in the Blue Drop score categories for 2014 and 2023 (graph legend to right)

Comparative analysis of the 2014 and 2023 blue drop scores, indicates that most of the system scores are in the >50-<80% (*Average Performance*) and in the >31-<50% (*Poor Performance*) categories. 7 systems in 2023 are in *Critical State* (<31%).

In summary, trend analysis since 2014 to 2023 indicate as follows:

- Systems in a 'critical state' decreased from 32 systems to 7 systems
- Systems in a 'poor state' decreased from 26 systems to 13 systems
- Systems in an 'average state' decreased from 34 systems to 13 systems
- Systems in the 'good state' increased from 2 systems to 5 systems
- Systems in 'excellent state' have not changed with only 1 system.

Provincial BDRR Analysis

The Blue Drop Risk Rating (BDRR) analysis assesses the risk across the entire water supply network. The BDRR formular was updated in 2021 to include an added risk indicator, i.e. 'E: Water Safety Plans', to address the risk assessment requirements outlined in SANS 241 of 2015. The BDRR now contains 5 risk indicators, i.e. design capacity (A), operational capacity (B), water quality compliance (C), technical capacity (D), and water safety plans (E). The results from the BDRR analyses are summarised in the table and figure following.

Table 180 - Municipal BDRR/BDRRmax Comparative Analysis from 2022 and 2023

BDRR/BDRR$_{max}$ COMPARATIVE ANALYSIS									
WSA Name	**# WSSs**	**# WBs/ WSPs**	**2022 (BD PAT)**	**2023 (BD Audit)**	**Performance Trend 2022 and 2023**	**BDRR Risk Category Split**			
						0-<50%	**50-<70%**	**70-<90%**	**90-100%**
Dr. Ruth S Mompati DM	7	1	73.60%	48.1%	↑	4	1	2	
JB Marks LM	8		14.40%	26.8%	↓	8			
Kgetlengrivier LM	2		100%	90.2%	↑			1	1
Madibeng LM	3	1	34.20%	30.8%	↑	2	1		
Maquassi Hills LM	2	2	65.20%	58.3%	↑		2		
Matlosana LM	1	1	41.40%	25.3%	↑	1			
Moretele LM	1	1	100%	67.3%	↑		1		
Moses Kotane LM	4	1	68.50%	36.2%	↑	4			
Ngaka Modiri Molema DM	5		82.50%	62.2%	↑	2		3	
Rustenburg LM	6	5	55.70%	40.3%	↑	5	1		
Totals & %BDRR/BDRR$_{max}$	**39**	**12**	**63.5%**	**43.9%**	↑	**26**	**6**	**6**	**1**

↑= improvement, ↓= regress, →= no change

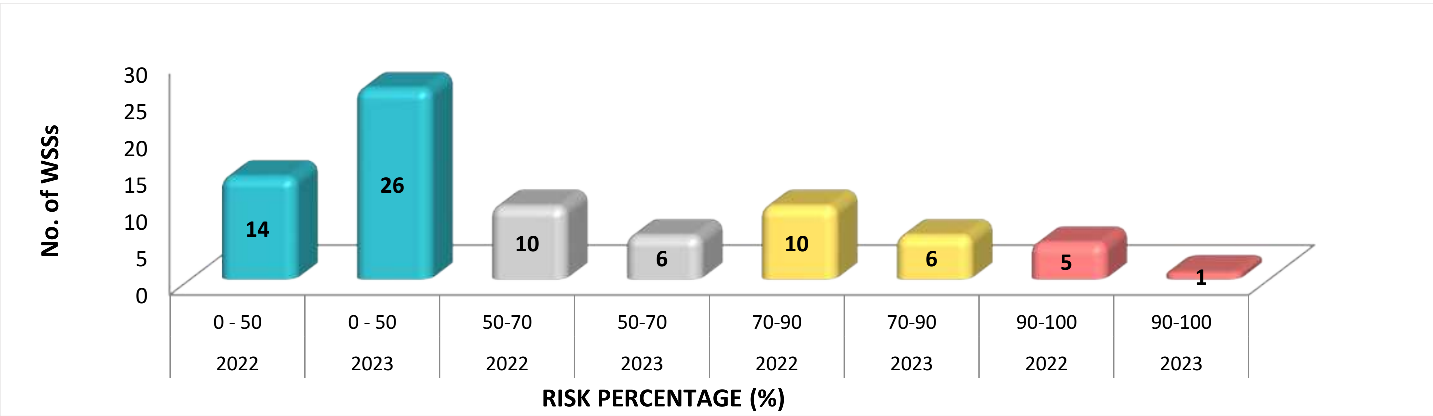


Figure 135 - a) WSS risk distribution and trends for 2022 and 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Trend analysis of the BDRR ratings for 2022 and 2023 indicates that:

- The 2023 audit cycle highlighted a progressive shift with an increase in the no. of low risk WSSs (14 to 26), a decrease in the medium risk WSSs (10 to 6), a decrease in the high risk WSSs (10 to 6), and a decrease in the critical risk WSSs (5 to 1).

Regulatory Enforcement

Water supply systems which fail to achieve the minimum Blue Drop target of 31%, are placed under regulatory focus. The Regulator requires these WSAs to submit a detailed corrective action plan (CAP) within 20 working days from publishing of this report. 7 WSSs received Blue Drop scores below 31%, and are placed under **regulatory surveillance**, in accordance with the Water Services Act (108 0f 1997). DWS together with COGTA will through the grant allocation systems ensure priority is given to application of grants to rectify/restore the water services treatment and supply shortcomings identified in this report.

Table 181 - WSSs with <31% Blue Drop scores

WSA Name	2023 BD Score	WSSs with <31% score
Dr. Ruth S Mompati DM	31.47%	Bogosing, Majeakgoro, Pudimoe, Schweizer Reneke
Kgetlengrivier LM	21.60%	Koster, Swartruggens
Ngaka Modiri Molema DM	36.74%	Ratlou: Kraaipan Cluster B/H

The following WSAs and their associated water treatment systems are in high and/or critical BDRR risk positions, which means that some or all the risk indicators are in a precarious state, i.e. operational capacity, design capacity utilisation, water quality compliance, technical capacity, and water safety plans. WTWs in high risk and critical risk positions pose a serious risk to public health. The following WSAs will be required to assess their risk contributors and to provide corrective measures in the above mentioned action plans to mitigate these risks.

Table 182 - %BDRR/BDRR$_{max}$ scores and WSSs in critical and high-risk space

WSA Name	2023 Average %BDRR/BDRRmax	WSSs in critical and high-risk space	
		Critical Risk (90-100%)	High Risk (70-<90%)
Dr. Ruth S Mompati DM	48.1%		Bogosing, Schweizer Reneke
Kgetlengrivier LM	90.2%	Koster	Swartruggens
Ngaka Modiri Molema DM	62.2%		Mafikeng, Ramotshere Moiloa: Motswedi + Gopane, Ratlou
Totals		**1 of 39 (3%)**	**6 of 39 (15%)**

Good practice risk management requires that the Water Safety Plans (WaSPs) are informed by meaningful Process and Condition Audits, supported by zealous implementation of corrective measures and ongoing monitoring of risk movement. 7 WSAs have all their water supply systems are in the low and medium risk positions, 2 WSAs have water supply systems in the high risk category, and only one WSA has one water supply system in the critical risk space.

Performance Barometer

The **Blue Drop Performance Barometer** presents the individual WSA Blue Drop Scores, which essentially reflects the level of mastery that a WSA has achieved in terms of its overall water services business. The bar chart below compares the 2014 and 2023 BD scores, ranked from highest to lowest performing WSA in 2023. The JB Marks LM and Matlosana LM have achieved good performance. Only 5 WSAs improved on their municipal blue drop scores whilst 5 WSAs did not improve on their municipal blue drop scores.

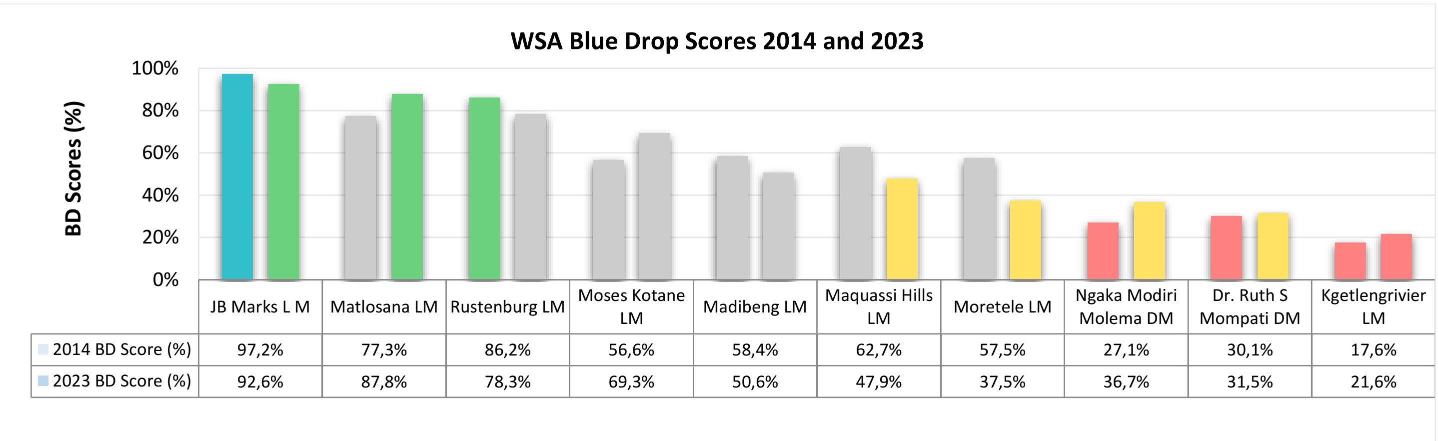


Figure 136 - a) Blue Drop scores 2014 (bar left) and 2023 (bar right; b) Colour legend

≥95 – 100% Excellent	
≥80-<95% Good	
≥50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

The BDRR Risk Barometer expresses the level of risk that a WSA poses in respect of its water supply system. The schematic below presents the BDRR in ascending order – with the low-risk WSAs on the left and higher risk WSAs to the far right. The analysis reveals that there are 3 WSAs in the medium risk category and 1 WSA in the critical risk category. 6 WSAs are situated in the low risk positions.

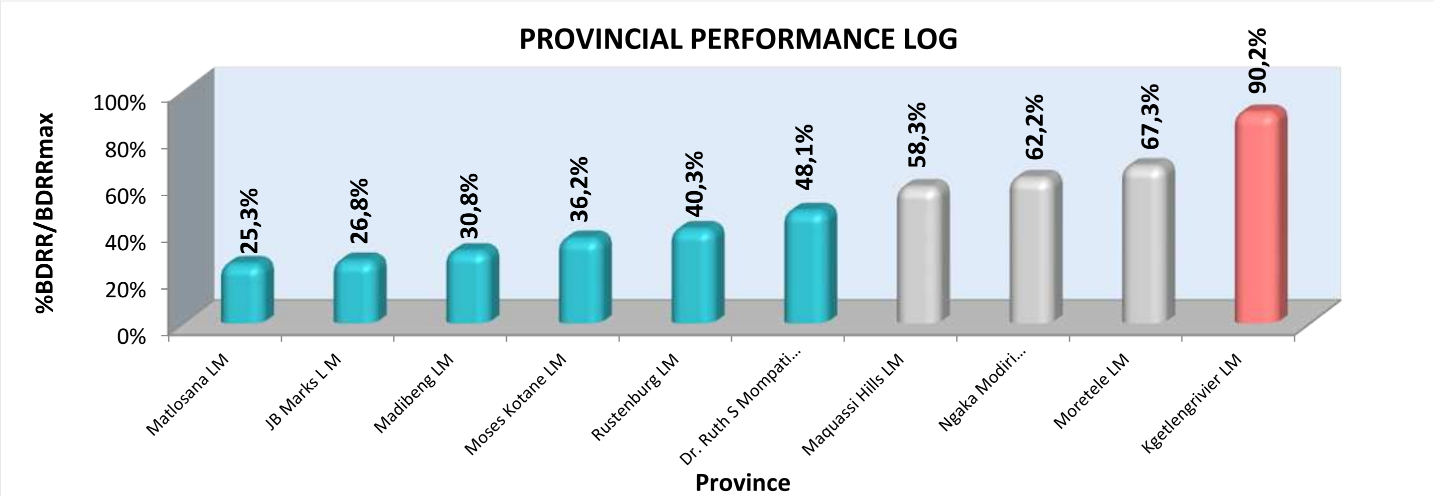


Figure 137 - a) %BDRR/BDRR$_{max}$ Risk Performance Profile/Log 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Provincial Best Performers

The JB Marks Local **Municipality** is the **BEST PERFORMING WSA** in the province, based on the following record of excellence:

- ✓ 2023 Blue Drop Score of 92.6%
- ✓ 2014 Blue Drop Score of 97.2%
- ✓ Regression of the BDRR from 14.4% in 2022 to 26.8% in 2023
- ✓ 8 systems (100%) in the low risk position
- ✓ TSA score of 94% for Potchefstroom WTW

The **Matlosana Local Municipality (Midvaal Water)** is the second-best scoring WSA:

- ✓ 2023 Blue Drop Score of 87.82%
- ✓ 2014 Blue Drop Score of 77.29%
- ✓ Improvement on the BDRR from 41.4% in 2022 to 25.3% in 2023
- ✓ 1 system (100%) in low risk position
- ✓ TSA score of 95% for Midvaal Water Company WTW

The Rustenburg Local **Municipality (Rand Water and Magalies Water)** is the third-best scoring WSA:

- ✓ 2023 Blue Drop Score of 78.31%
- ✓ 2014 Blue Drop Score of 86.15%
- ✓ Improvement on the BDRR from 55.7% in 2022 to 40.3% in 2023
- ✓ 5 systems (83%) in low risk positions
- ✓ TSA score 81% for Bospoort WTW

KPA Diagnostics

The BD audit process collects a vast amount of data that yield valuable insight into the state of the water services delivery and water quality in each province. Five focus areas or 'diagnostics' have been configured from the 2021/22 audit data and are discussed below.

Table 183 - Summary of the key diagnostic themes and reference to the respective Blue Drop KPAs

Diagnostic #	Diagnostic Description	Diagnostic Reference
1	**Technical Competence**	KPA 1, 2 & Bonus
2	**Treatment Capacity and Flow Distribution**	KPA 4 & Generic Audit data set
3	**Drinking Water Quality (DWQ) Monitoring and Compliance**	KPA 2 & 4 & Bonus
4	**Technical Site Assessments**	TSA and 2023 Blue Drop Watch Report
5	**Operation, Maintenance and Refurbishment of Assets**	KPA 3 & 4

Diagnostic 1: Technical Competence

Aim: This focus area assesses the technical human resources capacity that is available to manage and operate water treatment processes and maintain the related water infrastructure. Theory advocates that a correlation exists between human resources capacity and capability (sufficient number of appropriately qualified staff) and a WSI's performance. Thus, it is hypothesised that high HR capacity would translate to compliant water treatment plants and functional water supply network. Blue Drop assesses technical compliance on two levels: i) WTW plant supervision and process control staff and ii) Technical, scientific and maintenance staff.

(i) Plant Supervisors and Process Controllers

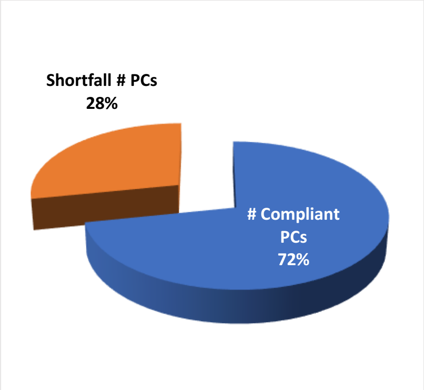
Findings: According to regulations, water treatment plants are classified as Class A, B, C, D or E plants. Similarly, Process Controllers and Plant Supervisors are registered as Class I, II, III, IV, V or VI Process Controllers. Higher classed plants require a higher level of Process Controllers due to technology complexity and strict water quality standards. Technical compliance of PCs and Supervisors is determined against the Blue Drop standards, as defined by Reg. 2834 of the Water Act 1956 (Act 54 of 1956) for the erection, enlargement, operation, and registration of water care works and draft Reg. 813 of the Water Services Act (No 108 of 1997). Regulation 2834 has been replaced by Regulation 3630 in 2023 but will only come in effect during the next Blue Drop audit cycle.

Table 184 - No. compliant versus shortfall in Supervisor and Process Controller staff

WSA & WB/WSP Name	# WTWs	# WSSs	# Available Compliant Staff			Staff Shortfall		Ratio*	2023 BD Score (%)
			PCs	Supervisor**	Total	PCs	Supervisor		
Magalies Water - Vaalkop	1	5 in NW	8	2	10	0	0	10.0	**69.3% ave.**
Midvaal Water	1	1	7	1	8	0	0	8.0	**87.8%**
Dr. Ruth S Mompati DM	7	7	17	3	20	8	1	2.9	**31.47%**
JB Marks LM	8	8	16	15	31	3	0	3.9	**92.60%**
Kgetlengrivier LM	2	2	2	2	4	4	0	2.0	**21.60%**
Madibeng LM	2	3	7	1	8	0	1	4.0	**50.64%**
Maquassi Hills LM	None	2							
Matlosana LM	None	1							
Moretele LM	None	1							
Moses Kotane LM	3	4	9	3	12	1	0	4.0	**69.25%**
Ngaka Modiri Molema DM	7	5	9	0	9	13	2	1.3	**36.74%**
Rustenburg LM	2	6	4	2	6	2	0	3.0	**78.31%**
Totals	**33**	**39**	**79**	**29**	**108**	**31**	**4**		

Note 1: Bloem Water (Sedibeng Water) Balkfontein WTW in FS supplies potable water to 2 WSSs in Maquassi Hills LM ; The City of Tshwane MM Temba WTW in GP is the sole bulk water supplier to Moretele LM ; Midvaal Water is the sole bulk water provider in the Matlosana LM
** Ratio depicts the no. of qualified staff divided by the no. of WTWs operated by this no. of staff. E.g. Dr Ruth S Mompati has 20 compliant Sups + PCs, divided by 7 WTWs = 2.9 qualified staff per WTW*
*** NB: The Supervisor totals will be inflated as it is not possible to differentiate between which Supervisors are shared/ roaming with other Class C to E WTWs*
Note 2: "Compliant staff" means qualified and registered staff that meets the BD standard for a particular Class Works. "Staff shortfall" means staff that do not meet the BD standard for a particular Class of works (+1 for a shift) and/or staffing gaps exist at the respective WTWs.

Competent human resources are vital enablers in ensuring efficient and sustainable management of water services and delivery of safe water quality to consumers. For the province in general, the operational competencies are found to be excellent for the Supervisory staff and predominantly excellent for the PCs in Magalies Water Vaalkop and Midvaal Water, Madibeng LM and Moses Kotane LM, as illustrated in the table above.



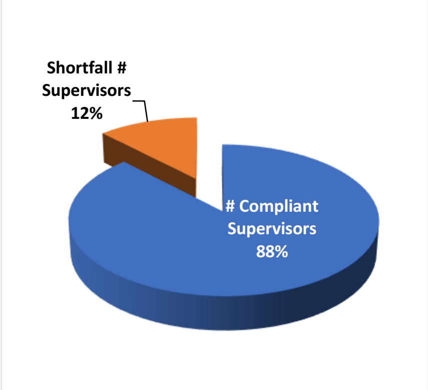


Figure 138 - Schematic illustration of compliant and shortfall of Supervisors (a) and Process Controllers (b)

Plant Supervisors: The pie charts indicate that 88% (29 of 33) of Plant Supervisors complies with the Blue Drop standard, with 4 shortfalls.

Process Controllers: Similarly, 72% (79 of 110) of the PC staff complies with the required standards, noting a zero shortfall for Magalies Water, Midvaal Water and 4 WSAs. There is a 28% (31 of 110) shortfall in Process Controllers with the highest shortfalls in the Ngaka Modiri Molema DM and Dr Ruth S Mompati DM.

Blue Drop standards require of Class A and B plants to employ dedicated Supervisors per WTW and Process Controllers per shift per works, whereas Class C to E plants may share Supervisory staff across works. Shifts have been introduced to ensure optimal operations while addressing security risks, particularly as it relates to theft and vandalism. Telemetry also reduces the requirement for on-site staff during night shifts, but these relaxations have to be done within the DWS regulatory guidelines.

The Regulator expects correlation between the competence of an operational team and the performance of a WTW, as measured by the BD score. The data indicates as follows:

- Magalies Water, Midvaal Water and all the WSAs have qualified PCs in place
- 9 WSAs have qualified Supervisors with exception of the Ngaka Modiri Molema DM.
- With the exception of Magalies Water, Midvaal Water and Madibeng LM, 9 WSAs have shortfalls in qualified Process Controllers and 3 WSAs have shortfalls in qualified Supervisors.

It is expected that a correlation would exist between the competence of an operational team and the performance of a water treatment works, as measured by the BD score. The results from the ratio analysis indicate high ratios ($\geq$3.0) for Magalies Water, Midvaal Water and 4 WSAs with WTWs.

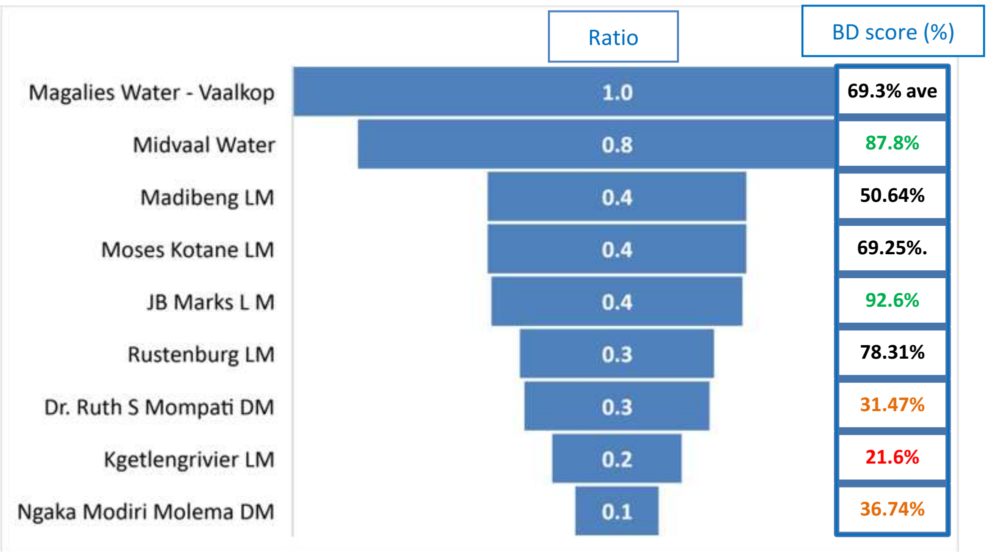


Figure 139 - Ratio of compliant operational staff to no. of WTWs and Comparison of Ratios with BD scores

Overall, the comparative bar chart confirms a reasonably close correlation between Magalies Water, Midvaal Water, Madibeng LM Moses Kotane LM, JB Marks LM and Rustenburg LM with high ratios (ranging from 3.0 to 10.0) and average to high BD scores (ranging from 50.6% to 92.6%). Lower ratios and lower BD scores are also noted for the bottom 3 WSAs in the bar chart above. No extreme variations are noted when comparing the ratios against the BD scores respectively.

(ii) Technical, Scientific and Maintenance staff

In addition to operational capacity (above), good management practice also requires access to qualified engineers, technicians, technologists, MISA appointees, scientists, and maintenance capability (below). Such competencies could reside in-house or accessible through term contracts and external specialists.

Table 185 - Summary of the maintenance capacity and no. of qualified and shortfall of Engineering, Technical and Scientific staff

WSA & WB/WSP Name	# WTWs	# WSSs	Maintenance Arrangement
Magalies Water - Vaalkop	1	5 in NW	Internal Team (only); Internal+Term Contract
Midvaal Water	1	1	Internal+Specific Outsourcing
Dr. Ruth S Mompati DM	7	7	Internal+Specific Outsourcing; Internal Team (only); No Capacity
JB Marks LM	8	8	Internal Team (only); Internal+Term Contract
Kgetlengrivier LM	2	2	Internal+Term Contract
Madibeng LM	2	3	Internal Team (only);Internal+Specific Outsourcing
Maquassi Hills LM	None	2	Internal+Term Contract; Internal+Specific Outsourcing
Matlosana LM	None	1	Internal+Specific Outsourcing
Moretele LM	None	1	Internal+Specific Outsourcing; Internal Team (only)
Moses Kotane LM	3	4	Internal+Term Contract
Ngaka Modiri Molema DM	7	5	Internal+Term Contract
Rustenburg LM	2	6	Internal Team (only);Internal+Specific Outsourcing
Totals	**33**	**39**	

WSA & WB/WSP Name	# WTWs	# WSSs	Qualified Technical Staff (#)					Technical Shortfall (#)	Qualified Scientists (#)	Scientists Shortfall (#)	Ratio*	2023 BD Score (%)
			Technicians	Technologists	Engineers	MISA appointees	Total					
Magalies Water - Vaalkop	1	5 in NW	1	5	1	0	**7**	0	5	0	1.4	**69.3% ave.**
Midvaal Water	1	1	1	0	1	0	**2**	2	2	0	2.0	**87.8%**
Dr. Ruth S Mompati DM	7	7	2	1	0	0	**3**	1	0	2	0.4	**31.47%**
JB Marks LM	8	8	1	4	1	0	**6**	0	2	0	0.8	**92.60%**
Kgetlengrivier LM	2	2	0	0	0	0	**0**	4	2	0	0.0	**21.60%**
Madibeng LM	2	3	1	3	0	0	**4**	1	0	2	1.3	**50.64%**
Maquassi Hills LM**	None	2	0	0	0	0	**0**	4	0	2	0.0	**47.85%**
Matlosana LM**	None	1	2	1	1	0	**4**	0	Midvaal	Midvaal	4.0	**87.82%**
Moretele LM**	None	1										**37.50%**
Moses Kotane LM	3	4	3	2	1	0	**6**	0	1	1	1.5	**69.25%**
Ngaka Modiri Molema DM	7	5	1	1	0	0	**2**	2	0	2	0.4	**36.74%**
Rustenburg LM	2	6	1	1	1	0	**3**	1	Magalies	Magalies	0.5	**78.31%**
Totals	**33**	**39**	**13**	**18**	**6**	**0**	**37**	**15**	**12**	**9**		

Note: Bloem Water (Sedibeng Water) Balkfontein WTW in FS supplies potable water to 2 WSSs in Maquassi Hills LM ; The City of Tshwane MM Temba WTW in GP is the sole bulk water supplier to Moretele LM ; Midvaal Water is the sole bulk water provider in the Matlosana LM

* The single number ratio depicts the no. of qualified technical staff divided by the no. of WSSs that have access to the staff. E.g., JB Marks has 6 qualified staff, divided by 8 WSSs = 0.8 qualified staff per WSS

** Maquassi Hills LM receives potable bulk water from the Balkfontien WTW (Bloem Water now CVW) in the Free State province but still has two other systems in the WSA; Matlosana LM receives potable water from Midvaal Water but still has staff linked to the distribution system; Moretele LM receives potable bulk water from the Pretoria Temba WTW and the Magalies Water Klipdrift WTW both situated in the Gauteng province – there is no indication of any staff linked to the distribution system

Note 1: “Qualified Technical Staff” means staff appointed in positions to support water services, and who has the required qualifications. “Technical Shortfall” is calculated based on a minimum requirement of at least 3 Engineers or more than 1 of each of Engineers, Technologists & Technicians; and at least one 1 Candidate Scientist and 1 Professional Scientist per WSI.

Note 2: “Qualified Scientists” means professional registered scientists (SACNASP) and candidate scientists appointed in positions to support water services. “Scientists shortfall” means that the WSA does not have at least one qualified SACNASP registered scientist and at least one 1 candidate scientist in their employ or contracted.

In terms of maintenance capacity, all the municipalities in the province have a reasonable contingent of qualified technical and maintenance staff. The maintenance staff comprises of a collective of in-house, contracted, or outsourced personnel. The data indicates that:

- Midvaal Water have internal maintenance teams supplement with specific outsourced services
- Magalies Water have internal maintenance teams supplemented with term contracts
- 4 of 10 (40%) WSAs have in-house maintenance teams
- 4 of 10 (40%) WSAs have internal maintenance teams supplemented with term contracts
- 6 of 10 (60%) WSAs have internal maintenance teams supplement with specific outsourced services.

In general, the province presents a strong case for qualified professional technical staff as follows:

- A total of 37 qualified staff comprised of 6 Engineers, 18 Technologists, 13 Technicians, no MISA appointees (qualified); and 12 SACNASP registered scientists are assigned to Magalies Water, Midvaal Water and 5 WSAs
- A total shortfall of 24 persons is identified, consisting of 15 technical staff and 9 scientists
- Midvaal Water and 6 WSAs have a total shortfall of 15 qualified technical staff with the highest indicated for Kgetlengrivier LM and Maquassi Hills (4 each)
- Magalies Water, Midvaal Water and 8 WSAs have access to credible laboratories that comply with the Blue Drop standards.

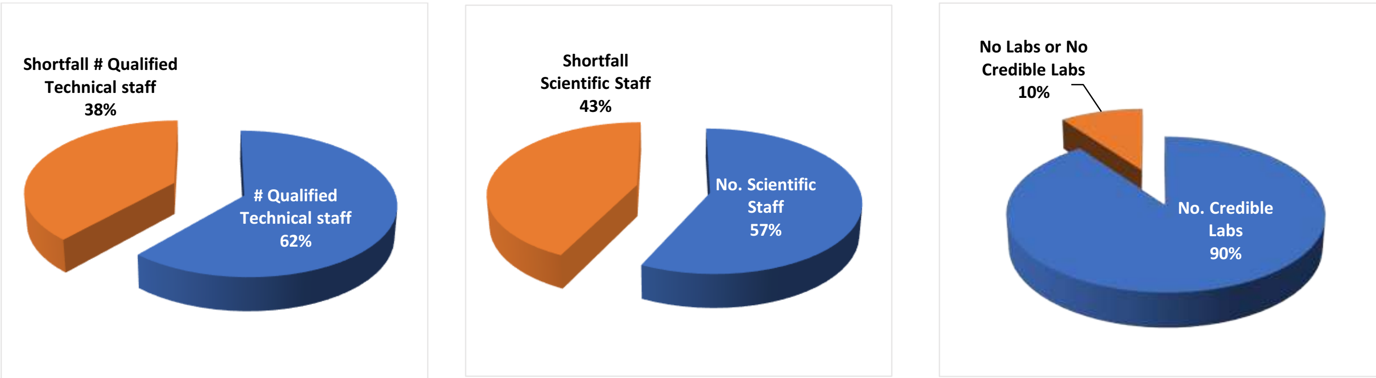


Figure 140 - Graphic illustration of the number and %: a) qualified engineering/technical staff; b) professional scientists; c) access to credible laboratory services that complies with Blue Drop standards

Ratio analysis has been done to determine the number of qualified technical and scientific staff assigned per WSS. It is expected that a higher ratio would correspond with well-performing and maintained water supply systems, as represented by the BD score.

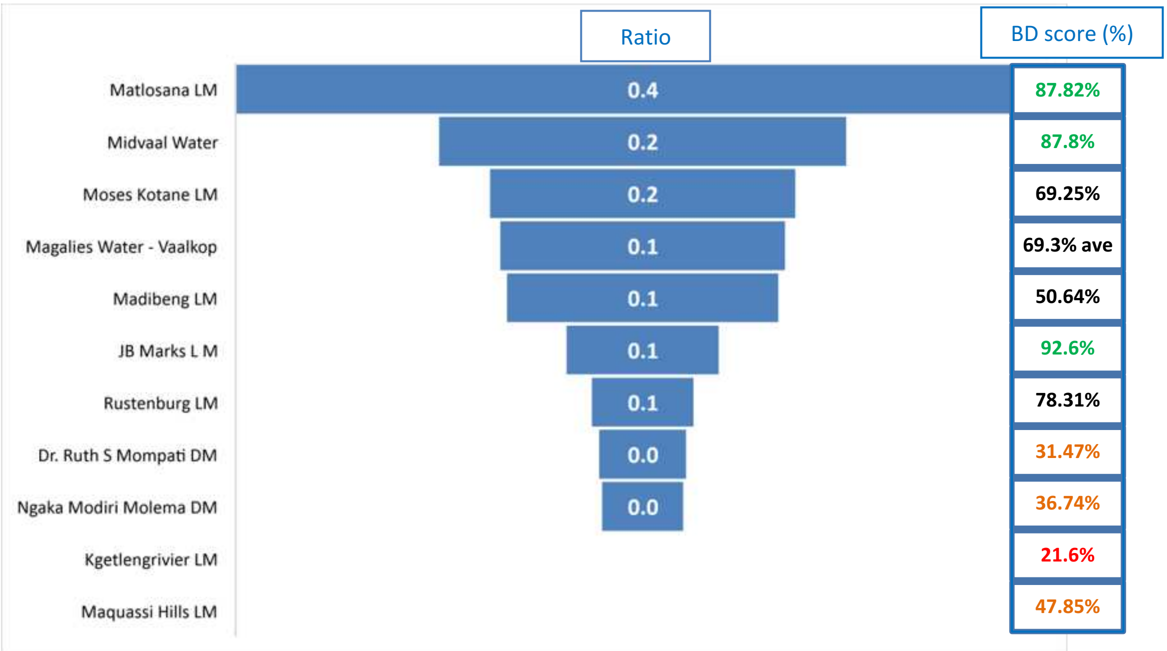


Figure 141 - Ratio of compliant technical staff to no. of WSSs and Comparison of Ratios with BD scores

The schematic above does show a strong correlation between medium to high ratios (≥1.4) and medium to high BD scores for Matlosana LM, Midvaal Water, Moses Kotane LM and Magalies Water (ranging from 69.3% to 87.8%). Similarly, Lower ratios and lower BD scores are associated with Ngaka Modiri Molema DM and Dr Ruth S Mompati DM. In contrast, JB Marks reflects a high BD score (due to the BD certified Potchefstroom WSS) and a lower ratio. Some correlation can be drawn between technical capacity and water supply performance. The involvement of Midvaal Water and Magalies Water have made a significant (positive) impact on the municipal BD scores particularly in the case of the Matlosana LM and Moses Kotane LM.

Overall, the results highlight the inter-dependency between technical capacity and performance. One of the options to enhance operational capacity is through dedicated training programmes. The Blue Drop audit incentivises training of operational staff over the 2-year period prior to the audit date. The results are summarised as follows:

Table 186 - No. of WTWs with operational staff sent on training over the past 2 years and vice versa

WSA & WB/WSP Name	# WTWs	# WTW staff attending training	# WTW without training
Magalies Water - Vaalkop	1	1	
Midvaal Water	1	1	
Dr. Ruth S Mompati DM	7		7
JB Marks LM	8	8	
Kgetlengrivier LM	2		2
Madibeng LM	2	2	
Maquassi Hills LM	None		
Matlosana LM	None		
Moretele LM	None		
Moses Kotane LM	3	1	2
Ngaka Modiri Molema DM	7	2	5
Rustenburg LM	2	1	1
Totals	**33**	**16 (48%)**	**17 (52%)**

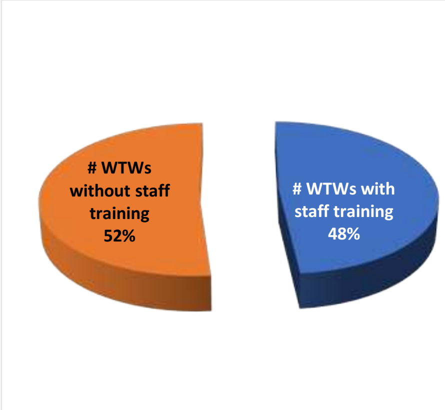


Figure 142 - %WTWs that have trained operational staff over the past two years

The results confirm that Magalies Water, Midvaal Water and 5 WSAs had their operational staff attend training over the past 2 years. 16 of 33 WTWs and boreholes had their operational staff attend training over the past 2 years. Investment in human capital through technical skills development is likely to mitigate some of the water quality failures and lower performances noted, and municipalities and water boards should prioritise ongoing skills development of technical staff and appointment of qualified staff that are legible for registration.

Diagnostic 2: Treatment Capacity and Flow Distribution

Aim: Diagnostic 2 deals with design and flow related dynamics, comprising of: i) design capacity and operational flow, ii) raw water abstraction, and iii) WUE and SIV.

(i) Design Capacity and Operational Flow

This diagnostic assesses the status of plant design capacity and daily water production at the WTWs, as well as SIVs as measured at the outflow from the WTW or inflow to the water distribution network. A capable WTW requires adequate installed design capacity and functional equipment to operate optimally. If the WTW design capacity is exceeded by the average daily production (treatment) volume, the WTW will not be able to deliver SANS compliant water quality. The available design capacity is typically exceeded when the water demand exceeds the installed design capacity, or when unit processes or equipment are dysfunctional, or when electrical supply problems render treatment and pumping of water defective. Typically, the production volume and SIV is the same if 1 WTW supplies 1 WSS, but different if multiple supply systems are feeding from a singular WTW.

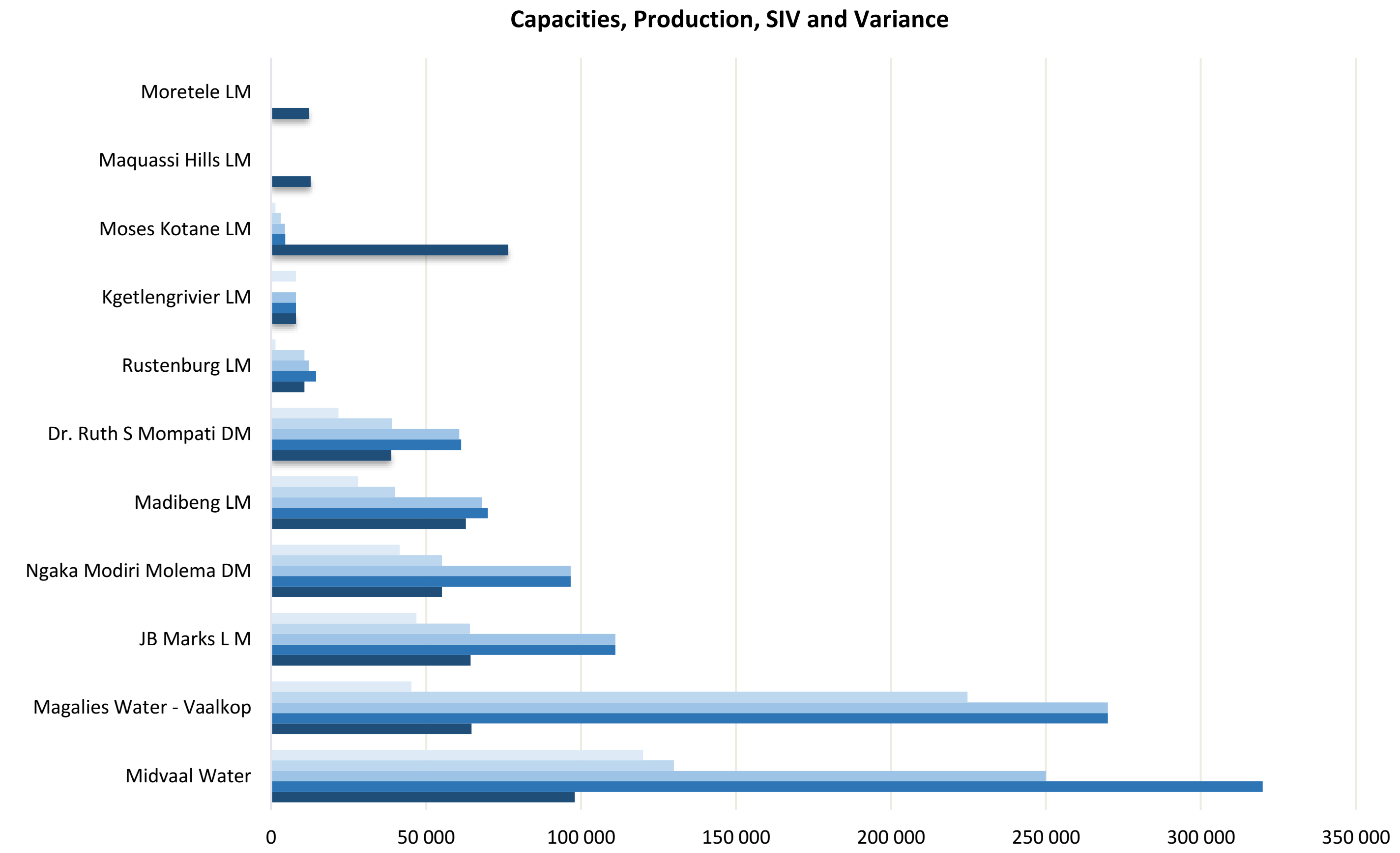
Findings: Analysis of the design capacity and average daily production/ treatment volume indicate a total design capacity of 956,151 kl/d for the province, with a total average daily treatment (operational) volume of 566,880 kl/d. Theoretically, this implies that 59% of the design capacity is used with 41% available to meet additional water demand. However, the full 956,151 kl/d is not available as some infrastructure is dysfunctional, leaving 881,167 kl/d available. The reduced capacity means that the province is closer to its total available capacity (64%) with a 36% surplus available. The capacity differential (difference between the installed and available capacity) will not constrain or impede any further social and economic development in the drainage areas. The WSAs do report and have knowledge of their installed and available capacities, and a higher figure than 36% surplus available cannot be expected.

For the province in general, all the WTWs are operating within their design capacities with the exception of 1 WTW that exceeds their total design capacity (3%). This risk is currently mitigated through operational optimisation and preventative maintenance regimes.

Table 187 - Summary of WTWs design and available capacities, average daily production, % available capacity, and total SIV towards the WSSs

WSA & WB/WSP Name	# WTWs	# WSSs	Design Capacity (kl/d)	Available Design Capacity (kl/d)	Average Daily Production (kl/d)	Available Variance* (kl/d)	% Use Available Capacity	Total SIV towards the WSS (kl/d)
Magalies Water - Vaalkop	1	5 in NW	270,000	270,000	224,746	45,254	83%	64,700
Midvaal Water	1	1	320,000	250,000	130,000	120,000	52%	98,000
Dr. Ruth S Mompati DM	7	7	61,300	60,736	38,988	21,748	64%	38,780
JB Marks LM	8	8	111,057	111,057	64,119	46,938	58%	64,335
Kgetlengrivier LM	2	2	8,000	8,000	0	8,000	0%	8,000
Madibeng LM	2	3	70,000	68,000	40,000	28,000	59%	62,860
Maquassi Hills LM	None	2						12,819
Matlosana LM	Midvaal Water	1						Midvaal Water
Moretele LM	None	1						12,250
Moses Kotane LM	3	4	4,600	4,480	3,119	1,361	70%	76,519
Ngaka Modiri Molema DM	7	5	96,694	96,694	55,130	41,564	57%	55,130
Rustenburg LM	2	6	14,500	12,200	10,778	1,422	88%	10,778
Totals	**33**	**39**	**956,151**	**881,167**	**566,880**	**314,287**	**64%**	**504,171**

Note: Bloem Water (Sedibeng Water) Balkfontein WTW in FS supplies potable water to 2 WSSs in Maquassi Hills LM ; The City of Tshwane MM Temba WTW in GP is the sole bulk water supplier to Moretele LM ; Midvaal Water is the sole bulk water provider in the Matlosana LM
** Difference between the available design capacity and the average daily production*



	Midvaal Water	Magalies Water - Vaalkop	JB Marks L M	Ngaka Modiri Molema DM	Madibeng LM	Dr. Ruth S Mompati DM	Rustenburg LM	Kgetlengrivier LM	Moses Kotane LM	Maquassi Hills LM	Moretele LM
Available Variance (kl/d)	120 000	45 254	46 938	41 564	28 000	21 748	1 422	8 000	1 361		
Ave. Daily Production (kl/d)	130 000	224 746	64 119	55 130	40 000	38 988	10 778	0	3 119		
Available Design Capacity (kl/d)	250 000	270 000	111 057	96 694	68 000	60 736	12 200	8 000	4 480		
Design Capacity (kl/d)	320 000	270 000	111 057	96 694	70 000	61 300	14 500	8 000	4 600		
Total SIV (kl/d)	98 000	64 700	64 335	55 130	62 860	38 780	10 778	8 000	76 519	12 819	12 250

Figure 143 - Design and available capacity, average daily production, available variance and total SIV for the WTWs

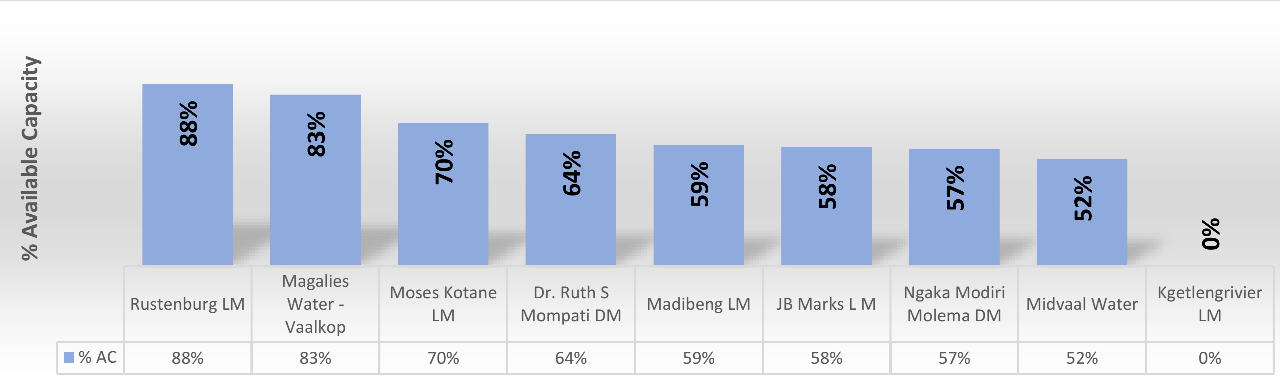


Figure 144 - % available capacity

(ii) Raw Water Abstraction

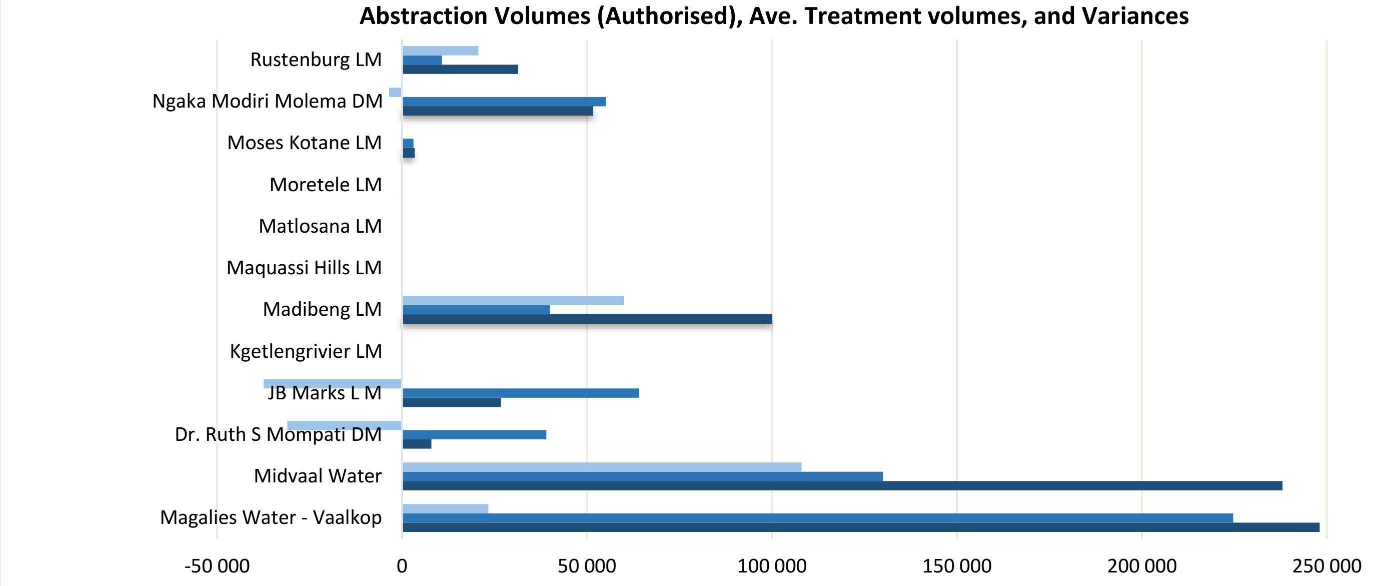
This diagnostic takes a snapshot view of the status of water abstraction authorisations from natural water resources across the province. As per the National Water Act (Act no 36 of 1998), Water Use Authorisation (WUA) mandate the maximum abstraction volumes of raw water, and the installation and monitoring of abstraction, inflow and outflow meters, whilst the BD audit requires WSAs to report the flows on IRIS and to calibrate meters annually. Any defects in terms of abstracting water from a resource without an authorisation, or exceeding the authorised volume, or reporting inaccurate volumes, or not monitoring abstraction against authorised volumes, are considered to be a regulatory risk and contravention of the law.

Findings: Data pertaining to the daily abstraction volumes (kl/d) (Authorised), average daily treatment volumes (kl/d), the names of the WTWs exceeding/with no Daily Abstraction Volumes (Authorised) and Average Daily Treatment Volumes (Authorised) is captured in the tables below.

Table 188 - Summary of Abstraction Volumes (Authorised), Average Daily Treatment Volumes, Variances & WTWs listed For Enforcement Action

WSA & WB/WSP Name	# WTWs	# WSSs	Daily Abstraction Volumes (Authorised) (kl/d)	Average Daily Treatment Volume (kl/d)	Average Variance (kl/d) [+ or Minus]
Magalies Water - Vaalkop	1	5	248,082	224,746	23,336
Midvaal Water	1	1	238,000	130,000	108,000
Dr. Ruth S Mompati DM	7	7	7,944	38,988	-31,044
JB Marks LM	8	8	26,682	64,119	-37,437
Kgetlengrivier LM	2	2	0	0	0
Madibeng LM	2	3	100,000	40,000	60,000
Maquassi Hills LM	None	2			
Matlosana LM	None	1			
Moretele LM	None	1			
Moses Kotane LM	3	4	3,333	3,119	214
Ngaka Modiri Molema DM	7	5	51,600	55,130	-3,530
Rustenburg LM	2	6	31,400	10,778	20,622
Totals	**33**	**45**	**707,041**	**566,880**	**140,161**

WSA & WB/WSP Name	WTW exceeding the Daily Abstraction Volumes (Authorised)	WTW with no Daily Abstraction Volumes (Authorised)
Dr. Ruth S Mompati DM	2 WTWs	5 WTWs
JB Marks LM	2 WTWs	6 WTWs
Kgetlengrivier LM		2 WTWs
Madibeng LM		1 WTW
Ngaka Modiri Molema DM	1 WTW	4 WTWs
Totals	**5**	**18**



	Magalies Water - Vaalkop	Midvaal Water	Dr. Ruth S Mompati DM	JB Marks L M	Kgetlengrivier LM	Madibeng LM	Maquassi Hills LM	Matlosana LM	Moretele LM	Moses Kotane LM	Ngaka Modiri Molema DM	Rustenburg LM
Ave. Variance (kl/d)	23 336	108 000	-31 044	-37 437	0	60 000	0	0	0	214	-3 530	20 622
Ave. Daily Treatment (kl/d)	224 746	130 000	38 988	64 119	0	40 000	0	0	0	3 119	55 130	10 778
Daily Abstraction (kl/d)	248 082	238 000	7 944	26 682	0	100 000	0	0	0	3 333	51 600	31 400

Figure 145 - Abstraction Volumes (Authorised), Average Daily Treatment Volumes, and Variances

WTWs that exceed the Daily Abstraction Volumes (Authorised) and WTWs with no Daily Abstraction Volumes (Authorised) are reflected in the 2nd table above. WTWs that are not complying with the regulations will be required to show correction in the next Blue Drop audit cycle. The results conclude that 5 WTWs are exceeding the permitted abstraction limits and 15 WTWs provided authorised water use abstraction volumes. The Daily Abstraction Volumes (Authorised) are not known for 18 water treatment systems resulting in negative average variances that skew the data sets. The negative average variances could be clearly attributed to the Dr Ruth S Mompati DM, JB Marks LM and Ngaka Modiri Molema DM for over abstraction.

For future BD audits, WSA/WSPs will be required to provide ‘actual’ abstraction volumes so that a comparative analysis can be undertaken of the ‘actual’ abstraction volume versus the authorised water use abstraction volumes (maximum). This would require that the WSAs and WSPs/WBs monitor and record all critical path flows (abstraction, raw and final).

(iii) Water Use Efficiency and System Input Value

The Department is committed to consider issues related to water scarcity and security, aiming to ensure there is sufficient water for the population, the economy, and the environment by increasing water use efficiency across all sectors. Water use for services sectors is specifically dealing with the quantity of water used directly by the consumer through the public distribution network and industries connected to the network.

This diagnostic assesses the water use efficiency (i.e., the average daily consumption in litres per person per day) and the individual and collective performance of the water supply systems. WUE indicates how effective water is used by consumers, i.e. the process between effective water use and actual water abstraction. This concept is closely related to the Department’s No Drop Certification assessment, whereby WUE, NRW and water losses are targeted as part of Water Conservation and Water Demand Management strategies by municipalities.

Findings: Both the Blue Drop audit and No Drop audit requires an IWA water balance to determine the SIV into each water supply system, and to identify and quantify possible losses from abstraction to the end-of-use point. Maquassi Hills LM, Ngaka Modiri Molema DM and Rustenburg LM systems have full water balances in place for 13 WSSs in total. 9 WSSs in 6 WSAs have partial water balances in place, and 5 WSAs with a total of 17 WSSs do not have water balances in place.

WUE is calculated based on the SIV contributions, population served, and the average daily consumption, as summarised in the following table.

Table 189 - Summary of total SIV, total population served, average daily consumption, WUE status and performance trend

WSA & WB/WSP Name	# WSSs	Total Population	Total SIV (kl/d)	2023 WUE (l/p/d)	2023 Blue Drop WUE Range and Performance	
Dr. Ruth S Mompati DM	7	254,217	38,780	153	>150-200	Good
JB Marks LM	8	243,330	64,335	264	>250-300	Poor
Kgetlengrivier LM	2	39,500	8,000	203	>200-250	Average
Madibeng LM	3	143,529	62,860	438	>300	Extremely High
Maquassi Hills LM	2	69,000	12,819	186	>150-200	Good
Matlosana LM	1	500,000	98,000	196	>150-200	Good
Moretele LM	1	40,082	12,250	306	>300	Extremely High
Moses Kotane LM	4	246,281	48,119	195	>150-200	Good
Ngaka Modiri Molema DM	5	251,947	55,130	219	>200-250	Average
Rustenburg LM	6	418,899	103,878	248	>200-250	Average
Totals	**39**	**2,206,785**	**504,171**	**228**		

WUE (l/cap/day) performance categories

Colour	WUE Range	Performance
Red	>300	Extremely high per capita water use
Yellow	>250-300	Poor per capita water use
Black	>200-250	Average per capita water use with potential for marked improvement
Dark grey	>150-200	Good per capita water use but some improvement may be possible subject to economic benefits
Light grey	<150	Excellent per capita water use management

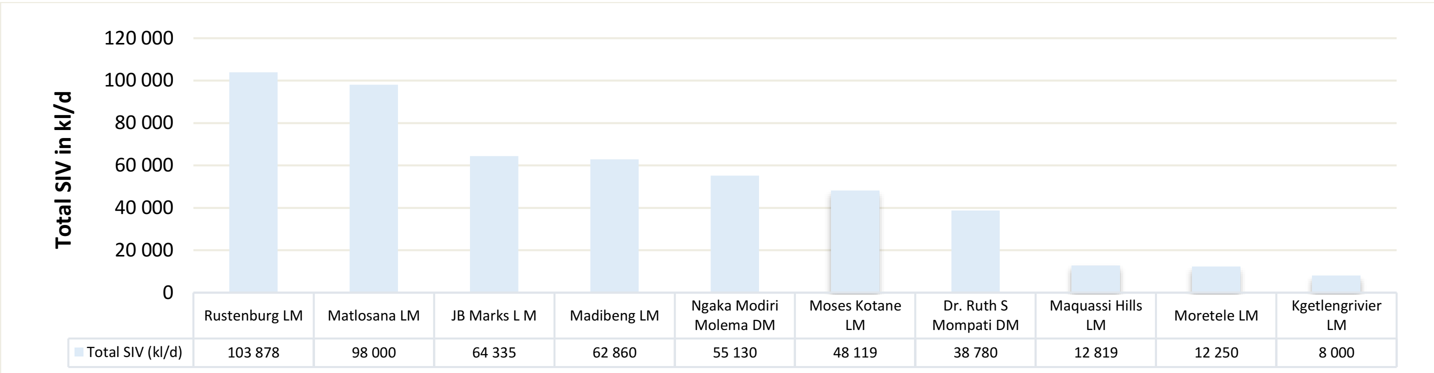


Figure 146 - Total SIV towards the WSSs

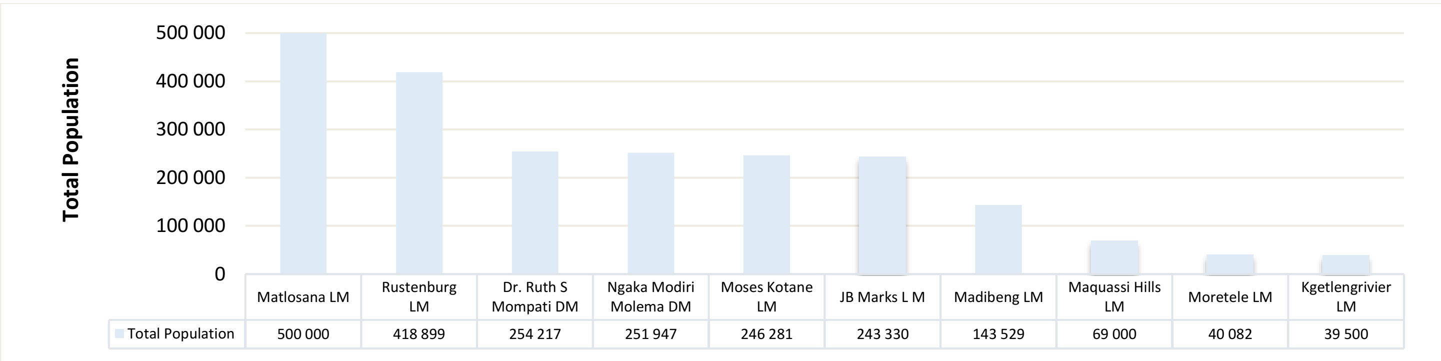


Figure 147 - Total Population served

For the province, 504,171 kl/d water is supplied to 2,206,785 consumers. Comparatively, Rustenburg LM distributes 21% of the total provincial SIV, followed by Matlosana LM (19%), JB Marks (13%) and Madibeng LM (12%). An average 228 litre of water is used per person per day, which implies an average per capita water use. Results from the diagnostic data show that 2 WSAs have WUEs of more than 300 l/c/d, which is regarded as extremely high according to national benchmarks. And 1 WSA has WUE between 250–300 l/c/d, which is regarded as poor. No Drop Certification is specifically tasked with plans to curb water losses and improve NRW through water accounting assessments and water conservation and demand management.

Diagnostic 3: Drinking Water Quality (DWQ) Monitoring and Compliance

Aim: Blue Drop audits values the principles of "To measure is to know" and "To know is to manage". The primary objective of a water treatment plant is to produce final water quality that is safe for human consumption at the end of the distribution network. This standard can only be measured and achieved if operational and compliance monitoring and DWQ compliance is executed at the correct frequency, sample point, and determinand type. This diagnostic assesses the i) operational and compliance monitoring status, ii) drinking water quality compliance, and iii) risk defined compliance and laboratory credibility.

(i) Drinking water operational and compliance monitoring

Findings: A minimum level of 90% operational monitoring compliance is applied as benchmark, to give weight to the importance of sampling and monitoring of the raw water, process unit water, and final water across the treatment stream. Compliance monitoring is also informed by SANS 241:2015 and the requirement for risk-informed monitoring through the WaSP process at both the WTW final and distribution network. DWQ compliance is calculated against the population size and the mandatory limits set by SANS 241:2015 and the Blue Drop standards, as calculated and reported from data loaded in the IRIS.

Table 190 - Summary of the KPA 2 WTW operational and WSS compliance monitoring status

WSA & WB/WSP Name	# WTWs	# WSSs	WTW Operational monitoring [KPA 2 sub-KPA 2.b)]		WSS Compliance monitoring [KPA 2 sub-KPA 2.c)]	
			Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]	Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]
Magalies Water - Vaalkop	1	5 in NW	1			5
Midvaal Water	1	1	1		1	
Dr. Ruth S Mompati DM	7	7	4	3		7
JB Marks LM	8	8	2	6	3	5
Kgetlengrivier LM	2	2		2		2
Madibeng LM	2	3		2	1	2
Maquassi Hills LM	None	2				2
Matlosana LM	None	1			1	
Moretele LM	None	1				1
Moses Kotane LM	3	4	1	2		4
Ngaka Modiri Molema DM	7	5	4	3		5
Rustenburg LM	2	6		2	2	4
Totals	**33**	**39**	**13 (39%)**	**20 (61%)**	**7 (18%)**	**32 (82%)**

The performance recorded in the table above stems from performance data as measured against the Blue Drop Standard expressed in KPA 2 and sub-KPAs 2.b) and 2.c). Overall, an unsatisfactory sampling and analysis regime is observed for both operational (61%) and compliance (82%) monitoring.

The data indicates that 13 of 33 WTWs (39%) are on par with good practice for operational monitoring of the raw and final water and the respective process units at the WTW. Magalies Water and Midvaal Water are doing well, whilst the 7 WSAs fail to meet the Blue Drop standard. In terms of compliance monitoring, 7 WSSs (18%) are on par with good compliance monitoring practices, and 32 WSSs (82%) are failing the Blue Drop standard.

The latter observation is noted with deep concern. Compliance monitoring is a legal requirement and the only means to measure the DWQ performance of a water supply system. Operational monitoring is the cornerstone of day-to-day process adjustments and optimisation to ensure that the water treatment is efficient and delivers quality final water. The results indicate that 20 WTWs and 32 WSSs are not achieving regulatory and industry standards.

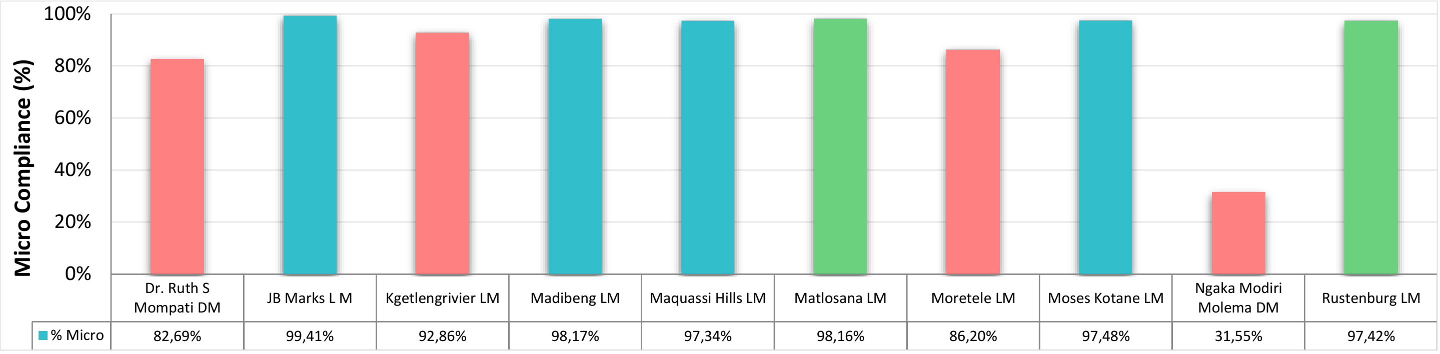
(ii) Drinking water quality compliance

Findings: DWQ compliance is measured against the requirements of SANS 241:2015 under KPA 5 of the Blue Drop audit. The tables following summarises the results of the DWQ status for Microbiological and Chemical Compliance, which also carries the highest Blue Drop score weighting of 35%.

Table 191 - Provincial Summary of the DWQ Status for Microbiological Compliance

WSA Name	# WSSs	Population	% Ave. Micro Compliance	# WSS Micro Performance Status		
				Excellent	Good	Unacceptable
Dr. Ruth S Mompati DM	7	254,217	82.69%	2	1	4
JB Marks LM	8	243,330	99.41%	7	1	
Kgetlengrivier LM	2	39,500	92.86%			2

WSA Name	# WSSs	Population	% Ave. Micro Compliance	# WSS Micro Performance Status		
				Excellent	Good	Unacceptable
Madibeng LM	3	143,529	98.17%	2		1
Maquassi Hills LM	2	69,000	97.34%	2		
Matlosana LM	1	500,000	98.16%		1	
Moretele LM	1	40,082	86.20%			1
Moses Kotane LM	4	246,281	97.48%	3		1
Ngaka Modiri Molema DM	5	251,947	31.55%			5
Rustenburg LM	6	418,899	97.42%	2	1	3
Totals	**39**	**2,206,785**	**88.13%**	**18**	**4**	**17**



MICRO: Population <100,000		
Colour	Status	Percentage
	Excellent	>97%
	Good	>96 - <97%
	Unacceptable	<96%

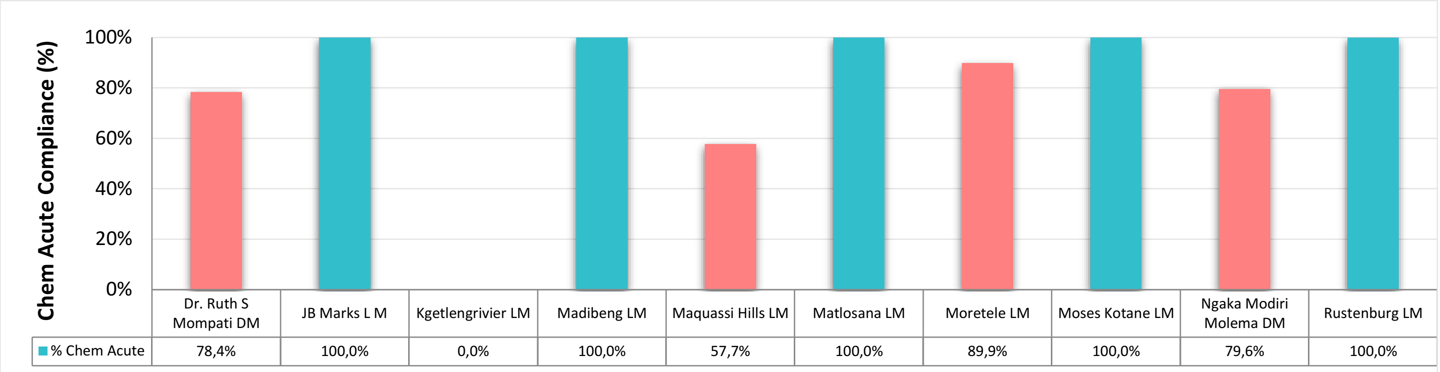
MICRO: Population >100,000		
Colour	Status	Percentage
	Excellent	>99%
	Good	>98 - <99%
	Unacceptable	<98%

Figure 148 - Provincial Microbiological Drinking Water Quality Status

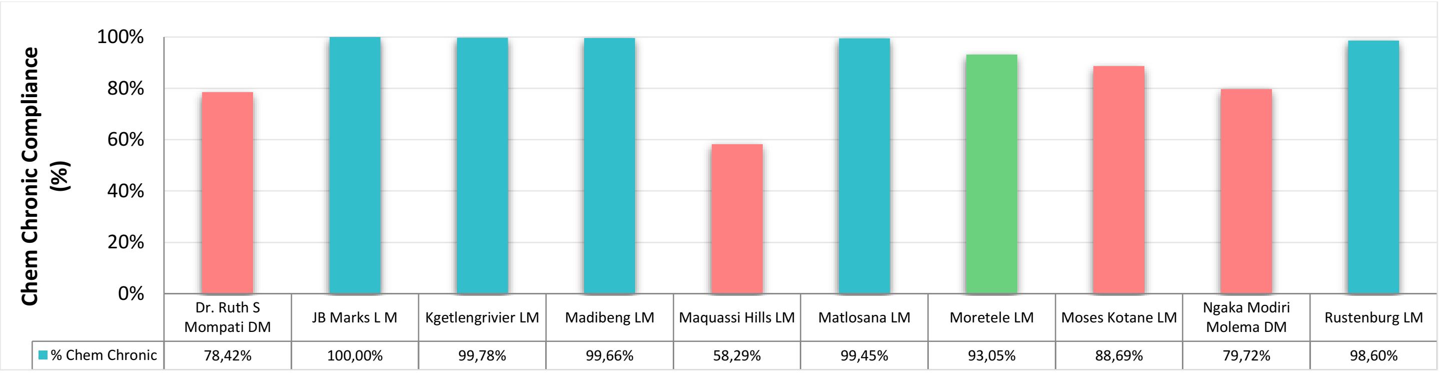
Out of the 39 WSSs, 22 (56%) systems achieved excellent and good microbiological quality, whilst 17 44(%) systems have an unacceptable microbiological water quality status. The water in these systems pose a serious acute health risk to the community. Failure to produce water that meets microbiological compliance standards can be linked back to poor operations, defective infrastructure, inadequate dosing rates, absence of disinfection chemicals, lack of monitoring, lack of operating and chemistry knowledge, and several other root causes. WSIs that are not monitoring the final water quality at the outlet of the treatment plant or at specific end use points are required to develop a monitoring programme and resume with compliance monitoring as a matter of urgency.

Table 192 - Provincial Summary of the DWQ Status for Chemical Acute Health and Chronic Health Compliance

WSA Name	# WSSs	Population	% Ave. Chem Acute Health Compliance	# WSS Chem Acute Health Performance Status			% Ave. Chem Chronic Health Compliance	# WSS Chem Chronic Health Performance Status		
				Excellent	Good	Unacceptable		Excellent	Good	Unacceptable
Dr. Ruth S Mompati DM	7	254,217	78.4%	5		2	78.4%	5		2
JB Marks LM	8	243,330	100.0%	8			100.0%	8		
Kgetlengrivier LM	2	39,500	0.0%			2	99.8%	2		
Madibeng LM	3	143,529	100.0%	3			99.7%	3		
Maquassi Hills LM	2	69,000	57.7%			2	58.3%			2
Matlosana LM	1	500,000	100.0%	1			99.4%	1		
Moretele LM	1	40,082	89.9%			1	93.1%		1	
Moses Kotane LM	4	246,281	100.0%	4			88.7%			4
Ngaka Modiri Molema DM	5	251,947	79.6%	4		1	79.7%	4		1
Rustenburg LM	6	418,899	100.0%	6			98.6%	6		
Totals	**39**	**2,206,785**	**80.5%**	**31**	**0**	**8**	**89.6%**	**29**	**1**	**9**



CHEM Acute Health: Population <100,000			CHEM Acute Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	≥97%		Excellent	≥99%
	Good	≥95 - <97%		Good	≥97 - <99%
	Unacceptable	<95%		Unacceptable	<97%



CHEM Chronic Health: Population <100,000			CHEM Chronic Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	≥95%		Excellent	≥97%
	Good	≥93 - <95%		Good	≥95 - <97%
	Unacceptable	<93%		Unacceptable	<95%

Figure 149 - Provincial Chemical Acute Health and Chronic Health Drinking Water Quality Status

Chemical acute health compliance shows that 31 (79%) systems have excellent, and no systems have good water quality, whilst 8 (21%) systems in 5 WSAs have an unacceptable chemical acute health compliance. Chemical chronic health compliance shows that 29 (74%) systems have excellent, and 1 (3%) system have good water quality, whilst 9 systems (23%) in 4 WSAs have an unacceptable chemical chronic health compliance.

The Water Services Act upholds standards regarding the monitoring and reporting on drinking water quality and issuance of advisory notices to the public when significant DWQ failures are observed. The audit process applies a penalty when DWQ failures are noticed without issuing such Water Quality Alert Notices to forewarn consumers of the status of (unsafe) water quality and to advise communities to source alternative water sources or methods to disinfect water used for drinking water purposes.

The following table reflects the compliance status of the WSAs as regards the issuing of these notices for DWQ failures.

Table 193 - Summary of Penalties Applied to WSSs for not Issuing Advisory Notices

WSA Name	# WSS	# WSS No Penalty Applied	# WSS Partial Penalty Applied	WSS Names Partial Penalty	# WSS Full Penalty Applied	WSS Names Full Penalty
Dr. Ruth S Mompati DM	7	4	2	Bogosing, Pudimoe	1	Schweizer Reneke
JB Marks LM	8	8				
Kgetlengrivier LM	2		2	Koster, Swartruggens		
Madibeng LM	3	2	1	Brits		
Maquassi Hills LM	2				2	Leeudoringstad-Witpoort, Tswellelang-Lebaleng
Matlosana LM	1		1	City of Matlosana		
Moretele LM	1		1	Temba		

WSA Name	# WSS	# WSS No Penalty Applied	# WSS Partial Penalty Applied	WSS Names Partial Penalty	# WSS Full Penalty Applied	WSS Names Full Penalty
Moses Kotane LM	4	1	3	Madikwe, Molatedi, Pella		
Ngaka Modiri Molema DM	5		4	Ditsobotla-Itsoseng, Mafikeng, Ramotshere Moiloa-Dinokana & Lehurutsh, Ramotshere Moiloa-Motswedi & Gopane	1	Ratlou-Kraaipan Cluster B/H
Rustenburg LM	6	6				
Totals	**39**	**21**	**14**		**4**	

No penalties were applied to 21 (54%) WSSs in 5 WSAs. Partial penalties were applied to 14 (36%) WSSs in 7 WSAs and full penalties were applied to 4 (10%) WSSs in 3 WSAs.

(iii) Risk defined compliance and laboratory credibility

Findings: Risk-defined compliance standards aim to determine the compliance (to SANS 241) of those parameters that have been found to pose a risk in a specific WSS and need to be included in the routine monitoring programme or frequency as prescribed by SANS 241. The province achieved an average Annual Risk Defined Compliance of 82%. Excellent risk defined compliance was achieved by 7 (18%) systems, good compliance for 7 (18%) systems and bad compliance for 25 (64%) systems with most of these systems residing in Dr. Ruth S Mompati DM, JB Marks LM, Moses Kotane LM and Ngaka Modiri Molema DM.

Table 194 - Summary of the DWQ Compliance for Risk Defined Compliance

WSA Name	# WSSs	Population	Ave. % Risk Defined Compliance	# WSS Performance Status		
				Excellent	Good	Bad
Dr. Ruth S Mompati DM	7	254,217	71.62%	2	1	4
JB Marks LM	8	243,330	93.76%	3	2	3
Kgetlengrivier LM	2	39,500	81.58%			2
Madibeng LM	3	143,529	87.96%	1		2
Maquassi Hills LM	2	69,000	59.11%			2
Matlosana LM	1	500,000	95.56%		1	
Moretele LM	1	40,082	89.74%			1
Moses Kotane LM	4	246,281	77.64%			4
Ngaka Modiri Molema DM	5	251,947	67.05%			5
Rustenburg LM	6	418,899	92.66%	1	3	2
Totals	**39**	**2,206,785**	**81.7%**	**7**	**7**	**25**

The aim of operational determinand compliance is to determine the efficiency of the water treatment process, by monitoring those parameters which are used to control the treatment process. Although not necessarily a health risk, these parameters provide good information on the integrity of the WTW. The province achieved an average % Actual Operational Determinand Compliance of 51%, the best performances coming from the Magalies Water and Midvaal Water, and the worst performances coming from the JB Marks LM and Ngaka Modiri Molema DM. Excellent risk defined compliance was achieved by 5 (13%) systems, good compliance for 1 (3%) system and bad compliance for 27 (69%) systems.

Table 195 - Summary of the Treatment (Operational) Efficiency Index

WSA & WB/WSP Name	# WTWs	Population	Ave. % Actual Operational Determinand Compliance	# WTW Performance Status		
				Excellent	Good	Bad
Magalies Water - Vaalkop	1	442,965	100%	1		
Midvaal Water	1	500,000	97%	1		
Dr. Ruth S Mompati DM	7	254,217	41%	2	1	4
JB Marks LM	8	243,330	30%			8
Kgetlengrivier LM	2	39,500	43%			2
Madibeng LM	2	143,529	23%			2
Maquassi Hills LM	None	69,000				
Matlosana LM	None					
Moretele LM	None	40,082				
Moses Kotane LM	3	31,281	22%			3
Ngaka Modiri Molema DM	7	251,947	51%			7
Rustenburg LM	2	190,934	49%	1		1
Totals	**33**	**2,206,785**	**51%**	**5**	**1**	**27**

The data confirms that 8 (89%) WSAs in the province have access to credible laboratories for compliance and operational analysis. These in-house or contracted laboratories are accredited with SANAS or have Proficiency Testing Schemes with SABS or have inter-laboratory quality checks in place to ensure that suitable analytical methods are applied and that quality assurance processes are followed to ensure credible water quality results. The province is predominantly meeting the regulatory expectation for the WSIs having access to credible analytical services for compliance and operational monitoring.

Diagnostic 4: Technical Site Assessments

Aim: The BD process makes provision for a Technical Site Assessment (TSA) in order to verify the desktop evidence through field-based inspections. This assessment includes a physical inspection of the entire water treatment plant with all its process units, as well as the reservoir and spot checks of a pumpstation and pipelines. The technical assessment is coupled with an asset condition check to determine an approximate cost (VROOM) to restore existing infrastructure to functional status for the treatment facility (only).

Findings: The results of the province's TSAs are summarised in the table below. A deviation of 10% between the BD and TSA score indicate a misalignment between the administrative aspects and the work on the ground. The Regulator regards a WTW with a TSA score of >80% to have an acceptable level of process control and functional equipment, and a TSA score of 90% as an excellent system that complies with most of the Blue Drop TSA standards. A TSA score of <30% indicates that the treatment facility and network fails in most regards, and is evident of dysfunctional infrastructure, failed process control, absence of record keeping and monitoring, and poor water quality.

The VROOM cost presents a ''Very Rough Order of Measurement" cost to return a WTWs functionality to its original design. More detail can be found in the Blue Drop Watch Report 2023.

Table 196 - %TSA and %BD score, and VROOM cost estimates total and split for civil, mechanical, and electrical

WSA & WB/WSP Name	TSA Name	%TSA	2023 BD Score (%)	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Dr. Ruth S Mompati DM	Bogosing	18.0%	31.47%	307,200	1,075,200	153,600	1,536,000
Dr. Ruth S Mompati DM	Pudimoe	39.0%	31.47%	3,700,000	9,620,000	1,480,000	14,800,000
JB Marks LM	Potchefstroom	94.0%	92.60%	2,246,400	280,800	280,800	2,808,000
Kgetlengrivier LM	Koster	44.0%	21.60%	29,920,000	3,740,000	3,740,000	37,400,000
Madibeng LM	Schoemansville	57.0%	50.64%	831,600	3,326,400	0	4,158,000
Matlosana LM	Midvaal Water Company	95.0%	87.82%	320,000	2,560,000	320,000	3,200,000
Moses Kotane LM	Madikwe	60.0%	69.25%	44,200	353,600	44,200	442,000
Ngaka Modiri Molema DM	Mmabatho	88.0%	36.74%	20,000	140,000	40,000	200,000
Rustenburg LM	Bospoort	81.4%	78.31%	2,015,640	2,267,595	755,865	5,039,100
			Totals	**R39,405,040**	**R23,363,595**	**R6,814,465**	**R69,583,100**
			% Split of Cost Items	**57%**	**33%**	**10%**	**100%**

A deviation of >10% between the BD and TSA score is noted for only 3 WSAs. A deviation of >20% between the BD and TSA score is noted for Koster (22%) and Mmabatho (51%). For the individual WTWs assessed in the province, a total budget of R69.6m is estimated, with the bulk of the work (90%) going towards restoration of mechanical equipment (33%) and civil infrastructure (57%).

Diagnostic 5: Operation, Maintenance and Refurbishment of Assets

Aim: Insufficient financial resources are often cited as a root cause to dysfunctional or non-compliant water treatment works and water networks. Knowledge and monitoring of fiscal spending are therefore a critical part of water services management and municipal governance of public assets. This diagnostic investigates the status of financial information as pertaining to O&M budgets and expenditure, asset figures, and capital funding.

Findings: A substantial amount of financial information was presented during the audit process. Unfortunately, the evidence was presented in different formats, levels of detail, or absent for some WSAs. It was observed that WSA teams with financial officials that were present during the audits performed better and had a better understanding of the water services challenges experienced by their technical peers.

Discrepancies observed included amongst others - generic or non-ringfenced budgets, contract lump sums for service providers presented as budgets, outdated or incomplete asset registers, and some cost drivers which were lacking. As data credibility presents a significant challenge, the Regulator grouped data into different certainty levels, as summarised at the end of this Diagnostic.

The result of each financial portfolio is discussed hereunder.

NOTE: The Regulator regards the financial and asset information with low confidence. Not all WSAs submitted verifiable information or complete financial data sets for the audit year in question.

Capital, O&M Budget and Actual, and Asset Value

The capital budgets, O&M budgets, O&M actual expenditure, and current asset values are summarised below.

Table 197 - Summary of the capital budgets, O&M budgets, O&M actual expenditure, and current asset values

WSA & WB/WSP Name	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
Magalies Water - Vaalkop	NI	R536,412,521	R547,893,383	102%	R2,552,747,328
Midvaal Water	NI	R1,251,507,687	R1,290,168,768	103%	R3,155,777,179
Dr. Ruth S Mompati DM	NI	NI	NI	NI	NI
JB Marks LM	R76,018,055	R263,214,968	R141,750,892	54%	R1,368,339,101
Kgetlengrivier LM	NI	R8,818,696	R2,306,488	26%	NI
Madibeng LM	R105,608,000	R50,736,604	R48,995,373	97%	NI
Maquassi Hills LM	NI	NI	NI	NI	NI
Matlosana LM	R261,430,820	R729,836,628	R365,278,926	50%	NI
Moretele LM	NI	R73,392,643	R91,328,692	124%	NI
Moses Kotane LM	R6,000,000	R281,250,847	R160,835,219	57%	NI
Ngaka Modiri Molema DM	R125,752,437	R279,903,580	R158,462,477	57%	NI
Rustenburg LM	R28,441,789	R56,987,128	R66,718,306	117%	NI
Totals	**R603,251,101**	**R3,532,061,302**	**R2,873,738,524**	**81%**	**R7,076,863,608**

The Regulatory Comments following in this Chapter list the capital projects with secured funding for each municipality and/or its bulk water provider (WSP). The capital lists are deemed to be a definitive means to address water service inadequacies and ensuring water infrastructure investment. A total capital budget of R603m has been reported for the refurbishment and upgrades of water supply system infrastructure for most of the WSAs. The largest capital budgets are observed for Matlosana LM (R261m), Ngaka Modiri Molema DM (R125.7m), and Madibeng LM (R105.6m).

For the 2021/22 fiscal year, the total O&M budget reported for the province was R3.532b, of which R2.874b (81%) has been expended. The highest over-expenditure of 124% by Moretele LM and the lowest under expenditure by Kgetlengrivier LM (26%) was observed. The provincial figures exclude only 2 WSAs who provided no financial information.

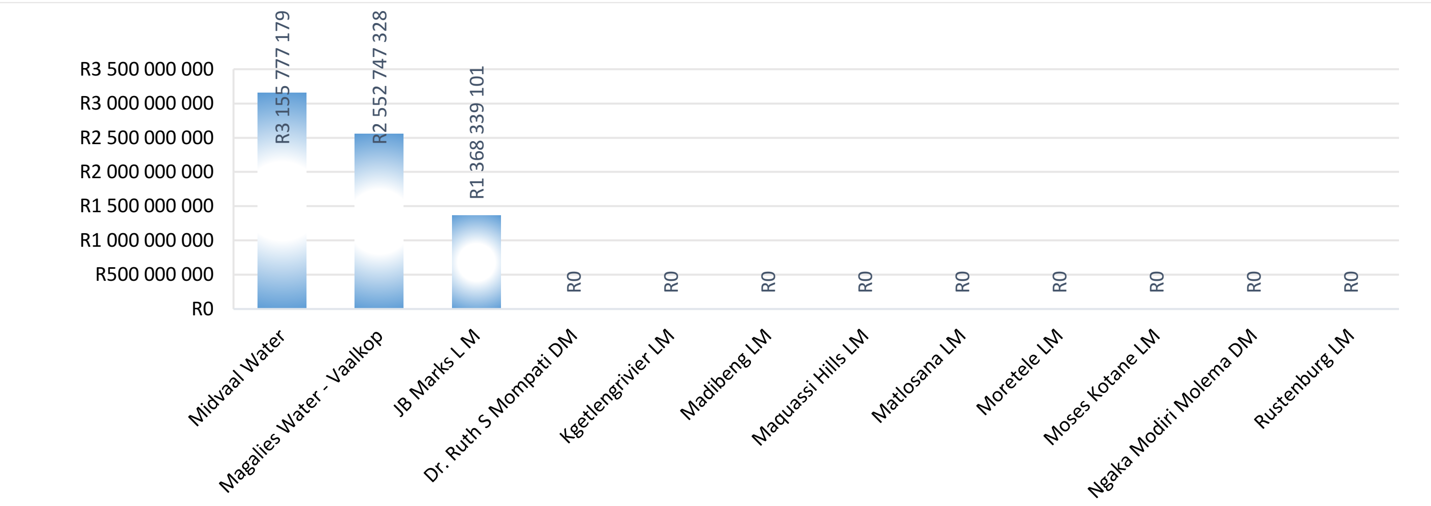


Figure 150 - Total current asset value reported

The total current asset value for water infrastructure (networks, pump stations, treatment plants) is reportedly R7.707b (excluding 9 WSAs with no information). The highest asset values are observed for Midvaal Water (R3.16b), followed by Magalies Water (R2.55b).

O&M Cost Benchmarking

By combining the SALGA and WRC WATCOST models, an estimation of the maintenance cost required per asset type can be done, i.e. civil, buildings, pipelines, mechanical, electrical, and instrumentation.

Table 198 - SALGA-WRC annual maintenance budget guideline and cost estimation

Description	% of Current Asset Value	Asset Value Estimate	Modified SALGA Maintenance Guideline	Annual Maintenance Budget Guideline
Current Asset Value estimate	**100%**	**R7,076,863,608**	**15.75%**	**R152,860,254**
Broken down into:				
1. Civil Structures	46%	R3,255,357,260	0.50%	R16,276,786
2. Buildings	3%	R212,305,908	1.50%	R3,184,589
3. Pipelines	6%	R424,611,816	0.75%	R3,184,589
4. Mechanical Equipment	30%	R2,123,059,082	4.00%	R84,922,363
5. Electrical Equipment	11%	R778,454,997	4.00%	R31,138,200
6. Instrumentation	4%	R283,074,544	5.00%	R14,153,727
Totals	**100%**	**R7,076,863,608**	**15.75%**	**R152,860,254**
			Minus 20% P&Gs and 10% Installation	**R45,858,076**
			Total	**R107,002,178**

The model estimates that R152.8m (2.16%) is required per year to maintain the assets valued at R7.707b. Notably, this maintenance estimate assumes that all assets are functional. In cases where Blue Drop Certification is not being achieved, it can be assumed that some form of inefficiency or constraint is being experienced, and national benchmarks closer to 7% of the asset value is advocated (R495.2m).

The table below indicates the SALGA maintenance cost estimation in relation to the O&M budget, and O&M actual expended.

Table 199 - O&M cost estimates by the SALGA versus actual budget and expenditure figures

Cost Reference	O&M Cost Estimate	Period	% of Asset Value
Modified SALGA	R152,860,254	Annually, estimation	2.16%
O&M Budget	R3,532,061,302	Actual for 2021/22	50%
O&M Spend	R2,873,738,524	Actual for 2021/22	41%

In addition, the table below indicates the Blue Drop audit findings on the water supply operations cost determination and water supply O&M budget status.

Table 200 - BD Audit Water Supply Operations Cost Determination and Water Supply O&M Budget status

WSA & WB/WSP Name	Water Supply Operations Cost Determination	Water Supply O&M Budget status
Magalies Water - Vaalkop	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
Midvaal Water	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
Dr. Ruth S Mompati DM	NO PROOF (0% SCORE)	NO PROOF
JB Marks LM	NOT SYSTEM SPECIFIC (GLOBAL); DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY; SYSTEM SPECIFIC BUDGET
Kgetlengrivier LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Madibeng LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Maquassi Hills LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Matlosana LM	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
Moretele LM	NO PROOF (0% SCORE); DETERMINED OF THE WHOLE SYSTEM	NO PROOF; SYSTEM SPECIFIC BUDGET
Moses Kotane LM	DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Ngaka Modiri Molema DM	NOT SYSTEM SPECIFIC (GLOBAL); DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Rustenburg LM	NOT SYSTEM SPECIFIC (GLOBAL); DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY; SYSTEM SPECIFIC BUDGET

From the tables above, the cost dynamics can be summarised as follows:

- The SALGA estimations for maintenance budgets is about 4.3% (Modified SALGA divided by O&M Budget) of the actual reported budgets for the 2021/22 fiscal year
- The actual O&M budget (50%) appears to be more than adequate when compared with the SALGA guideline (2.16%) or with the government benchmark (7%)
- These figures are impacted by some of the WSAs who did not provide budget and expenditure figures, and by some inaccurate asset values and where no asset values were provided for
- Lastly, the municipalities presents budget and expenditure data at different levels (table above) i.e. financial figures are not always ringfenced per water supply system – thus rendering provincial summaries to be indicative).

11.1 Magalies Water

Introduction

Magalies Water is the bulk water utility in South Africa and supplies potable water to more than 500 000 people in Gauteng, North West, Limpopo. Magalies Water operations cover an area of 42 000 km2 across the three provinces with water sourced from two major catchments being the Crocodile and the Pienaars rivers. However, in certain municipalities, Magalies Water serve on an operations and Maintenance contractual agreement where they operate the infrastructure owned by the local authority such as in Ngaka Modiri Molema DM and Dr Ruth Segomotsi Mompati DM in the North West province.

The utility serves the following 6 municipalities:

- City of Tshwane Metropolitan Municipality, supplied with 15.872 Ml/d
- Moses Kotane Local Municipality, supplied with 36 Ml/d
- Rustenburg Local Municipality, supplied with 20 M/d
- Modimolle/Mookgopong Local Municipality, supplied with 6.1 Ml/d
- Thabazimbi Local Municipality, supplied with 11 Ml/d
- Bela-Bela Local Municipality, supplied with 7.05 Ml/d

Magalies Water abstracts raw water and channelled to water treatments plants where it is treated before is supplied to its municipal and industrial clients. The Water Board own four WTPs, namely Vaalkop, Klipdrift, Wallmansthal and Cullinan. In total Magalies Water currently has the infrastructure and capacity to supply 314 megalitres or 314 million litres of water per day to all the municipalities mentioned above and the mines in the surrounding areas receiving bulk water from the water utility. Water is transported through pipelines, reservoirs, pumping stations, reticulation systems and owns a South African National Accreditation System (SANAS) accredited laboratory that is authorised and certified to analyse and rate the quality of water supplied to consumers. As such the performance of this bulk water utility is critical to the well-being of the people in area of supply.

Regulator's Comment

The Blue Drop Audit was well attended by all relevant staff members and the personnel were well prepared, experienced, and understood the requirements of the Blue Drop Audit. Magalies Water is commended for their preparedness and information provided. The scale of the Magalies Water system is significant, and the local municipalities are fortunate to have this utility to assist them in the provision of safe drinking water for their consumers.

Magalies Water proactively seeks to comply with the ISO 14001 certification requirements and ensures that all its areas of operations have no impact on the environment. All the four water treatment works owned and operated by Magalies Water are ISO 14001 certified and have been retained the certification to date. The Water Board is equipped with a laboratory accredited with a South African National Accredited System (SANAS) that is authorised and certified to analyse water quality. The accreditation ensures that credibility of the results from the laboratory is not questionable and follows accredited methods in analytical procedures followed by the laboratory. These results are then submitted to the Departmental owned web-based system were drinking water quality results are submitted called Integrated Regulatory Information Systems (IRIS). The lab results as well as Incident Management Protocol are aligned such that any incidents with respect to failures in the systems are investigated and rectified immediately. The audit team was able to follow any incident within the systems. Therefore, consumers can be assured that the Magalies Water team continuously monitors all potential problems and actively manage these risks to ensure that the drinking water supplied is of excellent quality. The water quality data shows excellent compliance to all the required parameters and consumers within the Magalies Water area of supply are assured of being able to drink water straight from the tap. Water Quality results are published in the Water Boards annual reports and also when incidents are picked up, communication is issued to clients and also placed on Magalies Water website and can be commended for managing these large and complex systems with excellence!

Magalies Water operates and maintains its systems with a vast technical, operational, and scientific team who are qualified and competent in all technical, operational, and scientific aspects of drinking water supply. There are contracts in place for chemical supply, calibration/verification of meters and evidence of Capex budget and expenditure with long term planning. Pipelines equipped with cathodic protection however age analysis and network related audits and planning are still lacking. Operational costs determination based on all the five costs drivers, chemical costs, maintenance costs, compensation of employee, energy costs and raw water costs are in place.

Blue Drop Findings

The Regulator Notes finds that that there were some shortcomings, and the following summarises the collective recommendations as following:

- With the exception of Cullinan WTW which had a process audit in place to assess the integrity of the WTW whether it meets all the design specification as originally intended. However all the WTW owned and operated by Magalies Water have condition assessment of the works is done, this is a shortcoming as it is not awarded a full score for the KPA however the Department is comforted by the fact that findings and recommendations of the condition assessments are implemented.
- The available budget was overspent by a small margin.
- Record keeping of maintenance work done and the maintenance planning that is aligned with asset register needs to be improved
- Minor improvements on asset register that is aligned with Blue Drop assessment criteria is required.

Technical Site Inspection

The ***Cullinan WTW*** is in a good condition with a TSA score of 94%. The Regulator observed that regular routine maintenance is done on site with no significant operational or maintenance issues noted. Both the operational and compliance water quality data show that this plant is producing water which complies with the drinking water standard.

The Magalies Water team was able to show how all divisions of the utility are able to maintain the water treatment processes as efficiently as possible with a large team. With jar Tests conducted on site to address any water quality variation that may occur that may require adjustments of chemical. The documentation provided allowed the audit team to drill down to the water quality results as well as up to identify the control measures and the risks carried by the utility. This included chemical stocks available, adjustments made and dosage rates which will help in estimation of duration it takes for a batch to complete and this helps in supply chain management to ensure there is sufficient stock of treatment chemicals. The team is commended on a job well done, setting a prime example of care, competence, and diligence in providing excellent water quality to consumers.

Refer to the Blue Drop Watch Report 2023 for more detail.

Sedimentation tank at Cullinan WTW

Overflow from sedimentation tanks

Panel 5 BD assessors and Magalies Water Team

Filter backwashing at Cullinan WTW

Jar Test Procedure used to determine of optimum dosage of treatment chemicals

Pumps to the command reservoir

11.2 Midvaal Water

Midvaal Water Company Non-Profit Company (NPC) is the Water Services Provider that is responsible for abstraction, treatment, and distribution of bulk potable water to a number of consumers such as:

1. City of Matlosana Local Municipality (main consumer)
2. Mining Companies
3. other medium to small consumers.

Midvaal Water Company supplies good quality drinking water to approximately 500 000 consumers at the most. It is situated in the Middle Vaal Region, 160km downstream from the Barrage and 115km downstream from Parys. Water is abstracted from the Middle Vaal River approximately 15km South of Stilfontein. The design capacity of the treatment plant is 320 ML and operational capacity of 250 ML/day. The water is fed into a distribution network of over 125km of large diameter pipelines feeding 9 service reservoirs. Midvaal Water Company supply the City of Matlosana with 98 000kl/d of potable water and Midvaal Water consists of 7 pumpstations (South Vaal, Ellaton Endpoint, Vierfontein booster, Vierfontein plant) from where water is pumped to various bulk reservoirs.

Regulatory Impression

The Department would like to commend Midvaal Water Company for their readiness, dedicated and competent teamwork, as well as their excellent level of organization. The Blue Drop audit team was officially welcomed by the Chief Executive Officer together with team of experts Chief Operation Officer, Senior Manager Operations, Plant Manager, Plant Foreman, Process Controllers and Safety Officer. The plant well managed and despite the poor raw water quality from the Vaal River, the plant produces an excellent quality drinking water to the consumers. Midvaal Water Company is applauded for offering a WaSP that is detailed and implemented. Midvaal Water Company provided proof of the implementation of interventions and recommendations identified in the Water Safety Plan. Midvaal Water reviews and updates their WaSP on a regular basis, with input from all stakeholders however, the process audit and network findings were not incorporated into the WaSP. Midvaal Water is also commended for good record keeping and placing a logbook on every unit process in order to monitor every stage of production to ensure that each process is performing its intended purification function.

Midvaal Water has its own SANAS accredited laboratory for sample analysis and scientific services personnel that are qualified and experienced. Additionally, they have a workshop onsite as well as technical, operational, engineering staff to maintains its systems. Another accomplishment of Midvaal Water is its work on a trial project to use chlorine dioxide as a disinfectant while NCP is dealing with a chlorination gas shortage. Contracts for chemical supply are in place, and there is evidence of a Capex budget and expenditure with long-term planning. The raw water pumpstation is well-maintained, and no leaks have been discovered. Midvaal Water's delivery network and booster pumpstation are in an area that has been invaded by the illegal miners also known as zama zamas, thus they have gone above and beyond to strengthen the security and safeguard their assets.

Midvaal Water Company

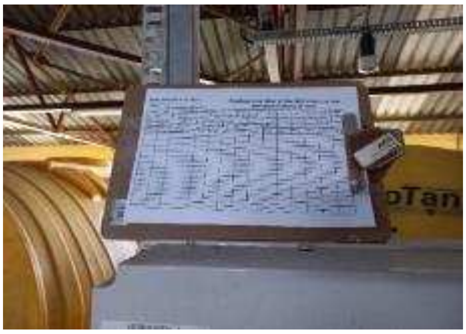
- The team is recognised for being extremely organised and well prepared for the assessments, as well as for their dedication.
- The Supervisory and Process Control staff comply with Regulation 813.
- The process controllers understand their duties and each unit process has a logbook in which the findings from each shift are recorded.
- The findings of the Process Audit and Network study are encouraged to be incorporated into the Water Safety Plan Midvaal Water Company.
- The maintenance schedule for Midvaal Water can be improved.
- Although there are operational issues with the DAF and Ozone units, they are recognised, and there is a plan is in place to address them.
- The available budget was overspent by a small margin.
- During the site visit there was issue of the large, isolated bubbles observed in the DAF and needs to be addressed.
- A small chemical spill occurred, although service staff were already informed of it.
- On the day of the inspection, there was chemical leaking from the dosing pipe joints, but service personnel had been alerted and it was being repaired.

Technical Site Inspection

The ***Midvaal Water Company WTW*** was inspected to verify the Blue Drop audit findings and received a technical site score of **95%.** The plant is well maintained, and Process Controllers understands their duties. The potable water produced by the treatment plant is of high quality and can be used with high confidence. Refer to the Blue Drop Watch Report 2023 for more detail.

Blue Drop team and Midvaal Water Company team of experts

Well maintained raw water pumpstation



Logbook placed at on every unit process

The plant surrounding is well maintained

11.3 Dr Ruth Segomotsi District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	31.47%
Blue Drop Score 2014	%	30.14%
Blue Drop Score 2012	%	52.94%
Blue Drop Score 2011	%	64.16%

Key Performance Area	Weight	Bloemhof	Bogosing	Christiana	Kgomotso
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	39.43%	16.10%	46.38%	38.43%
Blue Drop Score 2014	%	7.08%	60.73%	6.97%	71.81%
Blue Drop Score 2012	%	NI	48.43%	NI	66.10%
Blue Drop Score 2011	%	NI	76.23%	NI	82.61%
System Design Capacity	kL/d	14 400	1 200	8 600	1 500
System Available Capacity	kL/d	14 400	636	8 600	1 500
System Input Value	kL/d	11 432	636	5 827	1 228
Capacity Utilisation	%	79.39%	100.00%	67.76%	95.73%
Resource Abstracted From		Vaal	Vaalharts Scheme (canal)	Vaal	Harts River
BDRR 2023	%	30.76%	74.15%	24.86%	28.16%
BDRR 2022	%	24.90%	41.80%	26.70%	29.80%

Key Performance Area	Weight	Majeakgoro	Pudimoe	Schweizer-Reneke
Bulk/WSP		Phokwane LM	-	-
Blue Drop Score 2023	%	24.54%	28.08%	5.10%
Blue Drop Score 2014	%	83.74%	NI	9.41%
Blue Drop Score 2012	%	87.38%	NI	11.80%
Blue Drop Score 2011	%	89.48%	NI	N/A
System Design Capacity	kL/d	9 600	20 000	6 000
System Available Capacity	kL/d	9 600	20 000	6 000
System Input Value	kL/d	4 776	10 823	4 058
Capacity Utilisation	%	49.75%	54.12%	67.63%
Resource Abstracted From		Harts	Vaalharts Scheme (canal)	Wentzel Dam and boreholes
BDRR 2023	%	67.44%	48.80%	89.15%
BDRR 2022	%	55.20%	48.30%	100.00%

Technical Site Assessment: Bogosing WTW – 18%

The Regulator notes the dire state of management and drinking water quality in the Bogosing, Majeakgoro, Pudimoe and Schweizer-Reneke water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

11.4 JB Marks Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	92.60%
Blue Drop Score 2014	%	97.20%
Blue Drop Score 2012	%	98.45%
Blue Drop Score 2011	%	96.87%

Key Performance Area	Weight	Boikhutsong Village (Borehole)	Boikutso Village (Borehole)	Gamogopa Village (Borehole)	Goedgevonden Village (Borehole)
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	68.24%	65.74%	67.81%	75.16%
Blue Drop Score 2014	%	16.05%	9.50%	11.10%	10.42%
Blue Drop Score 2012	%	36.29%	40.19%	36.29%	39.29%
Blue Drop Score 2011	%	NA	38.63%	NA	35.90%
System Design Capacity	kL/d	346	346	648	1 296
System Available Capacity	kL/d	346	346	648	1 296
System Input Value	kL/d	300	864	350	432
Capacity Utilisation	%	86.71%	249.71%	54.01%	33.33%
Resource Abstracted From		Boreholes	Ground water (Borehole)	Groundwater	Boreholes/Groundwater (Vaal Catchment)
BDRR 2023	%	16.74%	18.72%	18.85%	14.60%
BDRR 2022	%	69.20%	77.70%	68.50%	68.20%

Key Performance Area	Weight	Potchefstroom WTW	Tsetse Village (Borehole)	Ventersdorp WTW	Welgevonden Village (Borehole)
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	95.59%	72.81%	81.15%	68.61%
Blue Drop Score 2014	%	97.20%	10.42%	27.94%	18.37%
Blue Drop Score 2012	%	98.45%	36.59%	56.98%	52.79%
Blue Drop Score 2011	%	96.87%	28.88%	34.50%	36.88%
System Design Capacity	kL/d	93 600	173	14 000	648
System Available Capacity	kL/d	93 600	173	14 000	648
System Input Value	kL/d	53 000	173	9 000	216
Capacity Utilisation	%	56.62%	100.00%	64.29%	0.00%
Resource Abstracted From		Potchefstroom	Groundwater (Vaal Catchment)	Skoonspruit river	Ground water (Vaal Catchment)
BDRR 2023	%	27.13%	14.31%	25.80%	26.21%
BDRR 2022	%	13.90%	69.50%	35.70%	30.50%

Technical Site Assessment: Potchefstroom WTW - 94%

11.5 Kgetlengriver Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	**%**	**21.60%**
Blue Drop Score 2014	**%**	**17.62%**
Blue Drop Score 2012	**%**	**48.20%**
Blue Drop Score 2011	**%**	**24.67%**

Key Performance Area	Weight	Koster	Swartruggens
Bulk/WSP		-	-
Blue Drop Score 2023	%	**19.18%**	**25.63%**
Blue Drop Score 2014	%	21.96%	12.73%
Blue Drop Score 2012	%	46.78%	61.08%
Blue Drop Score 2011	%	35.53%	30.68%
System Design Capacity	kL/d	5 000	3 000
System Available Capacity	kL/d	5 000	3 000
System Input Value	kL/d	5 000	3 000
Capacity Utilisation	%	NI	NI
Resource Abstracted From		Koster Dam	Lindleyspoort Dam
BDRR 2023	%	97.93%	70.31%
BDRR 2022	%	93.10%	95.00%

Technical Site Assessment: Koster WTW - 44%

The Regulator notes the dire state of management and drinking water quality in the Koster and Swartruggens water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

11.6 Madibeng Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	50.64%
Blue Drop Score 2014	%	58.38%
Blue Drop Score 2012	%	57.90%
Blue Drop Score 2011	%	36.72%

Key Performance Area	Weight	Brits	Hartbeespoort - Schoemansville	Hartbeespoort - Rand Water
Bulk/WSP		-	-	Rand Water
Blue Drop Score 2023	%	37.80%	47.03%	87.14%
Blue Drop Score 2014	%	58.12%	59.90%	NA
Blue Drop Score 2012	%	63.04%	29.75%	NA
Blue Drop Score 2011	%	37.24%	33.66%	NA
System Design Capacity	kL/d	60 000	10 000	5 427 000
System Available Capacity	kL/d	60 000	8 000	5 427 000
System Input Value	kL/d	40 000	8 000	14 860
Capacity Utilisation	%	66.67%	NI	86.35%
Resource Abstracted From		Crocodile River	Hartbeespoort Dam	Vaal Dam
BDRR 2023	%	50.04%	35.76%	30.59%
BDRR 2022	%	80.50%	28.20%	34.10%

Technical Site Assessment: Schoemansville – 57%

11.7 Maquassi Hills Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	47.85%
Blue Drop Score 2014	%	62.74%
Blue Drop Score 2012	%	0.00%
Blue Drop Score 2011	%	0.00%

Key Performance Area	Weight	Leeudoringstad-Witpoort System	Tswellelang-Lebaleng System
Bulk/WSP		Sedibeng Water	Sedibeng Water
Blue Drop Score 2023	%	47.61%	47.93%
Blue Drop Score 2014	%	67.74%	73.37%
Blue Drop Score 2012	%	N/A	N/A
Blue Drop Score 2011	%	N/A	N/A
System Design Capacity	kL/d	360 000	360 000
System Available Capacity	kL/d	360 000	360 000
System Input Value	kL/d	3 344	9 475
Capacity Utilisation	%	58.33%	58.33%
Resource Abstracted From		Vaal River	Vaal River
BDRR 2023	%	58.24%	58.30%
BDRR 2022	%	79.90%	57.80%

Technical Site Assessment: Leeudoringstad reservoir and pumpstation - 36%

11.8 Matlosana Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	87.82%
Blue Drop Score 2014	%	77.29%
Blue Drop Score 2012	%	95.35%
Blue Drop Score 2011	%	95.38%

Key Performance Area	Weight	City of Matlosana
Bulk/WSP		Midvaal Water
Blue Drop Score 2023	%	87.82%
Blue Drop Score 2014	%	77.29%
Blue Drop Score 2012	%	95.35%
Blue Drop Score 2011	%	95.38%
System Design Capacity	kL/d	320 000
System Available Capacity	kL/d	250 000
System Input Value	kL/d	98 000
Capacity Utilisation	%	52.00%
Resource Abstracted From		Vaal
BDRR 2023	%	25.27%
BDRR 2022	%	41.40%

Technical Site Assessment: Midvaal Water Company WTW - 95%

11.9 Moretele Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	37.50%
Blue Drop Score 2014	%	57.49%
Blue Drop Score 2012	%	59.72%
Blue Drop Score 2011	%	33.08%

Key Performance Area	Weight	Moretele LM
Bulk/WSP		City of Tshwane MM, Magalies Water
Blue Drop Score 2023	%	37.50%
Blue Drop Score 2014	%	57.49%
Blue Drop Score 2012	%	59.72%
Blue Drop Score 2011	%	33.08%
System Design Capacity	kL/d	172 000
System Available Capacity	kL/d	162 000
System Input Value	kL/d	12 250
Capacity Utilisation	%	59.11%
Resource Abstracted From		Apies River and Roodeplaat Dam
BDRR 2023	%	67.30%
BDRR 2022	%	100.00%

Technical Site Assessment: Moretele WTW – 31%

11.10 Moses Kotane Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	69.25%
Blue Drop Score 2014	%	56.61%
Blue Drop Score 2012	%	68.59%
Blue Drop Score 2011	%	31.51%

Key Performance Area	Weight	Madikwe WTP	Molatedi WTP	Pella WTP	Vaalkop WTP
Bulk/WSP		-	-	-	Magalies Water
Blue Drop Score 2023	%	50.30%	53.87%	38.53%	70.79%
Blue Drop Score 2014	%	33.82%	19.14%	30.85%	65.56%
Blue Drop Score 2012	%	26.88%	21.43%	31.20%	69.25%
Blue Drop Score 2011	%	26.29%	28.34%	23.62%	31.78%
System Design Capacity	kL/d	2 600	600	1 400	270 000
System Available Capacity	kL/d	2 600	480	1 400	270 000
System Input Value	kL/d	1 810	341	968	45 000
Capacity Utilisation	%	69.62%	71.04%	69.14%	83.24%
Resource Abstracted From		Madikwe Dam	Molatedi Dam	Pella Dam	Vaalkop Dam
BDRR 2023	%	25.99%	24.00%	34.94%	36.35%
BDRR 2022	%	57.80%	49.40%	59.00%	68.60%

Technical Site Assessment: Madikwe WTW - 60%

11.11 Ngaka Modiri Molema District Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	36.74%
Blue Drop Score 2014	%	27.05%
Blue Drop Score 2012	%	40.72%
Blue Drop Score 2011	%	0.66%

Key Performance Area	Weight	Ditsobotla: Itsoseng B/H / Lichtenburg	Mafikeng BH +WTW + Mmabatho WTW	Ramotshere Moiloa: Dinokana + Lehurutshe	Ramotshere Moiloa: Motswedi + Gopane
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	35.43%	37.30%	32.90%	41.00%
Blue Drop Score 2014	%	33.72%	31.12%	34.71%	33.46%
Blue Drop Score 2012	%	57.84%	46.00%	34.04%	50.53%
Blue Drop Score 2011	%	5.14%	8.89%	NA	8.85%
System Design Capacity	kL/d	25 000	65 000	3 500	2 000
System Available Capacity	kL/d	25 000	65 000	3 500	2 000
System Input Value	kL/d	5 000	47 000	337	1 599
Capacity Utilisation	%	20.00%	72.35%	9.63%	79.95%
Resource Abstracted From		Crocodile West Catchment	Molopo + Grootfontein boreholes	Crocodile West Marico Catchment	Sebojwane Dam
BDRR 2023	%	42.29%	70.56%	36.07%	72.83%
BDRR 2022	%	76.80%	78.60%	84.80%	84.70%

Key Performance Area	Weight	Ratlou: Kraaipan BH
Bulk/WSP		-
Blue Drop Score 2023	%	15.70%
Blue Drop Score 2014	%	16.81%
Blue Drop Score 2012	%	12.33%
Blue Drop Score 2011	%	NA
System Design Capacity	kL/d	1 194
System Available Capacity	kL/d	1 194
System Input Value	kL/d	1 194
Capacity Utilisation	%	100.00%
Resource Abstracted From		Limpopo WMA in Crocodile West Marico Catchment
BDRR 2023	%	82.93%
BDRR 2022	%	95.74%

Technical Site Assessment: Mmabatho WTW – 88%

The Regulator notes the dire state of management and drinking water quality in the Ratlou: Kraaipan BH water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

11.12 Rustenburg Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	78.31%
Blue Drop Score 2014	%	86.15%
Blue Drop Score 2012	%	91.55%
Blue Drop Score 2011	%	93.24%

Key Performance Area	Weight	Rustenburg North	Vaalkop-Boitekong	Vaalkop North-La Patrie	Vaalkop South-Kortbegrip
Bulk/WSP		Magalies Water	Magalies Water	Magalies Water	Magalies Water
Blue Drop Score 2023	%	68.71%	68.02%	68.71%	70.48%
Blue Drop Score 2014	%	NA	77.47%	NA	NA
Blue Drop Score 2012	%	NA	88.75%	NA	NA
Blue Drop Score 2011	%	NA	93.60%	NA	NA
System Design Capacity	kL/d	282 000	270 000	270 000	270 000
System Available Capacity	kL/d	280 000	270 000	270 000	270 000
System Input Value	kL/d	13 179	10 500	3 500	2 700
Capacity Utilisation	%	97.57%	83.24%	83.24%	83.24%
Resource Abstracted From		Vaalkop & Bospoort Dams	Vaalkop Dam	Vaalkop Dam	Vaalkop Dam
BDRR 2023	%	43.01%	41.82%	50.35%	34.00%
BDRR 2022	%	64.30%	81.20%	72.90%	72.90%

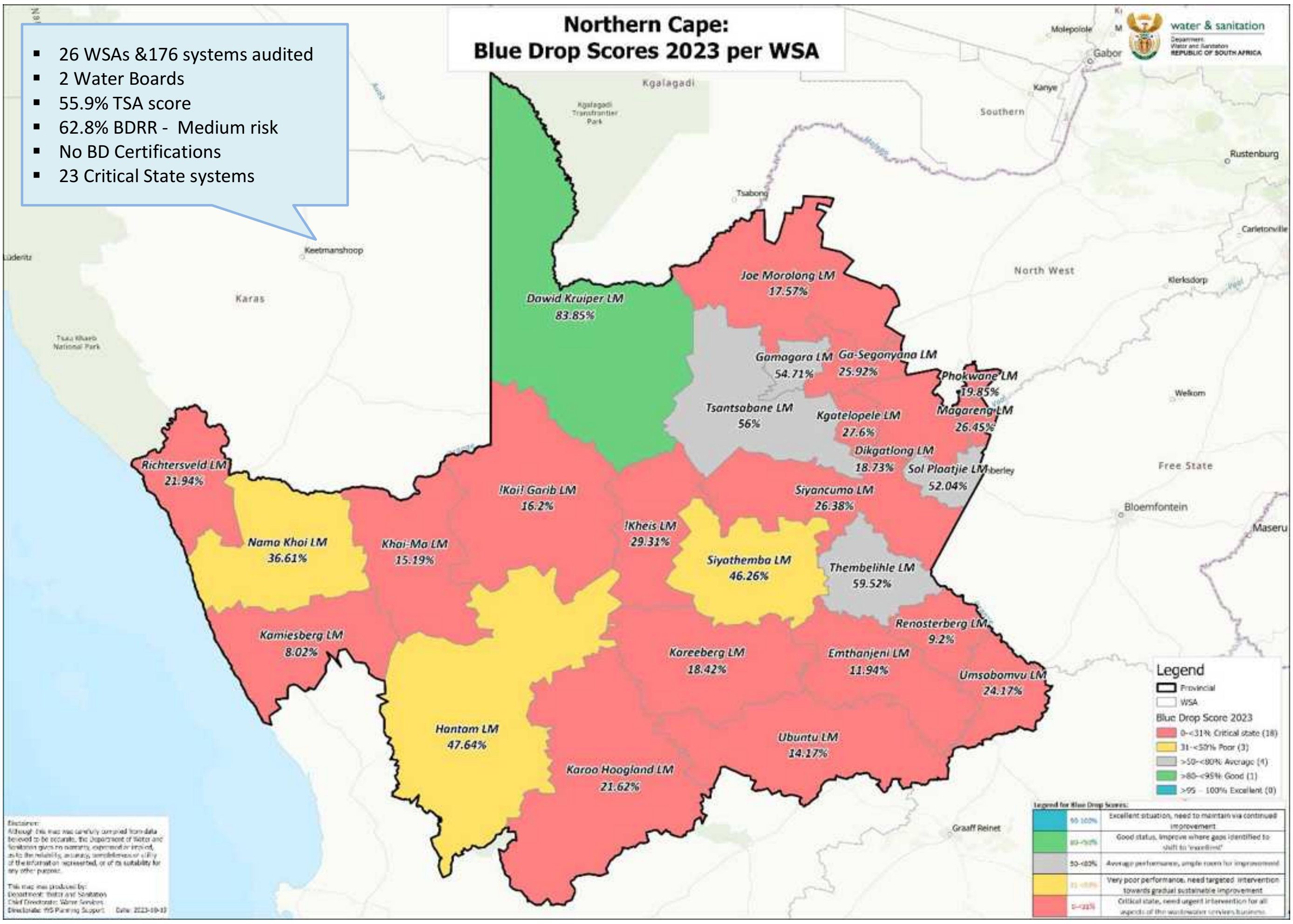
Key Performance Area	Weight	Rustenburg Kloof	Rustenburg Town
Bulk/WSP		-	Rand Water
Blue Drop Score 2023	%	81.24%	82.23%
Blue Drop Score 2014	%	NA	87.50%
Blue Drop Score 2012	%	NA	93.27%
Blue Drop Score 2011	%	NA	90.97%
System Design Capacity	kL/d	2 500	5 427 000
System Available Capacity	kL/d	2 200	5 427 000
System Input Value	kL/d	599	73 400
Capacity Utilisation	%	27.23%	86.35%
Resource Abstracted From		Dorp Spruit Dam	Vaal Dam
BDRR 2023	%	17.25%	39.95%
BDRR 2022	%	19.80%	39.80%

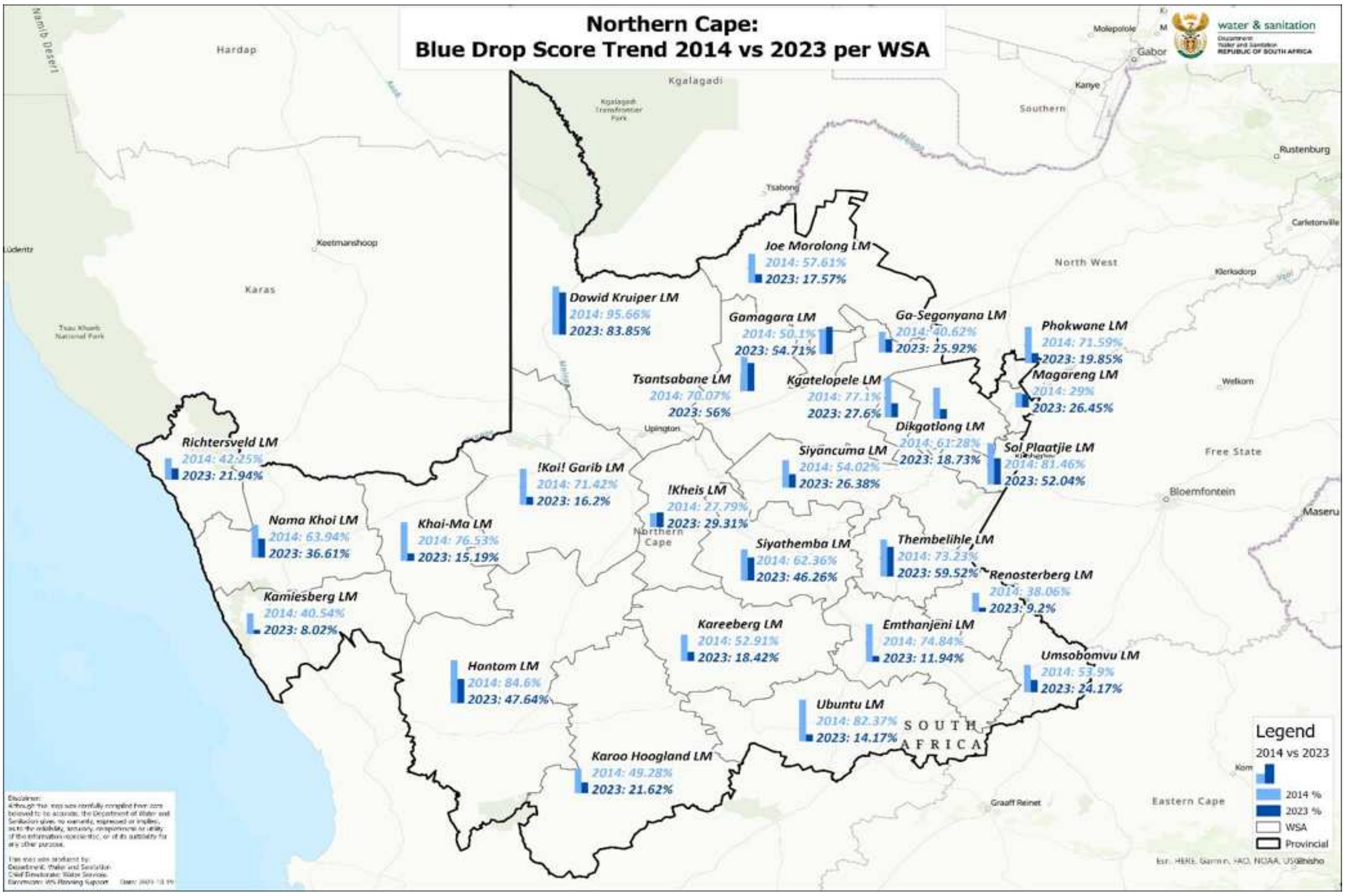
Technical Site Assessment: Bospoort WTW – 81%

George WTW: Construction underway to expand the water treatment capacity to meet the growing demand

Chemical dosing pumps at the new George WTW

- 26 WSAs &176 systems audited
- 2 Water Boards
- 55.9% TSA score
- 62.8% BDRR - Medium risk
- No BD Certifications
- 23 Critical State systems





Provincial Synopsis

The Northern Cape province provides drinking water to a total population of 1,129,644 persons in South Africa.

An audit attendance record of 100% of the 26 WSAs, with 176 water supply systems across the province and the 2 Water Board (Bloem Water and Sedibeng Water) affirms the province's commitment to the Blue Drop national incentive-based regulatory programme. Bloem Water has taken over the Sedibeng water supply systems and water treatment systems in the Free State and Northern Cape. It must be noted that Sedibeng Water was still in operation during the blue drop audit period and Bloem Water was not responsible for the respective systems over the audit period. Bloem Water has recently undergone a name change to Vaal Central Water (Government Gazette no. 48954 dated 13 July 2023). The main Bulk Water Supplier over the audit period was Sedibeng Water who supplies potable water to 22 water supply systems via the Vaal Gamagara, Henkries and Pelladrift WTWs owned by Sedibeng Water.

The Regulator determined that no water supply system scored more than 95% when measured against the Blue Drop standards and thus did not qualify for the prestigious Blue Drop Certification. In 2014, two water supply systems were awarded Blue Drop status. Using the 2014 audit results as comparative baseline, the province shows a decline in excellence for 2023.

Two (2) of 26 WSAs improved on their 2014 scores, namely !Kheis LM and Gamagara LM although Gamagara LM has improved it still falls within the risk category. The remaining 24 WSAs regressed to lower Blue Drop scores compared to their 2014 baselines. The Dawid Kruiper LM, Thembelihle LM and Tsantsabane LM are the best performing WSAs in the province. Excellent technical site assessment scores of 94% were achieved for the Vaal Gamagara and Calvinia WTWs, followed by the AH September WTW with a TSA score of 85%. 123 (of 176) water supply systems were identified to be in a critical state in the province compared with 34 water supply systems in 2014.

The province's overall Blue Drop performance is characterised by particular strengths when measured against the KPAs. Neither Sedibeng Water or the WSAs, with some exception for the Dawid Kruiper LM, stand out for its compliance, good practice and risk management practices that are well embedded in the water supply business. All five KPAs require attention and are reflecting scores below 50% - KPA 1 Capacity Management (38.0%), KPA 2 DWQ Risk Management (19.9%), KPA 3 Financial Management (23.8%), KPA 4 Technical Management (29.8%) and KPA 5 Drinking Water Quality Compliance (31.4%).

The provincial Blue Drop Risk Rating (BDRR) remained in the medium risk category but regressed from 51.5% in 2022 (BD PAT) to 62.8% in 2023. 71 (of 176) water supply systems are situated in the low risk category, 28 WSSs in the medium risk category, 29 WSSs in the high risk category, and 48 WSSs in the critical risk category.

The Regulator is optimistic that the 2023 Blue Drop report provides an updated residual basis from where a positive trajectory for water services delivery and improved performance will follow in the next BD audit. Municipalities and their service providers are encouraged to start preparation for the next Blue Drop audit cycle, which is planned to cover the financial year 2023/24 and released in 2025. The 2023 Blue Drop status for WSAs in the province are summarised in the table below.

Table 201 - 2023 Blue Drop Summary

WSA Name	2014 BD Score (%)	2023 BD Score (%)	2023 BD Certified ≥95%	2023 Critical State (<31%)
!Kai! Garib LM	71.42%	16.20%↓		All 16 WSSs
!Kheis LM	27.79%	29.31%↑		Gariep, Grootdrink, Wegdraai
Dawid Kruiper LM	95.66%	83.85%↓		
Dikgatlong LM	61.28%	18.73%↓		Barkley West, Windsorton
Emthanjeni LM	74.84%	11.94%↓		All 3 WSSs
Gamagara LM	50.10%	54.71%↑		Dibeng
Ga-Segonyana LM	40.62%	25.92%↓		23 of 24 WSSs
Hantam LM	84.60%	47.64%↓		
Joe Morolong LM	57.61%	17.57%↓		17 of 18 WSSs
Kamiesberg LM	40.54%	8.02%↓		All 16 WSSs
Kareeberg LM	52.91%	18.42%↓		All 3 WSSs
Karoo Hoogland LM	49.28%	21.62%↓		All 3 WSSs
Kgatelopele LM	77.10%	27.60%↓		Danielskuil
Khai-Ma LM	76.53%	15.19%↓		All 4 WSSs
Magareng LM	29.00%	26.45%↓		Warrenton
Nama Khoi LM	63.94%	36.61%↓		Buffelsrivier, Carolusberg, Goodhouse, Kommagas, Rooiwal, Vioolsdrift
Phokwane LM	71.59%	19.85%↓		Hartswater, Jan Kempdorp
Renosterberg LM	38.06%	9.20%↓		All 3 WSSs
Richtersveld LM	42.25%	21.94%↓		All 5 WSSs

WSA Name	2014 BD Score (%)	2023 BD Score (%)	2023 BD Certified ≥95%	2023 Critical State (<31%)
Siyancuma LM	54.02%	26.38%↓		All 4 WSSs
Siyathemba LM	62.36%	46.26%↓		Marydale
Sol Plaatjie LM	81.46%	52.04%↓		
Thembelihle LM	73.23%	59.52%↓		
Tsantsabane LM	70.07%	56.00%↓		Skeyfontein
Ubuntu LM	82.37%	14.17%↓		All 5 WSSs
Umsobomvu LM	53.90%	24.17%↓		All 3 WSSs
Totals	**-**	**-**	**0**	**123**

↑= improvement, ↓= regress, →= no change

The Department of Water and Sanitation acknowledges the excellence in water services management achieved for the Blue Drop Audit year of 2021-22. No Blue Drop Certificates are awarded in the Northern Cape Province.

Background to Water Delivery and Distribution Infrastructure

The total volume of water treated in the province is 338,721 kl/d. Twenty six (26) WSAs and One WBs (Sedibeng Water now Bloem Water with a new name change Vaal Central Water) are responsible for water services through a water network comprising of:

- 158 WTWs, boreholes, etc. with the bulk of the water treated and supplied by Sol Plaatje LM, Dawid Kruiper LM and Sedibeng Water to a total of 41 WSSs with a total Average Daily Production of 198,738 kl/d
- 22 WSSs in 7 WSAs are provided with bulk potable water via the Vaal Gamagara, Henkries and Pelladrift WTWs owned by Sedibeng Water
- 150 pump stations, 2,039 km bulk water supply lines, 764 km reticulation pipe lines, and 278 reservoirs/ towers (excluding many systems that were unable to provide data).

Table 202 - Summary of Capacities, Daily Production and SIV distribution according to plant sizes

	Micro Size Plants	Small Size Plants	Medium Size Plants	Large Size Plants	Macro Size Plants	Unknown (NI)*	Total
	<500 kl/day	500 - <2,000 kl/day	2,000 - <10,000 kl/day	10,000 - <25,000 kl/day	>25,000 kl/day		
No. of WTWs, Boreholes, Springs	59 (37%)	65 (41%)	28 (18%)	2 (1%)	4 (3%)		158
Total Design Capacity (kl/day)	13,492	58,990	136,164	57,000	305,000	None	570,646
Total Available Capacity (kl/day)	12,666	56,832	124,522	43,500	302,000	None	539,520
Average Daily Treatment Volume (kl/day)	5,939	34,027	85,395	28,082	185,278	31 NI	338,721
Total SIV (kl/day)	10,082	40,376	100,777	25,237	141,588	None	318,060
Design Capacity Utilisation (%)	44%	58%	63%	49%	61%		59%
Available Capacity Utilisation (%)	47%	60%	69%	65%	61%		63%

** "Unknown" means the number of WTWs with NI (No Information) on design capacity or available capacity or SIV*

The audit verified a total installed design capacity of 570,646 kl/d and a total available design capacity of 539,520 kl/d with most of this capacity residing in the medium and macro-sized water treatment plants. Collectively, the 158 WTWs produce 338,721 kl/d and distributes 318,060 kl/d across the water networks. By comparing the available treatment capacity with the average treated water volume, a spare treatment capacity of 200,799 kl/d is available (37%) to meet additional future demands. However, the WUE for the province is extremely high (ave. 392 l/p/d) compared to the international WUE benchmark of 180 l/p/d, indicating a high ratio between effective water use and actual water abstraction. Going forward, the province will have to dedicate significant resources to curb water losses and NRW.

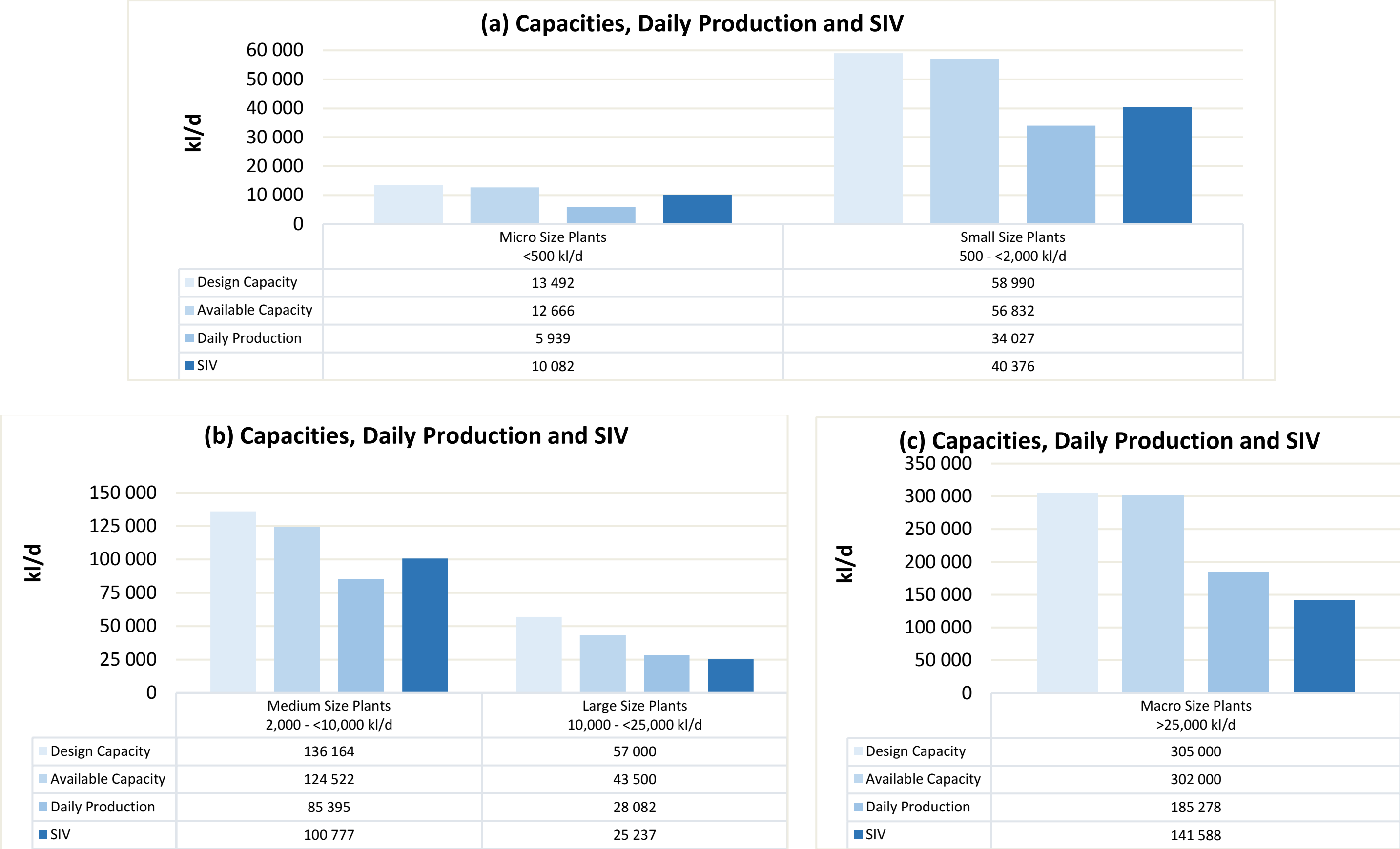


Figure 151 - Capacities, Daily Production and SIV Distribution - (a) micro to medium sized WTWs, (b) large WTWs, and (c) macro sized WTWs

In some cases, a Bulk Water Supplier supplies water across provincial borders and it is difficult to report accurately on design capacity and available capacity at provincial level, as the statistical data may become repetitive. Therefore, the reporting on the total system input volumes (SIV) would provide more accurate figures on the supply of treated water to the various water supply systems. The total SIV in the province is 318,060 kl/d and the average daily treatment volume is 338,721 kl/d and this indicates that the treated volume is more than the total SIV (106%) despite 31 WTWs and boreholes not measuring their average daily treatment volumes. The largest contributors to the total SIV for 41 WSSs are from Sol Plaatje LM, Dawid Kruiper LM and Sedibeng Water with a total SIV contribution of 198,738 kl/d (62%). Diagnostic no. 2 to follow herein will unpack these statistics in more detail.

The data shows that 11 WTWs daily average treatment volume exceeds the available design capacity. 7 WTWs have daily production volumes that exceed the authorised daily abstraction volumes.

The water distribution infrastructure is summarised in the table below.

Table 203 - Summary of Water Distribution Reticulation Infrastructure

WSA & WB Name	# WSS with no WSP/WB	# WSS with WSP/WB	Water Distribution Infrastructure			
			# Pump Stations (#)	Bulk Water Supply Lines (km)	Reticulation pipe lines (km)	# Reservoirs/ Towers
Bloem Water now Vaal Central Water (Sedibeng Water)	-	22	12	1,740.0	24.0	14
!Kai! Garib LM	16		18	41.0	0.5	20
!Kheis LM	7		10	NI	NI	17
Dawid Kruiper LM	11	6	31	87.0	356.8	38
Dikgatlong LM	2	2	4	2.0	NI	10
Emthanjeni LM	3		7	120.0	170.0	2
Gamagara LM	2	1	4	0.5	57.0	11
Ga-Segonyana LM	24		6	21.0	82.8	32
Hantam LM	6		NI	NI	NI	2
Joe Morolong LM	17	1	5	NI	NI	27
Kamiesberg LM	16		NI	NI	NI	NI
Kareeberg LM	3		4	NI	NI	3
Karoo Hoogland LM	3		NI	NI	NI	NI
Kgatelopele LM	1		2	3.0	62.0	2
Khai-Ma LM	3	1	2	0.0	0.0	7

WSA & WB Name	# WSS with no WSP/WB	# WSS with WSP/WB	Water Distribution Infrastructure			
			# Pump Stations (#)	Bulk Water Supply Lines (km)	Reticulation pipe lines (km)	# Reservoirs/ Towers
Magareng LM	1		3	1.7	11.2	9
Nama Khoi LM	5	10	NI	NI	NI	NI
Phokwane LM	3		2	NI	NI	7
Renosterberg LM	3		3	NI	NI	3
Richtersveld LM	5		NI	NI	NI	NI
Siyancuma LM	4		7	22.6	NI	12
Siyathemba LM	3		1	NI	NI	12
Sol Plaatjie LM	2		2	NI	NI	11
Thembelihle LM	2		3	NI	NI	13
Tsantsabane LM	4	1	19	NI	NI	11
Ubuntu LM	5		4	NI	NI	12
Umsobomvu LM	3		1	NI	NI	3
Totals	**154**	**22**	**150**	**2,038.8**	**764.3**	**278**

Provincial Blue Drop Analysis

The 100% response from the 26 WSAs audited demonstrates a firm commitment to progressive water services management in the province. Local Government reforms resulted in the merging of Khara Hais LM and Mier LM into Dawid Kruiper LM. Therefore, 26 WSAs were audited in 2023 compared to the 27 WSAs in 2014.

Table 204 - Blue Drop Comparative Analysis from 2012 to 2023

BLUE DROP COMPARATIVE ANALYSIS				
Performance Category	**2012**	**2014**	**2023**	**Performance trend 2014 and 2023**
Incentive-based indicators				
WSAs assessed (#)	27 (100%)	27 (100%)	26 (100%)	→
Water supply systems assessed (#)	143	173	176	↑
Blue Drop scores ≥50% (#)	68 (48%)	91 (53%)	23 (13%)	↓
Blue Drop scores <50% (#)	75 (52%)	82 (47%)	153 (87%)	↓
Blue Drop Certifications (#)	**1**	**2**	**0**	↓
Lowest Technical Site Assessment Score (%)	NA	23%	27%	↑
Highest Technical Site Assessment Score (%)	NA	100%	94%	↓

NA = Not Applied NI = No Information ↑= improvement, ↓= regress, →= no change

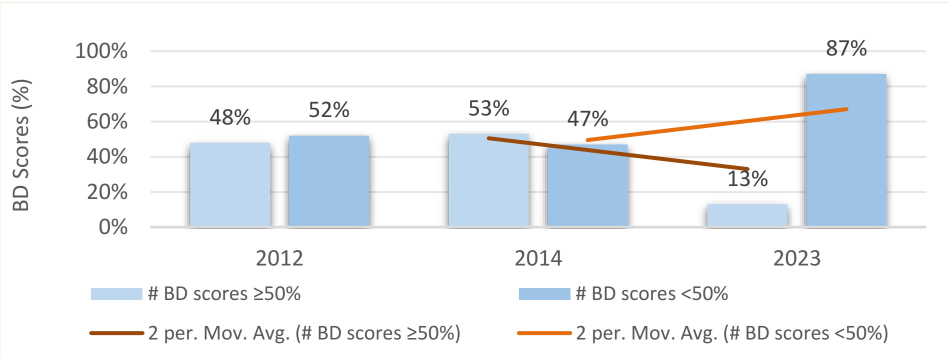
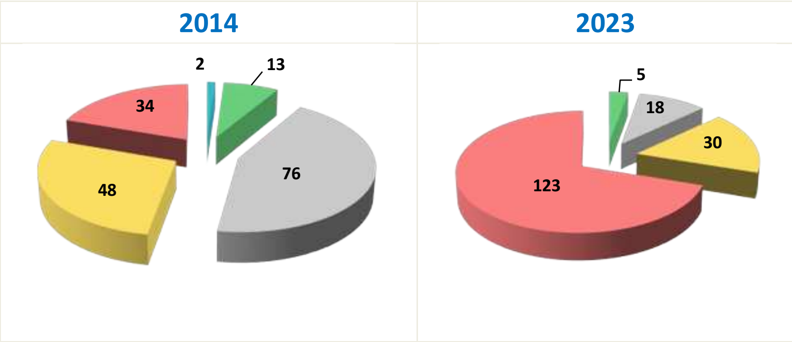


Figure 152 - Blue Drop trend analysis over the period 2012 to 2023, indicating the percentage BD scores above and below 50%

The trend analysis indicates that:

- The no. of systems audited has increased from 173 in 2014 to 176 in 2023
- The no. of systems with BD scores of ≥50% decreased from 91 (53%) in 2014 to 23 (13%) in 2023
- This trend was reversed with no. of systems with a BD score of ≤50% increasing from 82 (47%) in 2014 to 153 (87%) in 2023
- Blue Drop Certifications decreased from 2 awards in 2014 to no awards in 2023
- The lowest TSA score increased from 23% in 2014 to 27% in 2023, with the highest TSA score decreasing from 100% in 2014 to 94% in 2023
- The overall performance trend indicates a regression from 2014 to 2023

- This negative trajectory reinforces the need for regular audits to ensure timely turnaround and continued improvement
- The negative trend also implies that performance has declined in the absence of regulatory engagement of the BD audits between 2014 to 2023.



>95 – 100% Excellent	
>80-<95% Good	
>50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

Figure 153 - No. WSSs in the Blue Drop score categories for 2014 and 2023 (graph legend to right)

Comparative analysis of the 2014 and 2023 blue drop scores, indicates that most of the system scores are in the <31% (*Critical Performance*) category followed by the >31-<50% (*Poor Performance*) category. It is very concerning that 123 systems in 2023 reside in *Critical Performance* category.

In summary, trend analysis since 2014 to 2023 indicate as follows:

- Systems in a 'critical state' are 123
- Systems in a 'poor state' decreased from 48 systems to 30 systems
- Systems in an 'average state' decreased from 76 systems to 18 systems
- Systems in the 'good state' decreased from 13 systems to 5 systems
- Systems in the 'excellent state' decreased from 2 systems to 0 systems.

Provincial BDRR Analysis

The Blue Drop Risk Rating (BDRR) analysis assesses the risk across the entire water supply network. The BDRR formular was updated in 2021 to include an added risk indicator, i.e. 'E: Water Safety Plans', to address the risk assessment requirements outlined in SANS 241 of 2015. The BDRR now contains 5 risk indicators, i.e. design capacity (A), operational capacity (B), water quality compliance (C), technical capacity (D), and water safety plans (E). The results from the BDRR analyses are summarised in the table and figure following.

Table 205 - Municipal BDRR/BDRRmax Comparative Analysis from 2022 and 2023

BDRR/$BDRR_{max}$ COMPARATIVE ANALYSIS									
WSA Name	# WSSs	# WBs/ WSPs	2022 (BD PAT)	2023 (BD Audit)	Performance Trend 2022 and 2023	BDRR Risk Category Split			
						0-<50%	50-<70%	70-<90%	90-100%
!Kai! Garib LM	16		46.0%	69.4%	↓	4	2	10	
!Kheis LM	7		56.4%	51.7%	↑	4	2	1	
Dawid Kruiper LM	17	6	25.8%	45.9%	↓	14	2	1	
Dikgatlong LM	4	2	63.4%	72.6%	↓		1	2	1
Emthanjeni LM	3		55.1%	99.4%	↓				3
Gamagara LM	3	1	56.5%	40.4%	↑	2			1
Ga-Segonyana LM	24		45.1%	47.9%	↓	14	4	4	2
Hantam LM	6		19.6%	27.5%	↓	6			
Joe Morolong LM	18	1	61.3%	84.2%	↓			1	17
Kamiesberg LM	16		55.4%	94.6%	↓				16
Kareeberg LM	3		23.9%	38.2%	↓	3			
Karoo Hoogland LM	3		31.6%	53.0%	↓	1	1	1	
Kgatelopele LM	1		89.2%	68.4%	↑		1		
Khai-Ma LM	4	1	73.0%	85.5%	↓			1	3
Magareng LM	1		72.1%	75.7%	↓			1	
Nama Khoi LM	15	10	29.3%	48.1%	↓	8	6	1	
Phokwane LM	3		41.3%	51.4%	↓	1		2	
Renosterberg LM	3		63.8%	94.6%	↓			1	2
Richtersveld LM	5		97.3%	46.6%	↑	3			2
Siyancuma LM	4		59.5%	56.6%	↑		3	1	
Siyathemba LM	3		22.6%	40.8%	↓	1	2		
Sol Plaatjie LM	2		58.8%	48.5%	↑	2			
Thembelihle LM	2		25.7%	24.8%	↑	2			

BDRR/BDRR$_{max}$ COMPARATIVE ANALYSIS									
WSA Name	# WSSs	# WBs/ WSPs	2022 (BD PAT)	2023 (BD Audit)	Performance Trend 2022 and 2023	BDRR Risk Category Split			
						0-<50%	50-<70%	70-<90%	90-100%
Tsantsabane LM	5	1	50.0%	41.4%	↑	4			1
Ubuntu LM	5		55.9%	71.7%	↓		3	2	
Umsobomvu LM	3		60.5%	38.4%	↑	2	1		
Totals & %BDRR/BDRR$_{max}$	**176**	**22**	**51.5%**	**62.8%**	↓	**71**	**28**	**29**	**48**

↑= improvement, ↓= regress, →= no change

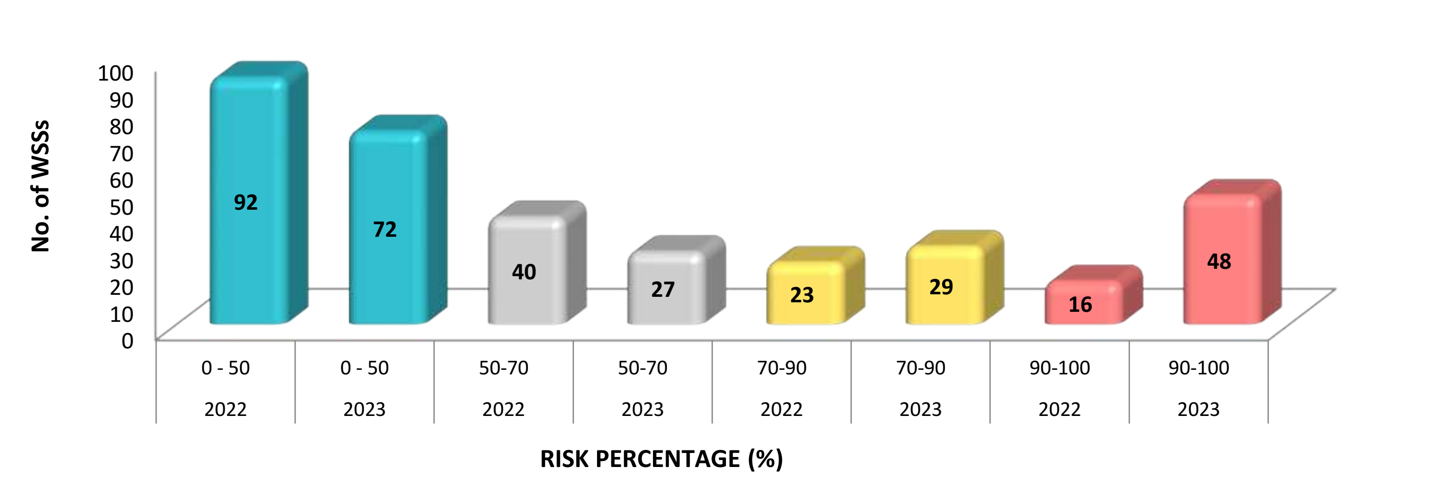
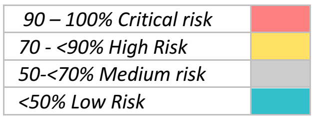


Figure 154 - a) WSS risk distribution and trends for 2022 and 2023; b) Colour legend



Trend analysis of the BDRR ratings for 2022 and 2023 indicates that:

- The 2023 audit cycle highlighted a progressive shift with a decrease in the no. of low risk WSSs (92 to 72), a decrease in the medium risk WSSs (40 to 27), an increase in high risk WSSs (23 to 29), and an increase in critical risk WSSs (16 to 48).

Regulatory Enforcement

Water supply systems which fail to achieve the minimum Blue Drop target of 31%, are placed under regulatory focus. The Regulator requires these WSAs to submit a detailed corrective action plan (CAP) within 20 working days from publishing of this report. 123 WSSs received Blue Drop scores below 31%, hence are placed under **regulatory surveillance**, in accordance with the Water Services Act (108 0f 1997).

DWS together with COGTA will through the grant allocation systems ensure priority is given to application of grants to rectify/restore the water services treatment and supply shortcomings identified in this report.

Table 206 - WSSs with <31% Blue Drop scores

WSA Name	2023 BD Score	WSSs with <31% score
!Kai! Garib LM	16.20%	All 16 WSSs
!Kheis LM	29.31%	Gariep, Grootdrink, Wegdraai
Dikgatlong LM	18.73%	Barkley West, Windsorton
Emthanjeni LM	11.94%	All 3 WSSs
Gamagara LM	54.71%	Dibeng
Ga-Segonyana LM	25.92%	23 of 24 WSSs
Joe Morolong LM	17.57%	17 of 18 WSSs
Kamiesberg LM	8.02%	All 16 WSSs
Kareeberg LM	18.42%	All 3 WSSs
Karoo Hoogland LM	21.62%	All 3 WSSs
Kgatelopele LM	27.60%	Danielskuil
Khai-Ma LM	15.19%	All 4 WSSs
Magareng LM	26.45%	Warrenton
Nama Khoi LM	36.61%	Buffelsrivier, Carolusberg, Goodhouse, Kommagas, Rooiwal, Vioolsdrift
Phokwane LM	19.85%	Hartswater, Jan Kempdorp

WSA Name	2023 BD Score	WSSs with <31% score
Renosterberg LM	9.20%	All 3 WSSs
Richtersveld LM	21.94%	All 5 WSSs
Siyancuma LM	26.38%	All 4 WSSs
Siyathemba LM	46.26%	Marydale
Tsantsabane LM	56.00%	Skeyfontein
Ubuntu LM	14.17%	All 5 WSSs
Umsobomvu LM	24.17%	All 3 WSSs
Totals	**22 WSAs**	**123 of 176 (70%)**

The following WSAs and their associated water treatment systems are in high and/or critical BDRR risk positions, which means that some or all the risk indicators are in a precarious state, i.e. operational capacity, design capacity utilisation, water quality compliance, technical capacity, and water safety plans. WTWs in high risk and critical risk positions pose a serious risk to public health. The following WSAs will be required to assess their risk contributors and to provide corrective measures in the above mentioned action plans to mitigate these risks.

Table 207 - %BDRR/BDRR$_{max}$ scores and WSSs in critical and high-risk space

WSA Name	2023 Average %BDRR/BDRRmax	WSSs in critical and high-risk space	
		Critical Risk (90-100%)	High Risk (70-<90%)
!Kai! Garib LM	69.4%		Alheit, Bloemsmond, Cillie, Eendiun, Keimoes, Lennertsville, Lutzburg, Marchand, Riemvasmaak-Sending, Soverby
!Kheis LM	51.7%		Wegdraai
Dawid Kruiper LM	45.9%		Philandersbron
Dikgatlong LM	72.6%	Windsorton	Barkley West, Koopmansfontein
Emthanjeni LM	99.4%	Britstown, De Aar, Hanover	
Gamagara LM	40.4%	Dibeng	
Ga-Segonyana LM	47.9%	Lokaleng, Thamoyanche	Bankhara-Bodulong, Mokalamosesane, Mothibistad, Sedibeng
Joe Morolong LM	84.2%	Bothetheletsa, Bothithong, Churchill, Dithakong, Gasehunelo, Gasese, Heiso, Kikahela, Laxey, Maipeng, Mamatwan/ Hotazel, Manyeding, Manyeding Lower, Metsetswaneng, Tsineng, Van Zylsrus, Ward 1 Heuningvlei	Hotazel
Kamiesberg LM	94.6%	Garies, Hondeklipbaai, Kamassies, Kamieskroon, Kharkams, Kheis, Klipfontein, Koiingnaas, Leliefontein, Lepelfontein, Nourivier, Paulshoek, Rooifontein, Soebatsfontein, Spoegrivier, Tweerivier	
Karoo Hoogland LM	53.0%		Sutherland
Khai-Ma LM	85.5%	Onseepkans (Melkbosrand), Onseepkans (RK), Witbank	Pofadder/Aggeneys (Pelladrift)
Magareng LM	75.7%		Warrenton
Nama Khoi LM	48.1%		Carolusberg
Phokwane LM	51.4%		Hartswater, Jan Kempdorp
Renosterberg LM	94.6%	Phillipstown, Vanderkloof	Petrusville (from Vanderkloof)
Richtersveld LM	46.6%	Vanderkloof, Sanddrift	
Siyancuma LM	56.6%		Schmidtsdrift
Tsantsabane LM	41.4%	Skeyfontein	
Ubuntu LM	71.7%		Merriman, Victoria West
Totals		**48 of 176 (27%)**	**29 of 176 (16%)**

Good practice risk management requires that the Water Safety Plans (WaSPs) are informed by meaningful Process and Condition Audits, supported by zealous implementation of corrective measures and ongoing monitoring of risk movement. Hantam LM, Kareeberg LM, Kgatelopele LM, Siyathemba LM, Sol Plaatjie LM, Umsobomvu LM and Thembelihle LM have no systems in the high or critical risks positions. The remaining WSAs all have water supply systems in the high and critical risk positions with Joe Morolong LM and Kamiesberg LM having the highest number of systems (16 and 17 respectively) in the critical risk positions.

Performance Barometer

The **Blue Drop Performance Barometer** on the following page presents the individual WSA Blue Drop Scores, which essentially reflects the level of mastery that a WSA has achieved in terms of its overall water services business. The bar chart below compares the 2014 and 2023 BD scores, ranked from highest to lowest performing WSA in 2023. Only Dawid Kruiper achieved a good performance municipal blue drop score, followed by Thembelihle LM, Tsantsabane LM, Gamagara LM and Sol Plaatjie LM who achieved an average performance municipal blue drop scores where Gamagara LM was the only WSA to slightly improve on their 2014 municipal blue drop score. The remaining 21 WSAs achieved municipal blue drop scores <50% (poor and critical performance categories).

The BDRR Risk Barometer on the following page expresses the level of risk that a WSA poses in respect of its water supply system. The schematic below presents the BDRR in ascending order – with the low-risk WSAs on the left and higher risk WSAs to the far right. The analysis reveals that there are 6 medium, 5 high or 3 critical risk WSAs in the province. 12 WSAs are situated in the low risk positions.

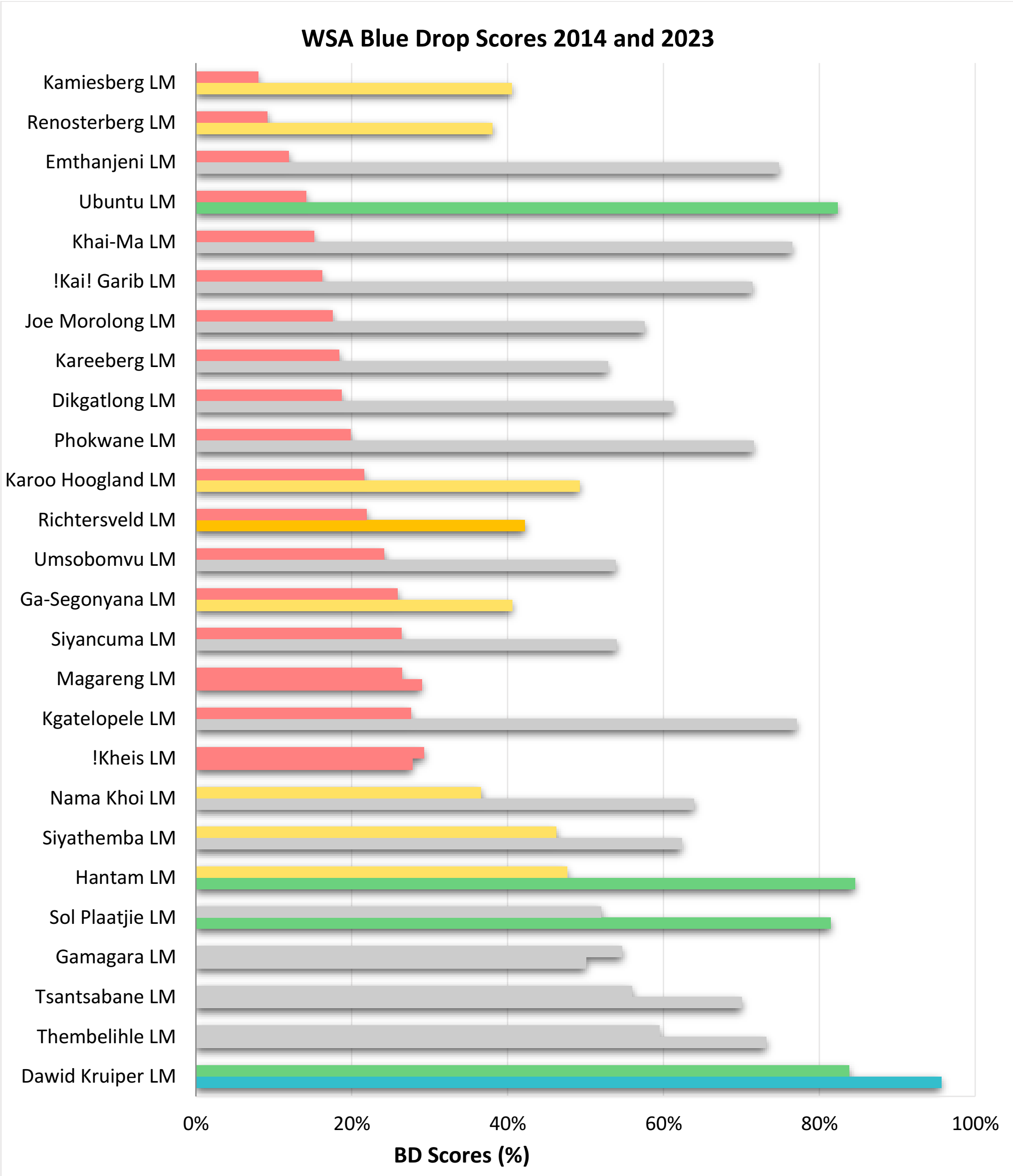


Figure 155 - a) Blue Drop scores 2014 (bar bottom) and 2023 (bar top); b) Colour legend

>95 – 100% Excellent	
>80-<95% Good	
>50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

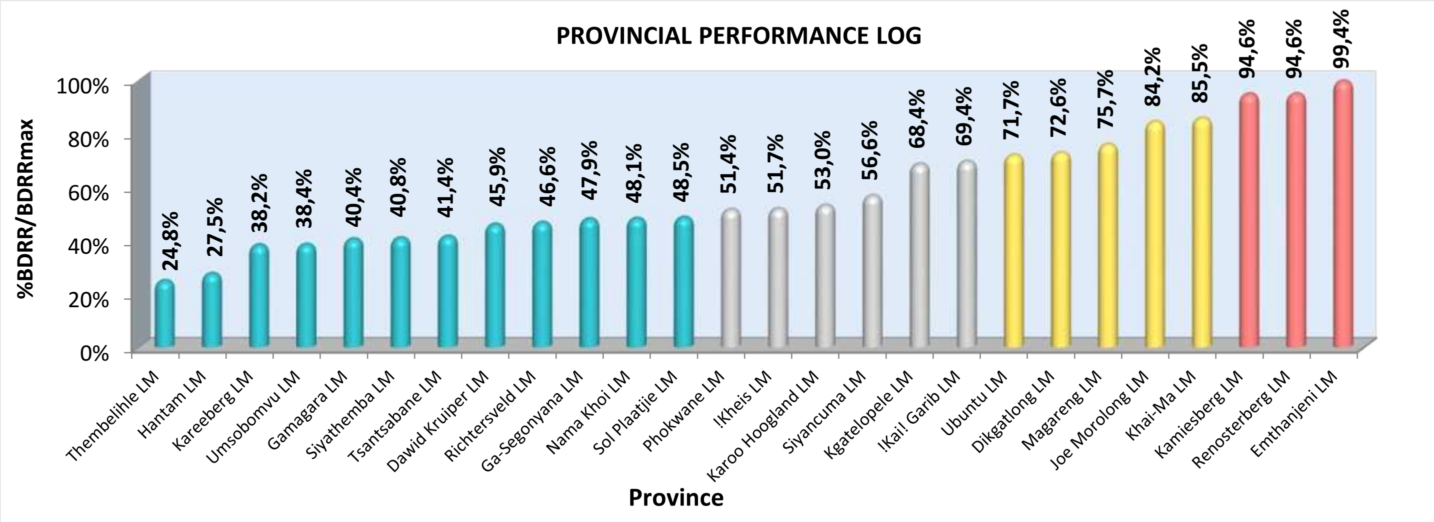


Figure 156 - a) %BDRR/BDRR$_{max}$ Risk Performance Log 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Provincial Best Performers

The **Dawid Kruiper Local Municipality [Bloem Water now Vaal Central Water (Sedibeng Water)]** is the **BEST PERFORMING WSA** in the province, based on the following record of excellence:

- ✓ 2023 Blue Drop Score of 83.85%
- ✓ 2014 Blue Drop Score of 95.66%
- ✓ Regression on the BDRR from 25.8% in 2022 to 45.9% in 2023
- ✓ 14 systems (82%) in the low risk position
- ✓ TSA score of 85% for AH September WTW

The **Thembelihle Local Municipality** is the second-best scoring WSA:

- ✓ 2023 Blue Drop Score of 59.52%
- ✓ 2014 Blue Drop Score of 73.23%
- ✓ Improvement on the BDRR from 25.7% in 2022 to 24.8% in 2023
- ✓ 2 systems (100%) in low risk position
- ✓ TSA score of 75% for Hopetown WTW

The **Tsantsabane Local Municipality [Bloem Water now Vaal Central Water (Sedibeng Water)]** is the third-best scoring WSA:

- ✓ 2023 Blue Drop Score of 56.0%
- ✓ 2014 Blue Drop Score of 70.07%
- ✓ Improvement on the BDRR from 50.0% in 2022 to 41.4% in 2023
- ✓ 4 systems (80%) in low risk positions
- ✓ TSA score of 94% for Vaal Gamagara WTW

KPA Diagnostics

The BD audit process collects a vast amount of data that yield valuable insight into the state of the water services delivery and water quality in each province. Five focus areas or 'diagnostics' have been configured from the 2021/22 audit data and are discussed below.

Table 208 - Summary of the key diagnostic themes and reference to the respective Blue Drop KPAs

Diagnostic #	Diagnostic Description	Diagnostic Reference
1	**Technical Competence**	KPA 1, 2 & Bonus
2	**Treatment Capacity and Flow Distribution**	KPA 4 & Generic Audit data set
3	**Drinking Water Quality (DWQ) Monitoring and Compliance**	KPA 2 & 4 & Bonus
4	**Technical Site Assessments**	TSA and 2023 Blue Drop Watch Report
5	**Operation, Maintenance and Refurbishment of Assets**	KPA 3 & 4

Diagnostic 1: Technical Competence

Aim: This focus area assesses the technical human resources capacity that is available to manage and operate water treatment processes and maintain the related water infrastructure. Theory advocates that a correlation exists between human resources capacity and capability (sufficient number of appropriately qualified staff) and a WSI's performance. Thus, it is hypothesised that high HR capacity would translate to compliant water treatment plants and functional water supply network. Blue Drop assesses technical compliance on two levels: i) WTW plant supervision and process control staff and ii) Technical, scientific and maintenance staff.

(i) Plant Supervisors and Process Controllers

Findings: According to regulations, water treatment plants are classified as Class A, B, C, D or E plants. Similarly, Process Controllers and Plant Supervisors are registered as Class I, II, III, IV, V or VI Process Controllers. Higher classed plants require a higher level of Process Controllers due to technology complexity and strict water quality standards. Technical compliance of PCs and Supervisors is determined against the Blue Drop standards, as defined by Reg. 2834 of the Water Act 1956 (Act 54 of 1956) for the erection, enlargement, operation, and registration of water care works and draft Reg. 813 of the Water Services Act (No 108 of 1997). Regulation 2834 has been replaced by Regulation 3630 in 2023 but will only come in effect during the next Blue Drop audit cycle.

Table 209 - No. compliant versus shortfall in Supervisor and Process Controller staff

WSA & WB Name	# WTWs	# WSSs	# Available Compliant Staff			Staff Shortfall		Ratio*	2023 BD Score (%)
			PCs	Supervisor	Total	PCs	Supervisor		
Bloem Water now Vaal Central Water (Sedibeng Water)	3	22	10	3	13	3	1	4.3	42.32% ave.
!Kai! Garib LM	16	16	0	15	15	38	0	0.9	16.20%
!Kheis LM	7	7	0	6	6	20	0	0.9	29.31%
Dawid Kruiper LM	11	17	10	16	26	16	0	2.4	83.85%
Dikgatlong LM	2	4	2	0	2	6	1	1.0	18.73%
Emthanjeni LM	3	3	0	0	0	6	1	0.0	11.94%
Gamagara LM	3	3	2	0	2	8	1	0.7	54.71%
Ga-Segonyana LM	22	24	0	0	0	50	2	0.0	25.92%
Hantam LM	6	6	4	0	4	9	1	0.7	47.64%
Joe Morolong LM	18	18	0	0	0	36	2	0.0	17.57%
Kamiesberg LM	16	16	0	0	0	32	2	0.0	8.02%
Kareeberg LM	3	3	0	0	0	6	1	0.0	18.42%
Karoo Hoogland LM	3	3	0	0	0	6	1	0.0	21.62%
Kgatelopele LM	1	1	0	0	0	2	1	0.0	27.60%
Khai-Ma LM	3	4	0	0	0	6	1	0.0	15.19%
Magareng LM	1	1	4	1	5	0	0	5.0	26.45%
Nama Khoi LM	5	15	0	1	1	10	1	0.2	36.61%
Phokwane LM	3	3	3	2	5	8	0	1.7	19.85%
Renosterberg LM	2	3	0	0	0	2	1	0.0	9.20%
Richtersveld LM	5	5	0	0	0	10	1	0.0	21.94%
Siyancuma LM	4	4	2	4	6	8	0	1.5	26.38%
Siyathemba LM	3	3	4	0	4	3	1	1.3	46.26%
Sol Plaatjie LM	2	2	2	0	2	6	1	1.0	52.04%
Thembelihle LM	3	2	8	0	8	0	1	2.7	59.52%
Tsantsabane LM	5	5	0	4	4	10	0	0.8	56.00%
Ubuntu LM	5	5	0	0	0	10	1	0.0	14.17%
Umsobomvu LM	3	3	1	0	1	7	1	0.3	24.17%

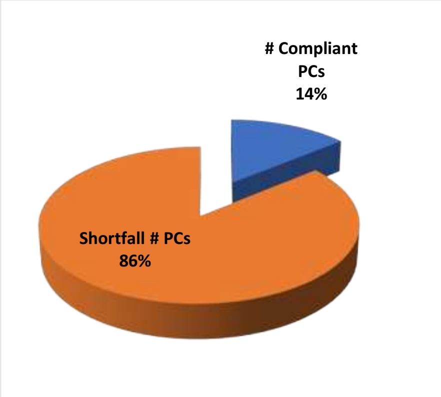
WSA & WB Name	# WTWs	# WSSs	# Available Compliant Staff			Staff Shortfall		Ratio*	2023 BD Score (%)
			PCs	Supervisor	Total	PCs	Supervisor		
Totals	**158**	**176**	**52**	**52**	**104**	**318**	**23**		

** Ratio depicts the no. of qualified staff divided by the no. of WTWs operated by this no. of staff. E.g., Dawid Kruiper has 26 compliant Sups + PCs, divided by 11 WTWs = 2.4 qualified staff per WTW*

NB: The Supervisor totals will be inflated as it is not possible to differentiate between which Supervisors are shared/ roaming with other Class C to E WTWs

Note: "Compliant staff" means qualified and registered staff that meets the BD standard for a particular Class Works. "Staff shortfall" means staff that do not meet the BD standard for a particular Class of works (+1 for a shift) and/or staffing gaps exist at the respective WTWs.

Competent human resources are vital enablers in ensuring efficient and sustainable management of water services and delivery of safe water quality to consumers. For the province in general, the operational competencies are found to be excellent for the Supervisory staff and predominantly excellent for the PCs in 2 of the 26 municipalities as illustrated in the table above.



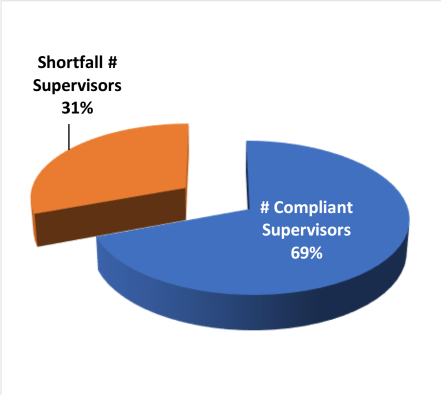


Figure 157 - Schematic illustration of compliant and shortfall of Supervisors (a) and Process Controllers (b)

Plant Supervisors: The pie charts indicate that 69% (52 of 75) of Plant Supervisors complies with the Blue Drop standard, with 23 shortfalls.

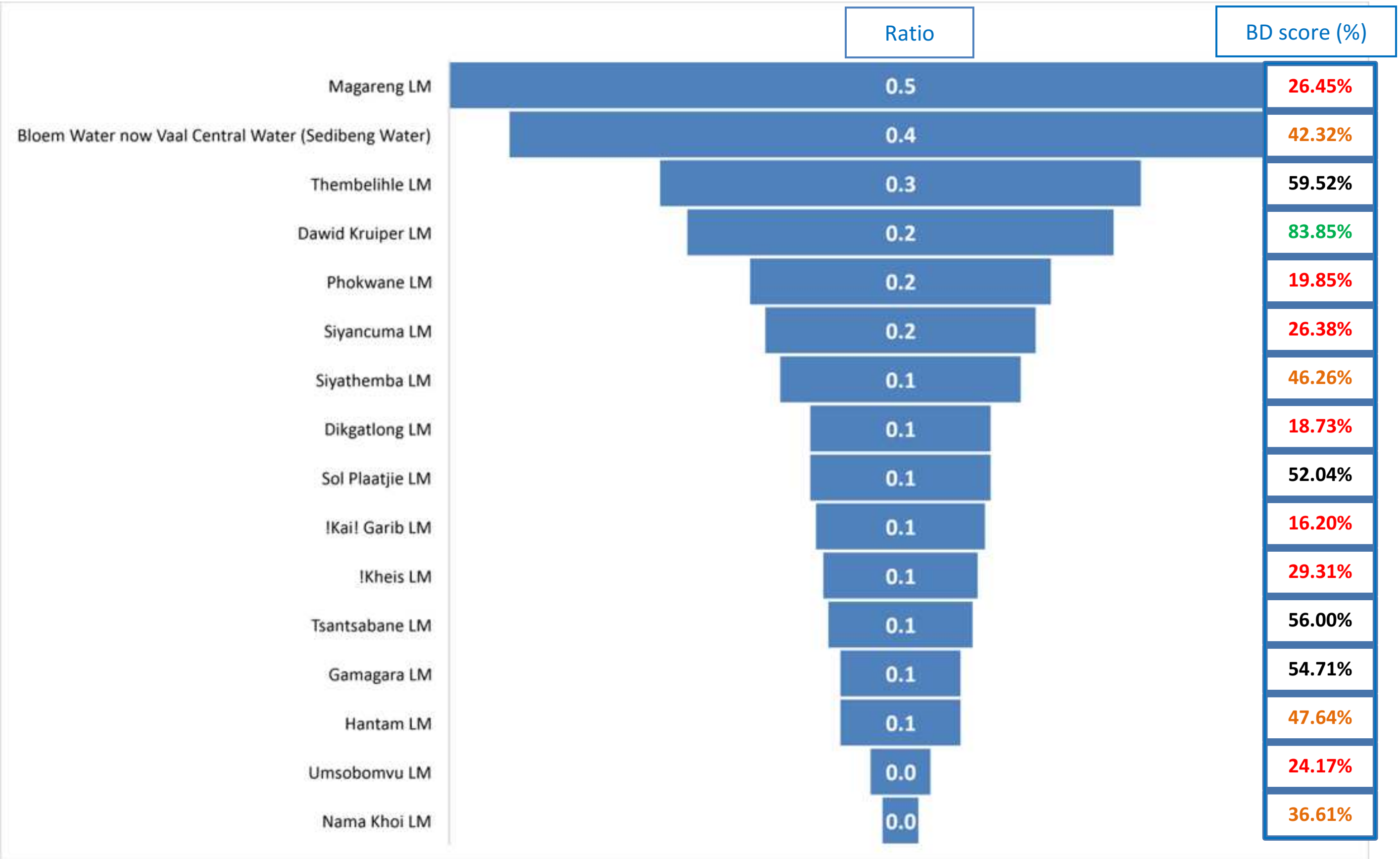
Process Controllers: Similarly, 14% (52 of 360) of the PC staff complies with the required standards, noting a zero shortfall for Magareng LM and Thembelihle LM. There is an 86% (318 of 360) shortfall in Process Controllers with the highest shortfall in Ga-Segonyana LM, Joe Morolong LM and Kamiesberg LM (2 each).

Blue Drop standards require of Class A and B plants to employ dedicated Supervisors per WTW and Process Controllers per shift per works, whereas Class C to E plants may share Supervisory staff across works. Shifts have been introduced to ensure optimal operations while addressing security risks, particularly as it relates to theft and vandalism. Telemetry also reduces the requirement for on-site staff during night shifts, but these relaxations have to be done within the DWS regulatory guidelines.

The Regulator expects correlation between the competence of an operational team and the performance of a WTW, as measured by the BD score. The data indicates as follows:

- 11 WSAs and Bloem Water now CSV (Sedibeng) have qualified PCs in place, with the exception of WTWs in 15 WSAs with no qualified PCs
- 8 WSAs and Bloem Water now CSV (Sedibeng) have qualified Supervisors in place, with the exception of WTWs in 18 WSAs with no qualified PCs. It should be noted that the qualified Supervisory staff totals will be inflated as it is not possible to differentiate between what Supervisors are shared/ roaming with other Class C to E WTWs

It is expected that a correlation would exist between the competence of an operational team and the performance of a water treatment works, as measured by the BD score. The results from the ratio analysis indicate high ratios for only 4 WSAs with WTWs. Overall, the comparative bar chart below confirms a reasonably close correlation between Thembisile LM and Dawid Kruiper LM with medium-to-high ratios (>2.0) and medium-high BD scores (ranging from 59% to 83%) Extreme variations are noted when comparing the ratios against the BD scores respectively.



Note: Emthanjeni LM, Ga-Segonyana LM, Joe Morolong LM, Kamiesberg LM, Kareeberg LM, Karoo Hoogland LM, Kgatelopele LM, Khai-Ma LM, Renosterberg LM, Richtersveld LM and Ubuntu LM were excluded from the schematic as their ratios were all 0.0

Figure 158 - Ratio of compliant operational staff to no. of WTWs and Comparison of Ratios with BD scores

(ii) Technical, Scientific and Maintenance staff

In addition to operational capacity (above), good management practice also requires access to qualified engineers, technicians, technologists, MISA appointees, scientists, and maintenance capability (below). Such competencies could reside in-house or accessible through term contracts and external specialists.

Table 210 - Summary of the maintenance capacity and no. of qualified and shortfall of Engineering, Technical and Scientific staff

WSA & WB Name	# WTWs	# WSSs	Maintenance Arrangement
Bloem Water now Vaal Central Water (Sedibeng Water)	3	22	Internal Team (only); Internal+Specific Outsourcing; Partially Capacitated
!Kai! Garib LM	16	16	Internal+Specific Outsourcing
!Kheis LM	7	7	Inadequate Capacity; Partially Capacitated
Dawid Kruiper LM	11	17	Internal Team (only)
Dikgatlong LM	2	4	Internal+Specific Outsourcing; Internal Team (only); Partially Capacitated
Emthanjeni LM	3	3	Internal Team (only)
Gamagara LM	3	3	Internal Team (only)
Ga-Segonyana LM	22	24	Internal+Specific Outsourcing; Internal Team (only); Inadequate Capacity
Hantam LM	6	6	Internal+Specific Outsourcing
Joe Morolong LM	18	18	Internal Team (only)
Kamiesberg LM	16	16	Internal+Specific Outsourcing
Kareeberg LM	3	3	Internal Team (only)
Karoo Hoogland LM	3	3	Internal+Specific Outsourcing
Kgatelopele LM	1	1	No Capacity
Khai-Ma LM	3	4	Inadequate Capacity
Magareng LM	1	1	Inadequate Capacity
Nama Khoi LM	5	15	Internal+Specific Outsourcing; Internal Team (only)
Phokwane LM	3	3	Internal Team (only); No Capacity
Renosterberg LM	2	3	Internal+Specific Outsourcing; Internal Team (only)
Richtersveld LM	5	5	Internal+Specific Outsourcing
Siyancuma LM	4	4	Partially Capacitated; Inadequate Capacity
Siyathemba LM	3	3	Internal Team (only)
Sol Plaatjie LM	2	2	Internal Team (only); Internal+Term Contract
Thembelihle LM	3	2	Partially Capacitated; Inadequate Capacity

WSA & WB Name	# WTWs	# WSSs	Maintenance Arrangement
Tsantsabane LM	5	5	Internal+Specific Outsourcing; Internal Team (only); Internal+Term Contract
Ubuntu LM	5	5	No Capacity
Umsobomvu LM	3	3	No Capacity
Totals	**158**	**176**	

WSA & WB Name	# WTWs	# WSSs	Qualified Technical Staff (#)					Technical Shortfall (#)	Qualified Scientists (#)	Scientists Shortfall (#)	Ratio*	2023 BD Score (%)
			Technicians	Technologists	Engineers	MISA appointees	Total					
Bloem Water now Vaal Central Water (Sedibeng Water)	3	22	3	8	2	0	**13**	0	1	1	0.6	42.32% ave
!Kai! Garib LM	16	16	1	0	0	0	**1**	3	0	2	0.1	**16.20%**
!Kheis LM	7	7	0	1	0	0	**1**	3	0	2	0.1	**29.31%**
Dawid Kruiper LM	11	17	1	1	1	0	**3**	1	1	1	0.2	**83.85%**
Dikgatlong LM	2	4	0	3	0	0	**3**	1	0	2	0.8	**18.73%**
Emthanjeni LM	3	3	1	2	0	0	**3**	1	0	2	1.0	**11.94%**
Gamagara LM	3	3	0	2	1	0	**3**	1	1	1	1.0	**54.71%**
Ga-Segonyana LM	22	24	0	0	0	0	**0**	4	0	2	0.0	**25.92%**
Hantam LM	6	6	0	2	0	0	**2**	2	0	2	0.3	**47.64%**
Joe Morolong LM	18	18	2	0	0	0	**2**	2	0	2	0.1	**17.57%**
Kamiesberg LM	16	16	1	0	0	0	**1**	3	0	2	0.1	**8.02%**
Kareeberg LM	3	3	0	0	0	0	**0**	4	0	2	0.0	**18.42%**
Karoo Hoogland LM	3	3	0	0	0	0	**0**	4	0	2	0.0	**21.62%**
Kgatelopele LM	1	1	0	2	0	0	**2**	2	0	2	2.0	**27.60%**
Khai-Ma LM	3	4	0	0	0	0	**0**	4	0	2	0.0	**15.19%**
Magareng LM	1	1	1	1	0	0	**2**	2	0	2	2.0	**26.45%**
Nama Khoi LM	5	15	0	0	0	0	**0**	4	0	2	0.0	**36.61%**
Phokwane LM	3	3	0	0	0	0	**0**	4	0	2	0.0	**19.85%**
Renosterberg LM	2	3	0	0	0	0	**0**	4	0	2	0.0	**9.20%**
Richtersveld LM	5	5	0	1	0	0	**1**	3	0	2	0.2	**21.94%**
Siyancuma LM	4	4	1	2	0	0	**3**	1	0	2	0.8	**26.38%**
Siyathemba LM	3	3	0	2	1	0	**3**	1	0	2	1.0	**46.26%**
Sol Plaatjie LM	2	2	1	1	1	0	**3**	1	1	1	1.5	**52.04%**
Thembelihle LM	3	2	2	0	0	0	**2**	2	0	2	1.0	**59.52%**
Tsantsabane LM	5	5	0	3	0	0	**3**	1	0	2	0.6	**56.00%**
Ubuntu LM	5	5	0	0	0	0	**0**	4	0	2	0.0	**14.17%**
Umsobomvu LM	3	3	0	3	1		**4**	0	1	1	1.3	**24.17%**
Totals	**158**	**176**	**14**	**34**	**7**	**0**	**55**	**62**	**5**	**49**		

* The single number ratio depicts the no. of qualified technical staff divided by the no. of WSSs that have access to the staff. E.g., Emthanjeni LM has 3 qualified staff, divided by 3 WSSs = 1.0 qualified staff per WSS

Note 1: "Qualified Technical Staff" means staff appointed in positions to support water services, and who has the required qualifications. "Technical Shortfall" is calculated based on a minimum requirement of at least 3 Engineers or more than 1 of each of Engineers, Technologists & Technicians; and at least one 1 Candidate Scientist and 1 Professional Scientist per WSI.

Note 2: "Qualified Scientists" means professional registered scientists (SACNASP) and candidate scientists appointed in positions to support water services. "Scientists shortfall" means that the WSA does not have at least one qualified SACNASP registered scientist and at least one 1 candidate scientist in their employ or contracted.

In terms of maintenance capacity, all the municipalities in the province have a reasonable contingent of qualified technical and maintenance staff. The maintenance staff comprises of a collective of in-house, contracted, or outsourced personnel. The data indicates that:

- Bloem Water now Vaal Central Water (Sedibeng Water) have internal maintenance teams supplemented with specific outsourced services, and partially capacitated for one of the water supply systems in the province
- 13 of 26 (50%) WSAs have in-house maintenance teams
- 2 of 26 (8%) WSAs have internal maintenance teams supplemented with term contracts
- 10 of 26 (38%) WSAs have internal maintenance teams supplement with specific outsourced services.

In general, the province presents a strong case for qualified professional technical staff as follows:

- A total of 55 qualified staff comprised of 7 Engineers, 34 Technologists, 14 Technicians, and no MISA appointees (qualified); and 5 SACNASP registered scientists are assigned to Bloem Water now Vaal Central Water (Sedibeng Water) and 26 WSAs
- A total shortfall of 111 persons is identified, consisting of 62 technical staff and 49 scientists

- 25 WSAs have a total shortfall of 62 qualified technical staff with the highest indicated for 4 WSAs (4 each)
- Bloem Water now VCW (Sedibeng) and 20 WSAs have access to credible laboratories that comply with the BD standards.

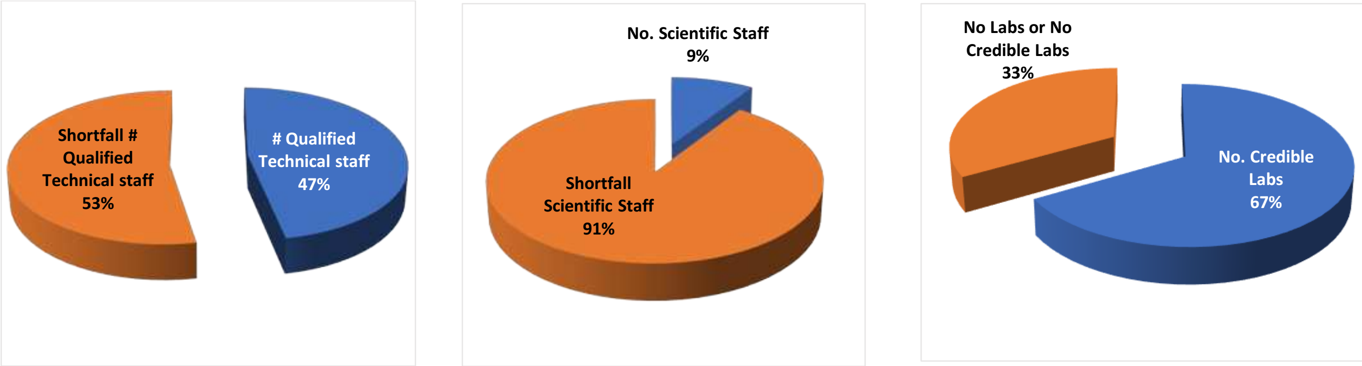
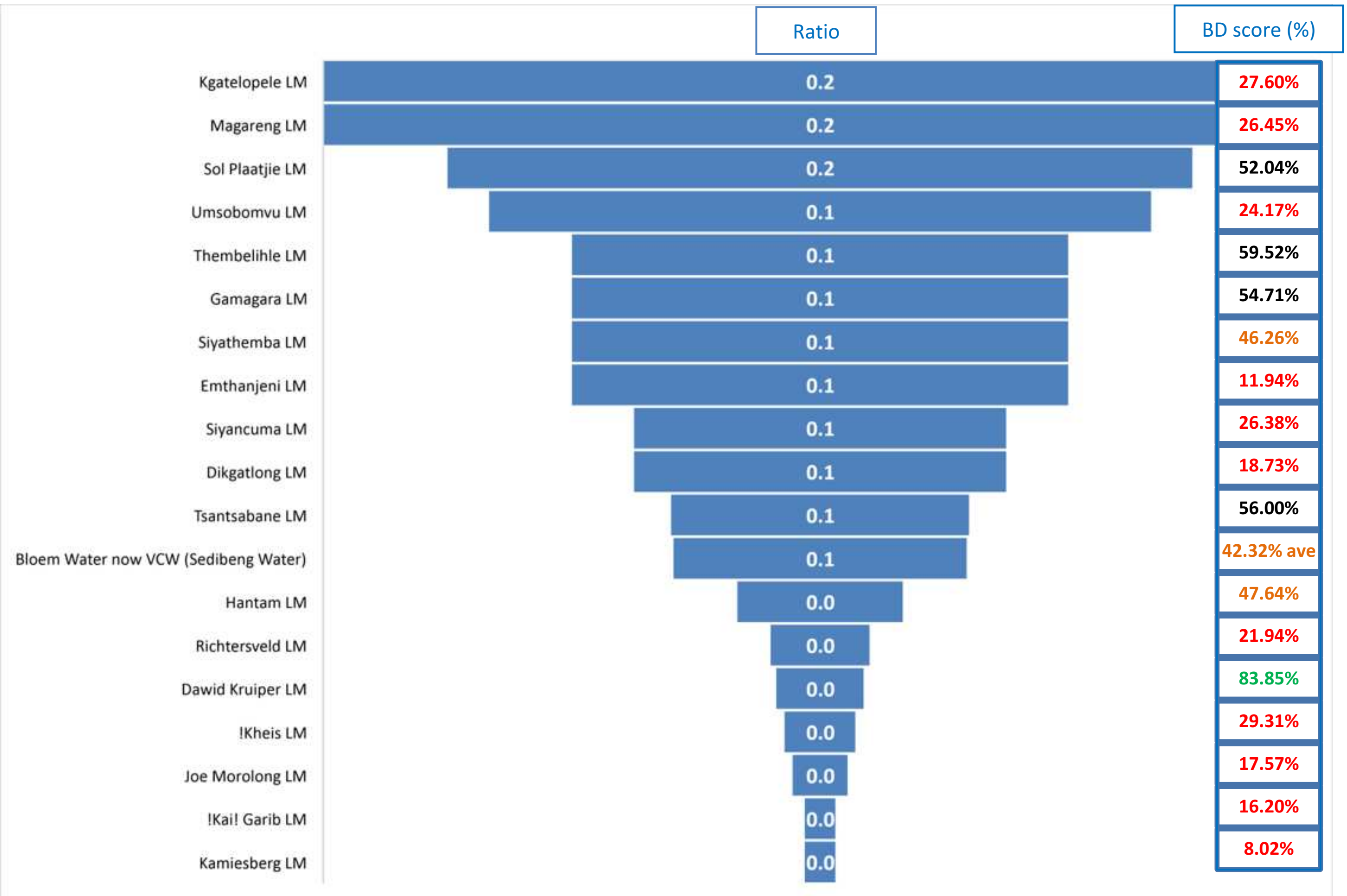


Figure 159 - Graphic illustration of the number and %: a) qualified engineering/technical staff; b) professional scientists; c) access to credible laboratory services that complies with Blue Drop standards

Ratio analysis has been done to determine the number of qualified technical and scientific staff assigned per WSS. It is expected that a higher ratio would correspond with well-performing and maintained water supply systems, as represented by the BD score.



Note: Nama Khoi LM, Ga-Segonyana LM, Karoo Hoogland LM, Phokwane LM, Kareeberg LM, Khai-Ma LM and Ubuntu LM were excluded from the schematic as their ratios were all 0.0

Figure 160 - Ratio of compliant technical staff to no. of WSSs and Comparison of Ratios with BD scores

The schematic does not show a strong correlation between high ratios and high BD scores as can be seen with Dawid Kruiper LM and Tsantsabane LM. Unlike the Green Drop 2022 diagnostics, no firm correlation can be drawn between technical capacity and water supply performance, mostly as result of the complexity of the WSA/Bulk Water Provider arrangement. It appears that Sedibeng Water made an insignificant impact on the municipal BD scores.

Overall, the results highlight the inter-dependency between technical capacity and performance. One of the options to enhance operational capacity is through dedicated training programmes. The Blue Drop audit incentivises training of operational staff over the 2-year period prior to the audit date. The results are summarised as follows:

Table 211 - No. of WTWs with operational staff sent on training over the past 2 years and vice versa

WSA & WB Name	# WTWs	# WTW staff attending training	# WTW without training
Bloem Water now Vaal Central Water (Sedibeng Water)	3		3
!Kai! Garib LM	16		16
!Kheis LM	7		7
Dawid Kruiper LM	11	7	4
Dikgatlong LM	2		2
Emthanjeni LM	3		3
Gamagara LM	3		3
Ga-Segonyana LM	22		22
Hantam LM	6		6
Joe Morolong LM	18		18
Kamiesberg LM	16		16
Kareeberg LM	3		3
Karoo Hoogland LM	3		3
Kgatelopele LM	1		1
Khai-Ma LM	3		3
Magareng LM	1	1	
Nama Khoi LM	5		5
Phokwane LM	3		3
Renosterberg LM	2		2
Richtersveld LM	5		5
Siyancuma LM	4		4
Siyathemba LM	3		3
Sol Plaatjie LM	2	2	
Thembelihle LM	3		3
Tsantsabane LM	5		5
Ubuntu LM	5		5
Umsobomvu LM	3		3
Totals	**158**	**10 (6%)**	**148 (94%)**

Figure 161 - %WTWs that have trained operational staff over the past two years

The results confirm that only 3 WSAs had their operational staff attend training over the past 2 years. 10 WTWs (6%) and boreholes in Dawid Kruiper LM, Magareng LM and Sol Plaatjie LM had their operational staff attend training over the past 2 years. Investment in human capital through technical skills development is likely to mitigate some of the water quality failures and lower performances noted, and municipalities and water boards should prioritise ongoing skills development of technical staff and appointment of qualified staff that are legible for registration.

Diagnostic 2: Treatment Capacity and Flow Distribution

Aim: Diagnostic 2 deals with design and flow related dynamics, comprising of: i) design capacity and operational flow, ii) raw water abstraction, and iii) WUE and SIV.

(i) Design Capacity and Operational Flow

This diagnostic assesses the status of plant design capacity and daily water production at the WTWs, as well as SIVs as measured at the outflow from the WTW or inflow to the water distribution network. A capable WTW requires adequate installed design capacity and functional equipment to operate optimally. If the WTW design capacity is exceeded by the average daily production (treatment) volume, the WTW will not be able to deliver SANS compliant water quality. The available design capacity is typically exceeded when the water demand exceeds the installed design capacity, or when unit processes or equipment are dysfunctional, or when electrical supply problems render treatment and pumping of water defective. Typically, the production volume and SIV is the same if 1 WTW supplies 1 WSS, but different if multiple supply systems are feeding from a singular WTW.

Findings: Analysis of the design capacity and average daily production/ treatment volume indicate a total design capacity of 570,646 kl/d for the province, with a total average daily treatment (operational) volume of 338,721 kl/d. Theoretically, this implies that 59% of the design capacity is used with 41% available to meet additional water demand. However, the full 570,646 kl/d is not available as some infrastructure is dysfunctional, leaving 539,520 kl/d available. The reduced capacity means that the province is closer to its total available capacity (63%) with a 37% surplus available. The capacity differential (difference between the installed and available capacity) will not constrain or impede any further social and economic development in the drainage areas. WSAs do report and have knowledge of their installed and available capacities, and a higher figure than 37% surplus available cannot be expected.

Most WSAs have their full installed capacity available with the exception of some of the water treatment systems. For the province in general, 147 WTWs are operating within their design capacities with the exception of 11 WTWs that exceeds their total design capacity (7%). This risk is currently mitigated through operational optimisation and preventative maintenance regimes.

Table 212 - Summary of WTWs design and available capacities, average daily production, % available capacity, and total SIV towards the WSSs

WSA & WB Name	# WTWs	# WSSs	Design Capacity (kl/d)	Available Design Capacity (kl/d)	Average Daily Production (kl/d)	Available Variance* (kl/d)	% Use Available Capacity	Total SIV towards the WSS (kl/d)
Bloem Water now Vaal Central Water (Sedibeng Water)	3	22	81,000	78,000	53,082	24,918	68%	20,019
!Kai! Garib LM	16	16	26,520	26,520	21,814	4,706	82%	21,814
!Kheis LM	7	7	4,383	4,383	3,167	1,216	72%	3,167
Dawid Kruiper LM	11	17	87,550	87,549	57,847	29,702	66%	44,375
Dikgatlong LM	2	4	9,000	9,000	0	9,000	0%	4,662
Emthanjeni LM	3	3	278	295	0	295	0%	278
Gamagara LM	3	3	7,530	7,947	9,610	-1,663	121%	9,610
Ga-Segonyana LM	22	24	55,787	37,887	24,227	13,660	64%	25,753
Hantam LM	6	6	7,095	7,095	5,255	1,840	74%	5,255
Joe Morolong LM	18	18	8,576	8,576	207	8,369	2%	7,663
Kamiesberg LM	16	16	2,875	1,662	1,742	-80	105%	1,742
Kareeberg LM	3	3	1,367	1,367	1,367	0	100%	1,367
Karoo Hoogland LM	3	3	5,600	5,600	5,600	0	100%	5,600
Kgatelopele LM	1	1	461	461	0	461	0%	461
Khai-Ma LM	3	4	1,500	1,500	0	1,500	0%	1,500
Magareng LM	1	1	8,400	8,400	4,750	3,650	57%	4,750
Nama Khoi LM	5	15	4,016	2,534	380	2,154	15%	380
Phokwane LM	3	3	19,600	19,600	4,776	14,824	24%	14,766
Renosterberg LM	2	3	2,730	2,730	2,730	0	100%	2,730
Richtersveld LM	5	5	4,840	2,790	2,040	750	73%	2,040
Siyancuma LM	4	4	12,388	12,388	13,446	-1,058	109%	13,446
Siyathemba LM	3	3	17,180	16,606	10,045	6,561	60%	10,045
Sol Plaatjie LM	2	2	166,881	166,881	87,809	79,072	53%	87,809
Thembelihle LM	3	2	6,273	6,273	5,799	474	92%	5,799
Tsantsabane LM	5	5	13,150	13,150	13,150	0	100%	13,150
Ubuntu LM	5	5	5,490	5,490	5,490	0	100%	5,490
Umsobomvu LM	3	3	10,176	4,836	4,389	447	91%	4,389
Totals	**158**	**176**	**570,646**	**539,520**	**338,721**	**200,799**	**63%**	**318,060**

* Difference between the available design capacity and the average daily production

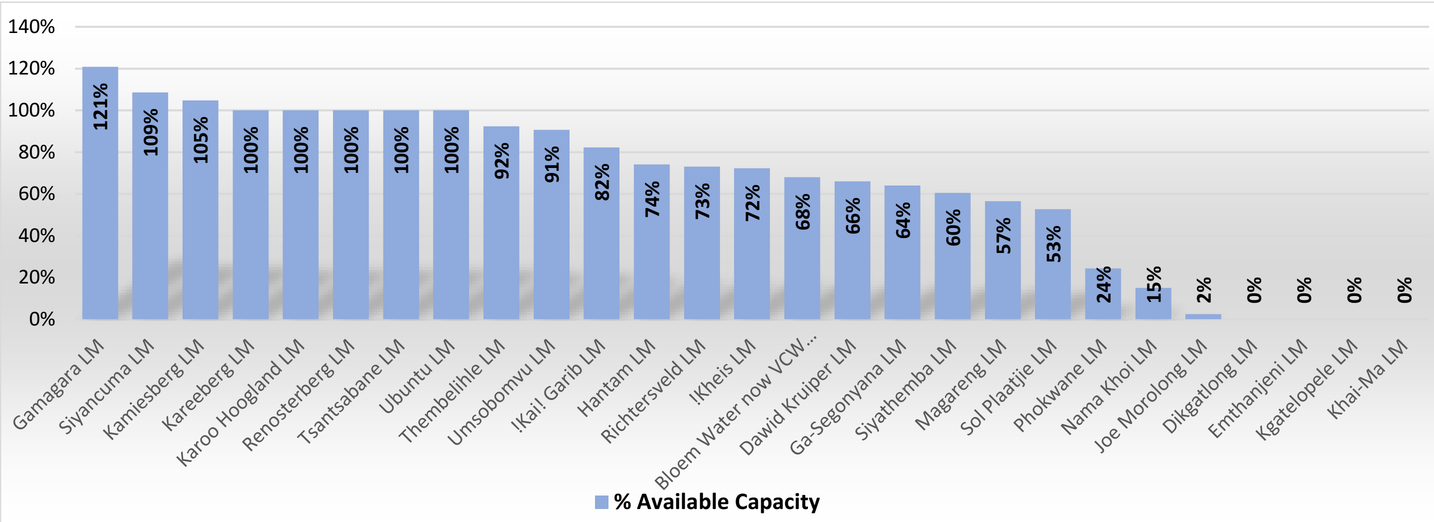
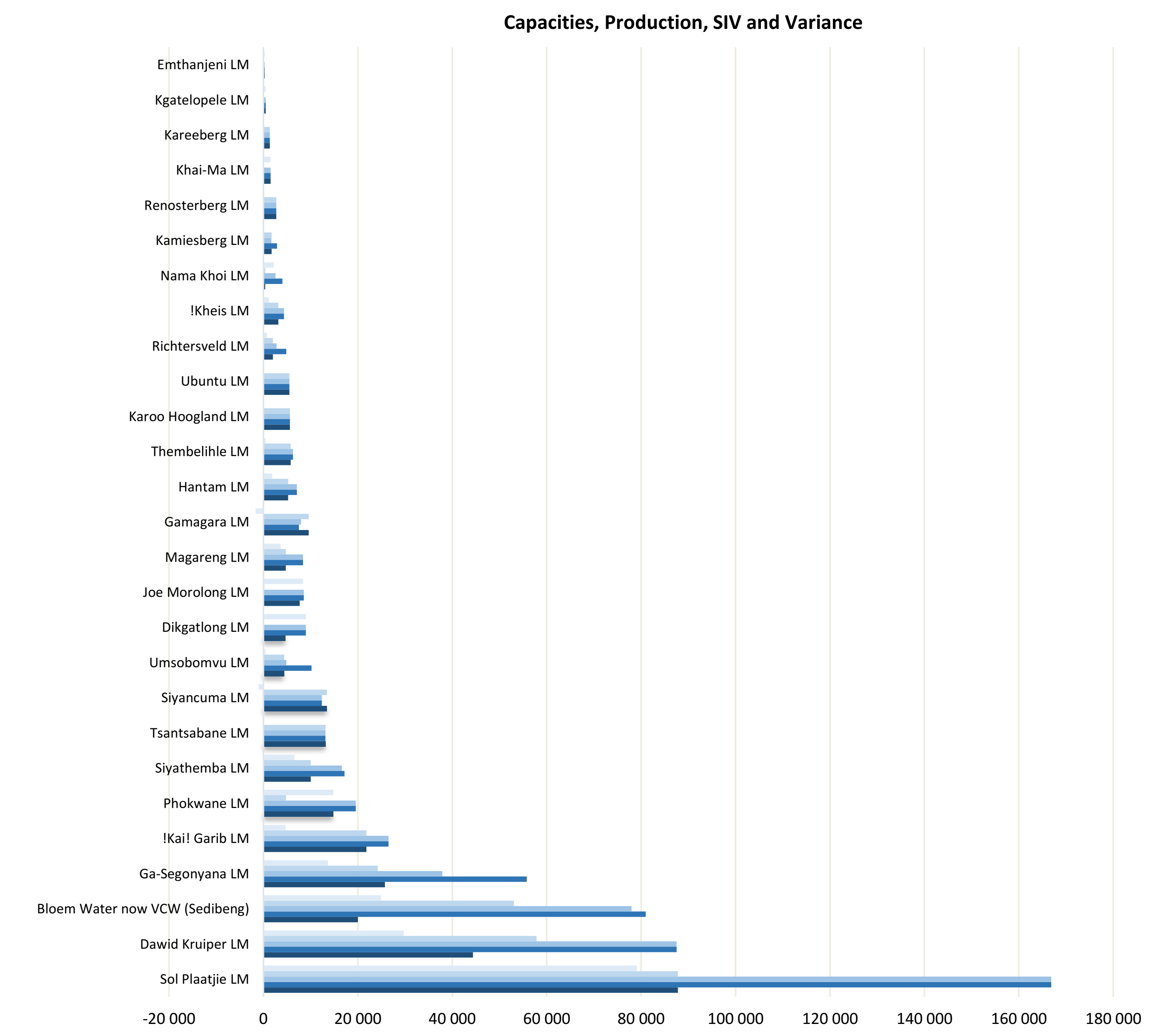


Figure 162 - % available capacity



	Sol Plaatjie LM	Dawid Kruiper LM	Bloem Water now VCW (Sedibeng)	Ga-Segonyana LM	!Kai! Garib LM	Phokwane LM	Siyathemba LM	Tsantsabane LM	Siyancuma LM	Umsobomvu LM	Dikgatlong LM	Joe Morolong LM	Magareng LM
Available Variance (kl/d)	79 072	29 702	24 918	13 660	4 706	14 824	6 561	0	-1 058	447	9 000	8 369	3 650
Ave. Daily Production (kl/d)	87 809	57 847	53 082	24 227	21 814	4 776	10 045	13 150	13 446	4 389	0	207	4 750
Available Design Capacity (kl/d)	166 881	87 549	78 000	37 887	26 520	19 600	16 606	13 150	12 388	4 836	9 000	8 576	8 400
Design Capacity (kl/d)	166 881	87 550	81 000	55 787	26 520	19 600	17 180	13 150	12 388	10 176	9 000	8 576	8 400
Total SIV (kl/d)	87 809	44 375	20 019	25 753	21 814	14 766	10 045	13 150	13 446	4 389	4 662	7 663	4 750

	Gamagara LM	Hantam LM	Thembelihle LM	Karoo Hoogland LM	Ubuntu LM	Richtersveld LM	!Kheis LM	Nama Khoi LM	Kamiesberg LM	Renosterberg LM	Khai-Ma LM	Kareeberg LM	Kgatelopele LM	Emthanjeni LM
Available Variance (kl/d)	-1 663	1 840	474	0	0	750	1 216	2 154	-80	0	1 500	0	461	295
Ave. Daily Production (kl/d)	9 610	5 255	5 799	5 600	5 490	2 040	3 167	380	1 742	2 730	0	1 367	0	0
Available Design Capacity (kl/d)	7 947	7 095	6 273	5 600	5 490	2 790	4 383	2 534	1 662	2 730	1 500	1 367	461	295
Design Capacity (kl/d)	7 530	7 095	6 273	5 600	5 490	4 840	4 383	4 016	2 875	2 730	1 500	1 367	461	278
Total SIV (kl/d)	9 610	5 255	5 799	5 600	5 490	2 040	3 167	380	1 742	2 730	1 500	1 367	461	278

Figure 163 - Design and available capacity, average daily production, available variance and total SIV for the WTWs

(ii) Raw Water Abstraction

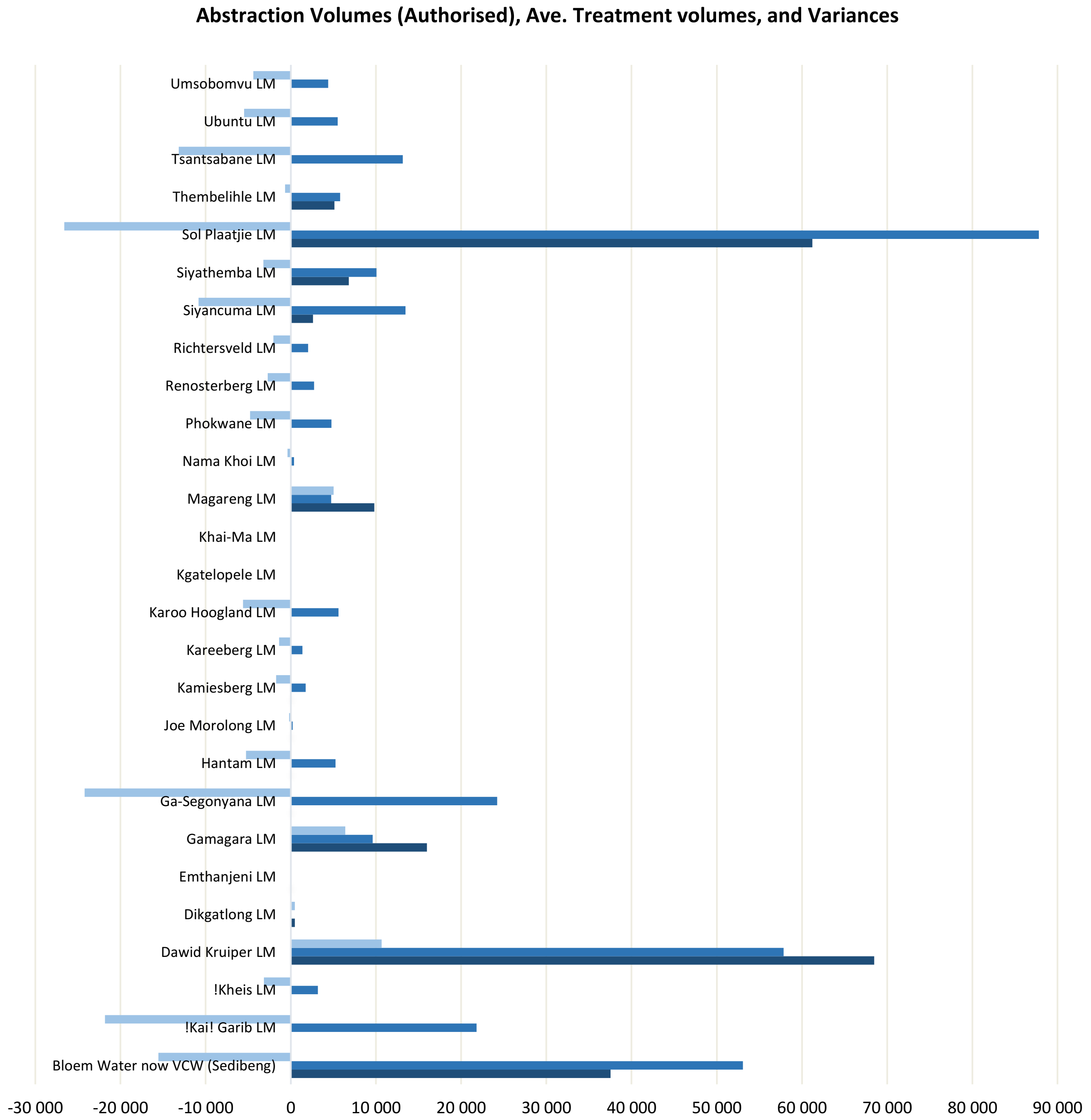
This diagnostic takes a snapshot view of the status of water abstraction authorisations from natural water resources across the province. As per the National Water Act (Act no 36 of 1998), Water Use Authorisation (WUA) mandate the maximum abstraction volumes of raw water, and the installation and monitoring of abstraction, inflow and outflow meters, whilst the BD audit requires WSAs to report the flows on IRIS and to calibrate meters annually. Any defects in terms of abstracting water from a resource without an authorisation, or exceeding the authorised volume, or reporting inaccurate volumes, or not monitoring abstraction against authorised volumes, are considered to be a regulatory risk and contravention of the law.

Findings: Data pertaining to the daily abstraction volumes (kl/d) (Authorised), average daily treatment volumes (kl/d), the names of the WTWs exceeding/with no Daily Abstraction Volumes (Authorised) and Average Daily Treatment Volumes (Authorised) is captured in the tables below.

Table 213 - Summary of Abstraction Volumes (Authorised), Average Daily Treatment Volumes, Variances & WTWs listed For Enforcement Action

WSA & WB Name	# WTWs	# WSSs	Daily Abstraction Volumes (Authorised) (kl/d)	Average Daily Treatment Volume (kl/d)	Average Variance (kl/d) [+ or Minus]
Bloem Water now Vaal Central Water (Sedibeng Water)	3	22	37,534	53,082	-15,548
!Kai! Garib LM	16	16	0	21,814	-21,814
!Kheis LM	7	7	0	3,167	-3,167
Dawid Kruiper LM	11	17	68,493	57,847	10,646
Dikgatlong LM	2	4	476	0	476
Emthanjeni LM	3	3	0	0	0
Gamagara LM	3	3	15,990	9,610	6,380
Ga-Segonyana LM	22	24	0	24,227	-24,227
Hantam LM	6	6	0	5,255	-5,255
Joe Morolong LM	18	18	0	207	-207
Kamiesberg LM	16	16	0	1,742	-1,742
Kareeberg LM	3	3	0	1,367	-1,367
Karoo Hoogland LM	3	3	0	5,600	-5,600
Kgatelopele LM	1	1	0	0	0
Khai-Ma LM	3	4	0	0	0
Magareng LM	1	1	9,786	4,750	5,036
Nama Khoi LM	5	15	0	380	-380
Phokwane LM	3	3	0	4,776	-4,776
Renosterberg LM	2	3	0	2,730	-2,730
Richtersveld LM	5	5	0	2,040	-2,040
Siyancuma LM	4	4	2,607	13,446	-10,839
Siyathemba LM	3	3	6,807	10,045	-3,238
Sol Plaatjie LM	2	2	61,214	87,809	-26,595
Thembelihle LM	3	2	5,126	5,799	-673
Tsantsabane LM	5	5	0	13,150	-13,150
Ubuntu LM	5	5	0	5,490	-5,490
Umsobomvu LM	3	3	0	4,389	-4,389
Totals	**158**	**176**	**208,033**	**338,721**	**-130,688**

WSA & WB Name	WTW exceeding the Daily Abstraction Volumes (Authorised)	WTW with no Daily Abstraction Volumes (Authorised)
Bloem Water now Vaal Central Water (Sedibeng Water)		2 WTWs
!Kai! Garib LM		All 16 WTWs
!Kheis LM		All 7 WTWs
Dawid Kruiper LM		10 WTWs
Dikgatlong LM		1 WTW
Emthanjeni LM		All 3 WTWs
Gamagara LM	1 WTW	
Ga-Segonyana LM		All 22 WTWs
Hantam LM		All 6 WTWs
Joe Morolong LM		All 18 WTWs
Kamiesberg LM		All 16 WTWs
Kareeberg LM		All 3 WTWs
Karoo Hoogland LM		All 3 WTWs
Kgatelopele LM		1 WTW
Khai-Ma LM		All 3 WTWs
Nama Khoi LM		All 5 WTWs
Phokwane LM		All 3 WTWs
Renosterberg LM		Both WTWs
Richtersveld LM		All 5 WTWs
Siyancuma LM	2 WTWs	2 WTWs
Siyathemba LM	2 WTWs	
Sol Plaatjie LM	2 WTWs	
Thembelihle LM		2 WTWs
Tsantsabane LM		All 5 WTWs
Ubuntu LM		All 5 WTWs
Umsobomvu LM		All 3 WTWs
Totals	**7**	**143**



	Bloem Water now VCW (Sedibeng)	!Kai! Garib LM	!Kheis LM	Dawid Kruiper LM	Dikgatlong LM	Emthanjeni LM	Gamagara LM	Ga-Segonyana LM	Hantam LM	Joe Morolong LM	Kamiesberg LM	Kareeberg LM	Karoo Hoogland LM
Ave. Variance (kl/d)	-15 548	-21 814	-3 167	10 646	476	0	6 380	-24 227	-5 255	-207	-1 742	-1 367	-5 600
Ave. Daily Treatment (kl/d)	53 082	21 814	3 167	57 847	0	0	9 610	24 227	5 255	207	1 742	1 367	5 600
Daily Abstraction (kl/d)	37 534	0	0	68 493	476	0	15 990	0	0	0	0	0	0

	Kgatelopele LM	Khai-Ma LM	Magareng LM	Nama Khoi LM	Phokwane LM	Renosterberg LM	Richtersveld LM	Siyancuma LM	Siyathemba LM	Sol Plaatjie LM	Thembelihle LM	Tsantsabane LM	Ubuntu LM	Umsobomvu LM
Ave. Variance (kl/d)	0	0	5 036	-380	-4 776	-2 730	-2 040	-10 839	-3 238	-26 595	-673	-13 150	-5 490	-4 389
Ave. Daily Treatment (kl/d)	0	0	4 750	380	4 776	2 730	2 040	13 446	10 045	87 809	5 799	13 150	5 490	4 389
Daily Abstraction (kl/d)	0	0	9 786	0	0	0	0	2 607	6 807	61 214	5 126	0	0	0

Figure 164 - Abstraction Volumes (Authorised), Average Daily Treatment Volumes, and Variances

WTWs that exceed the Daily Abstraction Volumes (Authorised) and WTWs with no Daily Abstraction Volumes (Authorised) are reflected in the 2nd table above. WTWs that are not complying with the regulations will be required to show correction in the next Blue Drop audit cycle. The results conclude that 7 WTWs in 4 WSAs are exceeding the permitted abstraction limits and 15 WTWs provided authorised water use abstraction volumes. The Daily Abstraction Volumes (Authorised) are not known for 143 water treatment systems resulting in negative average variances that skew the data sets. Negative average variances can only be clearly attributed to 7 WTWs for over abstraction.

For future BD audits, WSA/WSPs will be required to provide 'actual' abstraction volumes so that a comparative analysis can be undertaken of the 'actual' abstraction volume versus the authorised water use abstraction volumes (maximum). This would require that the WSAs and WSPs/WBs monitor and record all critical path flows (abstraction, raw and final).

(iii) Water Use Efficiency and System Input Value

The Department is committed to consider issues related to water scarcity and security, aiming to ensure there is sufficient water for the population, the economy, and the environment by increasing water use efficiency across all sectors. Water use for services sectors is specifically dealing with the quantity of water used directly by the consumer through the public distribution network and industries connected to the network.

This diagnostic assesses the water use efficiency (i.e., the average daily consumption in litres per person per day) and the individual and collective performance of the water supply systems. WUE indicates how effective water is used by consumers, i.e. the process between effective water use and actual water abstraction. This concept is closely related to the Department's No Drop Certification assessment, whereby WUE, NRW and water losses are targeted as part of Water Conservation and Water Demand Management strategies by municipalities.

Findings: Both the Blue Drop audit and No Drop audit requires an IWA water balance to determine the SIV into each water supply system, and to identify and quantify possible losses from abstraction to the end-of-use point. 4 WSAs and 23 systems have full water balances in place. 20 WSSs in 8 WSAs have partial water balances in place, and 19 WSAs with a total of 133 WSSs do not have water balances in place.

WUE is calculated based on the SIV contributions, population served, and the average daily consumption, as summarised in the following table.

Table 214 - Summary of total SIV, total population served, average daily consumption, WUE status and performance trend

WSA Name	# WSSs	Total Population	Total SIV (kl/d)	2023 WUE (l/p/d)	2023 Blue Drop WUE Range and Performance	
!Kai! Garib LM	16	40,090	21,814	544	>300	Extremely High
!Kheis LM	7	18,946	3,167	167	>150-200	Good
Dawid Kruiper LM	17	110,020	45,289	412	>300	Extremely High
Dikgatlong LM	4	52,577	6,834	130	<150	Excellent
Emthanjeni LM	3	35,600	278	8	<150	Excellent
Gamagara LM	3	34,603	11,016	318	>300	Extremely High
Ga-Segonyana LM	24	112,747	25,753	228	>200-250	Average
Hantam LM	6	21,449	5,255	245	>200-250	Average
Joe Morolong LM	18	90,882	9,117	100	<150	Excellent
Kamiesberg LM	16	9,527	1,742	183	>150-200	Good
Kareeberg LM	3	11,400	1,367	120	<150	Excellent
Karoo Hoogland LM	3	9,279	5,600	604	>300	Extremely High
Kgatelopele LM	1	12,717	461	36	<150	Excellent
Khai-Ma LM	4	13,405	3,723	278	>250-300	Poor
Magareng LM	1	20,858	4,750	228	>200-250	Average
Nama Khoi LM	15	48,102	6,647	138	<150	Excellent
Phokwane LM	3	64,317	14,766	230	>200-250	Average
Renosterberg LM	3	14,839	2,730	184	>150-200	Good
Richtersveld LM	5	12,815	2,040	159	>150-200	Good
Siyancuma LM	4	45,182	13,446	298	>250-300	Poor
Siyathemba LM	3	18,300	10,045	549	>300	Extremely High
Sol Plaatjie LM	2	264,850	87,809	332	>300	Extremely High
Thembelihle LM	2	13,500	5,799	430	>300	Extremely High
Tsantsabane LM	5	4,937	18,733	3,794	>300	Extremely High
Ubuntu LM	5	15,942	5,490	344	>300	Extremely High
Umsobomvu LM	3	32,760	4,389	134	<150	Excellent
Totals	**176**	**1,129,644**	**318,060**	**392**		

WUE (l/cap/day) performance categories

Colour	WUE Range	Performance
	>300	Extremely high per capita water use
	>250-300	Poor per capita water use
	>200-250	Average per capita water use with potential for marked improvement
	>150-200	Good per capita water use but some improvement may be possible subject to economic benefits
	<150	Excellent per capita water use management

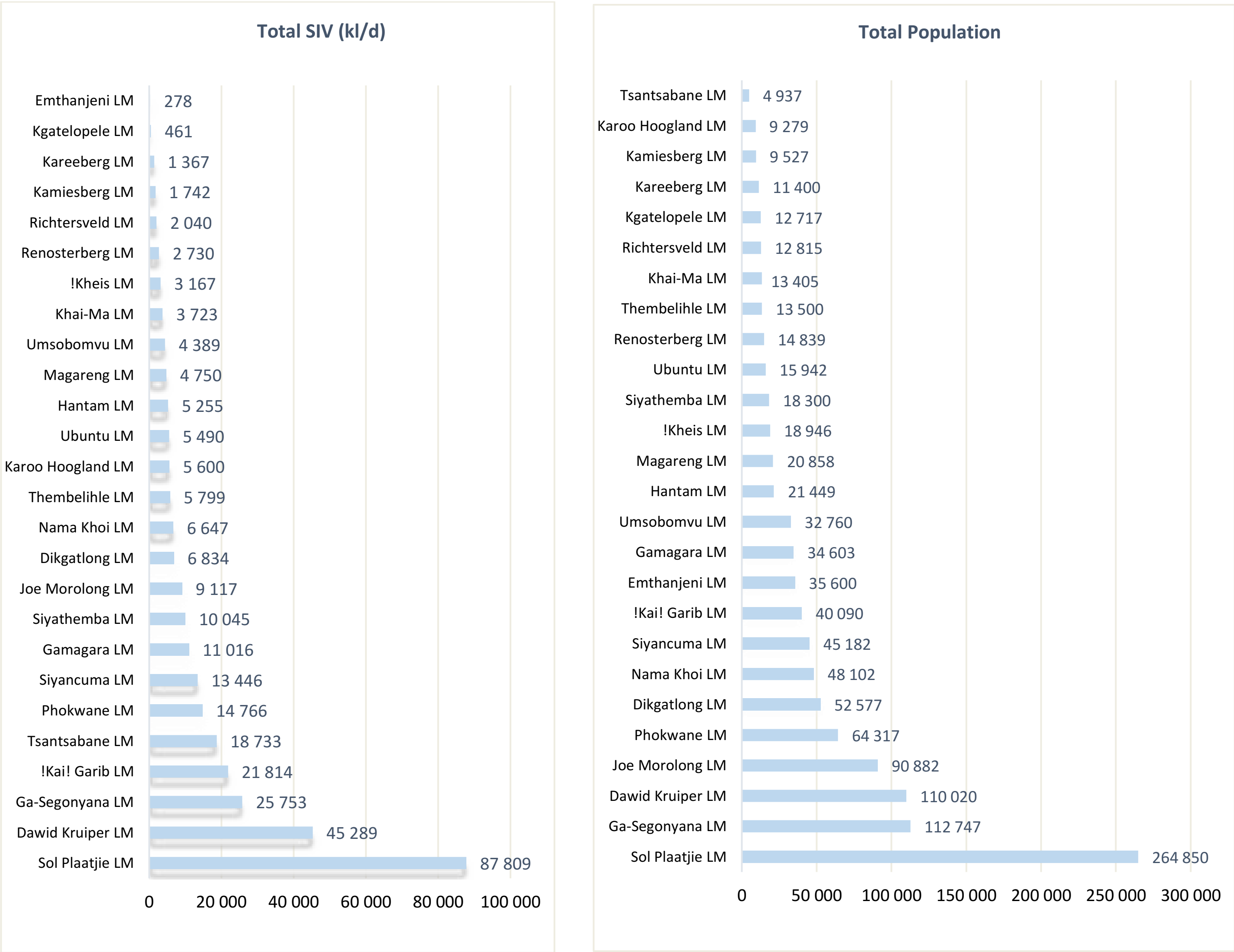


Figure 165 - Total SIV towards the WSSs and Total Population Served

For the province, 318,060 kl/d water is supplied to 1,129,644 consumers. Comparatively, Sol Plaatjie LM (highest) and Dawid Kruiper LM (2nd highest) combined distribute 42% of the total provincial SIV. An average 392 litre of water is used per person per day, which implies an extremely high per capita water use. Results from the diagnostic data show that 9 WSAs have WUEs of more than 300 l/c/d, which is regarded as extremely high according to national benchmarks. Only 2 WSAs have WUEs between 250–300 l/c/d, which is regarded as poor. No Drop Certification is specifically tasked with plans to curb water losses and improve NRW through water accounting assessments and water conservation and demand management.

Diagnostic 3: Drinking Water Quality (DWQ) Monitoring and Compliance

Aim: Blue Drop audits values the principles of "To measure is to know" and "To know is to manage". The primary objective of a water treatment plant is to produce final water quality that is safe for human consumption at the end of the distribution network. This standard can only be measured and achieved if operational and compliance monitoring and DWQ compliance is executed at the correct frequency, sample point, and determinand type. This diagnostic assesses the i) operational and compliance monitoring status, ii) drinking water quality compliance, and iii) risk defined compliance and laboratory credibility.

(i) Drinking water operational and compliance monitoring

Findings: A minimum level of 90% operational monitoring compliance is applied as benchmark, to give weight to the importance of sampling and monitoring of the raw water, process unit water, and final water across the treatment stream. Compliance monitoring is also informed by SANS 241:2015 and the requirement for risk-informed monitoring through the WaSP process at both the WTW final and distribution network. DWQ compliance is calculated against the population size and the mandatory limits set by SANS 241:2015 and the Blue Drop standards, as calculated and reported from data loaded in the IRIS.

Table 215 - Summary of the KPA 2 WTW operational and WSS compliance monitoring status

WSA & WB Name	# WTWs	# WSSs	WTW Operational monitoring [KPA 2 sub-KPA 2.b)]		WSS Compliance monitoring [KPA 2 sub-KPA 2.c)]	
			Satisfactory [BD score >90%]	Not Satisfactory [BD score <90%]	Satisfactory [BD score >90%]	Not Satisfactory [BD score <90%]
Bloem Water now Vaal Central Water (Sedibeng Water)	3	22	2	1	-	22
!Kai! Garib LM	16	16		16		16
!Kheis LM	7	7		7		7
Dawid Kruiper LM	11	17	9	2	10	7
Dikgatlong LM	2	4		2		4
Emthanjeni LM	3	3		3		3
Gamagara LM	3	3	1	2		3
Ga-Segonyana LM	22	24		22		24
Hantam LM	6	6	1	5		6
Joe Morolong LM	18	18	1	17		18
Kamiesberg LM	16	16		16		16
Kareeberg LM	3	3		3		3
Karoo Hoogland LM	3	3		3		3
Kgatelopele LM	1	1		1		1
Khai-Ma LM	3	4		3		4
Magareng LM	1	1	1	0		1
Nama Khoi LM	5	15	1	4		15
Phokwane LM	3	3	1	2		3
Renosterberg LM	2	3		2		3
Richtersveld LM	5	5		5		5
Siyancuma LM	4	4		4		4
Siyathemba LM	3	3	1	2		3
Sol Plaatjie LM	2	2	1	1		2
Thembelihle LM	3	2		3		2
Tsantsabane LM	5	5	1	4		5
Ubuntu LM	5	5		5		5
Umsobomvu LM	3	3	1	2		3
Totals	**158**	**176**	**21 (13%)**	**137 (87%)**	**10 (6%)**	**166 (94%)**

The performance recorded in the table above stems from performance data as measured against the Blue Drop Standard expressed in KPA 2 and sub-KPAs 2.b) and 2.c). Overall, a very unsatisfactory sampling and analysis regime is observed for both operational (87%) and compliance (94%) monitoring.

The data indicates that 21 of 158 WTWs (13%) are on par with good practice for operational monitoring of the raw and final water and the respective process units at the WTW. Only Bloem Water now Vaal Central Water (Sedibeng Water) and Dawid Kruiper LM are doing fairly well, whilst the remaining WSAs fail to meet the Blue Drop standard. In terms of compliance monitoring, 10 WSSs (6%) are on par with good compliance monitoring practices, and 166 WSSs (94%) are failing the Blue Drop standard.

The latter observation is noted with deep concern. Compliance monitoring is a legal requirement and the only means to measure the DWQ performance of a water supply system. Operational monitoring is the cornerstone of day-to-day process adjustments and optimisation to ensure that the water treatment is efficient and delivers quality final water. The results indicate that 137 WTWs and 166 WSSs are not achieving regulatory and industry standards.

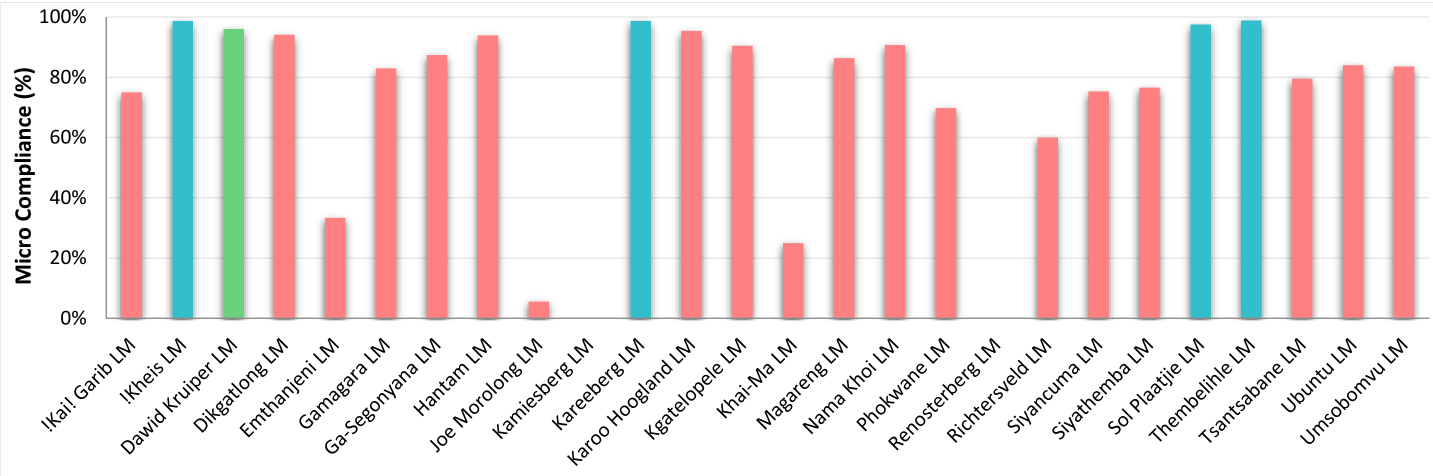
(ii) Drinking water quality compliance

Findings: DWQ compliance is measured against the requirements of SANS 241:2015 under KPA 5 of the Blue Drop audit. The tables following summarises the results of the DWQ status for Microbiological and Chemical Compliance, which also carries the highest Blue Drop score weighting of 35%.

Table 216 - Provincial Summary of the DWQ Status for Microbiological Compliance

WSA Name	# WSSs	Population	% Ave. Micro Compliance	# WSS Micro Performance Status		
				Excellent	Good	Unacceptable
!Kai! Garib LM	16	40,090	74.99%	5		11
!Kheis LM	7	18,946	98.69%	6		1
Dawid Kruiper LM	17	110,020	96.07%	10	2	5
Dikgatlong LM	4	52,577	94.13%	2		2
Emthanjeni LM	3	35,600	33.33%			3
Gamagara LM	3	34,603	82.92%	2		1

WSA Name	# WSSs	Population	% Ave. Micro Compliance	# WSS Micro Performance Status		
				Excellent	Good	Unacceptable
Ga-Segonyana LM	24	112,747	87.45%	16	1	7
Hantam LM	6	21,449	93.85%	2	1	3
Joe Morolong LM	18	90,882	5.51%	1		17
Kamiesberg LM	16	9,527	0.00%			16
Kareeberg LM	3	11,400	98.66%	2	1	
Karoo Hoogland LM	3	9,279	95.39%	1		2
Kgatelopele LM	1	12,717	90.54%			1
Khai-Ma LM	4	13,405	25.00%	1		3
Magareng LM	1	20,858	86.36%			1
Nama Khoi LM	15	48,102	90.73%	5	2	8
Phokwane LM	3	64,317	69.78%		1	2
Renosterberg LM	3	14,839	0.00%			3
Richtersveld LM	5	12,815	59.99%	3		2
Siyancuma LM	4	45,182	75.33%			4
Siyathemba LM	3	18,300	76.56%			3
Sol Plaatjie LM	2	264,850	97.48%		2	
Thembelihle LM	2	13,500	98.89%	2		
Tsantsabane LM	5	4,937	79.60%	4		1
Ubuntu LM	5	15,942	84.01%			5
Umsobomvu LM	3	32,760	83.60%			3
Totals	**176**	**1,129,644**	**72.26%**	**62**	**10**	**104**



MICRO: Population <100,000		
Colour	Status	Percentage
	Excellent	>97%
	Good	>96 - <97%
	Unacceptable	<96%

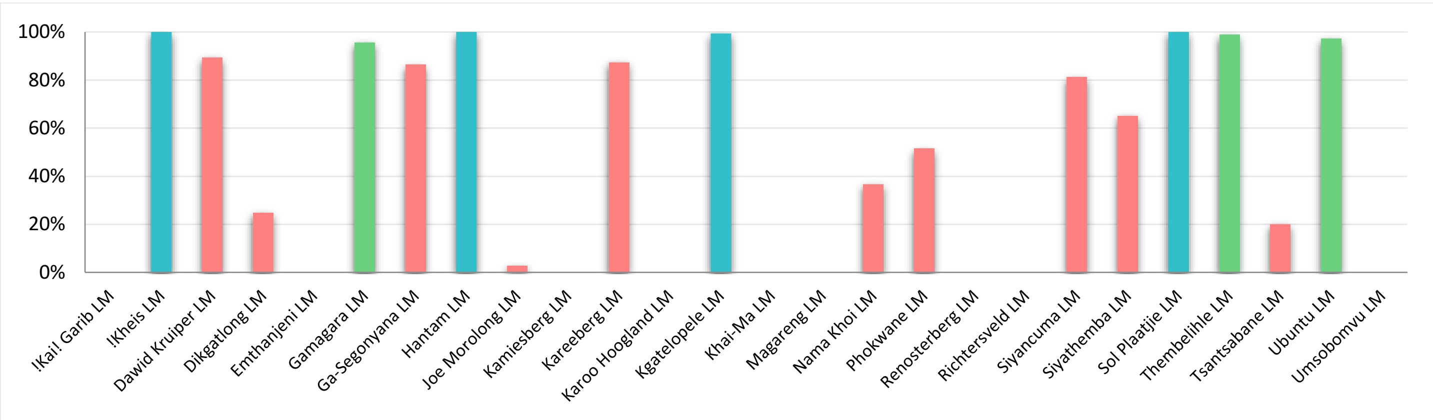
MICRO: Population >100,000		
Colour	Status	Percentage
	Excellent	>99%
	Good	>98 - <99%
	Unacceptable	<98%

Figure 166 - Provincial Microbiological Drinking Water Quality Status

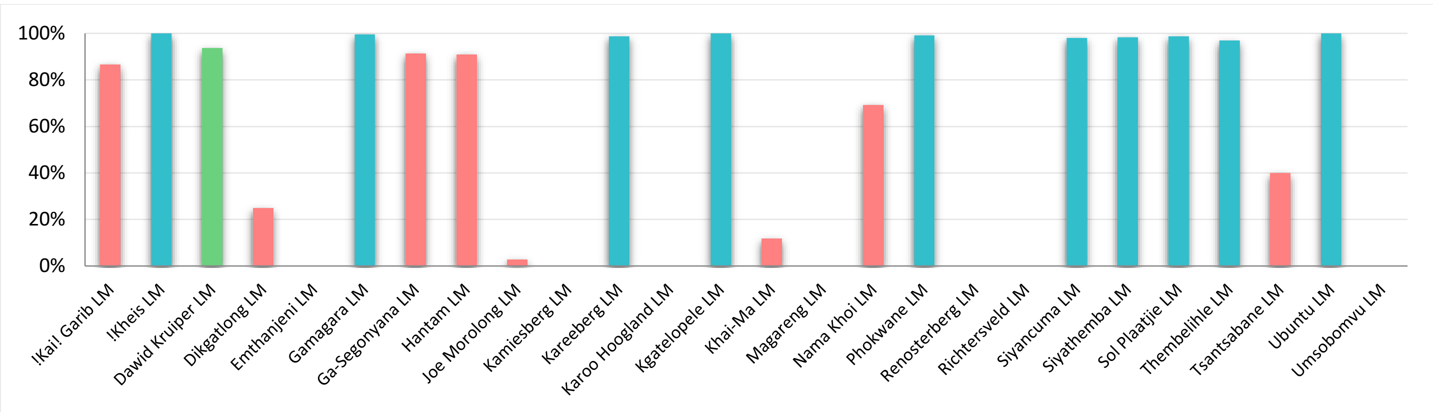
Out of the 176 WSSs, 72 (41%) systems achieved excellent and good microbiological quality, whilst 104 (59%) systems have an unacceptable microbiological water quality status. The water in these systems pose a serious acute health risk to the community. Failure to produce water that meets microbiological compliance standards can be linked back to poor operations, defective infrastructure, inadequate dosing rates, absence of disinfection chemicals, lack of monitoring, lack of operating and chemistry knowledge, and several other root causes. WSIs that are not monitoring the final water quality at the outlet of the treatment plant or at specific end use points are required to develop a monitoring programme and resume with compliance monitoring as a matter of urgency.

Table 217 - Provincial Summary of the DWQ Status for Chemical Acute Health and Chronic Health Compliance

WSA Name	# WSSs	Population	% Ave. Chem Acute Health Compliance	# WSS Chem Acute Health Performance Status			% Ave. Chem Chronic Health Compliance	# WSS Chem Chronic Health Performance Status		
				Excellent	Good	Unacceptable		Excellent	Good	Unacceptable
!Kai! Garib LM	16	40,090	0.0%			16	86.5%	13		3
!Kheis LM	7	18,946	100.0%	7			100.0%	7		
Dawid Kruiper LM	17	110,020	89.5%	14		3	93.7%	15		2
Dikgatlong LM	4	52,577	24.8%			4	24.7%			4
Emthanjeni LM	3	35,600	0.0%			3	0.0%			3
Gamagara LM	3	34,603	95.7%	1		2	99.6%	3		
Ga-Segonyana LM	24	112,747	86.4%	16		8	91.3%	21		3
Hantam LM	6	21,449	100.0%	6			90.9%	2		4
Joe Morolong LM	18	90,882	2.8%			18	2.8%			18
Kamiesberg LM	16	9,527	0.0%			16	0.0%			16
Kareeberg LM	3	11,400	87.4%	1		2	98.8%	3		
Karoo Hoogland LM	3	9,279	0.0%			3	0.0%			3
Kgatelopele LM	1	12,717	99.4%	1			100.0%	1		
Khai-Ma LM	4	13,405	0.0%			4	11.7%			4
Magareng LM	1	20,858	0.0%			1	0.0%			1
Nama Khoi LM	15	48,102	36.7%	5		10	69.1%	5	1	9
Phokwane LM	3	64,317	51.5%	1		2	99.1%	3		
Renosterberg LM	3	14,839	0.0%			3	0.0%			3
Richtersveld LM	5	12,815	0.0%			5	0.0%			5
Siyancuma LM	4	45,182	81.3%	3		1	98.1%	3		1
Siyathemba LM	3	18,300	65.2%	1		2	98.4%	3		
Sol Plaatjie LM	2	264,850	100.0%	2			98.7%	2		
Thembelihle LM	2	13,500	98.9%	1	1		96.9%	1	1	
Tsantsabane LM	5	4,937	20.0%			5	39.9%	2		3
Ubuntu LM	5	15,942	97.3%	4		1	100.0%	5		
Umsobomvu LM	3	32,760	0.0%			3	0.0%			3
Totals	**176**	**1,129,644**	**47.6%**	**63**	**1**	**112**	**57.7%**	**89**	**2**	**85**



CHEM Acute Health: Population <100,000			CHEM Acute Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	≥97%		Excellent	≥99%
	Good	≥95 - <97%		Good	≥97 - <99%
	Unacceptable	<95%		Unacceptable	<97%



CHEM Chronic Health: Population <100,000			CHEM Chronic Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	>95%		Excellent	>97%
	Good	>93 - <95%		Good	>95 - <97%
	Unacceptable	<93%		Unacceptable	<95%

Figure 167 - Provincial Chemical Acute Health and Chronic Health Drinking Water Quality Status

Chemical acute health compliance shows that 63 (36%) systems have excellent, and 1 (1%) system has good water quality, whilst 112 (63%) systems in 21 WSAs have an unacceptable chemical acute health compliance. Chemical chronic health compliance shows that 89 (51%) systems have excellent, and 2 (1%) systems have good water quality, whilst 85 (48%) systems in 17 WSAs have an unacceptable chemical chronic health compliance.

The Water Services Act upholds standards regarding the monitoring and reporting on drinking water quality and issuance of advisory notices to the public when significant DWQ failures are observed. The audit process applies a penalty when DWQ failures are noticed without issuing such Water Quality Alert Notices to forewarn consumers of the status of (unsafe) water quality and to advise communities to source alternative water sources or methods to disinfect water used for drinking water purposes.

The following table reflects the compliance status of the WSAs as regards the issuing of these notices for DWQ failures.

Table 218 - Summary of Penalties Applied to WSSs for not Issuing Advisory Notices

WSA Name	# WSS	# WSS No Penalty Applied	# WSS Partial Penalty Applied	# WSS Full Penalty Applied
!Kai! Garib LM	16	3	10	3
!Kheis LM	7	7		
Dawid Kruiper LM	17	9	5	3
Dikgatlong LM	4		3	1
Emthanjeni LM	3	2		1
Gamagara LM	3	2		1
Ga-Segonyana LM	24	6	18	
Hantam LM	6	1	5	
Joe Morolong LM	18			18
Kamiesberg LM	16			16
Kareeberg LM	3	2	1	
Karoo Hoogland LM	3	3		
Kgatelopele LM	1	1		
Khai-Ma LM	4	4		
Magareng LM	1			1
Nama Khoi LM	15		14	1
Phokwane LM	3	1	2	
Renosterberg LM	3			3
Richtersveld LM	5		3	2
Siyancuma LM	4			4
Siyathemba LM	3		3	
Sol Plaatjie LM	2	2		
Thembelihle LM	2	2		
Tsantsabane LM	5	5		
Ubuntu LM	5		2	3
Umsobomvu LM	3		2	1
Totals	**176**	**50**	**68**	**58**

Note: The names of the WSSs with partial and full penalties were just too many to record in the table above and hence were excluded here

No penalties were applied to 50 (28%) WSSs in 15 WSAs. Partial penalties were applied to 68 (39%) WSSs in 12 WSAs and full penalties were applied to 58 (33%) WSSs in 14 WSAS.

(iii) Risk defined compliance and laboratory credibility

Findings: Risk-defined compliance standards aim to determine the compliance (to SANS 241) of those parameters that have been found to pose a risk in a specific WSS and need to be included in the routine monitoring programme or frequency as prescribed by SANS 241. The province achieved an average Annual Risk Defined Compliance of 70.3%, with the best performances coming from Kgatelopele LM, Thembelihle LM, and Gamagara LM and the worst performances coming from Joe Morolong LM, Kamiesberg LM, Khai-Ma LM and Renosterberg LM. Excellent risk defined compliance was achieved by 39 (22%) systems, good compliance for 8 (5%) systems and bad compliance for 129 (73%) systems residing in 24 WSAs.

Table 219 - Summary of the DWQ Compliance for Risk Defined Compliance

WSA Name	# WSSs	Population	Ave. % Risk Defined Compliance	# WSS Performance Status		
				Excellent	Good	Bad
!Kai! Garib LM	16	40,090	68.21%	1		15
!Kheis LM	7	18,946	89.36%			7
Dawid Kruiper LM	17	110,020	81.99%	1	1	15
Dikgatlong LM	4	52,577	73.34%			4
Emthanjeni LM	3	35,600	38.89%			3
Gamagara LM	3	34,603	93.69%	1		2
Ga-Segonyana LM	24	112,747	87.87%	19		5
Hantam LM	6	21,449	90.94%	2	1	3
Joe Morolong LM	18	90,882	3.16%			18
Kamiesberg LM	16	9,527	0.00%			16
Kareeberg LM	3	11,400	89.04%			3
Karoo Hoogland LM	3	9,279	94.63%	2		1
Kgatelopele LM	1	12,717	100.00%	1		
Khai-Ma LM	4	13,405	12.67%			4
Magareng LM	1	20,858	69.70%			1
Nama Khoi LM	15	48,102	87.39%	3	2	10
Phokwane LM	3	64,317	81.57%		1	2
Renosterberg LM	3	14,839	0.00%			3
Richtersveld LM	5	12,815	57.60%	2		3
Siyancuma LM	4	45,182	79.10%			4
Siyathemba LM	3	18,300	90.47%			3
Sol Plaatjie LM	2	264,850	81.79%			2
Thembelihle LM	2	13,500	95.98%	2		
Tsantsabane LM	5	4,937	78.99%	3	1	1
Ubuntu LM	5	15,942	89.51%		2	3
Umsobomvu LM	3	32,760	91.81%	2		1
Totals	**176**	**1,129,644**	**70.30%**	**39**	**8**	**129**

The aim of operational determinand compliance is to determine the efficiency of the water treatment process, by monitoring those parameters which are used to control the treatment process. Although not necessarily a health risk, these parameters provide good information on the integrity of the WTW. The province achieved an average % Actual Operational Determinand Compliance of 10%, the best performance coming from Dawid Kruiper LM (82%) only and the worst performances coming 19 WSAs (0%). Excellent Operational Determinand compliance was achieved by 3 (2%) systems, good compliance for 12 (8%) systems and bad compliance for 143 (90%) systems with most of these systems residing in !Kai! Garib LM, Ga-Segonyana LM, Joe Morolong LM and Kamiesberg LM.

Table 220 - Summary of the Treatment (Operational) Efficiency Index

WSA & WB Name	# WTWs	Population	Ave. % Actual Operational Determinand Compliance	# WTW Performance Status		
				Excellent	Good	Bad
Bloem Water now Vaal Central Water (Sedibeng Water)	3	81,487	33%	1		2
!Kai! Garib LM	16	40,090	0%			16
!Kheis LM	7	18,946	0%			7
Dawid Kruiper LM	11	105,608	82%	1	8	2
Dikgatlong LM	2	42,429	0%			2
Emthanjeni LM	3	35,600	0%			3
Gamagara LM	3	25,000	33%	1		2
Ga-Segonyana LM	22	112,747	0%			22
Hantam LM	6	21,449	15%		1	5
Joe Morolong LM	18	89,382	0%			18
Kamiesberg LM	16	9,527	0%			16
Kareeberg LM	3	11,400	0%			3
Karoo Hoogland LM	3	9,279	0%			3
Kgatelopele LM	1	12,717	0%			1
Khai-Ma LM	3	3,205	0%			3
Magareng LM	1	20,858	0%			1
Nama Khoi LM	5	6,478	18%		1	4
Phokwane LM	3	64,317	0%			3
Renosterberg LM	2	14,839	0%			2
Richtersveld LM	5	12,815	0%			5
Siyancuma LM	4	45,182	0%			4

WSA & WB Name	# WTWs	Population	Ave. % Actual Operational Determinand Compliance	# WTW Performance Status		
				Excellent	Good	Bad
Siyathemba LM	3	18,300	0%			3
Sol Plaatjie LM	2	264,850	34%			2
Thembelihle LM	3	13,500	30%		1	2
Tsantsabane LM	5	937	0%			5
Ubuntu LM	5	15,942	0%			5
Umsobomvu LM	3	32,760	30%		1	2
Totals	**158**	**1,129,644**	**10%**	**3**	**12**	**143**

The data confirms that 20 (77%) WSAs in the province have access to credible laboratories for compliance and operational analysis. These in-house or contracted laboratories are accredited with SANAS or have Proficiency Testing Schemes with SABS or have inter-laboratory quality checks in place to ensure that suitable analytical methods are applied and that quality assurance processes are followed to ensure credible water quality results. The province is predominantly meeting the regulatory expectation for the WSIs having access to credible analytical services for compliance and operational monitoring.

Diagnostic 4: Technical Site Assessments

Aim: The Blue Drop process makes provision for a Technical Site Assessment (TSA) in order to verify the desktop evidence through field-based inspections. This assessment includes a physical inspection of the entire water treatment plant with all its process units, as well as the reservoir and spot checks of a pumpstation and pipelines. The technical assessment is coupled with an asset condition check to determine an approximate cost (VROOM) to restore existing infrastructure to functional status for the treatment facility (only).

Findings: The results of the province's TSAs are summarised in the table below. A deviation of 10% between the BD and TSA score indicate a misalignment between the administrative aspects and the work on the ground. The Regulator regards a WTW with a TSA score of >80% to have an acceptable level of process control and functional equipment, and a TSA score of 90% as an excellent system that complies with most of the Blue Drop TSA standards. A TSA score of <30% indicates that the treatment facility and network fails in most regards, and is evident of dysfunctional infrastructure, failed process control, absence of record keeping and monitoring, and poor water quality.

The VROOM cost presents a ''Very Rough Order of Measurement" cost to return a WTWs functionality to its original design. More detail can be found in the Blue Drop Watch Report 2023.

Table 221 - %TSA and %BD score, and VROOM cost estimates total and split for civil, mechanical, and electrical

WSA & WB Name	TSA Name	%TSA	2023 BD Score (%)	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Bloem Water now Vaal Central Water (Sedibeng Water)	Vaal Gamagara	94.0%	**54.71%**	2,160,000	17,280,000	2,160,000	21,600,000
!Kai! Garib LM	Kakamas	34.0%	**16.20%**	11,424,000	6,854,400	4,569,600	22,848,000
!Kheis LM	Groblershoop	40.0%	**29.31%**	718,520	718,520	359,260	1,796,300
Dawid Kruiper LM	AH September	85.0%	**83.85%**	6,240,000	46,800,000	9,360,000	62,400,000
Dikgatlong LM	Barkly West	52.0%	**18.73%**	7,078,993	6,292,438	2,359,664	15,731,096
Emthanjeni LM	De Aar	43.0%	**11.94%**	92,800	81,200	58,000	232,000
Gamagara LM	Kathu	57.0%	**54.71%**	7,350,750	3,341,250	2,673,000	13,365,000
Ga-Segonyana LM	Kuruman Reservoirs	48.0%	**25.92%**	168,000	756,000	756,000	1,680,000
Ga-Segonyana LM	Mothibistad	36.0%	**25.92%**	281,793	1,549,862	986,276	2,817,930
Hantam LM	Calvinia	94.0%	**47.64%**	1,144,880	143,110	143,110	1,431,100
Joe Morolong LM	Hotazel	59.0%	**17.57%**	360,000	864,000	216,000	1,440,000
Kamiesberg LM	Garies	68.0%	**8.02%**	62,586	500,685	62,586	625,856
Kareeberg LM	Carnarvon	28.0%	**18.42%**	280,800	124,800	218,400	624,000
Karoo Hoogland LM	Sutherland	82.0%	**21.62%**	42,350	190,575	190,575	423,500
Kgatelopele LM	Danielskuil	71.0%	**27.60%**	33,192	66,384	66,384	165,960
Khai-Ma LM	Onseepkans (Melkbosrand)	27.0%	**15.19%**	100,000	250,000	150,000	500,000
Magareng LM	Warrenton	55.0%	**26.45%**	1,470,000	525,000	105,000	2,100,000
Nama Khoi LM	Vioolsdrift	62.0%	**36.61%**	71,500	500,500	143,000	715,000
Phokwane LM	Hartswater	45.0%	**19.85%**	2,121,075	3,393,720	2,969,505	8,484,300
Renosterberg LM	Vanderkloof	42.0%	**9.20%**	746,200	5,969,600	746,200	7,462,000
Richtersveld LM	Port Nolloth / Alexander Baai (Alexcor & 8 Myl)	43.0%	**21.94%**	1,430	11,440	1,430	14,300
Siyancuma LM	Douglas	51.0%	**26.38%**	19,200,000	2,400,000	2,400,000	24,000,000
Siyathemba LM	Flippie Holtshauzen WTW Prieska	65.0%	**46.26%**	1,207,500	1,552,500	690,000	3,450,000

WSA & WB Name	TSA Name	%TSA	2023 BD Score (%)	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Sol Plaatjie LM	Kby Zone A-E : Ritchie	65.0%	**52.04%**	2,493,039	311,630	311,630	3,116,299
Thembelihle LM	Hopetown	75.0%	**59.52%**	128,800	450,800	708,400	1,288,000
Ubuntu LM	Victoria West	32.0%	**14.17%**	4,624,960	1,156,240	0	5,781,200
Umsobomvu LM	Colesberg	56.0%	**24.17%**	1,293,075	3,361,995	517,230	5,172,300
			Totals	**R70,896,243**	**R105,446,649**	**R32,921,250**	**R209,264,141**
			% Split of Cost Items	**34%**	**50%**	**16%**	**100%**

A deviation of >10% between the BD and TSA score is noted for 24 of the 27 (89%) WTWs assessed. A deviation of >20% between the BD and TSA score is noted for 16 of the 27 (59%) WTWs assessed. For the individual WTWs assessed in the province, a total budget of R209.3m is estimated, with the bulk of the work (84%) going towards restoration of mechanical equipment (50%) and civil infrastructure (34%).

Diagnostic 5: Operation, Maintenance and Refurbishment of Assets

Aim: Insufficient financial resources are often cited as a root cause to dysfunctional or non-compliant water treatment works and water networks. Knowledge and monitoring of fiscal spending are therefore a critical part of water services management and municipal governance of public assets. This diagnostic investigates the status of financial information as pertaining to O&M budgets and expenditure, asset figures, and capital funding.

Findings: A substantial amount of financial information was presented during the audit process. Unfortunately, the evidence was presented in different formats, levels of detail, or absent for some WSAs. It was observed that WSA teams with financial officials that were present during the audits performed better and had a better understanding of the water services challenges experienced by their technical peers.

Discrepancies observed included amongst others - generic or non-ringfenced budgets, contract lump sums for service providers presented as budgets, outdated or incomplete asset registers, and some cost drivers which were lacking. As data credibility presents a significant challenge, the Regulator grouped data into different certainty levels, as summarised at the end of this Diagnostic.

The result of each financial portfolio is discussed hereunder.

NOTE: The Regulator regards the financial and asset information with low confidence. Not all WSAs submitted verifiable information or complete financial data sets for the audit year in question.

Capital, O&M Budget and Actual, and Asset Value

The capital budgets, O&M budgets, O&M actual expenditure, and current asset values are summarised below.

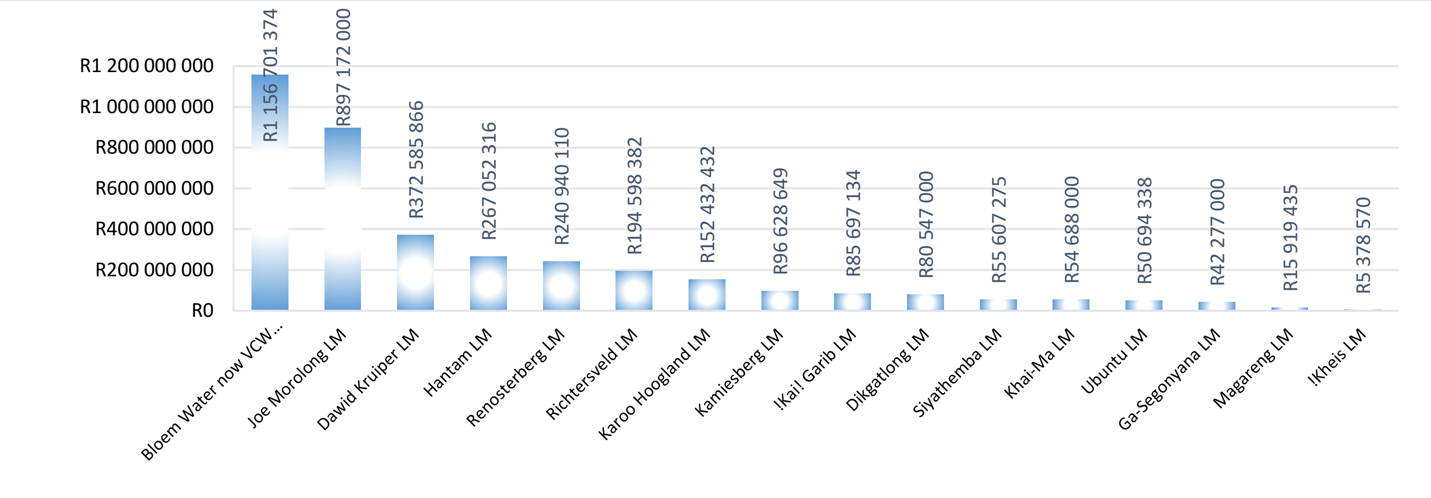
Table 222 - Summary of the capital budgets, O&M budgets, O&M actual expenditure, and current asset values

WSA & WB Name	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
Bloem Water now Vaal Central Water (Sedibeng Water)	NI	R217,323,175	R143,741,686	66%	R1,156,701,374
!Kai! Garib LM	R2,673,052	NI	NI	NI	R85,697,134
!Kheis LM	NI	NI	NI	NI	R5,378,570
Dawid Kruiper LM	R23,918,894	R43,019,239	R42,085,000	98%	R372,585,866
Dikgatlong LM	NI	NI	NI	NI	R80,547,000
Emthanjeni LM	NI	NI	NI	NI	NI
Gamagara LM	R11,123,095	R20,987,750	R17,072,321	81%	NI
Ga-Segonyana LM	NI	NI	NI	NI	R42,277,000
Hantam LM	NI	R18,195,078	R18,199,771	100%	R267,052,316
Joe Morolong LM	NI	NI	NI	NI	R897,172,000
Kamiesberg LM	NI	R1,603,684	NI	NI	R96,628,649
Kareeberg LM	R11,539,755	NI	NI	NI	NI
Karoo Hoogland LM	NI	NI	NI	NI	R152,432,432
Kgatelopele LM	R137,921	NI	NI	NI	NI
Khai-Ma LM	NI	NI	NI	NI	R54,688,000
Magareng LM	R13,041,000	R3,003,010	R2,691,041	90%	R15,919,435
Nama Khoi LM	NI	R22,110,476	R66,987,693	303%	NI
Phokwane LM	NI	NI	NI	NI	NI

WSA & WB Name	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
Renosterberg LM	NI	NI	NI	NI	R240,940,110
Richtersveld LM	NI	NI	NI	NI	R194,598,382
Siyancuma LM	R18,531,748	NI	NI	NI	NI
Siyathemba LM	NI	R18,997,418	R20,705,578	109%	R55,607,275
Sol Plaatjie LM	NI	R326,560,950	R326,815,704	100%	NI
Thembelihle LM	R12,042,284	R13,105,318	R11,823,177	90%	NI
Tsantsabane LM	R47,100,711	R26,925,874	R35,147,415	131%	NI
Ubuntu LM	NI	NI	NI	NI	R50,694,338
Umsobomvu LM	NI	NI	NI	NI	NI
Totals	**R140,108,460**	**R711,831,973**	**R685,269,386**	**96.3%**	**R3,768,919,880**

The Regulatory Comments following in this Chapter list the capital projects with secured funding for each municipality and/or its bulk water provider (WSP). The capital lists are deemed to be a definitive means to address water service inadequacies and ensuring water infrastructure investment. A total capital budget of R140.1m has been reported for the refurbishment and upgrades of water supply system infrastructure for 9 WSAs only. The largest capital budgets are observed for Tsantsabane LM (R47.1m) and Dawid Kruiper LM (R23.9m).

For the 2021/22 fiscal year, the total O&M budget reported for the province was R711.8m, of which R685.3m (96%) has been expended. The highest over-expenditure of 303% by the Magareng LM and the lowest under expenditure of 66% by the Bloem Water now Vaal Central Water (Sedibeng Water) was observed. The provincial figures exclude for 17 WSAs who had no and partial financial information.



Note: Emthanjeni LM, Gamagara LM, Kareeberg LM, Kgatelopele LM, Nama Khoi LM, Phokwane LM, Siyancuma LM, Sol Plaatjie LM, Thembelihle LM, Tsantsabane LM and Umsobomvu LM excluded from the graph as no total current asset values were provided for

Figure 168 - Total current asset value reported

The total current asset value for water infrastructure (networks, pump stations, treatment plants) is reportedly R3.769b (excluding 11 WSAs with no information). The highest asset values are observed for Bloem Water now Vaal Central Water (Sedibeng Water) (R1.157b), followed by Joe Morolong LM (R897m), Dawid Kruiper LM (R373m) and Hantam LM (R267m).

O&M Cost Benchmarking

By combining the SALGA and WRC WATCOST models, an estimation of the maintenance cost required per asset type can be done, i.e. civil, buildings, pipelines, mechanical, electrical, and instrumentation.

Table 223 - SALGA-WRC annual maintenance budget guideline and cost estimation

Description	% of Current Asset Value	Asset Value Estimate	Modified SALGA Maintenance Guideline	Annual Maintenance Budget Guideline
Current Asset Value estimate	**100%**	**R3,768,919,880**	**15.75%**	**R81,408,669**
Broken down into:				
1. Civil Structures	46%	R1,733,703,145	0.50%	R8,668,516
2. Buildings	3%	R113,067,596	1.50%	R1,696,014
3. Pipelines	6%	R226,135,193	0.75%	R1,696,014
4. Mechanical Equipment	30%	R1,130,675,964	4.00%	R45,227,039
5. Electrical Equipment	11%	R414,581,187	4.00%	R16,583,247

Description	% of Current Asset Value	Asset Value Estimate	Modified SALGA Maintenance Guideline	Annual Maintenance Budget Guideline
Current Asset Value estimate	**100%**	**R3,768,919,880**	**15.75%**	**R81,408,669**
6. Instrumentation	4%	R150,756,795	5.00%	R7,537,840
Totals	**100%**	**R3,768,919,880**	**15.75%**	**R81,408,669**
			Minus 20% P&Gs and 10% Installation	**R24,422,601**
			Total	**R56,986,069**

The model estimates that R81.4m (2.16%) is required per year to maintain the assets valued at R3.769b. Notably, this maintenance estimate assumes that all assets are functional. In cases where Blue Drop Certification is not being achieved, it can be assumed that some form of inefficiency or constraint is being experienced, and national benchmarks closer to 7% of the asset value is advocated (R264m).

The table below indicates the SALGA maintenance cost estimation in relation to the O&M budget, and O&M actual expended.

Table 224 - O&M cost estimates by the SALGA versus actual budget and expenditure figures

Cost Reference	O&M Cost Estimate	Period	% of Asset Value
Modified SALGA	R81,408,669	Annually, estimation	2.16%
O&M Budget	R711,831,973	Actual for 2021/22	18.9%
O&M Spend	R685,269,386	Actual for 2021/22	18.2%

In addition, the table below indicates the Blue Drop audit findings on the water supply operations cost determination and water supply O&M budget status.

Table 225 - BD Audit Water Supply Operations Cost Determination and Water Supply O&M Budget status

WSA & WB Name	Water Supply Operations Cost Determination	Water Supply O&M Budget status
Bloem Water now Vaal Central Water (Sedibeng Water)	DETERMINED OF THE WHOLE SYSTEM; NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY; SYSTEM SPECIFIC BUDGET
!Kai! Garib LM	NO PROOF (0% SCORE)	NO PROOF
!Kheis LM	NOT SYSTEM SPECIFIC (GLOBAL); DETERMINED OF THE WHOLE SYSTEM	BUDGET IS NOT RINGFENCED FOR WATER ONLY; NO PROOF
Dawid Kruiper LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Dikgatlong LM	NOT SYSTEM SPECIFIC (GLOBAL)	BUDGET IS NOT RINGFENCED FOR WATER ONLY
Emthanjeni LM	NO PROOF (0% SCORE)	NO PROOF
Gamagara LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Ga-Segonyana LM	NO PROOF (0% SCORE)	NO PROOF
Hantam LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Joe Morolong LM	NOT SYSTEM SPECIFIC (GLOBAL)	BUDGET IS NOT RINGFENCED FOR WATER ONLY
Kamiesberg LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Kareeberg LM	NO PROOF (0% SCORE)	NO PROOF
Karoo Hoogland LM	NO PROOF (0% SCORE)	NO PROOF
Kgatelopele LM	NO PROOF (0% SCORE)	NO PROOF
Khai-Ma LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Magareng LM	NOT SYSTEM SPECIFIC (GLOBAL)	BUDGET IS NOT RINGFENCED FOR WATER ONLY
Nama Khoi LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Phokwane LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Renosterberg LM	NO PROOF (0% SCORE)	NO PROOF
Richtersveld LM	NO PROOF (0% SCORE)	NO PROOF
Siyancuma LM	NO PROOF (0% SCORE)	NO PROOF
Siyathemba LM	DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Sol Plaatjie LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Thembelihle LM	DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Tsantsabane LM	DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Ubuntu LM	NO PROOF (0% SCORE)	NO PROOF

WSA & WB Name	Water Supply Operations Cost Determination	Water Supply O&M Budget status
Umsobomvu LM	NO PROOF (0% SCORE)	NO PROOF

From the tables above, the cost dynamics can be summarised as follows:

- The SALGA estimations for maintenance budgets is about 11.4% (Modified SALGA divided by O&M Budget) of the actual reported budgets for the 2021/22 fiscal year
- The actual O&M budget (18.9%) appears to be adequate when compared with the SALGA guideline (2.16%) or with the government benchmark (7%)
- These figures are impacted by the WSAs who did not provide budget and expenditure figures, and by some inaccurate asset values and where no asset values were provided for
- Lastly, the municipalities presents budget and expenditure data at different levels (table above) i.e. financial figures are not always ringfenced per water supply system – thus rendering provincial summaries to be indicative).

12.1 Dikgatlong Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	18.73%
Blue Drop Score 2014	%	61.28%
Blue Drop Score 2012	%	55.32%
Blue Drop Score 2011	%	67.48%

Key Performance Area	Weight	Barkley West	Delportshoop and Longlands	Koopmansfontein	Windsorton (Vaalharts)
Bulk/WSP		-	Sedibeng Water	Sedibeng Water	-
Blue Drop Score 2023	%	11.18%	35.80%	34.00%	9.18%
Blue Drop Score 2014	%	28.61%	64.77%	64.21%	24.09%
Blue Drop Score 2012	%	72.78%	92.44%	NI	55.09%
Blue Drop Score 2011	%	23.87%	72.78%	NI	NI
System Design Capacity	kL/d	8 000	36 000	36 000	1 000
System Available Capacity	kL/d	8 000	36 000	36 000	1 000
System Input Value	kL/d	3 762	2 146	26	900
Capacity Utilisation	%	NI	NI	NI	NI
Resource Abstracted From		Vaal River	Vaal River	Vaal River	Vaalharts Canal
BDRR 2023	%	86.54%	56.94%	79.45%	87.47%
BDRR 2022	%	75.30%	31.20%	80.20%	97.16%

Technical Site Assessment: Barkley West WTW – 52%

The Regulator note the dire state of management and drinking water quality in the Barkley West and Windsorton (Vaalharts) water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.2 Dawid Kruiper Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	83.85%
Blue Drop Score 2014	%	95.66%
Blue Drop Score 2012	%	71.70%
Blue Drop Score 2011	%	43.57%

Key Performance Area	Weight	Askham	Groot Mier	Karos	Klein Mier
Bulk/WSP		Sedibeng Water	Sedibeng Water	-	Sedibeng Water
Blue Drop Score 2023	%	57.05%	49.60%	79.93%	41.96%
Blue Drop Score 2014	%	22.94%	25.92%	91.17%	25.92%
Blue Drop Score 2012	%	37.86%	36.91%	66.15%	36.51%
Blue Drop Score 2011	%	27.72%	25.96%	37.51%	25.96%
System Design Capacity	kL/d	36 000	36 000	288	36 000
System Available Capacity	kL/d	36 000	36 000	288	36 000
System Input Value	kL/d	97	156	266	89
Capacity Utilisation	%	58.88%	58.88%	92.36%	58.88%
Resource Abstracted From		Vaal River	Vaal River	Orange River	Vaal River
BDRR 2023	%	33.65%	48.05%	19.39%	68.27%
BDRR 2022	%	88.50%	39.00%	15.70%	NI

Key Performance Area	Weight	Lambrechtsdrift	Leerkrans	Leseding	Loubos
Bulk/WSP		-	-	-	Sedibeng Water
Blue Drop Score 2023	%	81.40%	80.46%	64.49%	57.21%
Blue Drop Score 2014	%	90.65%	89.99%	90.65%	22.94%
Blue Drop Score 2012	%	46.90%	64.14%	55.78%	31.64%
Blue Drop Score 2011	%	26.97%	33.72%	33.28%	25.96%
System Design Capacity	kL/d	288	288	432	36 000
System Available Capacity	kL/d	288	288	432	36 000
System Input Value	kL/d	240	252	278	193
Capacity Utilisation	%	83.33%	87.50%	64.35%	58.88%
Resource Abstracted From		Orange River	Orange River	Orange River	Vaal River
BDRR 2023	%	21.05%	21.05%	31.87%	35.80%
BDRR 2022	%	14.40%	NI	16.80%	20.90%

Key Performance Area	Weight	Louisvale	Noenieput	Ntsikelelo	Philandersbron
Bulk/WSP		-	Sedibeng Water	-	Sedibeng Water
Blue Drop Score 2023	%	68.00%	57.21%	82.73%	50.60%
Blue Drop Score 2014	%	80.13%	15.66%	95.24%	19.59%

Key Performance Area	Weight	Louisvale	Noenieput	Ntsikelelo	Philandersbron
Blue Drop Score 2012	%	55.35%	17.36%	37.61%	18.94%
Blue Drop Score 2011	%	27.63%	24.24%	32.94%	29.88%
System Design Capacity	kL/d	288	36 000	288	36 000
System Available Capacity	kL/d	288	36 000	288	36 000
System Input Value	kL/d	243	193	250	186
Capacity Utilisation	%	84.38%	NI	86.81%	NI
Resource Abstracted From		Orange	Vaal River	Orange River	Vaal River;
BDRR 2023	%	31.87%	46.21%	18.24%	69.80%
BDRR 2022	%	25.70%	77.70%	19.00%	24.20%

Key Performance Area	Weight	Raaswater	Rietfontein	Swartkopdam	Upington
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**81.40%**	**56.91%**	**59.75%**	**85.38%**
Blue Drop Score 2014	%	77.83%	22.94%	6.12%	96.17%
Blue Drop Score 2012	%	57.82%	37.91%	8.96%	72.32%
Blue Drop Score 2011	%	44.22%	32.94%	NI	43.96%
System Design Capacity	kL/d	1 776	3 360	500	80 000
System Available Capacity	kL/d	1 775	3 360	500	80 000
System Input Value	kL/d	572	344	500	41 405
Capacity Utilisation	%	32.23%	10.24%	100.00%	68.60%
Resource Abstracted From		Orange River	Orange River	Orange River	Orange River
BDRR 2023	%	19.55%	34.69%	23.57%	32.93%
BDRR 2022	%	15.90%	75.00%	87.20%	21.20%

Key Performance Area	Weight	Welkom
Bulk/WSP		-
Blue Drop Score 2023	%	**70.93%**
Blue Drop Score 2014	%	19.37%
Blue Drop Score 2012	%	29.74%
Blue Drop Score 2011	%	22.44%
System Design Capacity	kL/d	42
System Available Capacity	kL/d	42
System Input Value	kL/d	25
Capacity Utilisation	%	58.57%
Resource Abstracted From		Orange
BDRR 2023	%	23.57%
BDRR 2022	%	44.30%

Technical Site Assessment:
AH September WTW – 84%

12.3 Emthanjeni Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	11.94%
Blue Drop Score 2014	%	74.84%
Blue Drop Score 2012	%	63.18%
Blue Drop Score 2011	%	60.42%

Key Performance Area	Weight	Britstown	De Aar	Hanover
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	11.80%	12.00%	11.80%
Blue Drop Score 2014	%	75.34%	77.79%	63.97%
Blue Drop Score 2012	%	63.68%	62.47%	68.39%
Blue Drop Score 2011	%	78.11%	56.72%	75.10%
System Design Capacity	kL/d	40	200	38
System Available Capacity	kL/d	40	8 703	55
System Input Value	kL/d	40	200	38
Capacity Utilisation	%	NI	NI	NI
Resource Abstracted From		Groundwater	Ground water	Ground water
BDRR 2023	%	99.11%	99.11%	99.11%
BDRR 2022	%	55.10%	55.10%	55.10%

Technical Site Assessment: De Aar WTW – 43%

The Regulator notes the dire state of management and drinking water quality in the Britstown, De Aar and Hanover water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.4 Ga-Segonyana Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	25.92%
Blue Drop Score 2014	%	40.62%
Blue Drop Score 2012	%	72.27%
Blue Drop Score 2011	%	37.32%

Key Performance Area	Weight	Bankhara-Bodulong	Batlharos	Ditshoswaneng	Galotolo
Bulk/WSP		-	Sedibeng Water	Sedibeng Water	Sedibeng Water
Blue Drop Score 2023	%	26.30%	29.75%	29.75%	23.35%
Blue Drop Score 2014	%	14.06%	60.51%	49.83%	57.42%
Blue Drop Score 2012	%	64.16%	NI	NI	NI
Blue Drop Score 2011	%	34.18%	NI	NI	NI
System Design Capacity	kL/d	1 000	2 300	580	345
System Available Capacity	kL/d	1 000	2 300	580	345
System Input Value	kL/d	1 092	5 417	139	47
Capacity Utilisation	%	109.20%	235.52%	23.97%	NI
Resource Abstracted From		4 x Boreholes	4 Boreholes	2 x Boreholes	1 x Borehole
BDRR 2023	%	78.72%	44.29%	33.98%	31.99%
BDRR 2022	%	49.80%	45.50%	48.70%	49.70%

Key Performance Area	Weight	Mothibistad	Ncweng	Pietbos	Sedibeng
Bulk/WSP		Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
Blue Drop Score 2023	%	7.60%	28.25%	22.23%	14.00%
Blue Drop Score 2014	%	NI	NI	62.17%	67.39%
Blue Drop Score 2012	%	NI	NI	NI	NI
Blue Drop Score 2011	%	NI	NI	NI	NI
System Design Capacity	kL/d	6 873	864	432	389
System Available Capacity	kL/d	6 873	864	432	389
System Input Value	kL/d	1 338	138	126	121
Capacity Utilisation	%	19.47%	15.97%	29.17%	31.11%
Resource Abstracted From		3 x Boreholes	2 x Boreholes	1 x Borehole	1 x Borehole
BDRR 2023	%	72.33%	26.82%	56.28%	77.48%
BDRR 2022	%	NI	44.70%	61.10%	50.50%

Key Performance Area	Weight	Magobe Magojaneng	Mapoteng	Maruping	Mokalamosesane
Bulk/WSP		Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
Blue Drop Score 2023	%	22.75%	28.25%	26.75%	12.50%

Key Performance Area	Weight	Magobe Magojaneng	Mapoteng	Maruping	Mokalamosesane
Blue Drop Score 2014	%	NI	NI	NI	NI
Blue Drop Score 2012	%	NI	NI	NI	NI
Blue Drop Score 2011	%	NI	NI	NI	NI
System Design Capacity	kL/d	1 730	864	1 814	520
System Available Capacity	kL/d	1 730	864	1 814	520
System Input Value	kL/d	573	712	1 814	67
Capacity Utilisation	%	33.12%	82.41%	NI	12.88%
Resource Abstracted From		2 x Boreholes	1.00	4 x Boreholes	1 x Borehole
BDRR 2023	%	37.36%	46.11%	36.36%	73.75%
BDRR 2022	%	47.10%	54.50%	NI	42.30%

Key Performance Area	Weight	Gamopedi	Gantatelang	Garuele	Gasebolao
Bulk/WSP		Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
Blue Drop Score 2023	%	**29.75%**	**32.25%**	**29.75%**	**28.25%**
Blue Drop Score 2014	%	57.92%	54.45%	55.93%	56.07%
Blue Drop Score 2012	%	NI	NI	NI	NI
Blue Drop Score 2011	%	NI	NI	NI	NI
System Design Capacity	kL/d	1 123	950	345	1 210
System Available Capacity	kL/d	1 123	950	345	1 210
System Input Value	kL/d	463	190	56	30
Capacity Utilisation	%	41.23%	20.00%	16.23%	2.48%
Resource Abstracted From		1 x Borehole	Boreholes	2 x Boreholes	1 x Borehole
BDRR 2023	%	33.98%	23.04%	28.01%	39.55%
BDRR 2022	%	60.20%	39.90%	75.10%	45.50%

Key Performance Area	Weight	Seven miles	Slouya	Thamoyanche	Vergenoeg
Bulk/WSP		Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
Blue Drop Score 2023	%	**24.85%**	**28.25%**	**3.00%**	**29.75%**
Blue Drop Score 2014	%	55.69%	NI	NI	NI
Blue Drop Score 2012	%	NI	NI	NI	NI
Blue Drop Score 2011	%	NI	NI	NI	NI
System Design Capacity	kL/d	520	432	430	950
System Available Capacity	kL/d	520	432	430	950
System Input Value	kL/d	82	20	250	239
Capacity Utilisation	%	15.77%	4.63%	58.14%	25.16%
Resource Abstracted From		3 x Boreholes	2 x Boreholes	2 x Boreholes	1 x Borehole
BDRR 2023	%	33.98%	20.50%	95.58%	24.43%

Key Performance Area	Weight	Seven miles	Slouya	Thamoyanche	Vergenoeg
BDRR 2022	%	54.30%	67.50%	46.10%	52.50%

Key Performance Area	Weight	Gasehubane	Kagung	Kuruman-Wrenchville	Lokaleng
Bulk/WSP		Sedibeng Water	Sedibeng Water	-	Sedibeng Water
Blue Drop Score 2023	%	**28.25%**	**21.85%**	**26.75%**	**3.00%**
Blue Drop Score 2014	%	NI	60.40%	17.19%	NI
Blue Drop Score 2012	%	NI	NI	64.16%	NI
Blue Drop Score 2011	%	NI	NI	8.55%	NI
System Design Capacity	kL/d	86	1 728	30 000	302
System Available Capacity	kL/d	86	1 728	12 100	302
System Input Value	kL/d	65	579	12 100	95
Capacity Utilisation	%	NI	33.51%	103.31%	31.46%
Resource Abstracted From		1 x Borehole	2 x Boreholes	Boreholes	2 x Boreholes
BDRR 2023	%	45.24%	32.59%	44.51%	93.38%
BDRR 2022	%	29.60%	42.30%	40.50%	56.50%

Technical Site Assessment: Kuruman Water System (WSA) – 55% and Mothibistad Water System – 64%

The Regulator notes the dire state of management and drinking water quality in the Bankhara-Bodulong, Batlharos, Ditshoswaneng, Galotolo, Mothibistad, Ncweng, Pietbos, Sedibeng, Magobe Magojaneng, Mapoteng, Maruping, Mokalamosesane, Gamopedi, Garuele, Gasebolao, Seven miles, Slouya, Thamoyanche, Vergenoeg, Gasehubane, Kagung, Kuruman-Wrenchville and Lokaleng water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.5 Gamagara Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	54.71%
Blue Drop Score 2014	%	50.10%
Blue Drop Score 2012	%	40.00%
Blue Drop Score 2011	%	49.79%

Key Performance Area	Weight	Dibeng	Kathu	Olifantshoek
Bulk/WSP		-	-	Sedibeng Water
Blue Drop Score 2023	%	**21.73%**	**60.41%**	**55.52%**
Blue Drop Score 2014	%	35.95%	38.60%	65.98%
Blue Drop Score 2012	%	25.06%	26.16%	55.96%
Blue Drop Score 2011	%	12.40%	67.01%	68.35%
System Design Capacity	kL/d	1 030	6 500	36 000
System Available Capacity	kL/d	1 447	6 500	36 000
System Input Value	kL/d	1 447	8 163	1 406
Capacity Utilisation	%	100.00%	132.62%	58.88%
Resource Abstracted From		Groundwater	Ga-Mogara	Vaal River
BDRR 2023	%	96.02%	42.94%	38.40%
BDRR 2022	%	93.50%	78.50%	31.10%

Technical Site Assessment: Kathu Water Supply System – 57%

The Regulator notes the dire state of management and drinking water quality in the Dibeng water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.6 Hantam Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	47.64%
Blue Drop Score 2014	%	84.60%
Blue Drop Score 2012	%	81.64%
Blue Drop Score 2011	%	75.07%

Key Performance Area	Weight	Brandvlei	Calvinia	Loeriesfontein	Middelpos
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	39.05%	45.88%	39.95%	43.55%
Blue Drop Score 2014	%	61.00%	92.00%	87.00%	65.00%
Blue Drop Score 2012	%	74.00%	88.00%	70.00%	69.00%
Blue Drop Score 2011	%	69.00%	78.00%	69.00%	57.00%
System Design Capacity	kL/d	500	4 000	600	360
System Available Capacity	kL/d	500	4 000	600	360
System Input Value	kL/d	500	2 160	600	360
Capacity Utilisation	%	100.00%	54.00%	100.00%	100.00%
Resource Abstracted From		Borehole	Karee Dam/ Boreholes	Borehole	Borehole
BDRR 2023	%	32.23%	27.48%	32.20%	32.23%
BDRR 2022	%	21.80%	20.60%	18.80%	15.80%

Key Performance Area	Weight	Nieuwoudtville	Swartkop
Bulk/WSP		-	-
Blue Drop Score 2023	%	57.87%	53.92%
Blue Drop Score 2014	%	83.00%	NA
Blue Drop Score 2012	%	87.00%	NA
Blue Drop Score 2011	%	78.00%	NA
System Design Capacity	kL/d	995	640
System Available Capacity	kL/d	995	640
System Input Value	kL/d	995	640
Capacity Utilisation	%	100.00%	100.00%
Resource Abstracted From		Borehole	Borehole
BDRR 2023	%	22.86%	23.85%
BDRR 2022	%	18.80%	15.70%

Technical Site Assessment: Calvinia WTW – 94%

12.7 Joe Morolong Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	17.57%
Blue Drop Score 2014	%	57.61%
Blue Drop Score 2012	%	33.42%
Blue Drop Score 2011	%	60.08%

Key Performance Area	Weight	Bothetheletsa Groundwater Management Area: D41L-M2	Bothithong Groundwater Management Area D41G-04	Churchill Groundwater Management Area: D41L-M10	Dithakong Groundwater Management Area D41G-02
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	16.05%	16.05%	16.05%	14.25%
Blue Drop Score 2014	%	19.18%	36.50%	28.55%	28.10%
Blue Drop Score 2012	%	40.36%	29.64%	26.64%	37.89%
Blue Drop Score 2011	%	74.33%	54.13%	51.39%	59.08%
System Design Capacity	kL/d	1 170	432	181	243
System Available Capacity	kL/d	1 170	432	181	243
System Input Value	kL/d	550	432	181	243
Capacity Utilisation	%	NI	0.00%	NI	NI
Resource Abstracted From		2 x Boreholes	7 x Boreholes	2 x Boreholes	6 x Boreholes
BDRR 2023	%	97.25%	98.03%	96.94%	97.48%
BDRR 2022	%	32.30%	69.50%	22.20%	19.60%

Key Performance Area	Weight	Gasehunelo Groundwater Management Area: D41L-M9	Gasese Groundwater Management Area D41L-K10	Heiso Groundwater Management Area: D41L-M8	Hotazel
Bulk/WSP		-	-	-	Sedibeng Water
Blue Drop Score 2023	%	13.75%	11.25%	11.65%	38.81%
Blue Drop Score 2014	%	28.10%	35.30%	35.60%	61.17%
Blue Drop Score 2012	%	37.89%	40.66%	25.81%	80.28%
Blue Drop Score 2011	%	59.08%	74.33%	50.63%	83.94%
System Design Capacity	kL/d	894	35	130	36 000
System Available Capacity	kL/d	894	35	130	36 000
System Input Value	kL/d	894	35	130	1 454
Capacity Utilisation	%	NI	NI	NI	NI
Resource Abstracted From		3 x Boreholes	2 x Boreholes	1 x Borehole	Vaal Gamagara WTP
BDRR 2023	%	100.00%	100.00%	100.00%	79.17%
BDRR 2022	%	43.50%	70.00%	20.50%	26.90%

Key Performance Area	Weight	Kikahela Groundwater Management Area: D41L-M1	Laxey Groundwater Management Area D41G-05	Maipeng Groundwater Management Area D41L-K9	Mamatwan/Hotazel Ground water Management Area D41K-G2
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**14.55%**	**12.75%**	**12.75%**	**12.75%**
Blue Drop Score 2014	%	35.60%	34.10%	17.98%	61.94%
Blue Drop Score 2012	%	39.24%	30.24%	26.86%	NI
Blue Drop Score 2011	%	68.90%	54.13%	73.17%	NI
System Design Capacity	kL/d	454	405	486	173
System Available Capacity	kL/d	454	405	486	173
System Input Value	kL/d	454	405	486	173
Capacity Utilisation	%	NI	NI	NI	NI
Resource Abstracted From		2 x Boreholes	6 x Boreholes	2 x Boreholes	2 x Boreholes
BDRR 2023	%	99.47%	100.00%	100.00%	100.00%
BDRR 2022	%	19.60%	91.20%	70.00%	20.50%

Key Performance Area	Weight	Manyeding A Groundwater Management Area: D41L-M5	Manyeding Lower Groundwater Management Area: D41L-M6	Metsetswaneng Groundwater Management Area: D41L-M7	Tsineng Groundwater Management Area: D41L-M11
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**12.75%**	**12.75%**	**11.25%**	**13.75%**
Blue Drop Score 2014	%	17.98%	35.60%	NI	35.60%
Blue Drop Score 2012	%	73.81%	52.63%	NI	NI
Blue Drop Score 2011	%	35.86%	30.36%	NI	NI
System Design Capacity	kL/d	691	143	350	259
System Available Capacity	kL/d	691	143	350	259
System Input Value	kL/d	691	143	350	259
Capacity Utilisation	%	NI	NI	NI	NI
Resource Abstracted From		2 x Boreholes	2 x Boreholes	3 x Boreholes;	2 x Boreholes
BDRR 2023	%	100.00%	100.00%	100.00%	100.00%
BDRR 2022	%	88.10%	20.50%	75.30%	70.00%

Key Performance Area	Weight	Van Zylsrus (Boreholes)	Ward 1 Heuningvlei Area
Bulk/WSP		-	-
Blue Drop Score 2023	%	**15.48%**	**12.75%**
Blue Drop Score 2014	%	36.58%	34.85%
Blue Drop Score 2012	%	36.41%	NI
Blue Drop Score 2011	%	68.19%	NI

Key Performance Area	Weight	Van Zylsrus (Boreholes)	Ward 1 Heuningvlei Area
System Design Capacity	kL/d	500	2 030
System Available Capacity	kL/d	500	2 030
System Input Value	kL/d	207	2 030
Capacity Utilisation	%	41.40%	NI
Resource Abstracted From		3 x Boreholes	8 x Boreholes
BDRR 2023	%	92.84%	100.00%
BDRR 2022	%	18.60%	27.70%

Technical Site Assessment: Hotazel WTW – 59%

The Regulator notes the dire state of management and drinking water quality in the Bothetheletsa, Bothithong, Churchill, Dithakong, Gasehunelo, Gasese, Heiso, Van Zylsrus, Ward 1 Heuningvlei Area, Kikahela, Laxey, Maipeng, Mamatwan/Hotazel, Manyeding, Manyeding, Metsetswaneng and Tsineng water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.8 Kamiesberg Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	8.02%
Blue Drop Score 2014	%	40.54%
Blue Drop Score 2012	%	35.63%
Blue Drop Score 2011	%	53.18%

Key Performance Area	Weight	Garies	Hondeklipbaai	Kamassies	Kamieskroon
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	10.13%	7.13%	7.13%	7.13%
Blue Drop Score 2014	%	38.00%	41.00%	38.00%	47.00%
Blue Drop Score 2012	%	28.00%	0.00%	37.00%	41.00%
Blue Drop Score 2011	%	43.00%	59.00%	53.00%	51.00%
System Design Capacity	kL/d	420	300	55	500
System Available Capacity	kL/d	1 500	135	55	130
System Input Value	kL/d	500	135	55	130
Capacity Utilisation	%	33.33%	100.00%	100.00%	100.00%
Resource Abstracted From		Borehole	Borehole	Borehole	Borehole
BDRR 2023	%	97.79%	93.38%	95.58%	93.38%
BDRR 2022	%	96.90%	82.90%	44.30%	96.90%

Key Performance Area	Weight	Kharkams	Kheis	Klipfontein	Koiingnaas
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	7.13%	7.13%	7.13%	7.13%
Blue Drop Score 2014	%	46.00%	45.00%	45.00%	33.00%
Blue Drop Score 2012	%	52.00%	52.00%	52.00%	34.00%
Blue Drop Score 2011	%	43.00%	63.00%	63.00%	58.00%
System Design Capacity	kL/d	210	132	96	163
System Available Capacity	kL/d	178	115	96	163
System Input Value	kL/d	178	115	96	163
Capacity Utilisation	%	100.00%	100.00%	100.00%	100.00%
Resource Abstracted From		Borehole	Borehole	Borehole	Borehole
BDRR 2023	%	95.58%	95.58%	95.58%	95.58%
BDRR 2022	%	96.90%	97.40%	39.60%	82.90%

Key Performance Area	Weight	Leliefontein	Lepelfontein	Nourivier	Paulshoek
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	7.13%	7.13%	7.13%	7.13%

Key Performance Area	Weight	Leliefontein	Lepelfontein	Nourivier	Paulshoek
Blue Drop Score 2014	%	46.00%	44.00%	39.00%	38.00%
Blue Drop Score 2012	%	37.00%	52.00%	37.00%	37.00%
Blue Drop Score 2011	%	42.00%	53.00%	53.00%	42.00%
System Design Capacity	kL/d	210	72	80	228
System Available Capacity	kL/d	60	23	60	105
System Input Value	kL/d	60	23	60	105
Capacity Utilisation	%	100.00%	100.00%	100.00%	100.00%
Resource Abstracted From		Borehole/ Groundwater	Groundwater/ Borehole	Borehole/ Groundwater	Groundwater/ Borehole
BDRR 2023	%	93.38%	93.38%	95.58%	93.38%
BDRR 2022	%	26.20%	39.50%	36.80%	96.90%

Key Performance Area	Weight	Rooifontein	Soebatsfontein	Spoegrivier	Tweerivier
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**7.13%**	**7.13%**	**10.13%**	**7.13%**
Blue Drop Score 2014	%	51.00%	41.00%	45.00%	38.00%
Blue Drop Score 2012	%	50.00%	52.00%	35.00%	NA
Blue Drop Score 2011	%	53.00%	53.00%	68.00%	NA
System Design Capacity	kL/d	181	60	108	60
System Available Capacity	kL/d	28	17	17	60
System Input Value	kL/d	28	17	17	60
Capacity Utilisation	%	100.00%	100.00%	100.00%	100.00%
Resource Abstracted From		Borehole	Groundwater	Groundwater	Groundwater
BDRR 2023	%	93.38%	93.38%	93.38%	95.58%
BDRR 2022	%	26.20%	38.30%	39.50%	47.40%

Technical Site Assessment: Garies WTW – 69%

The Regulator note the dire state of management and drinking water quality in the Garies, Hondeklipbaai, Kamassies, Kamieskroon, Kharkams, Kheis, Klipfontein, Koiingnaas, Leliefontein, Lepelfontein, Nourivier, Paulshoek, Rooifontein, Soebatsfontein, Spoegrivier and Tweerivier water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.9 Kareeberg Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	18.42%
Blue Drop Score 2014	%	52.91%
Blue Drop Score 2012	%	39.35%
Blue Drop Score 2011	%	35.06%

Key Performance Area	Weight	Carnarvon	Vanwyksvlei	Vosburg
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	17.33%	23.35%	19.50%
Blue Drop Score 2014	%	53.10%	37.99%	57.80%
Blue Drop Score 2012	%	39.66%	38.16%	38.16%
Blue Drop Score 2011	%	39.54%	35.99%	34.16%
System Design Capacity	kL/d	800	67	500
System Available Capacity	kL/d	800	67	500
System Input Value	kL/d	800	67	500
Capacity Utilisation	%	100.00%	100.00%	100.00%
Resource Abstracted From		Groundwater	Groundwater	Groundwater
BDRR 2023	%	40.74%	27.57%	35.52%
BDRR 2022	%	25.80%	23.50%	20.90%

Technical Site Assessment: Kareeberg Borehole Scheme (Carnarvon WTW) – 28%

The Regulator notes the dire state of management and drinking water quality in the Carnarvon, Vanwyksvlei and Vosburg water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.10 Karoo Hoogland Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	21.62%
Blue Drop Score 2014	%	49.28%
Blue Drop Score 2012	%	39.96%
Blue Drop Score 2011	%	50.63%

Key Performance Area	Weight	Fraserburg	Sutherland	Williston
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	29.25%	13.35%	18.75%
Blue Drop Score 2014	%	52.00%	49.00%	49.00%
Blue Drop Score 2012	%	40.00%	37.00%	43.00%
Blue Drop Score 2011	%	47.00%	53.00%	52.00%
System Design Capacity	kL/d	2 300	1 500	1 800
System Available Capacity	kL/d	2 300	1 500	1 800
System Input Value	kL/d	2 300	1 500	1 800
Capacity Utilisation	%	100.00%	100.00%	100.00%
Resource Abstracted From		Boreholes	Borehole	Borehole
BDRR 2023	%	28.64%	79.41%	62.11%
BDRR 2022	%	39.90%	18.70%	36.10%

Technical Site Assessment: Sutherland WTW – 80%

The Regulator notes the dire state of management and drinking water quality in the Fraserburg, Sutherland and Williston water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.11 Kgatelopele Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	27.60%
Blue Drop Score 2014	%	77.10%
Blue Drop Score 2012	%	66.03%
Blue Drop Score 2011	%	54.21%

Key Performance Area	Weight	Danielskuil (Boreholes)
Bulk/WSP		-
Blue Drop Score 2023	%	27.60%
Blue Drop Score 2014	%	77.10%
Blue Drop Score 2012	%	66.03%
Blue Drop Score 2011	%	54.21%
System Design Capacity	kL/d	461
System Available Capacity	kL/d	461
System Input Value	kL/d	461
Capacity Utilisation	%	NI
Resource Abstracted From		Groundwater
BDRR 2023	%	50.98%
BDRR 2022	%	18.70%

Technical Site Assessment: Danielskuil borehole system – 71%

The Regulator notes the dire state of management and drinking water quality in the Danielskuil water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.12 Khai Ma Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	15.19%
Blue Drop Score 2014	%	76.53%
Blue Drop Score 2012	%	53.11%
Blue Drop Score 2011	%	46.62%

Key Performance Area	Weight	Onseepkans (Melkbosrand TW)	Onseepkans (RK)	Pofadder (Pella drift)	Witbank
Bulk/WSP		-	-	Sedibeng Water	-
Blue Drop Score 2023	%	**5.65%**	**5.65%**	**21.68%**	**5.45%**
Blue Drop Score 2014	%	19.38%	26.82%	87.78%	19.83%
Blue Drop Score 2012	%	23.24%	10.61%	56.25%	6.50%
Blue Drop Score 2011	%	27.24%	27.06%	49.01%	26.62%
System Design Capacity	kL/d	500	500	27 000	500
System Available Capacity	kL/d	500	500	24 000	500
System Input Value	kL/d	500	500	2 223	500
Capacity Utilisation	%	NI	NI	94.90%	0.00%
Resource Abstracted From		Orange River	Orange River	Orange River	Orange River
BDRR 2023	%	100.00%	100.00%	84.68%	100.00%
BDRR 2022	%	92.00%	92.00%	70.60%	92.00%

Technical Site Assessment: Onseepkans WTW – 27%

The Regulator notes the dire state of management and drinking water quality in the Onseepkans (Melkbosrand TW), Onseepkans (RK), Pofadder (Pelladrift) and Witbank water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.13 !Kai Garib Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	16.20%
Blue Drop Score 2014	%	71.42%
Blue Drop Score 2012	%	68.99%
Blue Drop Score 2011	%	47.08%

Key Performance Area	Weight	Alheit	Augrabies	Bloemsmond	Cillie
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	9.30%	15.70%	10.80%	10.80%
Blue Drop Score 2014	%	60.28%	60.11%	73.30%	61.11%
Blue Drop Score 2012	%	69.52%	70.31%	69.52%	65.88%
Blue Drop Score 2011	%	47.30%	53.35%	52.78%	29.41%
System Design Capacity	kL/d	1 000	1 560	1 000	1 080
System Available Capacity	kL/d	1 000	1 560	1 000	1 080
System Input Value	kL/d	400	1 560	500	864
Capacity Utilisation	%	40.00%	100.00%	50.00%	80.00%
Resource Abstracted From		Orange River	Orange River	Orange River	Orange River
BDRR 2023	%	73.27%	68.89%	73.27%	89.77%
BDRR 2022	%	48.90%	56.10%	57.70%	61.70%

Key Performance Area	Weight	Currieskamp	Eenduin	Eksteenskuil	Kakamas
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	24.45%	8.70%	21.30%	23.40%
Blue Drop Score 2014	%	68.20%	NI	NI	83.31%
Blue Drop Score 2012	%	67.34%	NI	NI	71.89%
Blue Drop Score 2011	%	52.18%	NI	NI	53.35%
System Design Capacity	kL/d	500	1 000	1 000	6 400
System Available Capacity	kL/d	500	1 000	1 000	6 400
System Input Value	kL/d	175	400	400	7 000
Capacity Utilisation	%	35.00%	40.00%	40.00%	109.38%
Resource Abstracted From		Orange River	Orange River	Orange River	Orange River
BDRR 2023	%	20.19%	85.80%	41.25%	51.99%
BDRR 2022	%	37.10%	84.50%	48.30%	50.80%

Key Performance Area	Weight	Keimoes	Lennertsville	Lutzburg	Marchand
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	10.80%	11.80%	10.80%	10.80%

Key Performance Area	Weight	Keimoes	Lennertsville	Lutzburg	Marchand
Blue Drop Score 2014	%	68.46%	70.15%	59.90%	73.90%
Blue Drop Score 2012	%	69.47%	69.11%	67.30%	66.80%
Blue Drop Score 2011	%	53.26%	29.09%	45.70%	53.20%
System Design Capacity	kL/d	2 800	2 880	1 080	2 000
System Available Capacity	kL/d	2 800	2 880	1 080	2 000
System Input Value	kL/d	3 115	2 160	1 080	1 000
Capacity Utilisation	%	111.25%	75.00%	100.00%	50.00%
Resource Abstracted From		Orange River	Orange River	Orange River	Orange River
BDRR 2023	%	81.11%	75.68%	89.77%	85.80%
BDRR 2022	%	28.80%	NI	39.40%	25.90%

Key Performance Area	Weight	Riemvasmaak - Sending	Riemvasmaak - Vredesvallei	Soverby	Warmsand
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	11.40%	19.20%	10.80%	19.80%
Blue Drop Score 2014	%	62.90%	76.70%	73.63%	NI
Blue Drop Score 2012	%	33.20%	62.80%	68.06%	NI
Blue Drop Score 2011	%	31.40%	52.18%	52.45%	NI
System Design Capacity	kL/d	1 720	500	1 000	1 000
System Available Capacity	kL/d	1 720	500	1 000	1 000
System Input Value	kL/d	860	600	700	1 000
Capacity Utilisation	%	50.00%	120.00%	70.00%	100.00%
Resource Abstracted From		Orange River	Orange River	Orange River	Orange River
BDRR 2023	%	85.80%	44.26%	89.77%	47.50%
BDRR 2022	%	23.50%	37.10%	56.90%	59.40%

Technical Site Assessment: Kakamas WTW – 34%

The Regulator notes the dire state of management and drinking water quality in the Alheit, Augrabies, Bloemsmond, Cillie, Currieskamp, Eenduin, Eksteenskuil Kakamas, Keimoes, Lennertsville, Lutzburg, Marchand, Riemvasmaak-Sending, Riemvasmaak-Vredesvallei, Soverby and Warmsand water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.14 !Kheis Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	29.31%
Blue Drop Score 2014	%	27.79%
Blue Drop Score 2012	%	50.33%
Blue Drop Score 2011	%	53.43%

Key Performance Area	Weight	Brandboom Boegoeberg	Gariep	Groblershoop	Grootdrink
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	33.73%	30.83%	33.13%	28.40%
Blue Drop Score 2014	%	28.32%	28.39%	37.56%	28.63%
Blue Drop Score 2012	%	40.79%	49.59%	54.28%	48.59%
Blue Drop Score 2011	%	53.40%	47.35%	54.50%	52.60%
System Design Capacity	kL/d	763	100	1 000	724
System Available Capacity	kL/d	763	100	1 000	724
System Input Value	kL/d	295	57	1 400	492
Capacity Utilisation	%	38.66%	57.00%	140.00%	67.96%
Resource Abstracted From		Canal which is fed by Boegoeberg Dam	Orange River	Orange River	Orange River
BDRR 2023	%	40.74%	44.57%	50.09%	46.11%
BDRR 2022	%	56.10%	23.90%	51.30%	56.10%

Key Performance Area	Weight	Opwag: Zuma Valley	Topline	Wegdraai
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	32.53%	34.25%	17.28%
Blue Drop Score 2014	%	NI	21.35%	20.38%
Blue Drop Score 2012	%	NI	39.09%	55.00%
Blue Drop Score 2011	%	NI	52.51%	51.47%
System Design Capacity	kL/d	500	610	686
System Available Capacity	kL/d	500	610	686
System Input Value	kL/d	50	239	634
Capacity Utilisation	%	10.00%	39.18%	92.42%
Resource Abstracted From		Orange River	Canal from Boegoeberg Dam	Canal from Boegoeberg Dam
BDRR 2023	%	40.16%	40.74%	79.52%
BDRR 2022	%	81.00%	53.70%	53.70%

Technical Site Assessment: Groblershoop WTW – 40%

The Regulator notes the dire state of management and drinking water quality in the Gariep, Grootdrink and Wegdraai water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.15 Magareng Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	**%**	**26.45%**
Blue Drop Score 2014	**%**	**29.00%**
Blue Drop Score 2012	**%**	**72.66%**
Blue Drop Score 2011	**%**	**65.56%**

Key Performance Area	Weight	Warrenton
Bulk/WSP		-
Blue Drop Score 2023	%	**26.45%**
Blue Drop Score 2014	%	29.00%
Blue Drop Score 2012	%	72.66%
Blue Drop Score 2011	%	65.56%
System Design Capacity	kL/d	8 400
System Available Capacity	kL/d	8 400
System Input Value	kL/d	4 750
Capacity Utilisation	%	56.55%
Resource Abstracted From		Vaal
BDRR 2023	%	75.68%
BDRR 2022	%	62.10%

Technical Site Assessment: Warrenton WTW – 55%

The Regulator notes the dire state of management and drinking water quality in the Warrenton water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.16 Nama Khoi Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	36.61%
Blue Drop Score 2014	%	63.94%
Blue Drop Score 2012	%	63.47%
Blue Drop Score 2011	%	57.96%

Key Performance Area	Weight	Buffelsrivier	Goodhouse	Kommagas	Rooiwal
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	28.38%	30.00%	30.75%	28.38%
Blue Drop Score 2014	%	58.00%	50.00%	57.00%	52.00%
Blue Drop Score 2012	%	44.00%	60.00%	44.00%	60.00%
Blue Drop Score 2011	%	52.00%	42.00%	52.00%	63.00%
System Design Capacity	kL/d	2 000	346	670	500
System Available Capacity	kL/d	518	346	670	500
System Input Value	kL/d	80	30	40	123
Capacity Utilisation	%	15.44%	8.67%	5.97%	24.50%
Resource Abstracted From		Groundwater	Surface Water	Groundwater	Groundwater
BDRR 2023	%	55.45%	65.33%	48.41%	61.58%
BDRR 2022	%	42.30%	54.10%	55.30%	43.10%

Key Performance Area	Weight	Vioolsdrift	Bergsig	Bulletrap	Carolusberg
Bulk/WSP		-	Sedibeng Water	Sedibeng Water	Sedibeng Water
Blue Drop Score 2023	%	29.48%	38.82%	42.22%	29.42%
Blue Drop Score 2014	%	52.00%	65.00%	67.00%	60.00%
Blue Drop Score 2012	%	41.00%	NA	74.00%	57.00%
Blue Drop Score 2011	%	45.00%	NA	NA	NA
System Design Capacity	kL/d	500	18 000	18 000	18 000
System Available Capacity	kL/d	500	18 000	18 000	18 000
System Input Value	kL/d	107	526	55	264
Capacity Utilisation	%	21.40%	50.62%	50.62%	50.62%
Resource Abstracted From		Orange	Lower Orange	Lower Orange	Lower Orange
BDRR 2023	%	61.58%	45.77%	33.83%	73.64%
BDRR 2022	%	29.00%	25.60%	25.60%	26.80%

Key Performance Area	Weight	Concordia	Fonteintjie	Matjieskloof	Nababeep
Bulk/WSP		Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
Blue Drop Score 2023	%	34.62%	40.92%	35.92%	35.51%

Key Performance Area	Weight	Concordia	Fonteintjie	Matjieskloof	Nababeep
Blue Drop Score 2014	%	60.00%	65.00%	62.00%	65.00%
Blue Drop Score 2012	%	57.00%	NA	NA	59.00%
Blue Drop Score 2011	%	NA	NA	NA	NA
System Design Capacity	kL/d	18 000	18 000	18 000	18 000
System Available Capacity	kL/d	18 000	18 000	18 000	18 000
System Input Value	kL/d	460	180	350	992
Capacity Utilisation	%	50.62%	50.62%	50.62%	50.62%
Resource Abstracted From		Lower Orange	Lower Orange	Lower Orange	Lower Orange
BDRR 2023	%	66.67%	31.84%	51.74%	49.25%
BDRR 2022	%	25.60%	54.70%	26.80%	26.80%

Key Performance Area	Weight	Okiep	Springbok	Steinkopf
Bulk/WSP		Sedibeng Water	Sedibeng Water	Sedibeng Water
Blue Drop Score 2023	%	**42.81%**	**37.42%**	**34.16%**
Blue Drop Score 2014	%	65.00%	62.00%	67.00%
Blue Drop Score 2012	%	71.00%	57.00%	71.00%
Blue Drop Score 2011	%	NA	NA	NA
System Design Capacity	kL/d	18 000	18 000	18 000
System Available Capacity	kL/d	18 000	18 000	18 000
System Input Value	kL/d	716	2 143	581
Capacity Utilisation	%	50.62%	50.62%	50.62%
Resource Abstracted From		Lower Orange	Lower Orange	Lower Orange
BDRR 2023	%	31.84%	49.25%	44.77%
BDRR 2022	%	25.60%	26.80%	25.60%

Technical Site Assessment: Vioolsdrift WTW – 62%

The Regulator notes the dire state of management and drinking water quality in the Buffelsrivier, Goodhouse, Kommagas, Rooiwal, Vioolsdrift and Carolusberg water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within0 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.17 Phokwane Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	19.85%
Blue Drop Score 2014	%	71.59%
Blue Drop Score 2012	%	60.16%
Blue Drop Score 2011	%	49.44%

Key Performance Area	Weight	Hartswater	Jan Kempdorp	Pampierstad
Bulk/WSP		-	-	Sedibeng Water
Blue Drop Score 2023	%	11.80%	11.80%	36.75%
Blue Drop Score 2014	%	72.08%	62.27%	83.74%
Blue Drop Score 2012	%	42.88%	48.10%	87.38%
Blue Drop Score 2011	%	22.83%	24.21%	89.48%
System Design Capacity	kL/d	5 000	5 000	9 600
System Available Capacity	kL/d	5 000	5 000	9 600
System Input Value	kL/d	5 000	5 000	4 766
Capacity Utilisation	%	NI	NI	49.75%
Resource Abstracted From		Harts	Harts	Harts
BDRR 2023	%	63.75%	63.75%	30.54%
BDRR 2022	%	54.40%	58.20%	25.00%

Technical Site Assessment: Hartswater WTW – 45%

The Regulator notes the dire state of management and drinking water quality in the Hartswater and Jan Kempdorp water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.18 Renosterberg Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	**%**	**9.20%**
Blue Drop Score 2014	**%**	**38.06%**
Blue Drop Score 2012	**%**	**17.60%**
Blue Drop Score 2011	**%**	**25.36%**

Key Performance Area	Weight	Petrusville	Phillipstown	Vanderkloof
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	**9.40%**	**5.10%**	**9.40%**
Blue Drop Score 2014	%	38.58%	32.91%	38.58%
Blue Drop Score 2012	%	17.39%	18.24%	17.39%
Blue Drop Score 2011	%	36.88%	16.34%	36.88%
System Design Capacity	kL/d	2 600	130	2 600
System Available Capacity	kL/d	2 600	130	2 600
System Input Value	kL/d	1 560	130	1 040
Capacity Utilisation	%	100.00%	100.00%	NI
Resource Abstracted From		Vanderkloof Dam	Groundwater	Vanderkloof Dam
BDRR 2023	%	89.15%	95.58%	100.00%
BDRR 2022	%	63.80%	64.60%	63.80%

Technical Site Assessment: Vanderkloof WTW – 42%

The Regulator notes the dire state of management and drinking water quality in the Petrusville, Phillipstown and Vanderkloof water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.19 Richtersveld Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	21.94%
Blue Drop Score 2014	%	42.25%
Blue Drop Score 2012	%	36.77%
Blue Drop Score 2011	%	36.44%

Key Performance Area	Weight	Eksteenfontein	Kuboes	Lekkersing	Port Nolloth / Alexander Baai (Alexcor & 8 Myl)
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	29.75%	10.90%	28.25%	23.00%
Blue Drop Score 2014	%	39.00%	43.00%	36.00%	47.00%
Blue Drop Score 2012	%	44.00%	29.00%	41.00%	35.00%
Blue Drop Score 2011	%	45.00%	26.00%	44.00%	26.00%
System Design Capacity	kL/d	240	300	200	4 000
System Available Capacity	kL/d	240	300	200	1 950
System Input Value	kL/d	240	300	200	1 200
Capacity Utilisation	%	100.00%	100.00%	100.00%	61.54%
Average Daily Consumption	l/p/d	300	274	294	132
Resource Abstracted From		Borehole	Borehole	Borehole	Borehole
BDRR 2023	%	22.40%	95.58%	46.12%	43.20%
BDRR 2022	%	96.90%	96.90%	96.90%	97.40%

Key Performance Area	Weight	Sanddrift
Bulk/WSP		-
Blue Drop Score 2023	%	10.90%
Blue Drop Score 2014	%	28.00%
Blue Drop Score 2012	%	42.00%
Blue Drop Score 2011	%	41.00%
System Design Capacity	kL/d	100
System Available Capacity	kL/d	100
System Input Value	kL/d	100
Capacity Utilisation	%	100.00%
Resource Abstracted From		Borehole
BDRR 2023	%	95.58%
BDRR 2022	%	96.90%

Technical Site Assessment: Port Nolloth Borehole Supply System (Ag Myl WTW) - 43%

The Regulator notes the dire state of management and drinking water quality in the Eksteenfontein, Kuboes, Lekkersing, Port Nolloth/ Alexander Baai (Alexcor & 8 Myl) and Sanddrift water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.20 Siyancuma Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	26.38%
Blue Drop Score 2014	%	54.02%
Blue Drop Score 2012	%	19.66%
Blue Drop Score 2011	%	29.49%

Key Performance Area	Weight	Campbell	Douglas	Griekwastad	Schmidtsdrift
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	24.33%	29.65%	24.25%	20.25%
Blue Drop Score 2014	%	44.00%	53.00%	65.90%	47.32%
Blue Drop Score 2012	%	18.00%	23.00%	18.85%	17.55%
Blue Drop Score 2011	%	14.00%	36.00%	16.58%	33.49%
System Design Capacity	kL/d	574	5 000	5 800	1 014
System Available Capacity	kL/d	574	5 000	5 800	1 014
System Input Value	kL/d	574	6 058	5 800	1 014
Capacity Utilisation	%	100.00%	121.16%	100.00%	100.00%
Resource Abstracted From		Groundwater (fountains)	Orange, Vaal	Groundwater	Vaal
BDRR 2023	%	52.19%	58.32%	52.89%	72.34%
BDRR 2022	%	72.10%	63.80%	50.80%	81.80%

Technical Site Assessment: Douglas Water Supply System – 51%

The Regulator notes the dire state of management and drinking water quality in the Campbell, Douglas, Griekwastad and Schmidtsdrift water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.21 Siyathemba Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	46.26%
Blue Drop Score 2014	%	62.36%
Blue Drop Score 2012	%	62.40%
Blue Drop Score 2011	%	40.94%

Key Performance Area	Weight	Marydale	Niekerkshoop	Prieska
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	30.38%	31.68%	49.10%
Blue Drop Score 2014	%	43.75%	38.58%	65.12%
Blue Drop Score 2012	%	40.00%	45.19%	65.25%
Blue Drop Score 2011	%	50.85%	56.56%	37.52%
System Design Capacity	kL/d	1 200	980	15 000
System Available Capacity	kL/d	1 200	406	15 000
System Input Value	kL/d	840	735	8 470
Capacity Utilisation	%	70.00%	181.00%	56.47%
Resource Abstracted From		Groundwater	Groundwater	Orange River
BDRR 2023	%	53.34%	51.07%	39.11%
BDRR 2022	%	30.30%	41.00%	20.80%

Technical Site Assessment: Flippie Holtshauzen WTW - 63%

The Regulator notes the dire state of management and drinking water quality in the Marydale water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.22 Sol Plaatje Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	52.04%
Blue Drop Score 2014	%	81.46%
Blue Drop Score 2012	%	72.10%
Blue Drop Score 2011	%	84.23%

Key Performance Area	Weight	Kby Zone 16: Riverton	Kby Zone A-E : Ritchie
Bulk/WSP		-	-
Blue Drop Score 2023	%	52.13%	46.68%
Blue Drop Score 2014	%	81.59%	78.31%
Blue Drop Score 2012	%	72.34%	65.61%
Blue Drop Score 2011	%	84.74%	65.28%
System Design Capacity	kL/d	162 000	4 881
System Available Capacity	kL/d	162 000	4 881
System Input Value	kL/d	86 431	1 378
Capacity Utilisation	%	53.35%	28.23%
Resource Abstracted From		Vaal River	Modder
BDRR 2023	%	48.70%	41.24%
BDRR 2022	%	59.00%	53.10%

Technical Site Assessment: Ritchie WTW – 65%

12.23 Thembelihle Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	59.52%
Blue Drop Score 2014	%	73.23%
Blue Drop Score 2012	%	72.82%
Blue Drop Score 2011	%	45.87%

Key Performance Area	Weight	Hopetown	Strydenburg
Bulk/WSP		-	-
Blue Drop Score 2023	%	60.32%	53.43%
Blue Drop Score 2014	%	74.00%	65.00%
Blue Drop Score 2012	%	77.00%	62.00%
Blue Drop Score 2011	%	54.00%	29.00%
System Design Capacity	kL/d	5 600	673
System Available Capacity	kL/d	5 600	673
System Input Value	kL/d	5 126	673
Capacity Utilisation	%	91.54%	100.00%
Resource Abstracted From		Orange	Groundwater
BDRR 2023	%	23.82%	32.93%
BDRR 2022	%	26.00%	16.40%

Technical Site Assessment: Hopetown WTW – 75%

12.24 Tsantsabane Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	56.00%
Blue Drop Score 2014	%	70.07%
Blue Drop Score 2012	%	66.18%
Blue Drop Score 2011	%	59.47%

Key Performance Area	Weight	Groen Water	Jenn Haven	Postdene	Skeyfontein
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	45.08%	41.38%	49.93%	20.18%
Blue Drop Score 2014	%	44.00%	36.00%	46.00%	34.00%
Blue Drop Score 2012	%	69.00%	66.00%	69.00%	66.00%
Blue Drop Score 2011	%	50.00%	53.00%	48.00%	30.00%
System Design Capacity	kL/d	500	500	3 500	500
System Available Capacity	kL/d	500	500	3 500	500
System Input Value	kL/d	500	500	3 500	500
Capacity Utilisation	%	100.00%	100.00%	100.00%	100.00%
Resource Abstracted From		Groenwaterspruit	Groundwater	Groundwater	Groundwater
BDRR 2023	%	22.40%	22.40%	44.03%	93.06%
BDRR 2022	%	89.30%	39.80%	43.50%	89.00%

Key Performance Area	Weight	Postmasburg
Bulk/WSP		Sedibeng Water
Blue Drop Score 2023	%	59.78%
Blue Drop Score 2014	%	70.00%
Blue Drop Score 2012	%	66.00%
Blue Drop Score 2011	%	74.00%
System Design Capacity	kL/d	44 150
System Available Capacity	kL/d	44 150
System Input Value	kL/d	13 733
Capacity Utilisation	%	83.28%
Resource Abstracted From		Vaal River
BDRR 2023	%	41.07%
BDRR 2022	%	49.30%

Technical Site Assessment: Tsantsabane WSS – 94%

The Regulator notes the dire state of management and drinking water quality in the Skeyfontein water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.25 Ubuntu Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	14.17%
Blue Drop Score 2014	%	82.37%
Blue Drop Score 2012	%	72.63%
Blue Drop Score 2011	%	67.15%

Key Performance Area	Weight	Hutchinson	Loxton	Merriman	Richmond
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	**8.35%**	**11.75%**	**14.20%**	**18.35%**
Blue Drop Score 2014	%	62.14%	84.86%	61.42%	75.25%
Blue Drop Score 2012	%	NI	87.85%	NI	64.31%
Blue Drop Score 2011	%	61.89%	81.76%	54.94%	81.69%
System Design Capacity	kL/d	500	500	10	1 500
System Available Capacity	kL/d	500	500	10	1 500
System Input Value	kL/d	500	500	10	1 500
Capacity Utilisation	%	100.00%	100.00%	100.00%	100.00%
Resource Abstracted From		Groundwater	Groundwater	Groundwater	Groundwater
BDRR 2023	%	67.76%	67.76%	76.37%	62.22%
BDRR 2022	%	57.20%	38.60%	77.30%	63.30%

Key Performance Area	Weight	Victoria West
Bulk/WSP		-
Blue Drop Score 2023	%	**13.45%**
Blue Drop Score 2014	%	87.99%
Blue Drop Score 2012	%	77.18%
Blue Drop Score 2011	%	68.44%
System Design Capacity	kL/d	2 980
System Available Capacity	kL/d	2 980
System Input Value	kL/d	2 980
Capacity Utilisation	%	100.00%
Resource Abstracted From		Groundwater
BDRR 2023	%	77.75%
BDRR 2022	%	43.00%

Technical Site Assessment: Victoria borehole scheme – 32%

The Regulator notes the dire state of management and drinking water quality in the Hutchinson, Loxton, Merriman, Richmond, and Victoria West water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

12.26 Umsobomvu Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	24.17%
Blue Drop Score 2014	%	53.90%
Blue Drop Score 2012	%	15.76%
Blue Drop Score 2011	%	35.81%

Key Performance Area	Weight	Colesberg	Norvalspont	Noupoort
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	24.90%	15.53%	18.28%
Blue Drop Score 2014	%	55.79%	45.67%	40.43%
Blue Drop Score 2012	%	18.41%	10.93%	12.63%
Blue Drop Score 2011	%	35.81%	3.13%	8.63%
System Design Capacity	kL/d	8 210	174	1 792
System Available Capacity	kL/d	4 500	174	162
System Input Value	kL/d	4 000	227	162
Capacity Utilisation	%	88.89%	130.34%	100.00%
Resource Abstracted From		Orange River	Orange River	Ground water
BDRR 2023	%	38.32%	56.06%	36.96%
BDRR 2022	%	63.40%	50.70%	48.00%

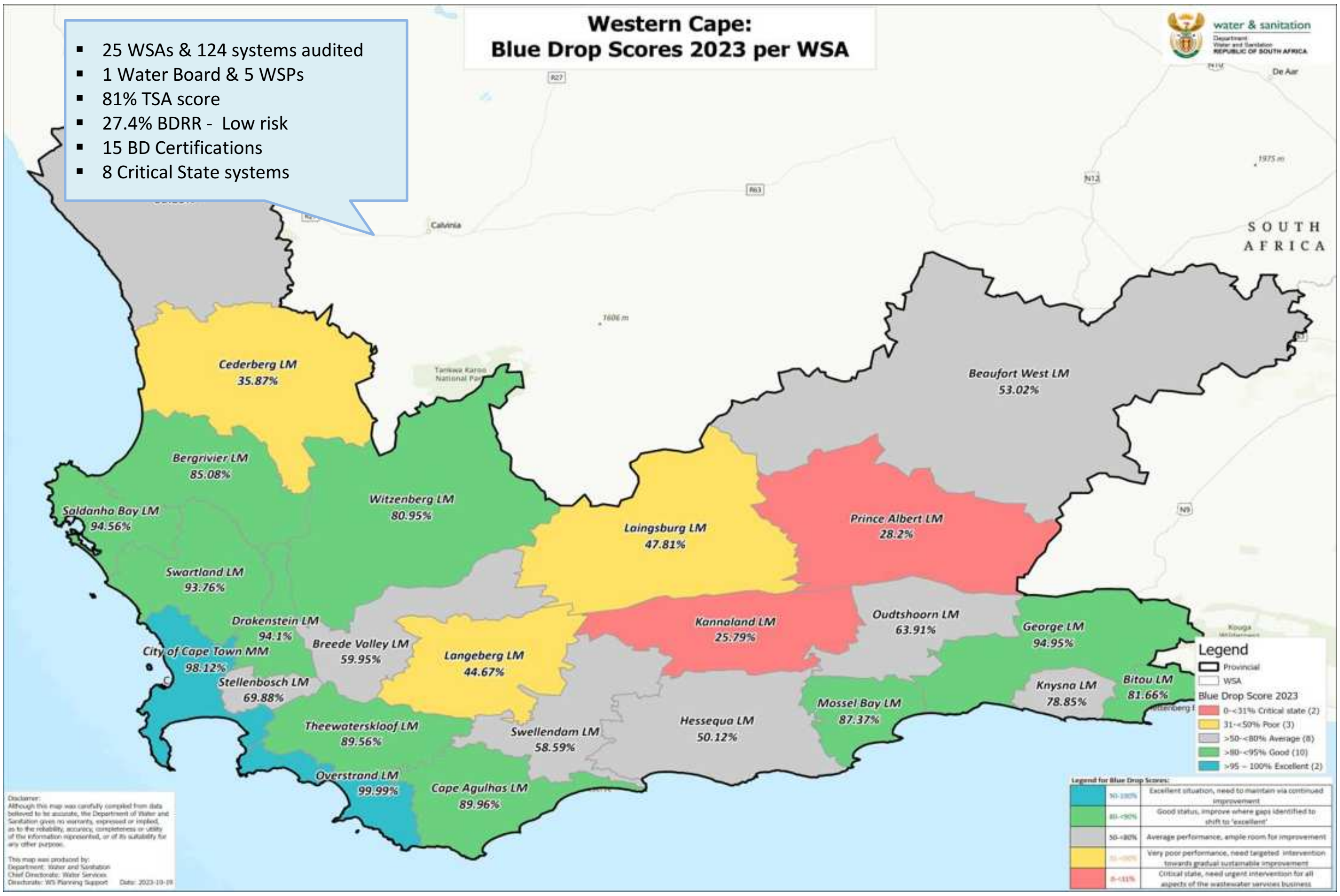
Technical Site Assessment: Colesberg WTW – 56%

The Regulator notes the dire state of management and drinking water quality in the Colesberg, Norvalspont and Noupoort water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

City of Cape Town: Faure WTW lime dosing in prime condition, exemplary of a clean well operated plant

Drakenstein: Welvanpas WTW chemical dosing – textbook: *a clean plant is a safe plant is a productive plant*

13. WESTERN CAPE PROVINCE: MUNICIPAL WATER MANAGEMENT PERFORMANCE



Provincial Synopsis

The Western Cape province provides drinking water to a total population of 6,241,092 persons in South Africa.

An audit attendance record of 100% of the 25 WSAs, with 124 water supply systems across the province, 1 Water Board (Overberg Water), 2 Bulk Water Service Providers (City of Cape Town MM and West Coast DM Bulk) and 3 WSPs (Nu Water, Veolia and IKUSASA), affirms the province's commitment to the Blue Drop national incentive-based regulatory programme. The main Bulk Water Suppliers are the City of Cape Town MM who supply potable water to the City of Cape Town, and 5 water supply systems in the Drakenstein LM and Stellenbosch LM, followed by the West Coast DM Bulk who supplies potable water to 7 water supply systems in the Bergrivier LM, Drakenstein LM, Saldanha Bay LM and Swartland LM, and finally Overberg Water that supplies potable water to 6 water supply systems in the Cape Agulhas LM, Hessequa LM and Theewaterskloof LM.

The Regulator determined that 15 water supply systems scored more than 95% when measured against the Blue Drop standards and thus qualified for the prestigious Blue Drop Certification. In 2014, 8 water supply systems were awarded Blue Drop status. Using the 2014 audit results as comparative baseline, the province shows an improvement in excellence for 2023.

Fifteen (15) of 25 WSAs improved on their 2014 scores as can be seen in the table below. The remaining 10 WSAs regressed to lower Blue Drop scores compared to their 2014 baselines. The Overstrand LM, City of Cape Town MM and George LM are the best performing WSAs in the province, all achieving Blue Drop Certifications for 10 water supply systems in total. The Blue Drop scores of these top WSA performers were supported by excellent technical site assessment scores of 94% for Buffelsriver and Preekstoel WTWs (both in Overstrand LM), followed by 98% for Faure and 95% for Steenbras WTWs, and 84% for George Municipal New WTW. A total of 8 water supply systems were identified to be in a critical state in the province compared with 9 water supply systems in 2014.

The province's overall Blue Drop performance is characterised by particular strengths when measured against the KPAs. The WSAs with Blue Drop scores in the excellent and good performance categories stand out for its compliance, good practice and risk management practices that are well embedded in the water supply business. All five Blue Drop KPAs in the province achieved averages above 50% - KPA 1 Capacity Management (70.9%), KPA 2 DWQ Risk Management (62.3%), KPA 3 Financial Management (70.7%), KPA 4 Technical Management (56.3%) and KPA 5 Drinking Water Quality Compliance (73.7%). There are at least 10 WSAs that need to give specific attention to the various KPAs that are reflecting scores below 50%.

The provincial Blue Drop Risk Rating (BDRR) remained in the low risk category and improved from 34.8% in 2022 (BD PAT) to 27.4% in 2023. 115 (of 124) water supply systems are situated in the low risk category, 8 WSSs in the medium risk category, 1 WSS in the high risk category, and no WSSs in the critical risk category.

The Regulator is optimistic that the 2023 Blue Drop report provides an updated residual basis from where a positive trajectory for water services delivery and improved performance will follow in the next BD audit. Municipalities and their service providers are encouraged to start preparation for the next Blue Drop audit cycle, which is planned to cover the financial year 2023/24 and released in 2025. The 2023 Blue Drop status for WSAs in the province are summarised in the table below.

Table 226 - 2023 Blue Drop Summary

WSA Name	2014 BD Score (%)	2023 BD Score (%)	2023 BD Certified ≥95%	2023 Critical State (<31%)
Beaufort West LM	89.5%	53.0%↓		Murraysburg, Nelspoort
Bergrivier LM	63.8%	85.1%↑	Velddrif (West Coast DM Bulk)	
Bitou LM	90.4%	81.7%↓		
Breede Valley LM	89.2%	60.0%↓		
Cape Agulhas LM	69.5%	90.0%↑		
Cederberg LM	40.0%	35.9%↓		
City of Cape Town MM	95.9%	98.1%↑	Cape Town	
Drakenstein LM	72.1%	94.1%↑	Hermon (City of Cape Town MM)	
George LM	82.8%	94.95%↑	George	
Hessequa LM	55.2%	50.1%↓		Jongensfontein
Kannaland LM	31.7%	25.8%↓		Ladismith, Van Wyksdorp, Zoar
Knysna LM	61.6%	78.9%↑		
Laingsburg LM	26.1%	47.8%↑		
Langeberg LM	72.3%	44.7%↓		
Matzikama LM	48.6%	55.2%↑		
Mossel Bay LM	78.8%	87.4%↑		
Oudtshoorn LM	51.3%	63.9%↑		
Overstrand LM	90.8%	99.99%↑	Baardskeerdersbos, Buffeljags Bay, Buffelsrivier, Greater Gansbaai, Greater Hermanus, Kleinmond, Pearly Beach, Stanford	
Prince Albert LM	34.1%	28.2%↓		Klaarstroom, Prince Albert

WSA Name	2014 BD Score (%)	2023 BD Score (%)	2023 BD Certified ≥95%	2023 Critical State (<31%)
Saldanha Bay LM	69.4%	94.6%↑	Hopefield	
Stellenbosch LM	80.1%	69.9%↓		
Swartland LM	74.3%	93.8%↑	Withoogte (West Coast DM Bulk)	
Swellendam LM	57.3%	58.6%↑		
Theewaterskloof LM	64.2%	89.6%↑	Botrivier	
Witzenberg LM	95.8%	81.0%↓		
Totals	-	-	15	8

↑= improvement, ↓= regress, →= no change

The Department of Water and Sanitation acknowledges the excellence in water services management achieved for the Blue Drop Audit year of 2021-22. Fifteen (15) Blue Drop Certificates are awarded in the Western Cape Province to the water supply systems of Berg Rivier LM, City of Cape Town MM, Drakenstein LM, George LM, Overstrand LM, Saldanha Bay LM, Swartland LM and Theewaterskloof LM:

Province	2023 Blue Drop Certified Systems
Western Cape	**Berg Rivier LM (West Coast DM Bulk)** ○ Velddrif **City of Cape Town MM** ○ Cape Town **Drakenstein LM (City of Cape Town MM)** ○ Hermon **George LM** ○ George **Overstrand LM** ○ Baardskeerdersbos ○ Buffeljags Bay ○ Buffelsrivier ○ Greater Gansbaai ○ Greater Hermanus ○ Kleinmond ○ Pearly Beach ○ Stanford **Saldanha Bay LM (West Coast DM Bulk)** ○ Hopefield **Swartland LM (West Coast DM Bulk)** ○ Withoogte **Theewaterskloof LM** ○ Botrivier

Background to Water Delivery and Distribution Infrastructure

The total volume of water treated in the province is 1,162,422 kl/d. Twenty five (25) WSAs, 1 WB, 2 Bulk Water Service Providers (CoCT MM and WCDM Bulk) and 3 WSPs (Nu Water, Veolia and IKUSASA) are responsible for water services through a water network comprising of:

- 126 WTWs, boreholes and springs with the bulk of the water treated and supplied by the 12 City of Cape Town WTWs to 3 WSAs (City of Cape Town MM, Drakenstein LM and Stellenbosch LM) with a total Average Daily Production of 808,423 kl/d
- 124 WSSs of which 18 WSSs in 10 WSAs are provided with bulk potable water from City of Cape Town MM, West Coast DM Bulk and Overberg Water
- 348 pump stations, 14,087 km bulk water supply lines, 6,563 km reticulation pipe lines (very low as NI for City of Cape Town MM), and 1,102 reservoirs/ towers (excluding the systems that were unable to provide data).

Table 227 - Summary of Capacities, Daily Production and SIV distribution according to plant sizes

	Micro Size Plants <500 kl/day	Small Size Plants 500 - <2,000 kl/day	Medium Size Plants 2,000 - <10,000 kl/day	Large Size Plants 10,000 - <25,000 kl/day	Macro Size Plants >25,000 kl/day	Unknown (NI)*	Total
No. of WTWs, Boreholes, Springs	20 (16%)	33 (26%)	45 (36%)	13 (10%)	15 (12%)	Excluding 6 Reservoirs	126
Total Design Capacity (kl/day)	4,738	38,638	199,896	210,960	2,000,200	None	2,454,432
Total Available Capacity (kl/day)	4,602	42,767	193,801	195,210	1,727,164	None	2,163,544
Average Daily Treatment Volume (kl/day)	3,620	22,650	98,681	75,976	961,494	2 NI	1,162,422
Total SIV (kl/day)	3,769	24,747	389,181	199,795	446,299		1,063,791
Design Capacity Utilisation (%)	76%	59%	49%	36%	48%		47%
Available Capacity Utilisation (%)	79%	53%	51%	39%	56%		54%

** "Unknown" means the number of WTWs with NI (No Information) on design capacity or available capacity or SIV*

The audit verified a total installed design capacity of 2,454,432 kl/d and a total available design capacity of 2,163,544. kl/d with most of this capacity residing in the macro-sized water treatment plants. Collectively, the 126 WTWs produce 1,162,422 kl/d and distributes 1,063,791 kl/d across the water networks. By comparing the available treatment capacity with the treated water volume, a spare treatment capacity of 1,001,122 kl/d is available (46%) to meet additional future demands. However, the WUE for the province is fairly high (ave. 243 l/p/d) compared to the international WUE benchmark of 180 l/p/d, indicating a high ratio between effective water use and actual water abstraction. Going forward, the province will have to dedicate significant resources to curb water losses and NRW.

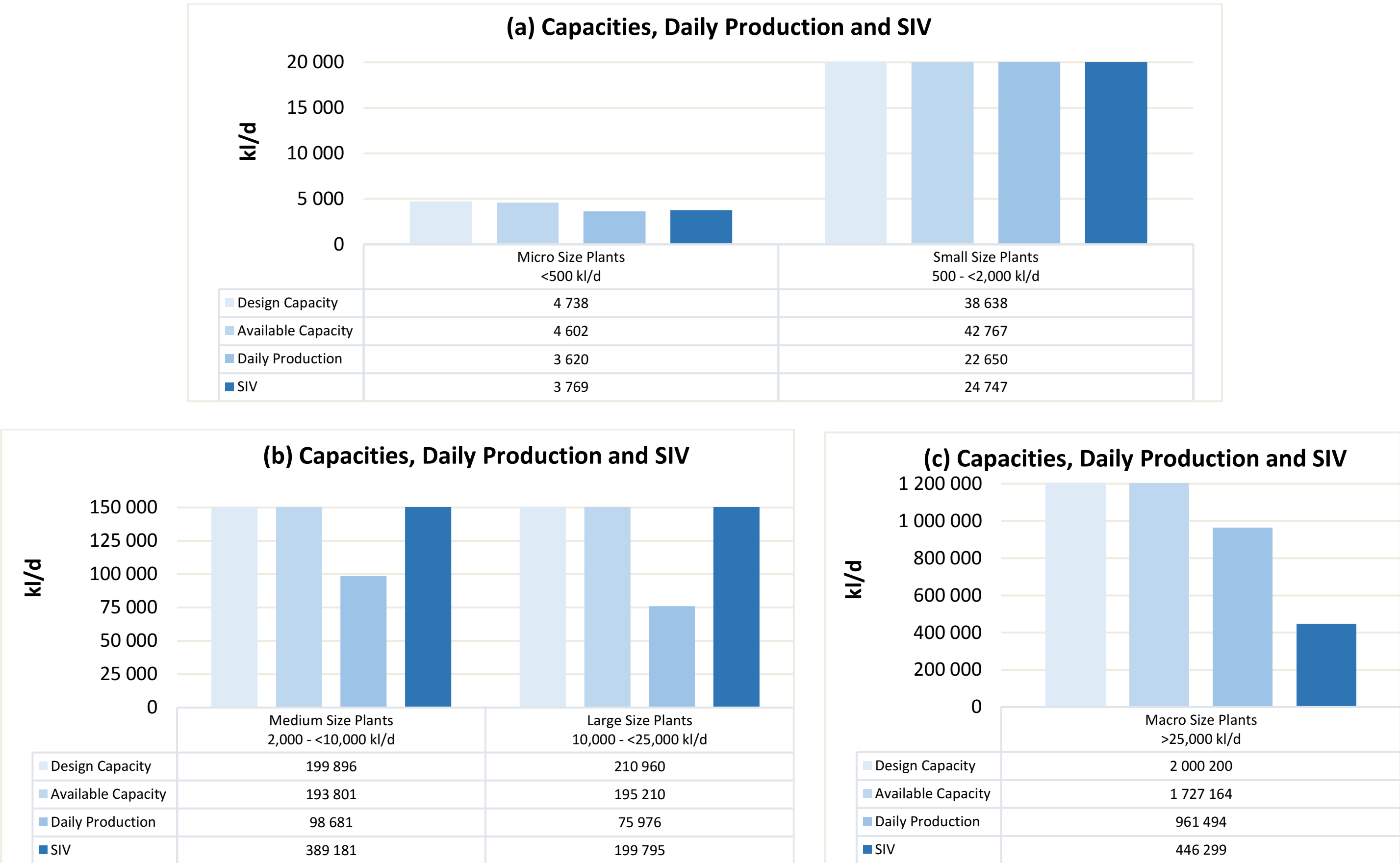


Figure 169 - Capacities, Daily Production and SIV Distribution - (a) micro to medium sized WTWs, (b) large WTWs, and (c) macro sized WTWs

The total SIV in the province is 1,063,791 kl/d and the average daily treatment volume is 1,162,422 kl/d and this indicates that the treated volume is more than the total SIV (109%) as only two WTWs are not measuring their average daily treatment volumes. The largest contributor to the total SIV for 5 WSSs are City of Cape Town MM with a total SIV contribution of 808,423 kl/d (66%).

Diagnostic no. 2 to follow herein will unpack these statistics in more detail. The data shows that the Hessequa LM and Prince Albert LM daily average treatment volumes exceed the available design capacities. 12 water supply systems in 10 WSAs have daily production volumes that exceed the authorised daily abstraction volumes.

The water distribution infrastructure is summarised in the table below.

Table 228 - Summary of Water Distribution Reticulation Infrastructure

WSA & WB Name	# WSS with no WSP/WB	# WSS with WSP/WB	Water Distribution Infrastructure			
			# Pump Stations (#)	Bulk Water Supply Lines (km)	Reticulation pipe lines (km)	# Reservoirs/ Towers
Overberg Water	-	6	2	1,314	NI	29
Beaufort West LM	4		6	84	204	11
Bergrivier LM	5	1	14	NI	NI	14
Bitou LM	3		26	104	279	25
Breede Valley LM	4		5	NI	NI	17
Cape Agulhas LM	7	2	6	118	243	24
Cederberg LM	6		0	NI	NI	0
City of Cape Town MM	1		93	11,023	NI	570
Drakenstein LM	2	3	18	110	782	27
George LM	4		19	82	888	41
Hessequa LM	7	3	0	NI	NI	0
Kannaland LM	4		0	NI	NI	0
Knysna LM	5		26	NI	356	52
Laingsburg LM	2		0	31	30	6
Langeberg LM	5		0	NI	NI	0
Matzikama LM	8		24	NI	NI	32
Mossel Bay LM	5		18	144	615	47
Oudtshoorn LM	3		1	77	611	15
Overstrand LM	8		26	114	781	49
Prince Albert LM	3		0	NI	NI	0
Saldanha Bay LM		3	7	193	NI	14
Stellenbosch LM	2	3	7	NI	NI	16
Swartland LM		2	24	566	1,060	57
Swellendam LM	4		0	NI	NI	7
Theewaterskloof LM	9	1	26	71	486	42
Witzenberg LM	5		0	56	229	7
Totals	**106**	**18**	**348**	**14,087**	**6,563**	**1,102**

Provincial Blue Drop Analysis

The 100% response from the 25 WSAs audited demonstrates a firm commitment to progressive water services management in the province. 25 WSAs were audited in 2023 compared to the 25 WSAs in 2014.

Table 229 - Blue Drop Comparative Analysis from 2012 to 2023

BLUE DROP COMPARATIVE ANALYSIS				
Performance Category	**2012**	**2014**	**2023**	**Performance trend 2014 and 2023**
Incentive-based indicators				
WSAs assessed (#)	25 (100%)	25 (100%)	25 (100%)	→
Water supply systems assessed (#)	117	122	124	↑
Blue Drop scores ≥50% (#)	103 (88%)	88 (72%)	96 (77%)	↑
Blue Drop scores <50% (#)	14 (12%)	34 (28%)	28 (23%)	↑
Blue Drop Certifications (#)	**33**	**8**	**15**	↑
Lowest Technical Site Assessment Score (%)	36%	48%	50%	↑
Highest Technical Site Assessment Score (%)	95%	97%	98%	↑

NA = Not Applied   NI = No Information   *↑= improvement, ↓= regress, →= no change*

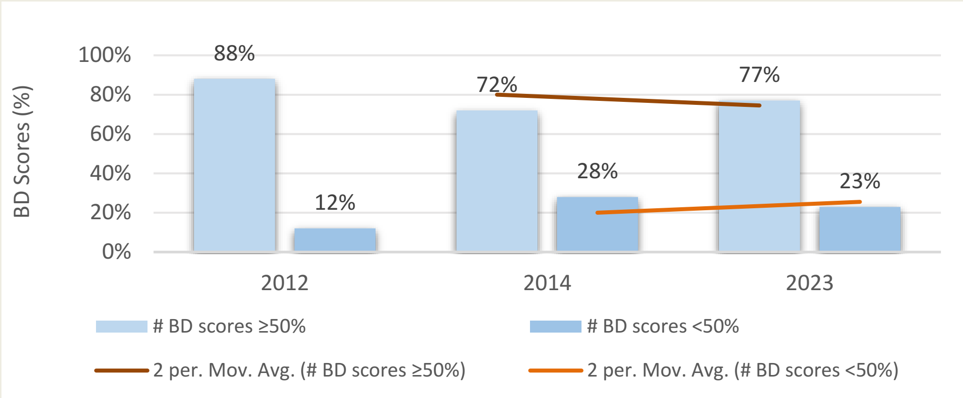


Figure 170 - Blue Drop trend analysis over the period 2012 to 2023, indicating the percentage BD scores above and below 50%

The trend analysis indicates that:

- The no. of systems audited has increased from the last BD audit in 2014
- The no. of systems with BD scores of ≥50% increased from 88 (72%) in 2014 to 96 (77%) in 2023
- This trend was reversed with no. of systems with a BD score of ≤50% decreasing from 34 (28%) in 2014 to 28 (23%) in 2023
- Blue Drop Certifications increased from 8 awards in 2014 to 15 awards in 2023
- The lowest TSA score increased from 48% in 2014 to 50% in 2023, with the highest TSA score increasing from 97% in 2014 to 98% in 2023
- The overall performance trend indicates a progression from 2014 to 2023
- Despite this positive trajectory, 10 WSAs still need regular audits to ensure timely turnaround and continued improvement
- The positive trend for 15 WSAs implies that performance has improved despite the absence of regulatory engagement of the BD audits between 2014 to 2023.

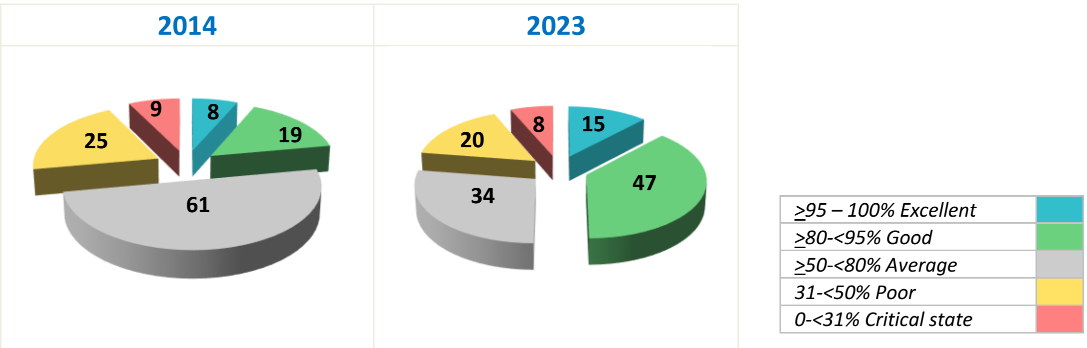


Figure 171 - No. WSSs in the Blue Drop score categories for 2014 and 2023 (graph legend to right)

Comparative analysis of the 2014 and 2023 blue drop scores, indicates that system scores are predominantly in the >80-<95% (*Good Performance*) category, with the >50-<80% (*Average Performance*) being the next largest category. 20 systems in 2023 reside in *Poor Performance* category and 8 systems are in *Critical State* (<31%) that shows an improvement from 34 systems in 2014 to 28 systems in 2023.

In summary, trend analysis since 2014 to 2023 indicate as follows:

- Systems in a 'critical state' are 8
- Systems in a 'poor state' decreased from 25 systems to 20 systems
- Systems in an 'average state' decreased from 61 systems to 34 systems
- Systems in the 'excellent and good state' increased from 27 systems (22%) to 62 systems (50%).

Provincial BDRR Analysis

The Blue Drop Risk Rating (BDRR) analysis assesses the risk across the entire water supply network. The BDRR formula was updated in 2021 to include an added risk indicator, i.e. 'E: Water Safety Plans', to address the risk assessment requirements outlined in SANS 241 of 2015. The BDRR now contains 5 risk indicators, i.e. design capacity (A), operational capacity (B), water quality compliance (C), technical capacity (D), and water safety plans (E). The results from the BDRR analyses are summarised in the table and figure following.

Table 230 - Municipal BDRR/BDRRmax Comparative Analysis from 2022 and 2023

BDRR/BDRR$_{max}$ COMPARATIVE ANALYSIS									
WSA Name	**# WSSs**	**# WBs/ WSPs**	**2022 (BD PAT)**	**2023 (BD Audit)**	**Performance Trend 2022 and 2023**	**BDRR Risk Category Split**			
						0-<50%	**50-<70%**	**70-<90%**	**90-100%**
Beaufort West LM	4		17.6%	23.7%	↓	3	1		
Bergrivier LM	6	1	30.0%	20.6%	↑	6			
Bitou LM	3		19.4%	21.3%	↓	3			
Breede Valley LM	4		43.2%	38.7%	↑	4			
Cape Agulhas LM	9	2	35.2%	22.5%	↑	8	1		
Cederberg LM	6		27.9%	29.2%	↓	6			
City of Cape Town MM	1		25.7%	31.0%	↓	1			
Drakenstein LM	5	3	33.6%	25.3%	↑	5			
George LM	4		40.1%	28.3%	↑	4			
Hessequa LM	10	3	39.9%	38.2%	↑	8	2		
Kannaland LM	4		89.5%	52.4%	↑	2	1	1	
Knysna LM	5		29.8%	22.8%	↑	5			
Laingsburg LM	2		50.6%	29.6%	↑	2			
Langeberg LM	5		22.2%	39.6%	↓	4	1		
Matzikama LM	8		32.1%	29.7%	↑	8			
Mossel Bay LM	5		28.4%	23.6%	↑	5			
Oudtshoorn LM	3		48.9%	30.5%	↑	3			
Overstrand LM	8		19.1%	17.8%	↑	8			
Prince Albert LM	3		46.4%	49.6%	↓	1	2		
Saldanha Bay LM	3	3	27.2%	19.4%	↑	3			
Stellenbosch LM	5	3	26.1%	24.8%	↑	5			
Swartland LM	2	2	25.0%	21.1%	↑	2			
Swellendam LM	4		33.1%	30.6%	↑	4			
Theewaterskloof LM	10	1	36.8%	27.7%	↑	10			
Witzenberg LM	5		25.3%	22.8%	↑	5			
Totals & %BDRR/BDRR$_{max}$	**124**	**18**	**34.8%**	**27.4%**	↑	**115**	**8**	**1**	**0**

↑= improvement, ↓= regress, →= no change

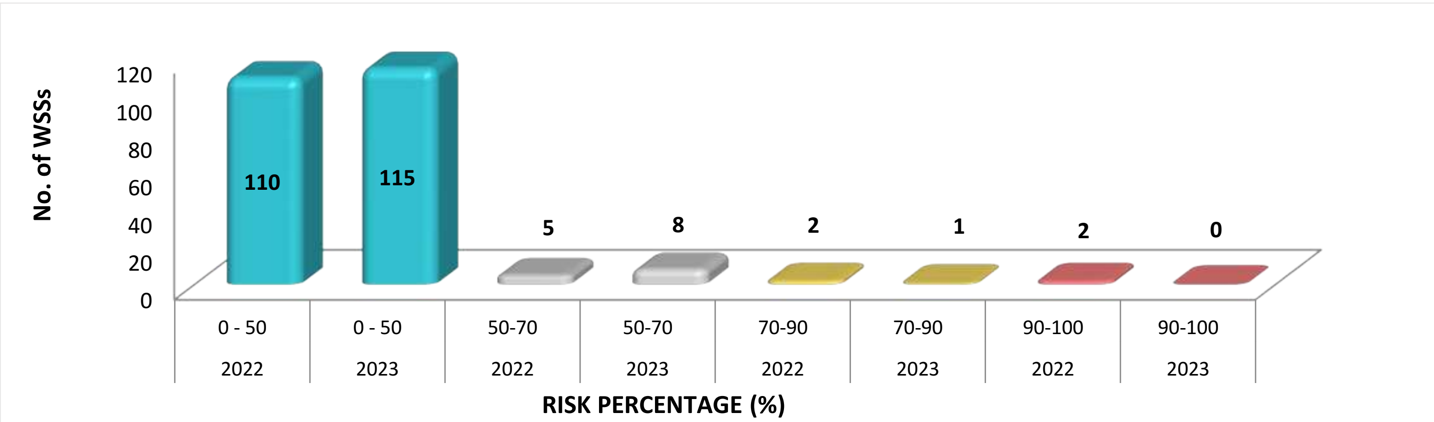


Figure 172 - a) WSS risk distribution and trends for 2022 and 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

Trend analysis of the BDRR ratings for 2022 and 2023 indicates that:

- The 2023 audit cycle highlighted a slightly progressive shift with an increase in the no. of low risk WSSs (110 to 115), an increase in the medium risk WSSs (5 to 8), a decrease in the high risk WSSs (2 to 1), and a decrease in the critical risk WSSs (2 to zero).

Regulatory Enforcement

Water supply systems which fail to achieve the minimum Blue Drop target of 31%, are placed under regulatory focus. The Regulator requires these WSAs to submit a detailed corrective action plan (CAP) within 20 working days from publishing of this report. 8 WSSs received Blue Drop scores below 31%, and hence are placed under **regulatory surveillance**, in accordance with the Water Services Act (108 0f 1997). DWS together with COGTA will through the grant allocation systems ensure priority is given to application of grants to rectify/restore the water services treatment and supply shortcomings identified in this report.

Table 231 - WSSs with <31% Blue Drop scores

WSA Name	2023 BD Score	WSSs with <31% score
Beaufort West LM	**53.0%**	Murraysburg, Nelspoort
Hessequa LM	**50.1%**	Jongensfontein
Kannaland LM	**25.8%**	Ladismith, Van Wyksdorp, Zoar
Prince Albert LM	**28.2%**	Klaarstroom, Prince Albert

The following WSAs and their associated water treatment systems are in high and/or critical BDRR risk positions, which means that some or all the risk indicators are in a precarious state, i.e. operational capacity, design capacity utilisation, water quality compliance, technical capacity, and water safety plans. WTWs in high risk and critical risk positions pose a serious risk to public health. The following WSAs will be required to assess their risk contributors and to provide corrective measures in the above mentioned action plans to mitigate these risks.

Table 232 - %BDRR/BDRR$_{max}$ scores and WSSs in critical and high-risk space

WSA Name	2023 Average %BDRR/BDRRmax	WSSs in critical and high-risk space	
		Critical Risk (90-100%)	High Risk (70-<90%)
Kannaland LM	52.4%		Van Wyksdorp

Good practice risk management requires that the Water Safety Plans (WaSPs) are informed by meaningful Process and Condition Audits, supported by zealous implementation of corrective measures and ongoing monitoring of risk movement. With the exception of only 1 water supply system in Kannaland LM, all the remaining water supply systems are in the low and medium risk positions – an exemplary status.

Performance Barometer

The **Blue Drop Performance Barometer** presents the individual WSA Blue Drop Scores, which essentially reflects the level of mastery that a WSA has achieved in terms of its overall water services business. The bar chart below compares the 2014 and 2023 BD scores, ranked from highest to lowest performing WSA in 2023. The City of Cape Town MM is commended for maintaining excellent performance and the Overstrand LM is commended for achieving excellent performance. 15 WSAs improved on their municipal blue drop scores that includes the City of Cape Town MM and Overstrand LM. The remaining 10 WSAs regressed on their municipal blue drop scores.

The BDRR Risk Barometer expresses the level of risk that a WSA poses in respect of its water supply system. The schematic below presents the BDRR in ascending order – with the low-risk WSAs on the left and higher risk WSAs to the far right. The analysis reveals that 24 of 25 WSAs are in low risk positions whilst only 1 WSA is in the medium position in the province.

Provincial Best Performers

The **Overstrand Local Municipality** is the **BEST PERFORMING WSA** in the province, based on the following record of excellence:

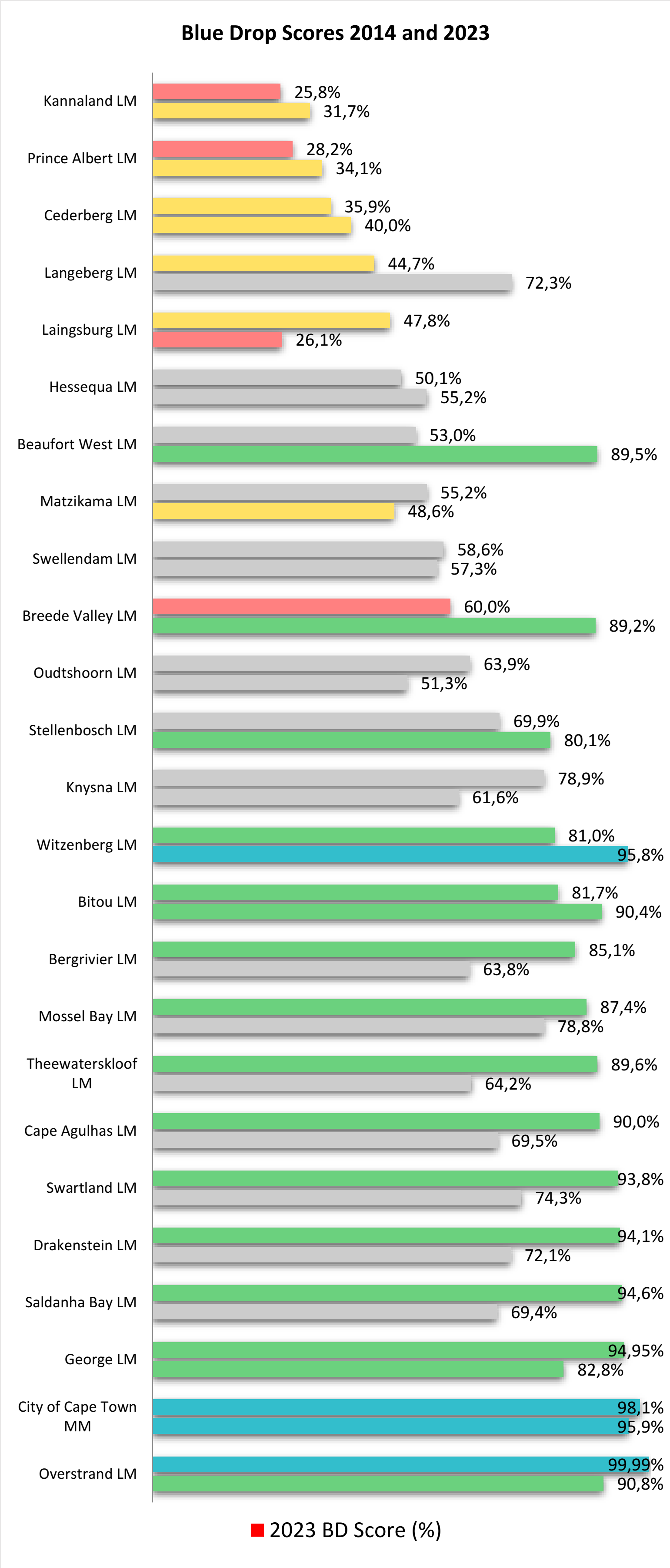
- ✓ 2023 Blue Drop Score of 99.99%
- ✓ 2014 Blue Drop Score of 90.8%
- ✓ Improvement on the BDRR from 19.1% in 2022 to 17.8% in 2023
- ✓ 8 systems (100%) in the low risk position
- ✓ TSA score of 94% for Buffelsriver and Preekstoel

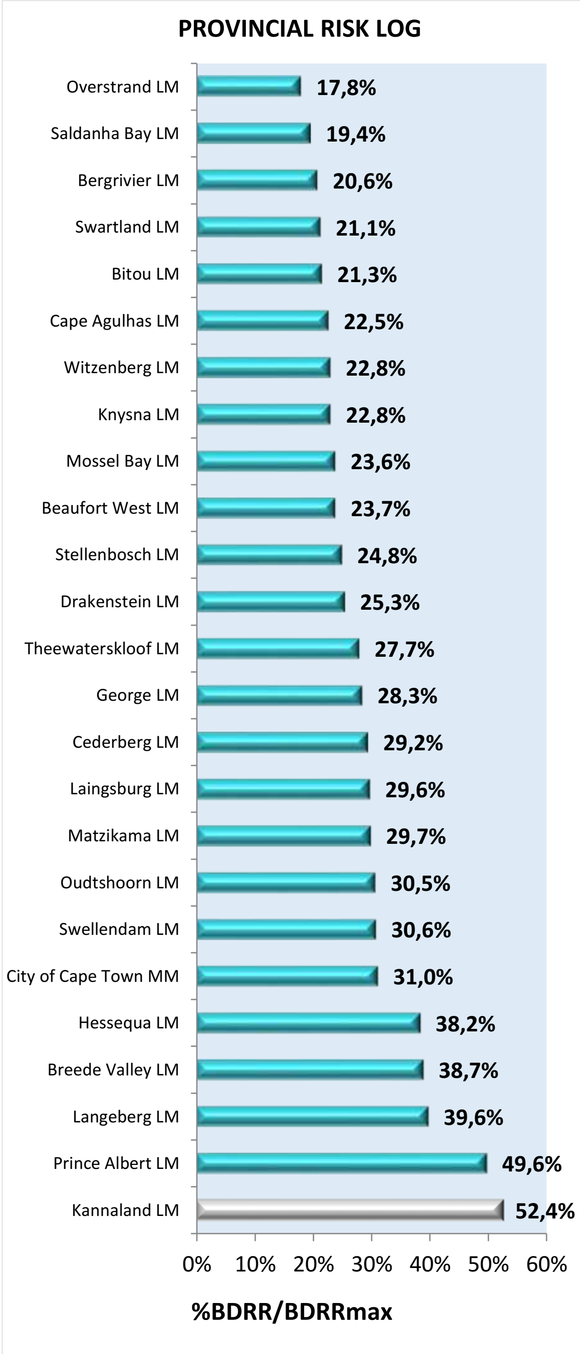
The **City of Cape Town Metropolitan Municipality** is the second-best scoring WSA:

- ✓ 2023 Blue Drop Score of 98.1%
- ✓ 2014 Blue Drop Score of 95.9%
- ✓ Low risk BDRR of 31% in 2023
- ✓ 1 system (100%) in low risk position
- ✓ TSA score of 98% for Faure and 95% for Steenbras

The **George Local Municipality** is the third-best scoring WSA:

- ✓ 2023 Blue Drop Score of 94.95%
- ✓ 2014 Blue Drop Score of 82.8%
- ✓ Low risk BDRR of 28.3% in 2023
- ✓ 4 systems (100%) in low risk positions
- ✓ TSA score 84% for George Municipal New





90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

≥95 – 100% Excellent	
≥80-<95% Good	
≥50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

Figure 173 (Left) - a) Blue Drop scores 2014 (bar bottom) and 2023 (bar top); b) Colour legend

Figure 174 (Right) - a) %BDRR/BDRR$_{max}$ Risk Performance Profile/Log 2023; b) Colour legend

KPA Diagnostics

The BD audit process collects a vast amount of data that yield valuable insight into the state of the water services delivery and water quality in each province. Five focus areas or 'diagnostics' have been configured from the 2021/22 audit data and are discussed below.

Table 233 - Summary of the key diagnostic themes and reference to the respective Blue Drop KPAs

Diagnostic #	Diagnostic Description	Diagnostic Reference
1	**Technical Competence**	KPA 1, 2 & Bonus
2	**Treatment Capacity and Flow Distribution**	KPA 4 & Generic Audit data set
3	**Drinking Water Quality (DWQ) Monitoring and Compliance**	KPA 2 & 4 & Bonus
4	**Technical Site Assessments**	TSA and 2023 Blue Drop Watch Report
5	**Operation, Maintenance and Refurbishment of Assets**	KPA 3 & 4

Diagnostic 1: Technical Competence

Aim: This focus area assesses the technical human resources capacity that is available to manage and operate water treatment processes and maintain the related water infrastructure. Theory advocates that a correlation exists between human resources capacity and capability (sufficient number of appropriately qualified staff) and a WSI's performance. Thus, it is hypothesised that high HR capacity would translate to compliant water treatment plants and functional water supply network. Blue Drop assesses technical compliance on two levels: i) WTW plant supervision and process control staff and ii) Technical, scientific and maintenance staff.

(i) Plant Supervisors and Process Controllers

Findings: According to regulations, water treatment plants are classified as Class A, B, C, D or E plants. Similarly, Process Controllers and Plant Supervisors are registered as Class I, II, III, IV, V or VI Process Controllers. Higher classed plants require a higher level of Process Controllers due to technology complexity and strict water quality standards. Technical compliance of PCs and Supervisors is determined against the Blue Drop standards, as defined by Reg. 2834 of the Water Act 1956 (Act 54 of 1956) for the erection, enlargement, operation, and registration of water care works and draft Reg. 813 of the Water Services Act (No 108 of 1997). Regulation 2834 has been replaced by Regulation 3630 in 2023 but will only come in effect during the next Blue Drop audit cycle.

Table 234 - No. compliant versus shortfall in Supervisor and Process Controller staff

WSA & WB Name	# WTWs	# WSSs	# Available Compliant Staff			Staff Shortfall		Ratio	2023 BD Score (%)
			PCs	Supervisor***	Total	PCs	Supervisor		
Overberg Water	3	6	14	4	18	0	0	6.0	82.8% ave
Beaufort West LM	5	4	8	2	10	5	0	2.0	53.0%
Bergrivier LM	5	6	2	7	9	8	0	1.8	85.1%
Bitou LM	3	3	5	3	8	4	0	2.7	81.7%
Breede Valley LM	4	4	5	3	8	5	0	2.0	60.0%
Cape Agulhas LM	2	9	19	12	31	3	0	15.5	90.0%
Cederberg LM	6	6	3	0	3	9	2	0.5	35.9%
City of Cape Town MM	12	1	39	15	54	12	2	4.5	98.1%
Drakenstein LM	6	5	1	6	7	11	0	1.2	94.1%
George LM	5	4	14	9	23	4	0	4.6	94.95%
Hessequa LM	7	10	7	0	7	12	2	1.0	50.1%
Kannaland LM	4	4	1	0	1	7	1	0.3	25.8%
Knysna LM	5	5	8	12	20	6	0	4.0	78.9%
Laingsburg LM*	None	2	2	0	2	2	1	None	47.8%
Langeberg LM	5	5	6	0	6	13	4	1.2	44.7%
Matzikama LM	8	8	3	8	11	13	0	1.4	55.2%
Mossel Bay LM	7	5	26	11	37	1	0	5.3	87.4%
Oudtshoorn LM	3	3	4	3	7	4	0	2.3	63.9%
Overstrand LM	9	8	41	79	120	1	0	13.3	99.99%
Prince Albert LM	3	3	4	0	4	2	1	1.3	28.2%
Saldanha Bay LM**	None	3							
Stellenbosch LM	3	5	18	0	18	0	1	6.0	69.9%
Swartland LM	2	2	13	2	15	2	0	7.5	93.8%
Swellendam LM	4	4	6	1	7	5	3	1.8	58.6%

WSA & WB Name	# WTWs	# WSSs	# Available Compliant Staff			Staff Shortfall		Ratio	2023 BD Score (%)
			PCs	Supervisor***	Total	PCs	Supervisor		
Theewaterskloof LM	10	10	14	42	56	12	0	5.6	89.6%
Witzenberg LM	5	5	9	11	20	2	0	4.0	81.0%
Totals	**126**	**124**	**272**	**230**	**484**	**143**	**17**		

* Water supplied by 2 Main Reservoirs - no conventional WTWs in Laingsburg LM. The WSI operates two basic water supply systems where groundwater is simply abstracted and disinfected before distribution so they PC staff in place
** Water supplied by Withoogte WTW - No WTWs in Saldanha Bay LM
*** NB: The Supervisor totals will be inflated as it is not possible to differentiate between which Supervisors are shared/ roaming with other Class C to E WTWs

Ratio depicts the no. of qualified staff divided by the no. of WTWs operated by this no. of staff. E.g., Beaufort West LM has 10 compliant Sups + PCs, divided by … WTWs = 2.0 qualified staff per WTW

Note: "Compliant staff" means qualified and registered staff that meets the BD standard for a particular Class Works. "Staff shortfall" means staff that do not meet the BD standard for a particular Class of works (+1 for a shift) and/or staffing gaps exist at the respective WTWs.

Competent human resources are vital enablers in ensuring efficient and sustainable management of water services and delivery of safe water quality to consumers. For the province in general, the operational competencies are found to be excellent for the Supervisory staff and excellent/good for the PCs in Overberg Water and in 6 of the 24 municipalities (Cederberg LM, Hessequa LM, Kannaland LM, Langeberg LM, Prince Albert LM and Stellenbosch LM excluding Saldanha Bay LM) as illustrated in the table above.

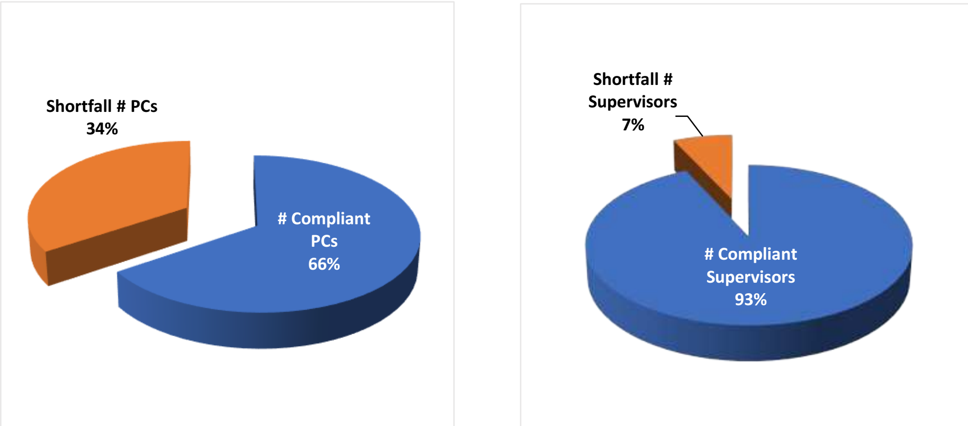


Figure 175 - Schematic illustration of compliant and shortfall of Supervisors (a) and Process Controllers (b)

Plant Supervisors: The pie charts indicate that 93% (230 of 247) of Plant Supervisors complies with the Blue Drop standard, with 17 shortfalls.

Process Controllers: Similarly, 66% (272 of 415) of the PC staff complies with the required standards, noting a zero shortfall for Overberg Water and Stellenbosch LM. There is a 34% (143 of 415) shortfall in Process Controllers with the highest shortfall (>10 No.) for 6 WSAs (City of Cape Town MM, Drakenstein LM, Hessequa LM, Langeberg LM, Matzikama LM and Theewaterskloof LM).

Blue Drop standards require of Class A and B plants to employ dedicated Supervisors per WTW and Process Controllers per shift per works, whereas Class C to E plants may share Supervisory staff across works. Shifts have been introduced to ensure optimal operations while addressing security risks, particularly as it relates to theft and vandalism. Telemetry also reduces the requirement for on-site staff during night shifts, but these relaxations have to be done within the DWS regulatory guidelines.

The Regulator expects correlation between the competence of an operational team and the performance of a WTW, as measured by the BD score. The data indicates as follows:

- All 24 WSAs (Saldanha Bay LM excluded) have qualified PCs in place. With the exception of Overberg Water, only 1 WSA does not have a shortfall in qualified PCs
- 17 WSAs (Saldanha Bay LM excluded) have qualified Supervisors in place. With the exception of Overberg Water, 15 WSAs do not have a shortfall in qualified Supervisors.

It is expected that a correlation would exist between the competence of an operational team and the performance of a water treatment works, as measured by the BD score. The results from the ratio analysis indicate high ratios (>4.0) for the Overberg Water WTWs and 10 WSAs with WTWs.

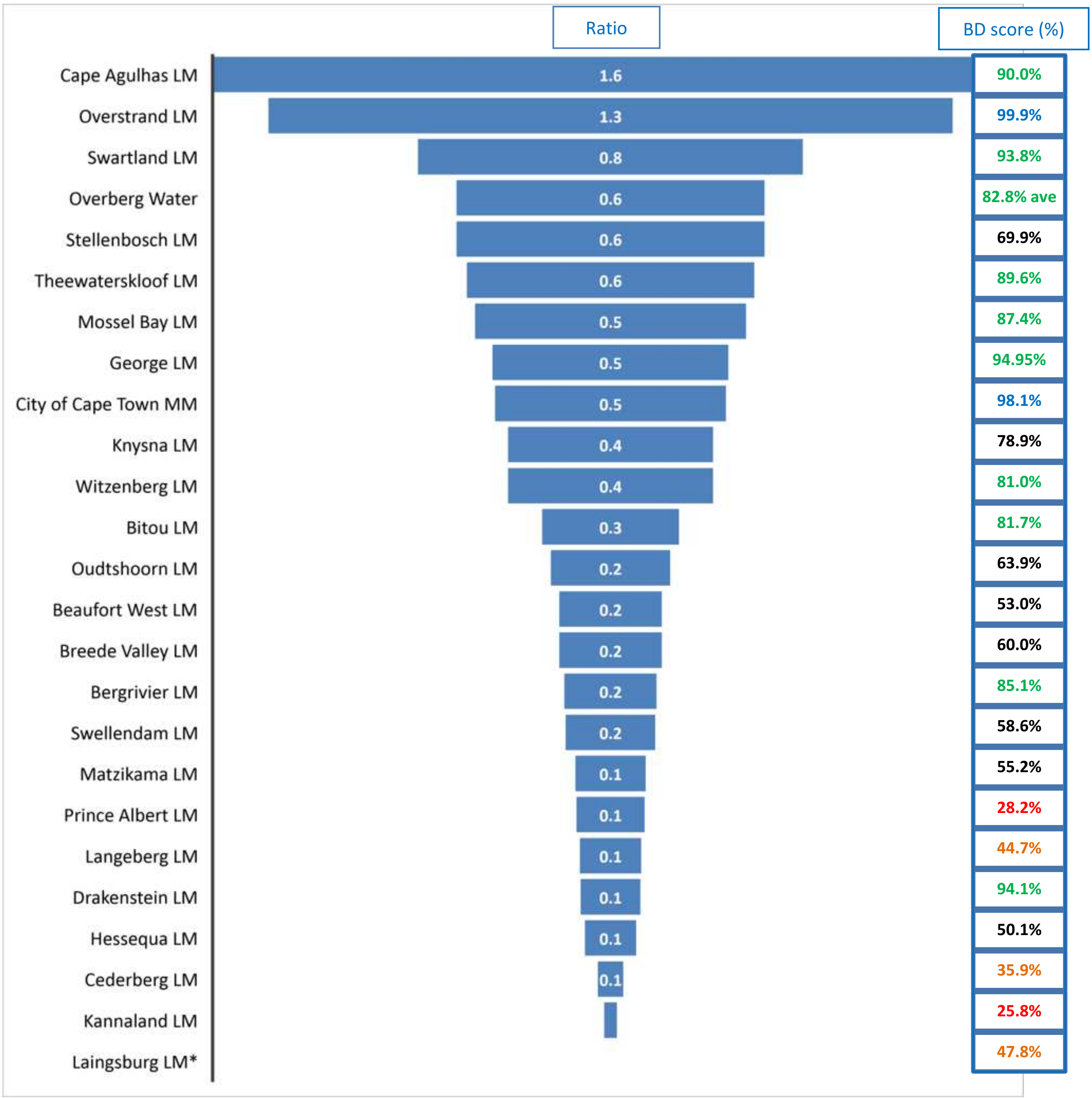


Figure 176 - Ratio of compliant operational staff to no. of WTWs and Comparison of Ratios with BD scores

Overall, the comparative bar chart confirms a reasonably close correlation between Overberg Water and the WSAs with high ratios (ranging from 2.7 to 15.5) and high BD scores (ranging from 69.9% to 99.9%) with the exception of Stellenbosch LM that does receive some of their potable water supply from the City of Cape Town MM. There are anomalies with Bergrivier LM and Drakenstein LM with lower ratios but high BD scores and this may be due to the fact that these WSAs receive potable water supply from West Coast DM Bulk and City of Cape Town MM respectively. At the lower end, lower ratios and lower BD scores are reflected from Prince Albert LM to Laingsburg LM.

(ii) Technical, Scientific and Maintenance staff

In addition to operational capacity (above), good management practice also requires access to qualified engineers, technicians, technologists, MISA appointees, scientists, and maintenance capability (below). Such competencies could reside in-house or accessible through term contracts and external specialists.

Table 235 - Summary of the maintenance capacity and no. of qualified and shortfall of Engineering, Technical and Scientific staff

WSA & WB Name	# WTWs	# WSSs	Maintenance Arrangement
Overberg Water	3	6	Internal+Term Contract
Beaufort West LM	5	4	Internal+Term Contract
Bergrivier LM	5	6	Internal+Specific Outsourcing; Internal Team (only)

WSA & WB Name	# WTWs	# WSSs	Maintenance Arrangement
Bitou LM	3	3	Internal+Specific Outsourcing
Breede Valley LM	4	4	Internal+Specific Outsourcing
Cape Agulhas LM	2	9	Internal+Term Contract
Cederberg LM	6	6	Internal+Term Contract
City of Cape Town MM	12	1	Internal+Specific Outsourcing
Drakenstein LM	6	5	Internal+Specific Outsourcing; Internal Team (only)
George LM	5	4	Internal+Term Contract
Hessequa LM	7	10	Internal Team (only); Internal+Term Contract
Kannaland LM	4	4	Internal+Specific Outsourcing
Knysna LM	5	5	Internal+Term Contract
Laingsburg LM	None	2	Internal+Specific Outsourcing; Internal Team (only)
Langeberg LM	5	5	Internal Team (only)
Matzikama LM	8	8	Partially Capacitated
Mossel Bay LM	7	5	Internal+Term Contract
Oudtshoorn LM	3	3	Internal+Specific Outsourcing
Overstrand LM	9	8	Internal+Term Contract
Prince Albert LM	3	3	Internal+Term Contract
Saldanha Bay LM	None	3	Internal+Specific Outsourcing; Internal Team (only); Internal+Term Contract
Stellenbosch LM	3	5	Internal+Specific Outsourcing; Internal+Term Contract
Swartland LM	2	2	Internal+Specific Outsourcing; Internal Team (only); Internal+Term Contract
Swellendam LM	4	4	Partially Capacitated; Inadequate Capacity
Theewaterskloof LM	10	10	Internal+Term Contract
Witzenberg LM	5	5	Internal+Specific Outsourcing
Totals	**126**	**124**	

WSA & WB Name	# WTWs	# WSSs	Qualified Technical Staff (#)					Technical Shortfall (#)	Qualified Scientists (#)	Scientists Shortfall (#)	Ratio*	2023 BD Score (%)
			Technicians	Technologists	Engineers	MISA appointees	Total					
Overberg Water	3	6	2	3	1	0	**6**	0	2	0	1.0	**82.8% ave**
Beaufort West LM	5	4	1	1	0	0	**2**	2	0	2	0.5	**53.0%**
Bergrivier LM	5	6	2	4	1	0	**7**	0	1	1	1.2	**85.1%**
Bitou LM	3	3	0	2	3	0	**5**	0	1	1	1.7	**81.7%**
Breede Valley LM	4	4	0	0	0	0	**0**	4	1	1	0.0	**60.0%**
Cape Agulhas LM	2	9	2	3	1	0	**6**	0	0	2	0.7	**90.0%**
Cederberg LM	6	6	1	1	1	0	**3**	1	0	2	0.5	**35.9%**
City of Cape Town MM	12	1	9	9	9	0	**27**	0	18	0	27.0	**98.1%**
Drakenstein LM	6	5	1	2	2	0	**5**	0	3	0	1.0	**94.1%**
George LM	5	4	3	3	3	0	**9**	0	2	0	2.3	**94.95%**
Hessequa LM	7	10	3	3	0	3	**9**	1	0	2	0.9	**50.1%**
Kannaland LM	4	4	0	0	0	1	**1**	3	0	2	0.3	**25.8%**
Knysna LM	5	5	0	4	0	0	**4**	2	2	0	0.8	**78.9%**
Laingsburg LM	None	2	2	0	0	1	**3**	0	0	2	1.5	**47.8%**
Langeberg LM	5	5	1	0	1	0	**2**	2	0	2	0.4	**44.7%**
Matzikama LM	8	8	2	1	0	1	**4**	0	0	2	0.5	**55.2%**
Mossel Bay LM	7	5	2	3	3	0	**8**	0	1	1	1.6	**87.4%**
Oudtshoorn LM	3	3	1	1	1	0	**3**	1	0	2	1.0	**63.9%**
Overstrand LM	9	8	2	2	4	0	**8**	0	2	0	1.0	**99.99%**
Prince Albert LM	3	3	0	0	0	0	**0**	4	0	2	0.0	**28.2%**
Saldanha Bay LM	None	3	1	3	2	0	**6**	0	1	1	2.0	**94.6%**
Stellenbosch LM	3	5	0	3	2	0	**5**	1	1	1	1.0	**69.9%**
Swartland LM	2	2	6	6	1	0	**13**	0	2	0	6.5	**93.8%**
Swellendam LM	4	4	1	1	1	0	**3**	1	0	2	0.8	**58.6%**
Theewaterskloof LM	10	10	5	4	2	1	**12**	0	2	0	1.2	**89.6%**
Witzenberg LM	5	5	4	2	1	0	**7**	0	0	2	1.4	**81.0%**
Totals	**126**	**124**	**51**	**61**	**39**	**7**	**158**	**22**	**39**	**30**		

* The single number ratio depicts the no. of qualified technical staff divided by the no. of WSSs that have access to the staff. E.g., Bergrivier LM has 7 qualified staff, divided by 6 WSSs = 1.2 qualified staff per WSS

Note 1: "Qualified Technical Staff" means staff appointed in positions to support water services, and who has the required qualifications. "Technical Shortfall" is calculated based on a minimum requirement of at least 3 Engineers or more than 1 of each of Engineers, Technologists & Technicians; and at least one 1 Candidate Scientist and 1 Professional Scientist per WSI.

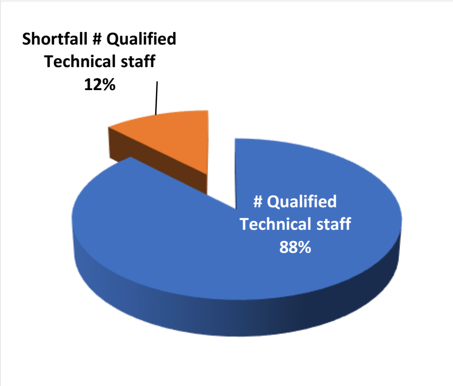
Note 2: "Qualified Scientists" means professional registered scientists (SACNASP) and candidate scientists appointed in positions to support water services. "Scientists shortfall" means that the WSA does not have at least one qualified SACNASP registered scientist and at least one 1 candidate scientist in their employ or contracted.

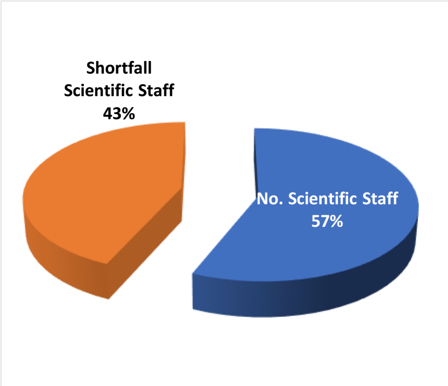
In terms of maintenance capacity, all the municipalities in the province have a reasonable contingent of qualified technical and maintenance staff. The maintenance staff comprises of a collective of in-house, contracted, or outsourced personnel. The data indicates that:

- Overberg Water, City of Cape Town MM and West Coast DM Bulk have internal maintenance teams supplemented with specific outsourced services and term contracts
- 13 of 25 (52%) WSAs have internal maintenance teams supplemented with term contracts
- 5 of 25 (20%) WSAs have in-house maintenance teams
- 12 of 25 (48%) WSAs have internal maintenance teams supplement with specific outsourced services
- 2 of 25 (8%) WSAs are partially capacitated and/or inadequately capacitated for some of their water supply systems.

In general, the province presents a strong case for qualified professional technical staff as follows:

- A total of 158 qualified staff comprised of 39 Engineers, 61 Technologists, 51 Technicians, 7 MISA appointees (qualified); and 39 SACNASP registered scientists are assigned to Overberg Water and 13 WSAs
- A total shortfall of 52 persons is identified, consisting of 22 technical staff and 30 scientists
- 14 WSAs have a total shortfall of 22 qualified technical staff with the highest indicated for Breede Valley LM and Prince Albert LM (4 each), Kannaland LM (3), and Beaufort West LM, Knysna LM, and Langeberg LM (2 each)
- Overberg Water and 24 WSAs have access to credible laboratories that comply with the Blue Drop standards.





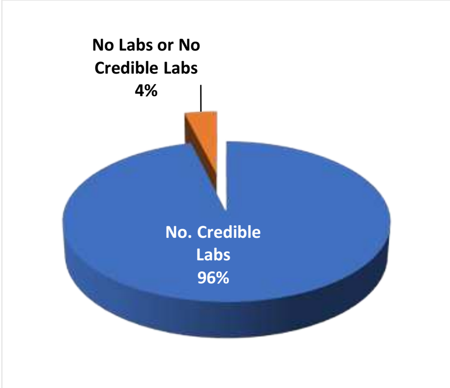


Figure 177 - Graphic illustration of the number and %: a) qualified engineering/technical staff; b) professional scientists; c) access to credible laboratory services that complies with Blue Drop standards

Ratio analysis has been done to determine the number of qualified technical and scientific staff assigned per WSS. It is expected that a higher ratio would correspond with well-performing and maintained water supply systems, as represented by the BD score.

The schematic on the following page does show a strong correlation between high ratios ($\geq$ 1.0) and high BD scores for City of Cape Town to Drakenstein LM (ranging from 81.0% to 98.1%) with Laingsburg LM excluded which may be due to them managing Reservoirs and related infrastructure in the distribution system only. Overstrand LM being the other anomaly with a low ratio (1.0) and the highest BD score (99.9). In the bottom half of the schematic, lower ratios and lower BD scores are reflected from Stellenbosch LM to Prince Albert LM with the only anomaly being Cape Agulhas that has a low ratio of 0.7 and a high BD score of 90%.

With the exception of the 4 WSAs mentioned above, a reasonable correlation can be drawn between technical capacity and water supply performance, despite the complexity of the WSA/Bulk Water Provider, and the associated delivery and distribution infrastructure arrangements. The involvement of the City of Cape Town MM, the West Coast DM Bulk and Overberg Water have made a significant (positive) impact on the municipal BD scores for the WSAs they are providing water services.

Figure 178 - Ratio of compliant technical staff to no. of WSSs and Comparison of Ratios with BD scores

Overall, the results highlight the inter-dependency between technical capacity and performance. One of the options to enhance operational capacity is through dedicated training programmes. The Blue Drop audit incentivises training of operational staff over the 2-year period prior to the audit date. The results are summarised as follows:

Table 236 - No. of WTWs with operational staff sent on training over the past 2 years and vice versa

WSA & WB Name	# WTWs	# WTW staff attending training	# WTW without training
Overberg Water	3	3	
Beaufort West LM	5		5
Bergrivier LM	5	2	3
Bitou LM	3	3	0
Breede Valley LM	4	2	2
Cape Agulhas LM	2	1	1
Cederberg LM	6		6
City of Cape Town MM	12	11	1
Drakenstein LM	6	4	2

WSA & WB Name	# WTWs	# WTW staff attending training	# WTW without training
George LM	5	5	0
Hessequa LM	7	1	6
Kannaland LM	4	4	0
Knysna LM	5	3	2
Laingsburg LM	None	None	None
Langeberg LM	5		5
Matzikama LM	8	7	1
Mossel Bay LM	7	4	3
Oudtshoorn LM	3	2	1
Overstrand LM	9	9	0
Prince Albert LM	3		3
Saldanha Bay LM	None	None	None
Stellenbosch LM	3	3	0
Swartland LM	2	2	0
Swellendam LM	4		4
Theewaterskloof LM	10	7	3
Witzenberg LM	5	5	0
Totals	**126**	**78 (63%)**	**48 (37%)**

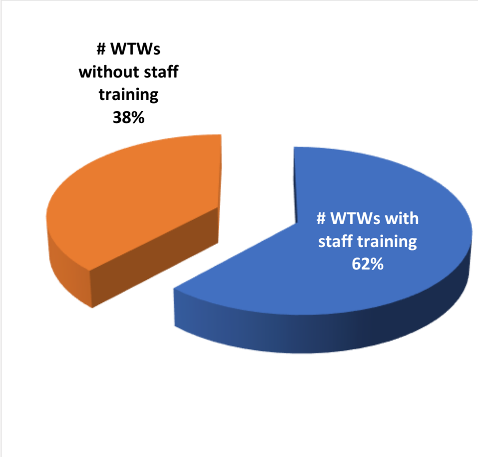


Figure 179 - %WTWs that have trained operational staff over the past two years

The results confirm that Overberg Water and 18 WSAs had their operational staff attend training over the past 2 years with the exception of operational staff from 5 WSAs. 78 of 126 WTWs (63%) had their operational staff attend training over the past 2 years. Investment in human capital through technical skills development is likely to mitigate some of the water quality failures and lower performances noted, and municipalities and water boards should prioritise ongoing skills development of technical staff and appointment of qualified staff that are legible for registration.

Diagnostic 2: Treatment Capacity and Flow Distribution

Aim: Diagnostic 2 deals with design and flow related dynamics, comprising of: i) design capacity and operational flow, ii) raw water abstraction, and iii) WUE and SIV.

(i) Design Capacity and Operational Flow

This diagnostic assesses the status of plant design capacity and daily water production at the WTWs, as well as SIVs as measured at the outflow from the WTW or inflow to the water distribution network. A capable WTW requires adequate installed design capacity and functional equipment to operate optimally. If the WTW design capacity is exceeded by the average daily production (treatment) volume, the WTW will not be able to deliver SANS compliant water quality. The available design capacity is typically exceeded when the water demand exceeds the installed design capacity, or when unit processes or equipment are dysfunctional, or when electrical supply problems render treatment and pumping of water defective. Typically, the production volume and SIV is the same if 1 WTW supplies 1 WSS, but different if multiple supply systems are feeding from a singular WTW.

Findings: Analysis of the design capacity and average daily production/ treatment volume indicate a total design capacity of 2,454,432 kl/d for the province, with a total average daily treatment (operational) volume of 1,162,422 kl/d. Theoretically, this implies that 47% of the design capacity is used with 53% available to meet additional water demand. However, the full 2,454,432 kl/d is not available as some infrastructure is dysfunctional, leaving 2,163,544 kl/d available. The reduced capacity means that the province is closer to its total available capacity (54%) with a 46% surplus available. The capacity differential (difference between the installed and available capacity) will not constrain or impede any further social and economic development in the drainage areas. The WSAs do report or have knowledge of their installed and available capacities, and a higher figure than 46% surplus available cannot be expected. For the province in general, 110 WTWs are operating within their available design capacities with the exception of 16 WTWs that exceeds their total available capacity (13%). This risk is currently mitigated through operational optimisation and preventative maintenance regimes.

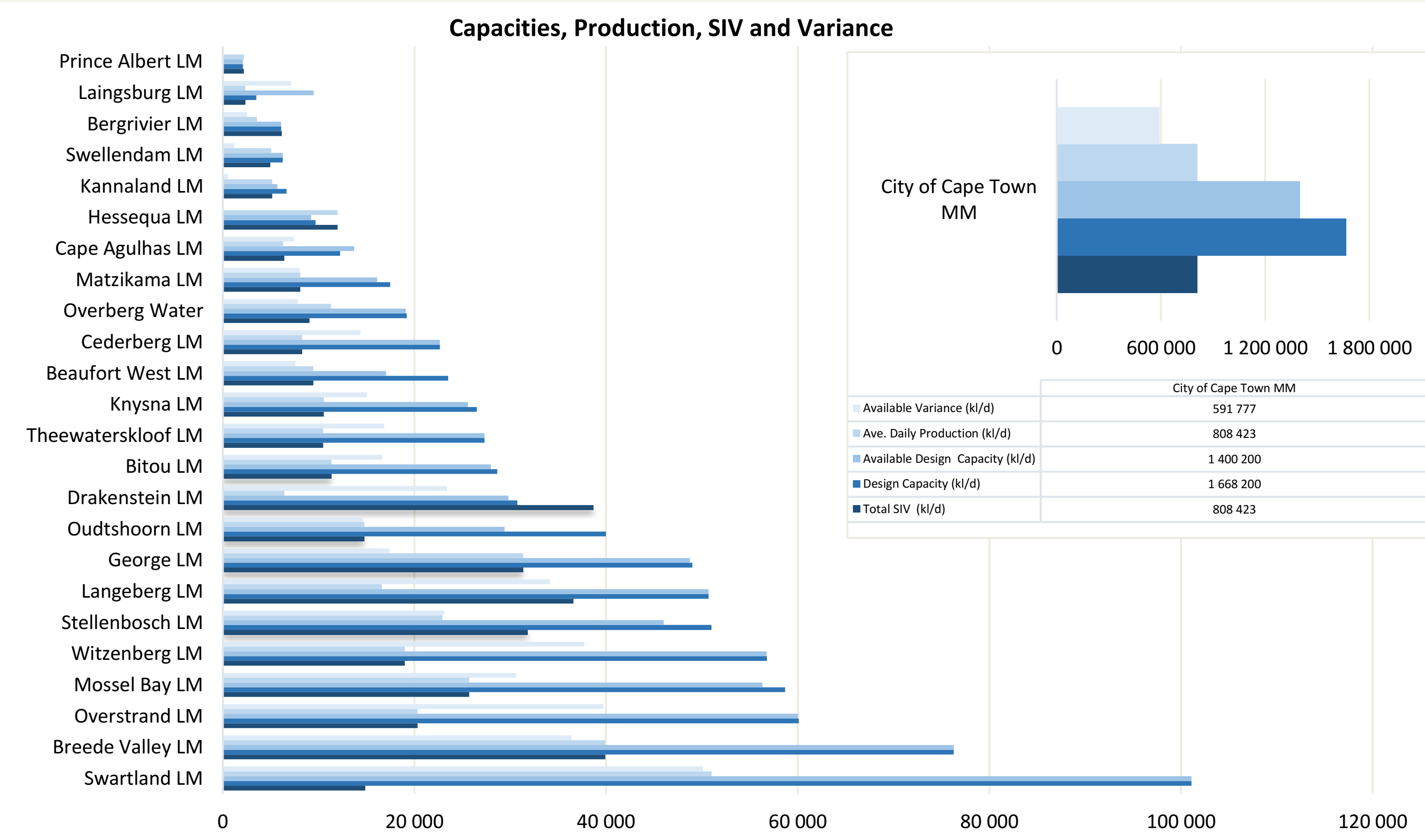
Table 237 - Summary of WTWs design and available capacities, average daily production, % available capacity, and total SIV towards the WSSs

WSA & WB Name	# WTWs	# WSSs	Design Capacity (kl/d)	Available Design Capacity (kl/d)	Average Daily Production (kl/d)	Available Variance* (kl/d)	% Use Available Capacity	Total SIV towards the WSS (kl/d)
Overberg Water	3	6	19,200	19,100	11,280	7,820	59%	9,029
Beaufort West LM	5	4	23,524	17,024	9,459	7,565	56%	9,459
Bergrivier LM	5	6	6,080	6,080	3,541	2,539	58%	6,152
Bitou LM	3	3	28,648	27,968	11,347	16,621	41%	11,347

WSA & WB Name	# WTWs	# WSSs	Design Capacity (kl/d)	Available Design Capacity (kl/d)	Average Daily Production (kl/d)	Available Variance* (kl/d)	% Use Available Capacity	Total SIV towards the WSS (kl/d)
Breede Valley LM	4	4	76,300	76,300	39,914	36,386	52%	39,914
Cape Agulhas LM	2	9	12,249	13,689	6,280	7,409	46%	6,429
Cederberg LM	6	6	22,650	22,650	8,292	14,359	37%	8,292
City of Cape Town MM	12	1	1,668,200	1,400,200	808,423	591,777	58%	808,423
Drakenstein LM	6	5	30,738	29,808	6,417	23,391	22%	38,702
George LM	5	4	49,000	48,720	31,332	17,388	64%	31,332
Hessequa LM	7	10	9,680	9,200	11,969	-2,769	130%	11,969
Kannaland LM	4	4	6,660	5,700	5,159	541	91%	5,159
Knysna LM	5	5	26,510	25,577	10,538	15,039	41%	10,538
Laingsburg LM**	None	2	3,500	9,469	2,366	7,103	25%	2,366
Langeberg LM	5	5	50,710	50,710	16,584	34,126	33%	36,584
Matzikama LM	8	8	17,451	16,097	8,081	8,016	50%	8,081
Mossel Bay LM	7	5	58,700	56,313	25,721	30,592	46%	25,721
Oudtshoorn LM	3	3	40,000	29,395	14,769	14,626	50%	14,769
Overstrand LM	9	8	60,105	60,053	20,328	39,725	34%	20,328
Prince Albert LM	3	3	2,100	2,100	2,179	-79	104%	2,179
Saldanha Bay LM	None	3						28,863
Stellenbosch LM	3	5	51,000	46,000	22,907	23,093	50%	31,840
Swartland LM	2	2	101,100	101,100	51,000	50,100	50%	14,860
Swellendam LM	4	4	6,250	6,250	5,057	1,193	81%	4,937
Theewaterskloof LM	10	10	27,300	27,300	10,471	16,829	38%	10,471
Witzenberg LM	5	5	56,777	56,741	19,008	37,733	33%	19,007
Totals	**126**	**124**	**2,454,432**	**2,163,544**	**1,162,422**	**1,001,122**	**54%**	**1,216,751**

* Difference between the available design capacity and the average daily production

** No conventional WTWs in Laingsburg LM. The WSI operates two basic water supply systems where groundwater is simply abstracted and disinfected



	City of Cape Town MM
Available Variance (kl/d)	591 777
Ave. Daily Production (kl/d)	808 423
Available Design Capacity (kl/d)	1 400 200
Design Capacity (kl/d)	1 668 200
Total SIV (kl/d)	808 423

	Swartland LM	Breede Valley LM	Overstrand LM	Mossel Bay LM	Witzenberg LM	Stellenbosch LM	Langeberg LM	George LM	Oudtshoorn LM	Drakenstein LM	Bitou LM	Theewaterskloof LM	Knysna LM	Beaufort West LM	Cederberg LM	Overberg Water	Matzikama LM	Cape Agulhas LM	Hessequa LM	Kannaland LM	Swellendam LM	Bergrivier LM	Laingsburg LM	Prince Albert LM
Available Variance (kl/d)	50 100	36 386	39 725	30 592	37 733	23 093	34 126	17 388	14 626	23 391	16 621	16829	15 039	7 565	14 359	7 820	8 016	7 409	-2 769	541	1 193	2 539	7 103	-79
Ave. Daily Production (kl/d)	51 000	39 914	20 328	25 721	19 008	22 907	16 584	31 332	14 769	6 417	11 347	10471	10 538	9 459	8 292	11 280	8 081	6 280	11 969	5 159	5 057	3 541	2 366	2 179
Available Design Capacity (kl/d)	101 100	76 300	60 053	56 313	56 741	46 000	50 710	48 720	29 395	29 808	27 968	27300	25 577	17 024	22 650	19 100	16 097	13 689	9 200	5 700	6 250	6 080	9 469	2 100
Design Capacity (kl/d)	101 100	76 300	60 105	58 700	56 777	51 000	50 710	49 000	40 000	30 738	28 648	27300	26 510	23 524	22 650	19 200	17 451	12 249	9 680	6 660	6 250	6 080	3 500	2 100
Total SIV (kl/d)	14 860	39 914	20 328	25 721	19 007	31 840	36 584	31 332	14 769	38 702	11 347	10 471	10 538	9 459	8 292	9 029	8 081	6 429	11 969	5 159	4 937	6 152	2 366	2 179

Figure 180 - Design and available capacity, average daily production, available variance and total SIV for the WTWs

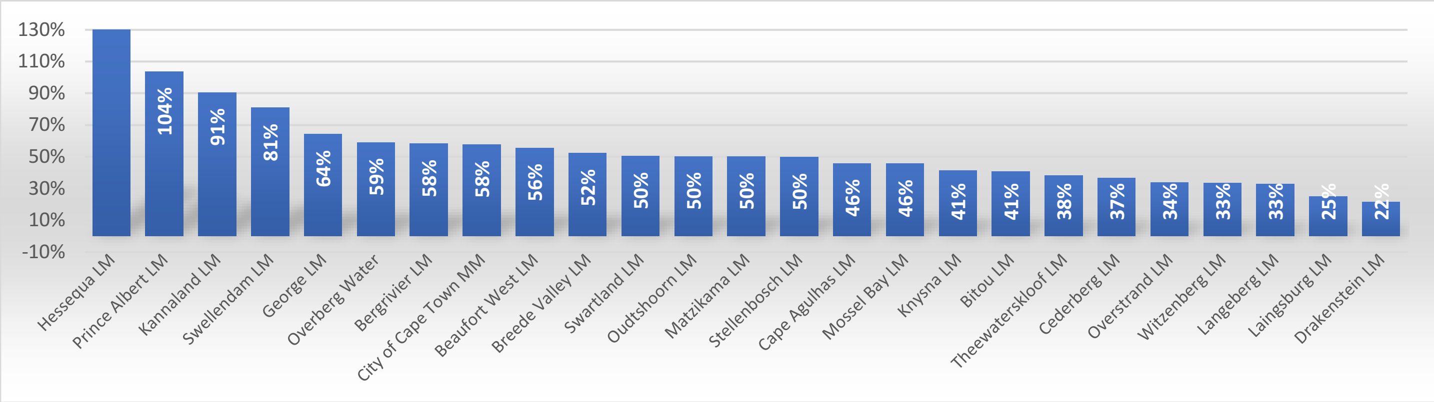


Figure 181 - % available capacity

(ii) Raw Water Abstraction

This diagnostic takes a snapshot view of the status of water abstraction authorisations from natural water resources across the province. As per the National Water Act (Act no 36 of 1998), Water Use Authorisation (WUA) mandate the maximum abstraction volumes of raw water, and the installation and monitoring of abstraction, inflow and outflow meters, whilst the BD audit requires WSAs to report the flows on IRIS and to calibrate meters annually. Any defects in terms of abstracting water from a resource without an authorisation, or exceeding the authorised volume, or reporting inaccurate volumes, or not monitoring abstraction against authorised volumes, are considered to be a regulatory risk and contravention of the law.

Findings: Data pertaining to the daily abstraction volumes (kl/d) (Authorised), average daily treatment volumes (kl/d), the names of the WTWs exceeding/with no Daily Abstraction Volumes (Authorised) and Average Daily Treatment Volumes (Authorised) is captured in the tables below.

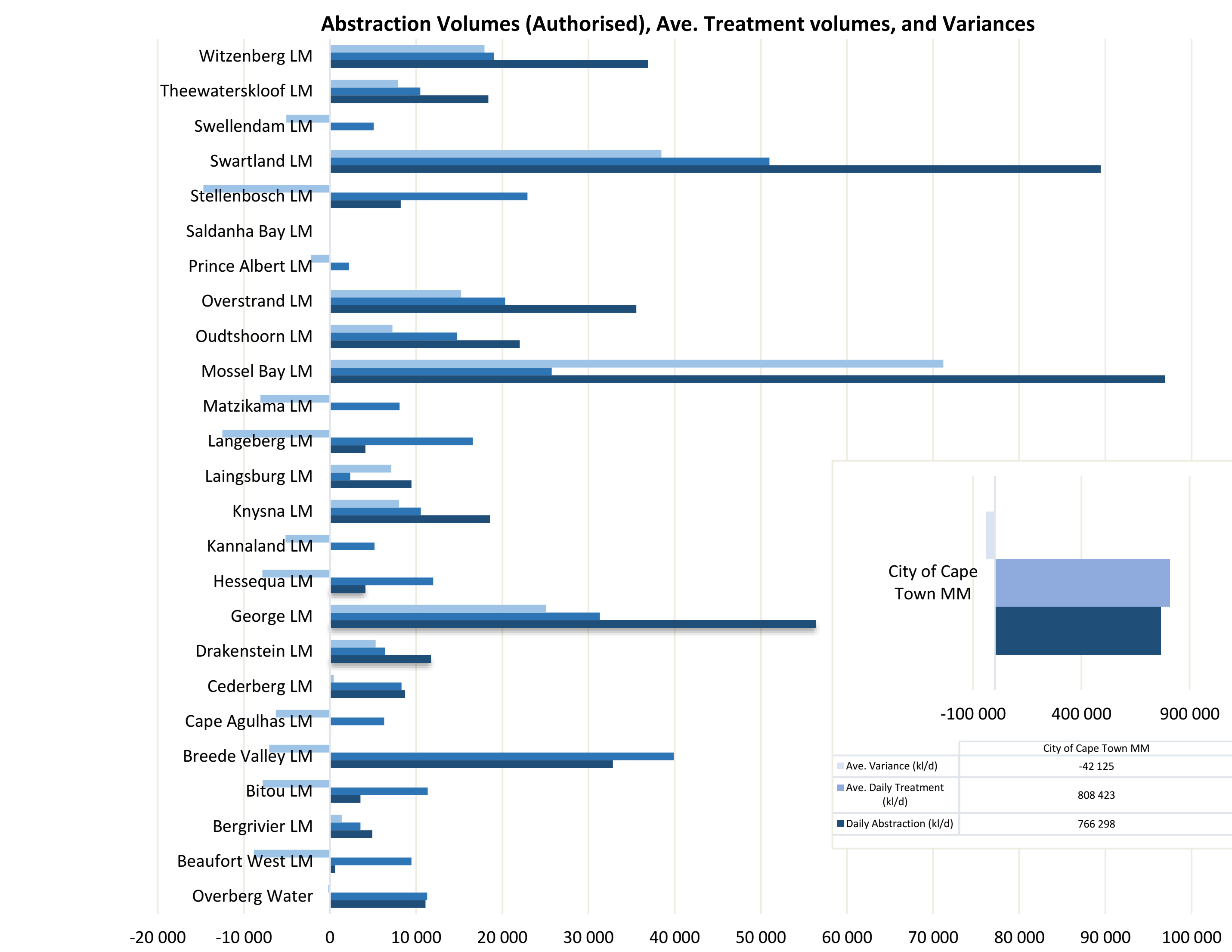
Table 238 - Summary of Abstraction Volumes (Authorised), Average Daily Treatment Volumes, Variances & WTWs listed For Enforcement Action

WSA & WB Name	# WTWs	# WSSs	Daily Abstraction Volumes (Authorised) (kl/d)	Average Daily Treatment Volume (kl/d)	Average Variance (kl/d) [+ or Minus]
Overberg Water	3	6	11,075	11,280	-205
Beaufort West LM	5	4	600	9,459	-8,859
Bergrivier LM	5	6	4,909	3,541	1,368
Bitou LM	3	3	3,531	11,347	-7,816
Breede Valley LM	4	4	32,847	39,914	-7,067
Cape Agulhas LM	2	9	0	6,280	-6,280
Cederberg LM	6	6	8,733	8,292	442
City of Cape Town MM	12	1	766,298	808,423	-42,125
Drakenstein LM	6	5	11,711	6,417	5,294
George LM	5	4	56,438	31,332	25,106
Hessequa LM	7	10	4,120	11,969	-7,849
Kannaland LM	4	4	0	5,159	-5,159
Knysna LM	5	5	18,558	10,538	8,020
Laingsburg LM*	None	2	9,469	2,366	7,103
Langeberg LM	5	5	4,110	16,584	-12,475
Matzikama LM	8	8	0	8,081	-8,081
Mossel Bay LM	7	5	96,919	25,721	71,198
Oudtshoorn LM	3	3	22,012	14,769	7,243
Overstrand LM	9	8	35,542	20,328	15,214
Prince Albert LM	3	3	0	2,179	-2,179
Saldanha Bay LM	None	3	0	NA	NA
Stellenbosch LM	3	5	8,200	22,907	-14,707
Swartland LM	2	2	89,451	51,000	38,451
Swellendam LM	4	4	0	5,057	-5,057
Theewaterskloof LM	10	10	18,380	10,471	7,909
Witzenberg LM	5	5	36,926	19,008	17,918
Totals	**126**	**124**	**1,239,829**	**1,162,422**	**77,407**

* No conventional WTWs in Laingsburg LM. The WSI operates two basic water supply systems where groundwater is simply abstracted and disinfected

WSA Name	WTW exceeding the Daily Abstraction Volumes (Authorised)	WTW with no Daily Abstraction Volumes (Authorised)
Beaufort West LM	Murraysburg	Beaufort West, Beaufort West WRP, Merweville, Nelspoort
Bergrivier LM	Redelinghuys	

WSA Name	WTW exceeding the Daily Abstraction Volumes (Authorised)	WTW with no Daily Abstraction Volumes (Authorised)
Bitou LM	Plettenberg Bay	Kurland, Natures Valley
Breede Valley LM	Bokrivier	De Doorns, Fairy Glen (De Koppen)
Cape Agulhas LM		Bredasdorp, Spanjaards Kloof
Cederberg LM		Leipoltdville
City of Cape Town MM		Blackheath, Steenbras
Drakenstein LM	Saron	
George LM		Haarlem, Uniondale, Wilderness
Hessequa LM		Garcia, Jongensfontein, Melkhoutfontein, Stilbay
Kannaland LM		All 4 WTWs
Knysna LM	Rheenendal	Buffalo Bay, Karatara
Langeberg LM		Bonnievale, McGregor, Montagu, Robertson
Matzikama LM		All 8 WTWs
Mossel Bay LM		Lodewykstenk, Ruiterbos
Oudtshoorn LM	De Rust, Dysselsdorp	
Prince Albert LM		All 3 WTWs
Stellenbosch LM	Paradyskloof	Franschhoek, Idas Valley
Swellendam LM		All 4 WTWs
Theewaterskloof LM	Ruensveld West	Bereaville, Genadendal, Riviersonderend, Tesslaarsdal, Voorstekraal
Witzenberg LM	Op-Die-Berg, Tulbagh	



	Overberg Water	Beaufort West LM	Bergrivier LM	Bitou LM	Breede Valley LM	Cape Agulhas LM	Cederberg LM	Drakenstein LM	George LM	Hessequa LM	Kannaland LM	Knysna LM
Ave. Variance (kl/d)	-205	-8 859	1 368	-7 816	-7 067	-6 280	442	5 294	25 106	-7 849	-5 159	8 020
Ave. Daily Treatment (kl/d)	11 280	9 459	3 541	11 347	39 914	6 280	8 292	6 417	31 332	11 969	5 159	10 538
Daily Abstraction (kl/d)	11 075	600	4 909	3 531	32 847	0	8 733	11 711	56 438	4 120	0	18 558

	Laingsburg LM	Langeberg LM	Matzikama LM	Mossel Bay LM	Oudtshoorn LM	Overstrand LM	Prince Albert LM	Saldanha Bay LM	Stellenbosch LM	Swartland LM	Swellendam LM	Theewaterskloof LM	Witzenberg LM
Ave. Variance (kl/d)	7 103	-12 475	-8 081	71 198	7 243	15 214	-2 179	0	-14 707	38 451	-5 057	7 909	17 918
Ave. Daily Treatment (kl/d)	2 366	16 584	8 081	25 721	14 769	20 328	2 179	0	22 907	51 000	5 057	10 471	19 008
Daily Abstraction (kl/d)	9 469	4 110	0	96 919	22 012	35 542	0	0	8 200	89 451	0	18 380	36 926

Figure 182 - Abstraction Volumes (Authorised), Average Daily Treatment Volumes, and Variances

WTWs that exceed the Daily Abstraction Volumes (Authorised) and WTWs with no Daily Abstraction Volumes (Authorised) are reflected in the 2nd table above. WTWs that are not complying with the regulations will be required to show correction in the next Blue Drop audit cycle. The results conclude that 12 WTWs are exceeding the permitted abstraction limits and 72 WTWs provided authorised water use abstraction volumes. The Daily Abstraction Volumes (Authorised) are not known for 54 water treatment systems resulting in negative average variances that skew the data sets.

For future BD audits, WSA/WSPs will be required to provide 'actual' abstraction volumes so that a comparative analysis can be undertaken of the 'actual' abstraction volume versus the authorised water use abstraction volumes (maximum). This would require that the WSAs and WSPs/WBs monitor and record all critical path flows (abstraction, raw and final).

(iii) Water Use Efficiency and System Input Value

The Department is committed to consider issues related to water scarcity and security, aiming to ensure there is sufficient water for the population, the economy, and the environment by increasing water use efficiency across all sectors. Water use for services sectors is specifically dealing with the quantity of water used directly by the consumer through the public distribution network and industries connected to the network.

This diagnostic assesses the water use efficiency (i.e., the average daily consumption in litres per person per day) and the individual and collective performance of the water supply systems. WUE indicates how effective water is used by consumers, i.e. the process between effective water use and actual water abstraction. This concept is closely related to the Department's No Drop Certification assessment, whereby WUE, NRW and water losses are targeted as part of Water Conservation and Water Demand Management strategies by municipalities.

Findings: Both the Blue Drop audit and No Drop audit requires an IWA water balance to determine the SIV into each water supply system, and to identify and quantify possible losses from abstraction to the end-of-use point. Overberg Water and 13 WSAs have full water balances in place for 68 WSSs in total. 10 WSAs have partial water balances in place for 42 WSSs, and 4 WSAs with a total of 14 WSSs do not have water balances in place.

WUE is calculated based on the SIV contributions, population served, and the average daily consumption, as summarised in the following table.

Table 239 - Summary of total SIV, total population served, average daily consumption, WUE status and performance trend

WSA & WB Name	# WSSs	Total Population	Total SIV (kl/d)	2023 WUE (l/p/d)	2023 Blue Drop WUE Range and Performance	
Beaufort West LM	4	53,984	9,459	175	>150-200	Good
Bergrivier LM	6	39,622	6,152	155	>150-200	Good
Bitou LM	3	65,495	11,347	173	>150-200	Good
Breede Valley LM	4	169,000	39,914	236	>200-250	Average
Cape Agulhas LM	9	28,770	8,919	310	>300	Extremely High
Cederberg LM	6	21,080	8,292	393	>300	Extremely High
City of Cape Town MM	1	4,420,472	655,463	148	<150	Excellent
Drakenstein LM	5	200,052	38,702	193	>150-200	Good
George LM	4	188,087	31,332	167	>150-200	Good
Hessequa LM	10	30,717	15,131	493	>300	Extremely High
Kannaland LM	4	14,400	5,159	358	>300	Extremely High
Knysna LM	5	73,700	10,538	143	<150	Excellent
Laingsburg LM	2	7,886	2,366	300	>250-300	Poor
Langeberg LM	5	70,565	36,584	518	>300	Extremely High
Matzikama LM	8	45,365	8,081	178	>150-200	Good
Mossel Bay LM	5	81,473	25,721	316	>300	Extremely High
Oudtshoorn LM	3	83,390	14,769	177	>150-200	Good
Overstrand LM	8	109,703	20,328	185	>150-200	Good
Prince Albert LM	3	12,000	2,179	182	>150-200	Good
Saldanha Bay LM	3	99,210	28,863	291	>250-300	Poor
Stellenbosch LM	5	126,795	31,840	251	>250-300	Poor
Swartland LM	2	81,349	14,860	183	>150-200	Good
Swellendam LM	4	25,384	4,937	194	>150-200	Good
Theewaterskloof LM	10	110,824	13,848	125	<150	Excellent
Witzenberg LM	5	81,769	19,008	232	>200-250	Average
Totals	**124**	**6,241,092**	**1,063,792**	**243**		

WUE (l/cap/day) performance categories

Colour	WUE Range	Performance
	>300	Extremely high per capita water use
	>250-300	Poor per capita water use
	>200-250	Average per capita water use with potential for marked improvement
	>150-200	Good per capita water use but some improvement may be possible subject to economic benefits
	<150	Excellent per capita water use management

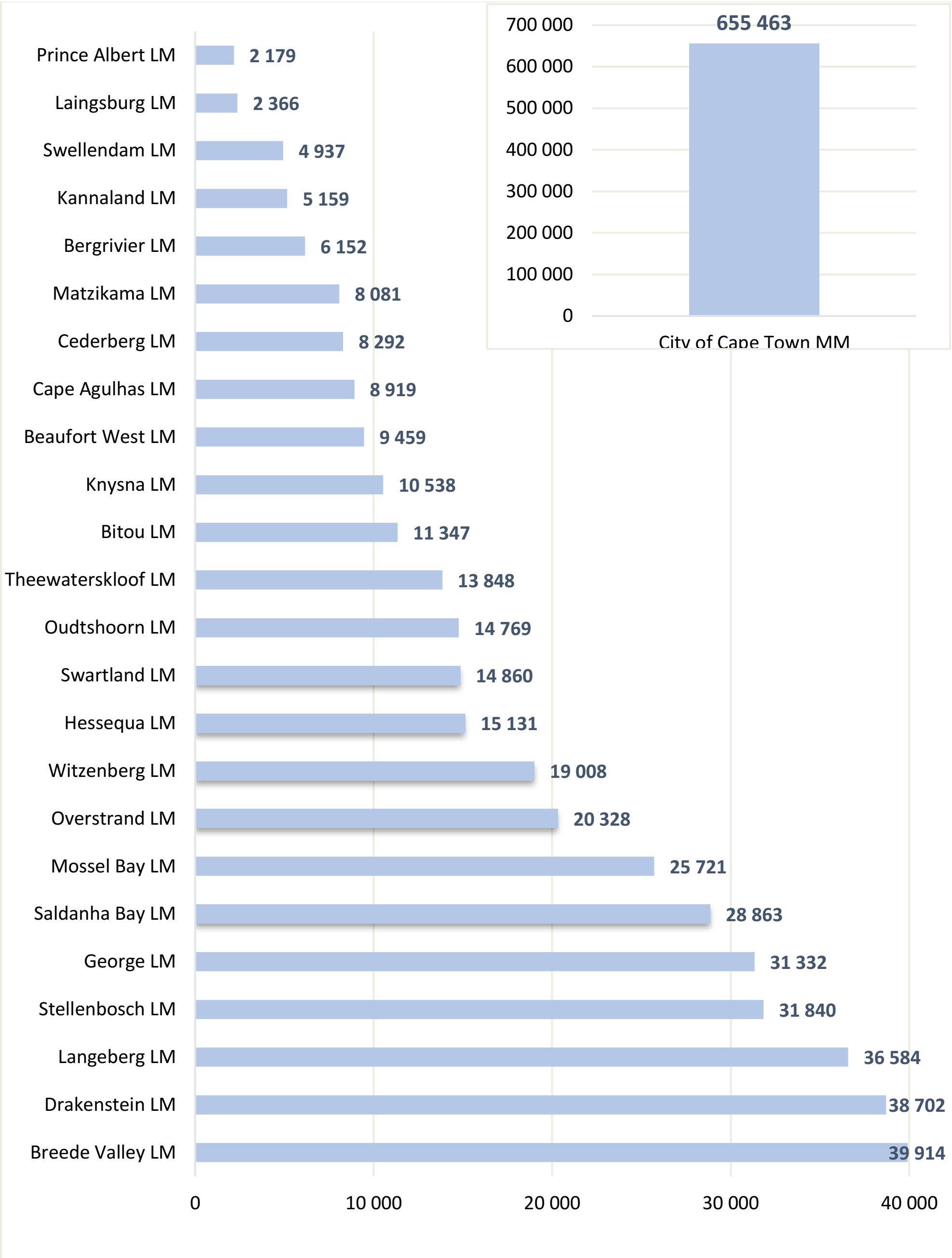


Figure 183 - Total SIV towards the WSSs

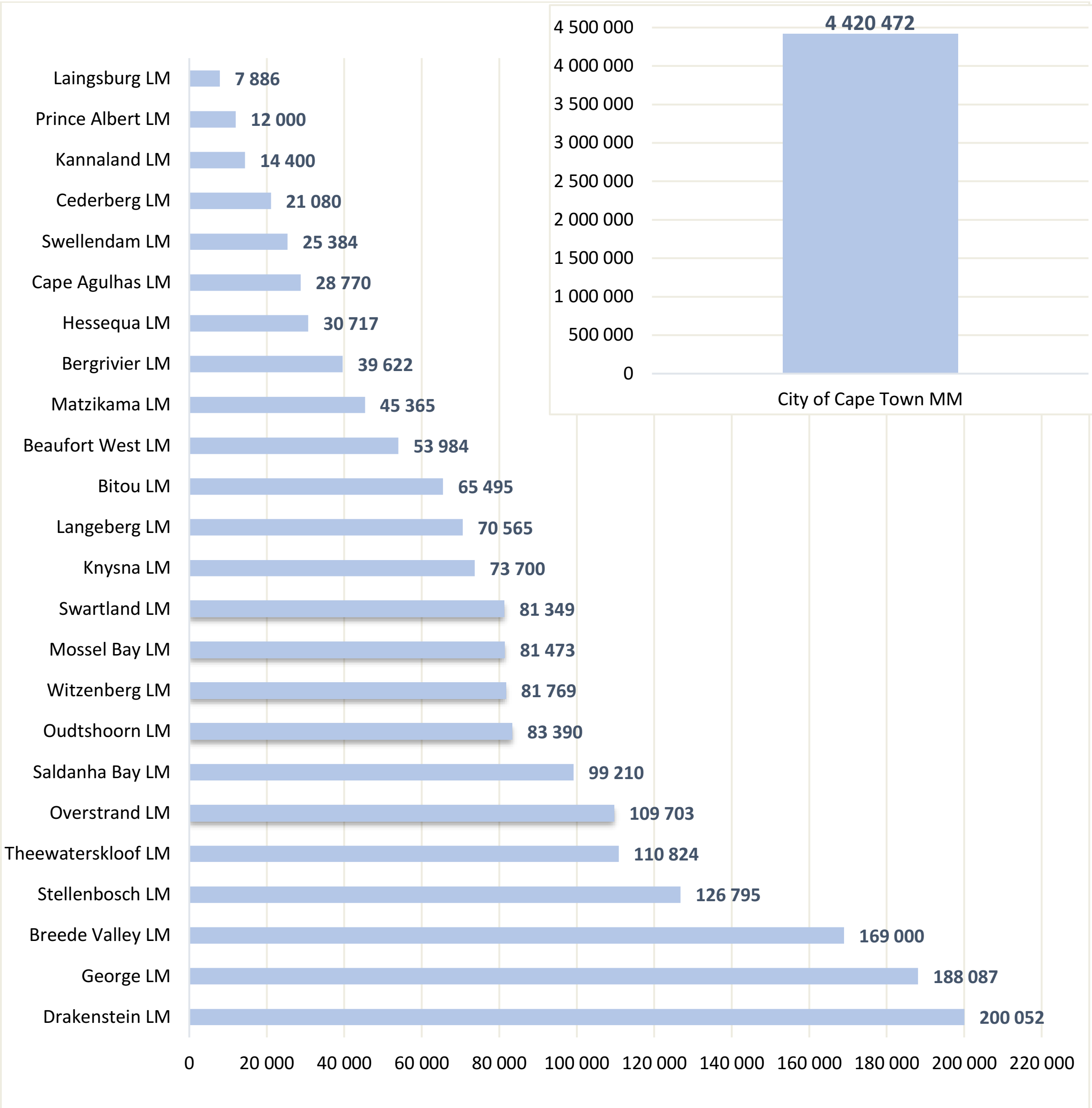


Figure 184 - Total Population served

For the province, 1,063,792 kl/d water is supplied to 6,241,092 consumers. Comparatively, the City of Cape Town MM distributes 62% of the total provincial SIV followed by Breede Valley LM (4%). An average 243 litre of water is used per person per day, which implies a high (average) per capita water use. Results from the diagnostic data show that 6 WSAs have a WUE of more than 300 l/c/d, which is regarded as extremely high according to national benchmarks, and 3 WSAs have a WUE between 250–300 l/c/d, which is regarded as poor. No Drop Certification is specifically tasked with plans to curb water losses and improve NRW through water accounting assessments and water conservation and demand management.

Diagnostic 3: Drinking Water Quality (DWQ) Monitoring and Compliance

Aim: Blue Drop audits values the principles of "To measure is to know" and "To know is to manage". The primary objective of a water treatment plant is to produce final water quality that is safe for human consumption at the end of the distribution network. This standard can only be measured and achieved if operational and compliance monitoring and DWQ compliance is executed at the correct frequency, sample point, and determinand type. This diagnostic assesses the i) operational and compliance monitoring status, ii) drinking water quality compliance, and iii) risk defined compliance and laboratory credibility.

(i) Drinking water operational and compliance monitoring

Findings: A minimum level of 90% operational monitoring compliance is applied as benchmark, to give weight to the importance of sampling and monitoring of the raw water, process unit water, and final water across the treatment stream. Compliance monitoring is also informed by SANS 241:2015 and the requirement for risk-informed monitoring through the WaSP process at both the WTW final and distribution network. DWQ compliance is calculated against the population size and the mandatory limits set by SANS 241:2015 and the Blue Drop standards, as calculated and reported from data loaded in the IRIS.

Table 240 - Summary of the KPA 2 WTW operational and WSS compliance monitoring status

WSA & WB Name	# WTWs	# WSSs	WTW Operational monitoring [KPA 2 sub-KPA 2.b)]		WSS Compliance monitoring [KPA 2 sub-KPA 2.c)]	
			Satisfactory [BD score >90%]	Not Satisfactory [BD score <90%]	Satisfactory [BD score >90%]	Not Satisfactory [BD score <90%]
Overberg Water	3	6	3		6	
Beaufort West LM	5	4		5		4
Bergrivier LM	5	6	1	4	6	
Bitou LM	3	3	2	1	3	
Breede Valley LM	4	4	1	3		4
Cape Agulhas LM	2	9	1	1	7	2
Cederberg LM	6	6		6		6
City of Cape Town MM	12	1	10	2	1	
Drakenstein LM	6	5	5	1	5	
George LM	5	4	3	2	4	
Hessequa LM	7	10		7		10
Kannaland LM	4	4		4		4
Knysna LM	5	5	3	2		5
Laingsburg LM	None	2				2
Langeberg LM	5	5	5			5
Matzikama LM	8	8	3	5		8
Mossel Bay LM	7	5	1	6	5	
Oudtshoorn LM	3	3	1	2		3
Overstrand LM	9	8	8	1	8	
Prince Albert LM	3	3		3		3
Saldanha Bay LM	None	3			1	2
Stellenbosch LM	3	5		3		5
Swartland LM	2	2	2		2	
Swellendam LM	4	4		4		4
Theewaterskloof LM	10	10	8	2		10
Witzenberg LM	5	5	5		5	
Totals	**126**	**124**	**62 (49%)**	**64 (51%)**	**47 (38%)**	**77 (62%)**

The performance recorded in the table above stems from performance data as measured against the BD Standard expressed in KPA 2 and sub-KPAs 2.b) and 2.c). Overall, an unsatisfactory sampling and analysis regime is observed for both operational (51%) and compliance (62%) monitoring. The data indicates that 62 of 126 WTWs (49%) are on par with good practice for operational monitoring of the raw and final water and the respective process units at the WTW. Overberg Water and 7 WSAs are doing well, whilst the remaining WSAs fail to meet the BD standard. In terms of compliance monitoring, 47 WSSs (38%) are on par with good compliance monitoring practices, and 77 WSSs (62%) are failing the BD standard. The latter observation is noted with concern. Compliance monitoring is a legal requirement and the only means to measure the DWQ performance of a water supply system. Operational monitoring is the cornerstone of day-to-day process adjustments and optimisation to ensure that the water treatment is efficient and delivers quality final water. The results indicate that 64 WTWs and 77 WSSs are not achieving regulatory and industry standards.

(ii) Drinking water quality compliance

Findings: DWQ compliance is measured against the requirements of SANS 241:2015 under KPA 5 of the Blue Drop audit. The tables following summarises the results of the DWQ status for Microbiological and Chemical Compliance, which also carries the highest Blue Drop score weighting of 35%.

Table 241 - Provincial Summary of the DWQ Status for Microbiological Compliance

WSA Name	# WSSs	Population	% Ave. Micro Compliance	# WSS Micro Performance Status		
				Excellent	Good	Unacceptable
Beaufort West LM	4	53,984	98.95%	3		1
Bergrivier LM	6	39,622	97.49%	5		1
Bitou LM	3	65,495	99.99%	3		
Breede Valley LM	4	169,000	97.49%	1	2	1
Cape Agulhas LM	9	28,770	97.40%	6	1	2
Cederberg LM	6	21,080	99.99%	6		
City of Cape Town MM	1	4,420,472	99.70%	1		
Drakenstein LM	5	200,052	97.00%	2	1	2
George LM	4	188,087	99.99%	4		

WSA Name	# WSSs	Population	% Ave. Micro Compliance	# WSS Micro Performance Status		
				Excellent	Good	Unacceptable
Hessequa LM	10	30,717	95.31%	6	1	3
Kannaland LM	4	14,400	78.65%			4
Knysna LM	5	73,700	99.68%	5		
Laingsburg LM	2	7,886	91.58%			2
Langeberg LM	5	70,565	97.02%	3		2
Matzikama LM	8	45,365	99.49%	7		1
Mossel Bay LM	5	81,473	99.94%	5		
Oudtshoorn LM	3	83,390	88.72%		1	2
Overstrand LM	8	109,703	99.04%	8		
Prince Albert LM	3	12,000	93.05%	1		2
Saldanha Bay LM	3	99,210	98.70%	3		
Stellenbosch LM	5	126,795	98.44%	5		
Swartland LM	2	81,349	99.38%	2		
Swellendam LM	4	25,384	97.07%	2	1	1
Theewaterskloof LM	10	110,824	98.29%	7		3
Witzenberg LM	5	81,769	99.99%	5		
Totals	**124**	**6,241,092**	**96.89%**	**90**	**7**	**27**

MICRO: Population <100,000		
Colour	Status	Percentage
	Excellent	≥97%
	Good	≥96 - <97%
	Unacceptable	<96%

MICRO: Population >100,000		
Colour	Status	Percentage
	Excellent	≥99%
	Good	≥98 - <99%
	Unacceptable	<98%

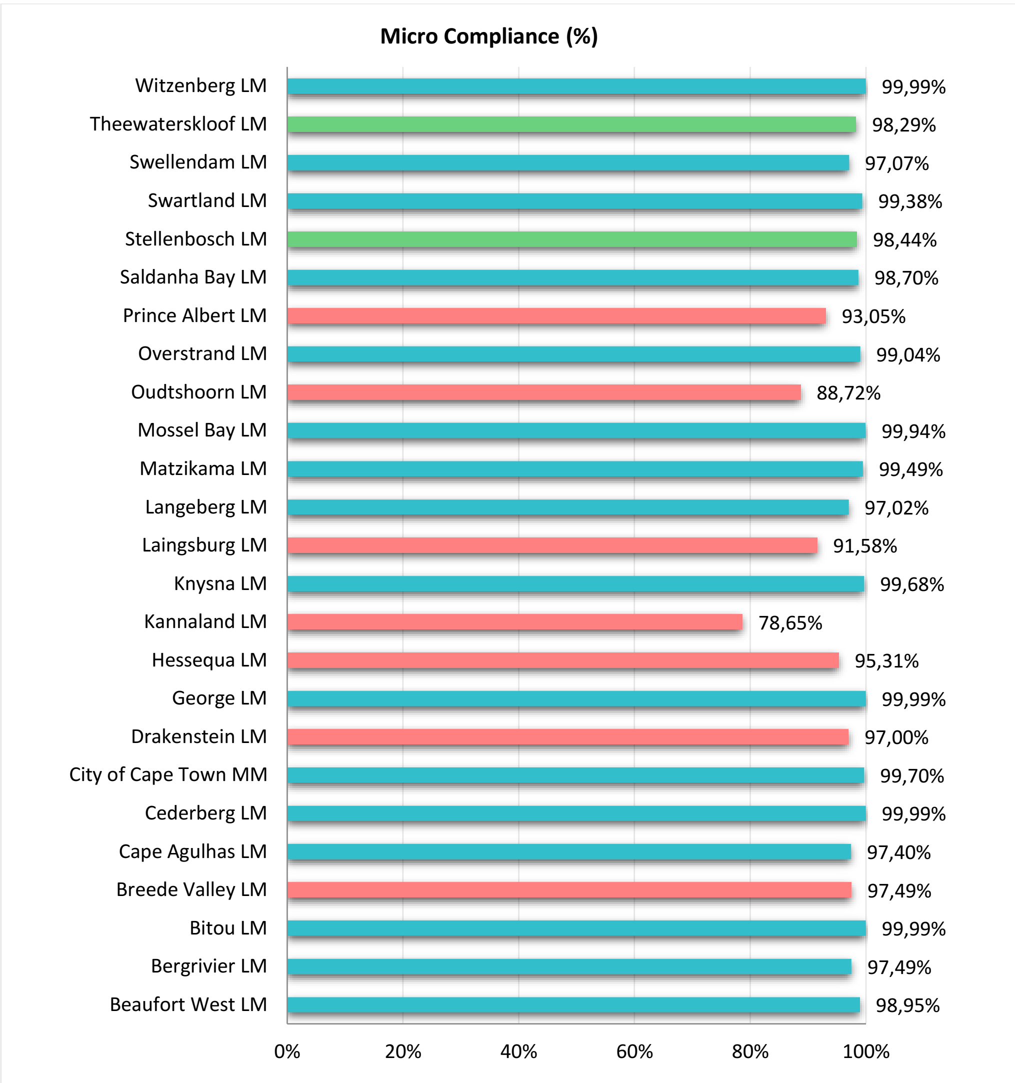


Figure 185 - Provincial Microbiological Drinking Water Quality Status

Out of the 124 WSSs, 97 (78%) systems achieved excellent and good microbiological quality, whilst 27 (22%) systems have an unacceptable microbiological water quality status. The water in these systems pose a serious acute health risk to the community. Failure to produce water that meets microbiological compliance standards can be linked back to poor operations, defective infrastructure, inadequate dosing rates, absence of disinfection chemicals, lack of monitoring, lack of operating and chemistry knowledge, and several other root causes. WSIs that are not monitoring the final water quality at the outlet of the treatment plant or at specific end use points are required to develop a monitoring programme and resume with compliance monitoring as a matter of urgency.

Table 242 - Provincial Summary of the DWQ Status for Chemical Acute Health and Chronic Health Compliance

WSA Name	# WSSs	Population	% Ave. Chem Acute Health Compliance	# WSS Chem Acute Health Performance Status			% Ave. Chem Chronic Health Compliance	# WSS Chem Chronic Health Performance Status		
				Excellent	Good	Unacceptable		Excellent	Good	Unacceptable
Beaufort West LM	4	53,984	25.0%	1		3	74.9%	3		1
Bergrivier LM	6	39,622	100.0%	6			98.5%	6		
Bitou LM	3	65,495	100.0%	3			99.8%	3		
Breede Valley LM	4	169,000	100.0%	4			100.0%	4		
Cape Agulhas LM	9	28,770	100.0%	9			99.3%	9		
Cederberg LM	6	21,080	0.0%			6	100.0%	6		
City of Cape Town MM	1	4,420,472	100.0%	1			99.9%	1		
Drakenstein LM	5	200,052	100.0%	5			100.0%	5		
George LM	4	188,087	100.0%	4			99.7%	4		
Hessequa LM	10	30,717	45.0%	3		7	99.7%	10		
Kannaland LM	4	14,400	0.0%			4	0.0%			4
Knysna LM	5	73,700	99.0%	4	1		99.0%	5		
Laingsburg LM	2	7,886	100.0%	2			99.5%	2		
Langeberg LM	5	70,565	100.0%	5			100.0%	5		
Matzikama LM	8	45,365	99.9%	8			100.0%	8		
Mossel Bay LM	5	81,473	100.0%	5			100.0%	5		
Oudtshoorn LM	3	83,390	100.0%	3			100.0%	3		
Overstrand LM	8	109,703	100.0%	8			98.7%	8		
Prince Albert LM	3	12,000	30.3%			3	97.7%	2	1	
Saldanha Bay LM	3	99,210	100.0%	3			99.3%	3		
Stellenbosch LM	5	126,795	100.0%	5			100.0%	5		
Swartland LM	2	81,349	100.0%	2			99.6%	2		
Swellendam LM	4	25,384	90.0%	3		1	99.3%	4		
Theewaterskloof LM	10	110,824	100.0%	10			99.3%	10		
Witzenberg LM	5	81,769	100.0%	5			99.7%	5		
Totals	**124**	**6,241,092**	**83.6%**	**99**	**1**	**24**	**94.6%**	**118**	**1**	**5**

CHEM Acute Health: Population <100,000			CHEM Acute Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	≥97%		Excellent	≥99%
	Good	≥95 - <97%		Good	≥97 - <99%
	Unacceptable	<95%		Unacceptable	<97%

CHEM Chronic Health: Population <100,000			CHEM Chronic Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	>95%		Excellent	>97%
	Good	>93 - <95%		Good	>95 - <97%
	Unacceptable	<93%		Unacceptable	<95%

Figure 186 - Provincial Chemical Acute Health and Chronic Health Drinking Water Quality Status

Chemical acute health compliance shows that 99 (80%) systems have excellent, and 1 (1%) system has good water quality, whilst 24 (19%) systems in 6 WSAs have an unacceptable chemical acute health compliance. Chemical chronic health compliance shows that 118 (96%) systems have excellent, and 1 (1%) system has good water quality, whilst 4 (3%) systems in 2 WSAs have an unacceptable chemical chronic health compliance.

The Water Services Act upholds standards regarding the monitoring and reporting on drinking water quality and issuance of advisory notices to the public when significant DWQ failures are observed. The audit process applies a penalty when DWQ failures are noticed without issuing such Water Quality Alert Notices to forewarn consumers of the status of (unsafe) water quality and to advise communities to source alternative water sources or methods to disinfect water used for drinking water purposes.

The following table reflects the compliance status of the WSAs as regards the issuing of these notices for DWQ failures.

Table 243 - Summary of Penalties Applied to WSSs for not Issuing Advisory Notices

WSA Name	# WSS	# WSS No Penalty Applied	# WSS Partial Penalty Applied	WSS Names Partial Penalty	# WSS Full Penalty Applied	WSS Names Full Penalty
Beaufort West LM	4	1	3	Merweville, Murraysburg, Nelspoort		
Bergrivier LM	6	5			1	Piketberg
Bitou LM	3	3				
Breede Valley LM	4	4				
Cape Agulhas LM	9	5	2	Klipdale, L` Agulhas	2	Protem, Spanjaardskloof
Cederberg LM	6	6				
City of Cape Town MM	1	1				
Drakenstein LM	5	2	3	Bainskloof, Saron, Drakenstein		
George LM	4	4				
Hessequa LM	10	8			2	Gouritsmond, Witsand
Kannaland LM	4		3	Calitzdorp, Ladismith, Zoar	1	Van Wyksdorp
Knysna LM	5	5				
Laingsburg LM	2		2	Laingsburg Main Reservoir, Matjiesfontein		
Langeberg LM	5	3	2	Ashton, Montagu		
Matzikama LM	8	8				
Mossel Bay LM	5	5				
Oudtshoorn LM	3	3				
Overstrand LM	8	8				
Prince Albert LM	3	1	2	Klaarstroom, Prince Albert		
Saldanha Bay LM	3	2	1	Langebaan		
Stellenbosch LM	5	4	1	Blackheath		
Swartland LM	2	2				
Swellendam LM	4	3	1	Buffelsjagrivier		
Theewaterskloof LM	10	8	1	Tesselaarsdal	1	Genadendal
Witzenberg LM	5	5				
Totals	**124**	**96**	**21**		**7**	

No penalties were applied to 96 (77%) WSSs in 22 WSAs. Partial penalties were applied to 21 (17%) WSSs in 11 WSAs, and Full penalties were applied to 7 (6%) WSSs in 4 WSAs.

(iii) Risk defined compliance and laboratory credibility

Findings: Risk-defined compliance standards aim to determine the compliance (to SANS 241) of those parameters that have been found to pose a risk in a specific WSS and need to be included in the routine monitoring programme or frequency as prescribed by SANS 241. The province achieved an average Annual Risk Defined Compliance of 91.6%, with the best performances coming from Bitou LM, Overstrand LM and City of Cape Town MM, and the worst performances coming from Kannaland LM and Prince Albert LM. Excellent risk defined compliance was achieved by 54 (44%) systems, good compliance for 18 (14%) systems and bad compliance for 52 (42%) systems with most of these systems (>3 no.) residing in 9 of the WSAs.

Table 244 - Summary of the DWQ Compliance for Risk Defined Compliance

WSA Name	# WSSs	Population	Ave. %Risk Defined Compliance	# WSS Performance Status		
				Excellent	Good	Bad
Beaufort West LM	4	53,984	86.43%		2	2
Bergrivier LM	6	39,622	93.96%	2	2	2
Bitou LM	3	65,495	99.88%	3		
Breede Valley LM	4	169,000	95.50%	2	1	1
Cape Agulhas LM	9	28,770	92.55%	5		4
Cederberg LM	6	21,080	88.19%	3		3
City of Cape Town MM	1	4,420,472	97.41%	1		
Drakenstein LM	5	200,052	95.79%	3	2	
George LM	4	188,087	96.94%	3		1
Hessequa LM	10	30,717	92.71%	4	1	5
Kannaland LM	4	14,400	78.65%	1		3
Knysna LM	5	73,700	89.76%	1	1	3
Laingsburg LM	2	7,886	94.90%	1	1	
Langeberg LM	5	70,565	93.58%	2	2	1
Matzikama LM	8	45,365	84.95%	2		6
Mossel Bay LM	5	81,473	92.26%	1	3	1
Oudtshoorn LM	3	83,390	81.64%		1	2
Overstrand LM	8	109,703	98.79%	8		
Prince Albert LM	3	12,000	80.23%			3
Saldanha Bay LM	3	99,210	95.84%	3		
Stellenbosch LM	5	126,795	95.35%	3		2
Swartland LM	2	81,349	95.37%	1	1	
Swellendam LM	4	25,384	95.21%	3		1
Theewaterskloof LM	10	110,824	87.82%	2	1	7
Witzenberg LM	5	81,769	85.35%			5
Totals	**124**	**6,241,092**	**91.56%**	**54**	**18**	**52**

The aim of operational determinand compliance is to determine the efficiency of the water treatment process, by monitoring those parameters which are used to control the treatment process. Although not necessarily a health risk, these parameters provide good information on the integrity of the WTW. The province achieved an average % Actual Operational Determinand Compliance of 51%, the best performances coming from Overberg Water, George LM, Swartland LM and Overstarnd LM and the worst performances coming from Beaufort West LM, Cederberg LM, Hessequa LM, Kannaland LM, Prince Albert LM and Stellenbosch LM. Excellent risk defined compliance was achieved by 44 (35%) systems, good compliance for 23 (18%) systems and bad compliance for 59 (47%) systems with most of these systems (>3 no.) residing in 11 WSAs.

Table 245 - Summary of the Treatment (Operational) Efficiency Index

WSA & WB Name	# WTWs	Population	Ave. % Actual Operational Determinand Compliance	# WTW Performance Status		
				Excellent	Good	Bad
Overberg Water	3	28,700	97%	3		
Beaufort West LM	5	53,984	0%			5
Bergrivier LM	5	39,622	36%	1		4
Bitou LM	3	65,495	63%	1	1	1
Breede Valley LM	4	169,000	30%		1	3
Cape Agulhas LM	2	27,770	50%	1		1
Cederberg LM	6	21,080	0%			6
City of Cape Town MM	12	4,420,472	89%	10		2

WSA & WB Name	# WTWs	Population	Ave. % Actual Operational Determinand Compliance	# WTW Performance Status		
				Excellent	Good	Bad
Drakenstein LM	6	200,052	92%	2	3	1
George LM	5	188,087	97%	4	1	
Hessequa LM	7	21,041	0%			7
Kannaland LM	4	14,400	0%			4
Knysna LM	5	73,700	88%	2	2	1
Laingsburg LM	None	7,886				
Langeberg LM	5	70,565	90%		5	
Matzikama LM	8	45,365	42%		3	5
Mossel Bay LM	7	81,473	83%	4	2	1
Oudtshoorn LM	3	83,390	33%	1		2
Overstrand LM	9	109,703	97%	8	1	
Prince Albert LM	3	12,000	0%			3
Saldanha Bay LM	None	99,210				
Stellenbosch LM	3	126,795	0%			3
Swartland LM	2	81,349	98%	2		
Swellendam LM	4	25,384	16%			4
Theewaterskloof LM	10	92,800	86%	3	1	6
Witzenberg LM	5	81,769	94%	2	3	
Totals	**126**	**6,241,092**	**51%**	**44**	**23**	**59**

The data confirms that 24 of 25 WSAs in the province have access to credible laboratories for compliance and operational analysis. These in-house or contracted laboratories are accredited with SANAS or have Proficiency Testing Schemes with SABS or have inter-laboratory quality checks in place to ensure that suitable analytical methods are applied and that quality assurance processes are followed to ensure credible water quality results. The province is meeting the regulatory expectation for the WSIs having access to credible analytical services for compliance and operational monitoring.

Diagnostic 4: Technical Site Assessments

Aim: The BD process makes provision for a Technical Site Assessment (TSA) in order to verify the desktop evidence through field-based inspections. This assessment includes a physical inspection of the entire water treatment plant with all its process units, as well as the reservoir and spot checks of a pumpstation and pipelines. The technical assessment is coupled with an asset condition check to determine an approximate cost (VROOM) to restore existing infrastructure to functional status for the treatment facility (only).

Findings: The results of the province's TSAs are summarised in the table below. A deviation of 10% between the BD and TSA score indicate a misalignment between the administrative aspects and the work on the ground. The Regulator regards a WTW with a TSA score of >80% to have an acceptable level of process control and functional equipment, and a TSA score of 90% as an excellent system that complies with most of the Blue Drop TSA standards. A TSA score of <30% indicates that the treatment facility and network fails in most regards, and is evident of dysfunctional infrastructure, failed process control, absence of record keeping and monitoring, and poor water quality.

The VROOM cost presents a ''Very Rough Order of Measurement" cost to return a WTWs functionality to its original design. More detail can be found in the Blue Drop Watch Report 2023.

Table 246 - %TSA and %BD score, and VROOM cost estimates total and split for civil, mechanical, and electrical

WSA & WB Name	TSA Name	%TSA	2023 BD Score (%)	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Overberg Water	Ruensveld - West	82%	**82.8% ave**	1,596,000	2,736,000	228,000	4,560,000
Overberg Water	Duivenhoks	82%	**82.8% ave**	840,000	1,440,000	120,000	2,400,000
Beaufort West LM	Beaufort West	70%	**53.0%**	1,362,000	1,589,000	1,589,000	4,540,000
Bergrivier LM	Piketberg	88%	**85.1%**	757,240	1,135,860	0	1,893,100
Bitou LM	Plettenberg Bay	80%	**81.7%**	1,417,500	2,835,000	1,417,500	5,670,000
Breede Valley LM	Fairy Glen (De Koppen)	90%	**60.0%**	140,690	1,125,520	140,690	1,406,900
Cape Agulhas LM	Bredasdorp	91%	**90.0%**	720,000	720,000	0	1,440,000
Cederberg LM	Citrusdal	51%	**35.9%**	4,199,800	10,499,500	6,299,700	20,999,000
City of Cape Town MM	Faure	98%	**98.1%**	1,200,000	300,000	0	1,500,000
City of Cape Town MM	Steenbras	95%	**98.1%**	459,360	114,840	0	574,200
Drakenstein LM	Welvanpas	96%	**94.1%**	8,000	64,000	8,000	80,000
George LM	George Municipal New	84%	**94.95%**	920,000	2,300,000	1,380,000	4,600,000
Hessequa LM	Riversdale	77%	**50.1%**	78,800	591,000	118,200	788,000

WSA & WB Name	TSA Name	%TSA	2023 BD Score (%)	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Kannaland LM	Ladismith	72%	**25.8%**	720,000	400,000	480,000	1,600,000
Knysna LM	Knysna	79%	**78.9%**	3,393,000	2,968,875	2,120,625	8,482,500
Laingsburg LM	Laingsburg Main Reservoir	74%	**47.8%**	1,391,280	463,760	463,760	2,318,800
Langeberg LM	Ashton	70%	**44.7%**	1,715,040	1,715,040	857,520	4,287,600
Matzikama LM	Vredendal	50%	**55.2%**	6,023,159	3,011,579	1,003,860	10,038,598
Mossel Bay LM	Kleinbrak	80%	**87.4%**	5,355,000	8,415,000	1,530,000	15,300,000
Oudtshoorn LM	Dysselsdorp	73%	**63.9%**	1,421,820	1,895,760	1,421,820	4,739,400
Overstrand LM	Buffelsriver	94%	**99.99%**	202,627	109,107	0	311,735
Overstrand LM	Preekstoel	94%	**99.99%**	1,399,971	753,831	0	2,153,802
Prince Albert LM	Prince Albert	50%	**28.2%**	1,828,200	761,750	457,050	3,047,000
Stellenbosch LM	Blackheath	96%	**69.9%**	1,204,000	301,000	0	1,505,000
Stellenbosch LM	Paradyskloof	71%	**69.9%**	140,580	1,124,640	140,580	1,405,800
Stellenbosch LM	Wemmershoek	96%	**69.9%**	1,725,000	1,150,000	0	2,875,000
Swartland LM	Swartland	92%	**93.8%**	960,300	2,240,700	0	3,201,000
Swartland LM	Withoogte	95%	**93.8%**	432,000	1,728,000	0	2,160,000
Swellendam LM	Swellendam	68%	**58.6%**	2,375,727	1,096,489	182,748	3,654,964
Theewaterskloof LM	Grabouw	82%	**89.6%**	2,340,000	5,460,000	0	7,800,000
Witzenberg LM	Ceres	80%	**81.0%**	1,146,600	617,400	0	1,764,000
			Totals	**R47,473,694**	**R59,663,651**	**R19,959,053**	**R127,096,399**
			% Split of Cost Items	**37%**	**47%**	**16%**	**100%**

A deviation of >10% between the BD and TSA score is noted for Beaufort West LM (17%), Breede Valley LM (30%), Cederberg LM (15%), Hessequa LM (27%), Kannaland LM (46%), Laingsburg LM (26%), Langeberg LM (25%), Prince Albert LM (22%) and Stellenbosch LM (26%). A deviation of >20% between the BD and TSA score is noted for the 7 WSAs mentioned above.

For the individual WTWs assessed in the province, a total budget of R127.1m is estimated, with the bulk of the work (84%) going towards restoration of mechanical equipment (47%) and civil infrastructure (37%).

Diagnostic 5: Operation, Maintenance and Refurbishment of Assets

Aim: Insufficient financial resources are often cited as a root cause to dysfunctional or non-compliant water treatment works and water networks. Knowledge and monitoring of fiscal spending are therefore a critical part of water services management and municipal governance of public assets. This diagnostic investigates the status of financial information as pertaining to O&M budgets and expenditure, asset figures, and capital funding.

Findings: A substantial amount of financial information was presented during the audit process. Unfortunately, the evidence was presented in different formats, levels of detail, or absent for some WSAs. It was observed that WSA teams with financial officials that were present during the audits performed better and had a better understanding of the water services challenges experienced by their technical peers.

Discrepancies observed included amongst others - generic or non-ringfenced budgets, contract lump sums for service providers presented as budgets, outdated or incomplete asset registers, and some cost drivers which were lacking. As data credibility presents a significant challenge, the Regulator grouped data into different certainty levels, as summarised at the end of this Diagnostic.

The result of each financial portfolio is discussed hereunder.

NOTE: The Regulator regards the financial and asset information with low confidence. Not all WSAs submitted verifiable information or complete financial data sets for the audit year in question.

Capital, O&M Budget and Actual, and Asset Value

The capital budgets, O&M budgets, O&M actual expenditure, and current asset values are summarised below.

Table 247 - Summary of the capital budgets, O&M budgets, O&M actual expenditure, and current asset values

WSA & WB Name	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
Overberg Water	NI	R82,561,000	R80,565,083	98%	R86,914,942
Beaufort West LM	NI	R30,792,117	R25,802,644	84%	R329,664,000
Bergrivier LM	R42,200,000	R24,480,000	R22,950,000	94%	R67,453,082

WSA & WB Name	Capital budget available (R)	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value (R)
Bitou LM	R16,985,000	R30,887,902	R38,182,274	124%	R211,856,000
Breede Valley LM	R131,754,669	R112,627,382	R119,417,372	106%	NI
Cape Agulhas LM	R5,652,000	R25,682,590	R24,808,706	97%	R323,496,000
Cederberg LM	R19,143,000	R837,553,060	R759,826,473	91%	NI
City of Cape Town MM	R577,600,000	R1,404,217,099	R1,391,487,740	99%	R12,392,355,000
Drakenstein LM	R16,680,000	R189,597,850	R181,596,988	96%	R1,008,761,913
George LM	R79,375,000	R206,730,363	R199,543,369	97%	R378,192,335
Hessequa LM	R6,000,000	R13,932,246	NI	NI	NI
Kannaland LM	R14,439,990	NI	NI	NI	R30,169,661
Knysna LM	R15,770,000	R55,521,615	R54,485,125	98%	R346,167,000
Laingsburg LM	R4,500,000	R3,697,321	R3,556,787	96%	R13,081,000
Langeberg LM	R36,947,104	NI	NI	NI	NI
Matzikama LM	R36,518,510	R13,869,206	R14,548,946	105%	NI
Mossel Bay LM	R1,411,616	R67,813,440	R53,306,627	79%	R308,669,705
Oudtshoorn LM	R49,500,000	R38,672,200	R41,730,440	108%	R237,671,000
Overstrand LM	R37,330,000	R100,735,388	R99,979,166	99%	R502,705,000
Prince Albert LM	R6,552,000	R2,298,400	R2,101,532	91%	R53,781,000
Saldanha Bay LM	R52,200,000	R131,937,720	R129,210,346	98%	R468,670,686
Stellenbosch LM	R13,544,622	R119,809,227	R129,534,051	108%	NI
Swartland LM	R5,300,000	R206,978,785	R191,048,512	92%	R872,940,278
Swellendam LM	R43,354,787	R24,141,512	R24,656,352	102%	NI
Theewaterskloof LM	R29,800,000	R32,484,895	R32,172,482	99%	R130,767,234
Witzenberg LM	R21,135,257	R37,522,794	R39,382,760	105%	NI
Totals	**R1,258,393,555**	**R3,794,544,112**	**R3,659,893,775**	**96.5%**	**R17,763,315,836**

The Regulatory Comments following in this Chapter list the capital projects with secured funding for each municipality and/or its bulk water provider (WSP). The capital lists are deemed to be a definitive means to address water service inadequacies and ensuring water infrastructure investment. A total capital budget of R1.26b has been reported for the refurbishment and upgrades of water supply system infrastructure for most of the WSAs. The largest capital budgets are observed for City of Cape Town MM (R577.6m), Breede Valley LM (R131.7m), and George LM (R79.4m).

For the 2021/22 fiscal year, the total O&M budget reported for the province was R3.794m, of which R3.66m (96.5%) has been expended. Over-expenditure of 124% by Bitou LM and under expenditure by Mossel Bay LM (79%) was observed. The provincial figures exclude Kannaland LM, Langeberg LM and Hessequa LM who had no and partial financial information.

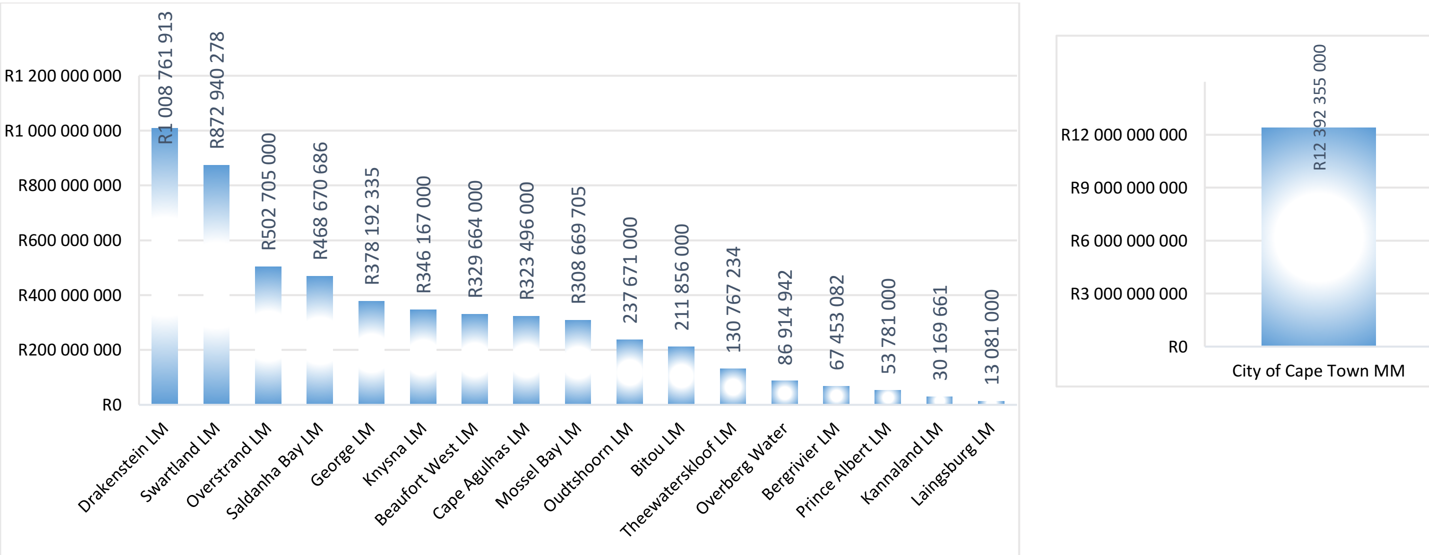


Figure 187 - Total current asset value reported

The total current asset value for water infrastructure (networks, pump stations, treatment plants) is reportedly R17.76b (excluding 8 WSAs with no information). The highest asset values are observed for City of Cape Town MM (R12.4b), followed by Drakenstein LM (R1.01b), Swartland LM (R873m), Overstrand LM (R503m), and Saldanha Bay LM (R469m).

O&M Cost Benchmarking

By combining the SALGA and WRC WATCOST models, an estimation of the maintenance cost required per asset type can be done, i.e. civil, buildings, pipelines, mechanical, electrical, and instrumentation.

Table 248 - SALGA-WRC annual maintenance budget guideline and cost estimation

Description	% of Current Asset Value	Asset Value Estimate	Modified SALGA Maintenance Guideline	Annual Maintenance Budget Guideline
Current Asset Value estimate	**100%**	**R17,763,315,836**	**15.75%**	**R383,687,622**
Broken down into:				
1. Civil Structures	46%	R8,171,125,285	0.50%	R40,855,626
2. Buildings	3%	R532,899,475	1.50%	R7,993,492
3. Pipelines	6%	R1,065,798,950	0.75%	R7,993,492
4. Mechanical Equipment	30%	R5,328,994,751	4.00%	R213,159,790
5. Electrical Equipment	11%	R1,953,964,742	4.00%	R78,158,590
6. Instrumentation	4%	R710,532,633	5.00%	R35,526,632
Totals	**100%**	**R17,763,315,836**	**15.75%**	**R383,687,622**
			Minus 20% P&Gs and 10% Installation	**R115,106,287**
			Total	**R268,581,335**

The model estimates that R383.7m (2.16%) is required per year to maintain the assets valued at R17.76b. Notably, this maintenance estimate assumes that all assets are functional. In cases where Blue Drop Certification is not being achieved, it can be assumed that some form of inefficiency or constraint is being experienced, and national benchmarks closer to 7% of the asset value is advocated (R1.243b).

The table below indicates the SALGA maintenance cost estimation in relation to the O&M budget, and O&M actual expended.

Table 249 - O&M cost estimates by the SALGA versus actual budget and expenditure figures

Cost Reference	O&M Cost Estimate	Period	% of Asset Value
Modified SALGA	R383,687,622	Annually, estimation	2.16%
O&M Budget	R3,794,544,112	Actual for 2021/22	21.3%
O&M Spend	R3,659,893,775	Actual for 2021/22	20.6%

In addition, the table below indicates the Blue Drop audit findings on the water supply operations cost determination and water supply O&M budget status.

Table 250 - BD Audit Water Supply Operations Cost Determination and Water Supply O&M Budget status

WSA & WB Name	Water Supply Operations Cost Determination	Water Supply O&M Budget status
Overberg Water	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Beaufort West LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Bergrivier LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Bitou LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Breede Valley LM	DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Cape Agulhas LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Cederberg LM	NO PROOF (0% SCORE)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
City of Cape Town	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
Drakenstein LM	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
George LM	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
Hessequa LM	DETERMINED FOR PART OF SYSTEM; NOT SYSTEM SPECIFIC (GLOBAL); NO PROOF (0% SCORE)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Kannaland LM	NOT SYSTEM SPECIFIC (GLOBAL)	NO PROOF
Knysna LM	DETERMINED OF THE WHOLE SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Laingsburg LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Langeberg LM	DETERMINED FOR PART OF SYSTEM	NO PROOF
Matzikama LM	DETERMINED FOR PART OF SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Mossel Bay LM	DETERMINED FOR PART OF SYSTEM	SYSTEM SPECIFIC BUDGET
Oudtshoorn LM	NOT SYSTEM SPECIFIC (GLOBAL); DETERMINED FOR PART OF SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Overstrand LM	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
Prince Albert LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Saldanha Bay LM	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
Stellenbosch LM	DETERMINED OF THE WHOLE SYSTEM; NO PROOF (0% SCORE)	SYSTEM SPECIFIC BUDGET: WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY

WSA & WB Name	Water Supply Operations Cost Determination	Water Supply O&M Budget status
Swartland LM	NOT SYSTEM SPECIFIC (GLOBAL)	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY
Swellendam LM	NO PROOF (0% SCORE)	SYSTEM SPECIFIC BUDGET
Theewaterskloof LM	DETERMINED OF THE WHOLE SYSTEM	SYSTEM SPECIFIC BUDGET
Witzenberg LM	DETERMINED FOR PART OF SYSTEM	WSI GLOBAL BUDGET FOR ALL SYSTEMS - BUT IS RINGFENCE FOR WATER ONLY

From the tables above, the cost dynamics can be summarised as follows:

- The SALGA estimations for maintenance budgets is about 10% (Modified SALGA divided by O&M Budget) of the actual reported budgets for the 2021/22 fiscal year
- The actual O&M budget (21.3%) appears to be more than adequate when compared with the SALGA guideline (2.16%) or with the government benchmark (7%)
- These figures may be impacted by the 3 WSAs who did not provide budget and expenditure figures, and by the 8 WSAs where no asset values were provided for
- Lastly, the municipalities presents budget and expenditure data at different levels (table above) i.e. financial figures are not always ringfenced per water supply system – thus rendering provincial summaries to be indicative).

13.1 West Coast DM Bulk

Introduction

The West Coast District Municipality consists of the Matzikama, Cederberg, Bergrivier, Saldanha Bay and Swartland Local Municipalities and this entity operates two treatment plants to provide water to the following 4 municipalities:

1. Bergrivier Local Municipality
2. Saldanha Bay Local Municipality
3. Swartland Local Municipality
4. Drakenstein Local Municipality

The WCDM operates the 29.1 Ml/d Swartland Treatment Plant at around 15 Ml/d and produces potable water from the Voëlvlei Dam. The bulk of this final water is distributed to the Swartland LM through a network of 210 km bulk lines, 8 pumpstations and 11 reservoirs while about 4% of this final water is distributed to the Drakenstein LM into its Gouda system. The Withoogte Treatment Plant operates at about 50% of its designed 72 Ml/d capacity and distributes about 86% of its output to the Saldanha Bay LM, 6 % to the Swartland LM and the remaining 8% to the Bergrivier LM through a network of 314 km bulk lines, 3 pumpstations and 11 reservoirs.

Regulator's Comment

The WCDM was well prepared for the Blue Drop assessment and was represented by their Chemical Engineering Technologist and accompanied by the Plant Manager. They were well informed with the requirements for the Blue Drop process and have undergone similar previous exercises. The required information was uploaded in advance and any missing information was dealt with immediately and forwarded to the team in further correspondence. The WCDM operates and maintain the two plants on behalf of its local municipalities and have a well-functioning supply chain management programme which enables the entity to provide for the required services and products for effective operations and maintenance. The Regulator would like to see a larger complement of scientific personnel to oversee water quality compliance programs. The WCDM's capital expenses was focussed on laboratory equipment to improve monitoring, as well as movable items such as machinery and valves to attend to bulk pipeline repairs. Larger capital expenses forms part of the various local municipality's planning.

Blue Drop Findings

The Regulator noted the following:

- Both Water Treatment Plants has sufficient process controller attendance, as well as a competent supervisory section.
- Implementation of the water safety plan and the process audit findings are taking place, with specifically the use of chlorine dioxide at both plants mentioned as an initiative to counter deteriorating raw water qualities.
- The WCDM is aware of the importance of water demand management and work done in this regard is commended where leakages are attended to, and losses are monitored and logged.
- Systems are in place to monitor water qualities on a regular basis.

Technical Site Inspection

Both plants from the WCDM were inspected to verify the Blue Drop audit findings and the ***Swartland WTP*** received a technical site score of 92%, while the ***Withoogte WTP*** received a technical site score of 95%. Both plants were found to be neat, well operated, and regularly monitored for performance. Both plants have been testing the addition of chlorine dioxide to its treatment train, with the view of taste and odour removal, as well as ensuring a residual in the pipeline. This was also installed to counter the risk of low supplies of chlorine gas. At the Swartland WTP, the installation of lights at the sludge dams, and additional handrails at the filters to ensure safe working conditions, as well as the installation of one more air blower can be considered. The Withoogte plant should install emergency washes at the flocculant dosing station, while the filter backwash pumps should be regularly maintained to ensure sufficient standby.

The WCDM takes deep pride in their work which was evident in the discussions held on site with the various process controllers. In general, however, a need for more training was expressed amongst the process controllers. Apart from this, the workplace satisfaction is high and inspire good performance.


Sedimentation tank at Swartland WTP


Service and High Lift Pumpstation at Swartland WTP


Flocculation channels at Withoogte WTP


Backwashing of filters at Withoogte WTP

13.2 Overberg Water

Introduction

Overberg Water Board came into being in 1993 when the former Duivenhoks and Ruensveld water boards amalgamated. Overberg Water Board is a National Government Business Enterprise as defined in Schedule 3B of the Public Finance Management Act (PFMA). This entity operates three treatment plants to provide water to the following 3 municipalities: -

1. Hessequa Local Municipality
2. Cape Agulhas Local Municipality
3. Theewaterskloof Local Municipality

Overberg Water operates the 5 Ml/d Duivenhoks Treatment Plant at 63% of its capacity and produces potable water from the Duivenhoks Dam. The final water is distributed to the Hessequa LM through a network of 462 km bulk lines and 10 reservoirs. The Ruensveld East Treatment Plant operates at about 51% of its designed 4.7 Ml/d capacity and provides water to the Protem system of the Cape Agulhas. The Ruensveld West Treatment Plant has a design capacity of 9.5 Ml/d and operates at around 61% of its capacity to supply water to the Theewaterskloof LM as well as the Cape Agulhas' Protem system. Both Ruensveld systems extract water from the Riversonderend river/weir, and these systems have an estimated 437 km of bulk lines with 2 pumpstations and 8 reservoirs.

Regulator's Comment

Overberg Water prepared well for the Blue Drop assessment and was represented by a total complement of 7 technical people with head office personnel assisted by the three plant managers. All information required was at hand and supplemented with additional documentation when requested for it. All three plants are adequately staffed and complies with National regulations on the Process Controller and supervisory staff requirements. Water Safety Plans and Process Audits have been compiled for all the plants and the Regulator observed ongoing implementation of recommendations from these documents.

Overberg Water has a well-functioning Supply Chain Management process to ensure timeous procurement of services and products for its operations. A total capital budget of R 8.7 million rand has been earmarked mainly for the supply of generators at strategic points to ensure surety of supply of potable water.

Blue Drop Findings

The Regulator noted the following:

- All three Water Treatment Plants has sufficient process controller attendance, as well as a competent supervisory section.
- No planned training is currently taking place and Overberg Water is urged to attend to this important aspect of career development. The same issue was raised during the technical site assessment exercise.
- All plants are equipped with inhouse monitoring equipment and a well set out monitoring programme is followed for water quality, water quantity and chemical stock usage.
- Water demand management procedures are practiced and water balances across its delivery network is done on a regular basis.

Technical Site Inspection

The ***Ruensveld West WTP*** was inspected to verify the Blue Drop audit findings and received a technical site assessment score of 84%. The works comprises an 9.5 Ml/d conventional treatment plant. The works was found to be operational and although the majority of the plant seems to be in fairly good condition, well managed and maintained, there is concern about the fact that the sand filters are not operating satisfactorily due to the outage of air blowers. Refurbishment of the filters as well as installing duty and standby air-blowers should be implemented urgently. Chemical dosing takes place downstream of the hydraulic jump (weir overflow), moving the dosing point upstream should be considered to allow for sufficient turbulent conditions. Increased security should be considered at the command reservoir as the telemetry was out of order due to vandalism. All considered the total VROOM amount comes to R 568 000/Ml/d. In addition, it seems that the disinfection regime can be improved with a 96.7% compliance figure for Microbiological Acute Health (samples taken fortnightly at sufficient sampling points). A backup disinfection system should also be considered. The Chemical compliance (Acute and Chronic Health) is excellent at >99.90%. The workplace satisfaction is adequate, but the lack of training is of concern.

For more details, the Blue Drop Watch Report 2023 can be consulted.


Raw water pipe at Ruensveld West WTP


Sludge ponds at the Ruensveld West WTP


Backwash water sump next to the high lift pumpstation


High lift Pumps at Ruensveld West WTP

13.3 Beaufort West Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	53.02%
Blue Drop Score 2014	%	89.52%
Blue Drop Score 2012	%	94.91%
Blue Drop Score 2011	%	92.01%

Key Performance Area	Weight	Beaufort West	Merweville	Murraysburg	Nelspoort
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	56.90%	34.85%	26.65%	30.65%
Blue Drop Score 2014	%	95.22%	78.33%	48.36%	70.10%
Blue Drop Score 2012	%	96.30%	86.40%	N/A	74.50%
Blue Drop Score 2011	%	95.40%	79.70%	N/A	61.20%
System Design Capacity	kL/d	22 144	280	600	500
System Available Capacity	kL/d	15 644	280	600	500
System Input Value	kL/d	8 148	160	749	402
Capacity Utilisation	%	52.23%	57.14%	124.83%	80.40%
Resource Abstracted From		Boreholes / Gamka Dam / Reclaimed Water	Boreholes	Boreholes	Soutrivier augmented by boreholes
BDRR 2023	%	22.97%	17.76%	56.42%	17.76%
BDRR 2022	%	15.70%	29.10%	39.40%	28.60%

Technical Site Assessment: Beaufort West WTW – 70%

The Regulator note the dire state of management and drinking water quality in the Murraysburg and Nelspoort water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

13.4 Berg River Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	85.08%
Blue Drop Score 2014	%	63.79%
Blue Drop Score 2012	%	90.60%
Blue Drop Score 2011	%	85.20%

Key Performance Area	Weight	Aurora	Eendekuil	Piketberg	Porterville
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	83.30%	81.50%	69.98%	87.53%
Blue Drop Score 2014	%	62.30%	49.29%	57.01%	72.90%
Blue Drop Score 2012	%	83.80%	90.20%	87.50%	95.00%
Blue Drop Score 2011	%	70.40%	76.20%	68.80%	78.20%
System Design Capacity	kL/d	200	200	3 150	2 270
System Available Capacity	kL/d	200	200	3 150	2 270
System Input Value	kL/d	126	224	1 862	1 173
Capacity Utilisation	%	63.00%	112.00%	59.11%	51.67%
Resource Abstracted From		Underground water	Waboomfontein Spring and borehole	Bergrivier 90% and 10% Voelvleispring	Three fountains from the mountains - Waterfall stream and North/South springs from Winterhoek mountain
BDRR 2023	%	15.32%	21.51%	36.79%	21.34%
BDRR 2022	%	16.10%	15.60%	32.00%	22.90%

Key Performance Area	Weight	Redelinghuys	Velddrif
Bulk/WSP		-	West Coast DM Bulk
Blue Drop Score 2023	%	87.43%	95.00%
Blue Drop Score 2014	%	54.80%	67.00%
Blue Drop Score 2012	%	73.30%	97.60%
Blue Drop Score 2011	%	52.70%	93.20%
System Design Capacity	kL/d	260	72 000
System Available Capacity	kL/d	260	72 000
System Input Value	kL/d	156	2 611
Capacity Utilisation	%	60.00%	50.00%
Resource Abstracted From		Matroosfontein fountain	Misverstand Weir on the Berg River
BDRR 2023	%	16.21%	19.87%
BDRR 2022	%	14.30%	49.90%

Technical Site Assessment: Piketberg WTP – 89%

13.5 Bitou West Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	81.66%
Blue Drop Score 2014	%	90.44%
Blue Drop Score 2012	%	97.74%
Blue Drop Score 2011	%	96.12%

Key Performance Area	Weight	Kurland	Nature`s Valley	Plettenberg Bay
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	80.45%	75.65%	81.81%
Blue Drop Score 2014	%	81.96%	83.62%	90.86%
Blue Drop Score 2012	%	97.40%	97.80%	97.80%
Blue Drop Score 2011	%	95.00%	95.00%	96.20%
System Design Capacity	kL/d	648	1 000	27 000
System Available Capacity	kL/d	648	320	27 000
System Input Value	kL/d	590	154	10 603
Capacity Utilisation	%	91.05%	48.13%	39.27%
Resource Abstracted From		Wit River	Grootrivier	Keurboomsriver, Palmietrivier
BDRR 2023	%	20.04%	16.07%	21.56%
BDRR 2022	%	17.70%	13.70%	19.60%

Technical Site Assessment: Plettenberg Bay WTW – 80%

13.6 Breede Valley Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	59.95%
Blue Drop Score 2014	%	89.16%
Blue Drop Score 2012	%	89.02%
Blue Drop Score 2011	%	85.93%

Key Performance Area	Weight	Bokrivier (Touwsrivier)	De Doorns	De Koppen (Fairyglen)	Worcester/Rawsonville
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	58.08%	61.58%	54.42%	60.38%
Blue Drop Score 2014	%	85.95%	89.27%	89.86%	NI
Blue Drop Score 2012	%	87.60%	90.70%	90.70%	NI
Blue Drop Score 2011	%	74.70%	90.30%	82.00%	NI
System Design Capacity	kL/d	1 500	4 800	10 000	60 000
System Available Capacity	kL/d	1 500	4 800	10 000	60 000
System Input Value	kL/d	1 790	4 830	3 194	30 100
Capacity Utilisation	%	119.33%	100.63%	31.94%	50.17%
Resource Abstracted From		Touws River	Touws River	Touws River	Stettynskloof Dam
BDRR 2023	%	46.01%	47.28%	30.64%	39.20%
BDRR 2022	%	41.00%	47.00%	31.10%	45.20%

Technical Site Assessment: De Koppen (Fairyglen) WTW – 90%

13.7 Cape Agulhas Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	89.17%
Blue Drop Score 2014	%	69.48%
Blue Drop Score 2012	%	86.64%
Blue Drop Score 2011	%	73.01%

Key Performance Area	Weight	Aniston/ Waenhuskrans	Bredasdorp	Klipdale	L` Agulhas
Bulk/WSP		-	-	Overberg Water	-
Blue Drop Score 2023	%	86.33%	94.68%	86.23%	88.03%
Blue Drop Score 2014	%	76.20%	74.40%	75.60%	54.10%
Blue Drop Score 2012	%	75.60%	91.20%	87.30%	79.90%
Blue Drop Score 2011	%	82.90%	64.00%	82.00%	82.40%
System Design Capacity	kL/d	750	8 000	9 500	1 200
System Available Capacity	kL/d	750	8 000	9 500	1 200
System Input Value	kL/d	319	3 250	150	350
Capacity Utilisation	%	42.53%	40.63%	60.81%	29.17%
Resource Abstracted From		Two boreholes	Klein Sanddrift Dam via the Vleikloof Dam, boreholes and the Uitvlught spring	Sonderend river	Two boreholes
BDRR 2023	%	13.74%	16.71%	26.60%	13.74%
BDRR 2022	%	25.90%	34.20%	NI	19.70%

Key Performance Area	Weight	Napier	Protem	Spanjaardskloof	Struisbaai
Bulk/WSP		-	Overberg Water	-	-
Blue Drop Score 2023	%	81.13%	86.71%	59.10%	89.83%
Blue Drop Score 2014	%	46.40%	74.60%	42.30%	66.80%
Blue Drop Score 2012	%	87.10%	75.60%	68.00%	84.50%
Blue Drop Score 2011	%	79.90%	80.30%	N/A	61.10%
System Design Capacity	kL/d	1 000	4 700	149	1 000
System Available Capacity	kL/d	1 290	4 600	149	2 150
System Input Value	kL/d	850	2 340	149	1 436
Capacity Utilisation	%	65.89%	50.87%	NI	66.79%
Resource Abstracted From		Boreholes	Riviersonderend	Oog - Spring	Three boreholes
BDRR 2023	%	27.46%	25.16%	35.73%	24.67%
BDRR 2022	%	25.90%	NI	21.50%	32.60%

Key Performance Area	Weight	Suiderstrand
Bulk/WSP		-
Blue Drop Score 2023	%	88.08%
Blue Drop Score 2014	%	62.30%
Blue Drop Score 2012	%	83.80%
Blue Drop Score 2011	%	70.40%
System Design Capacity	kL/d	150
System Available Capacity	kL/d	150
System Input Value	kL/d	75
Capacity Utilisation	%	50.00%
Resource Abstracted From		Two boreholes
BDRR 2023	%	12.10%
BDRR 2022	%	17.80%

Technical Site Assessment: Bredasdorp WTW (Cape Agulhas LM) – 91.4% and Ruensveld West WTW (Overberg Water Board) – 84%

13.8 Cederberg Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	35.87%
Blue Drop Score 2014	%	39.96%
Blue Drop Score 2012	%	80.39%
Blue Drop Score 2011	%	51.05%

Key Performance Area	Weight	Citrusdal	Clanwilliam	Elands Bay	Graafwater
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	38.05%	32.80%	32.80%	35.58%
Blue Drop Score 2014	%	45.29%	37.48%	27.54%	56.10%
Blue Drop Score 2012	%	82.92%	73.43%	79.57%	82.20%
Blue Drop Score 2011	%	55.76%	40.22%	53.33%	51.49%
System Design Capacity	kL/d	8 300	6 900	1 000	750
System Available Capacity	kL/d	8 300	6 900	1 000	750
System Input Value	kL/d	2 666	1 964	535	675
Capacity Utilisation	%	32.12%	28.46%	53.50%	89.93%
Resource Abstracted From		Olifant River	Clanwilliam, Jan Dissals	Boreholes	Boreholes
BDRR 2023	%	22.04%	39.41%	38.55%	43.32%
BDRR 2022	%	17.70%	35.80%	35.40%	20.90%

Key Performance Area	Weight	Lambert`s Bay	Leipoldtville
Bulk/WSP		-	-
Blue Drop Score 2023	%	38.05%	31.50%
Blue Drop Score 2014	%	28.30%	34.90%
Blue Drop Score 2012	%	87.31%	82.22%
Blue Drop Score 2011	%	55.76%	54.89%
System Design Capacity	kL/d	5 200	500
System Available Capacity	kL/d	5 200	500
System Input Value	kL/d	1 952	500
Capacity Utilisation	%	37.54%	100.00%
Resource Abstracted From		Boreholes	Boreholes
BDRR 2023	%	22.04%	43.03%
BDRR 2022	%	17.70%	53.90%

Technical Site Assessment: Citrusdal WTW – 51%

13.9 City of Cape Town Metropolitan Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	**%**	**98.12%**
Blue Drop Score 2014	**%**	**95.86%**
Blue Drop Score 2012	**%**	**98.14%**
Blue Drop Score 2011	**%**	**97.61%**

Key Performance Area	Weight	Cape Town
Bulk/WSP		-
Blue Drop Score 2023	%	**98.12%**
Blue Drop Score 2014	%	96.00%
Blue Drop Score 2012	%	98.00%
Blue Drop Score 2011	%	98.00%
System Design Capacity	kL/d	1 668 200
System Available Capacity	kL/d	1 400 200
System Input Value	kL/d	808 423
Capacity Utilisation	%	64.55%
Resource Abstracted From		Steenbras lower dam; Theewaterskloof dam via the Kleinplaas balancing dam; Wemmershoek dam and Theewaterskloof dam; De Villiers Dam (Primary source), Victoria Dam and Alexandra dam – Indirect sources; Voel
BDRR 2023	%	30.95%
BDRR 2022	%	25.70%

Technical Site Assessment: Faure WTP – 98%, Steenbras WTW – 93%

13.10 Drakenstein Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	94.10%
Blue Drop Score 2014	%	72.14%
Blue Drop Score 2012	%	96.29%
Blue Drop Score 2011	%	95.72%

Key Performance Area	Weight	Bainskloof	Drakenstein	Gouda	Hermon
Bulk/WSP		-	CoCT MM	WCDM Bulk	CoCT MM
Blue Drop Score 2023	%	87.05%	94.53%	93.67%	95.68%
Blue Drop Score 2014	%	50.50%	72.10%	74.10%	85.70%
Blue Drop Score 2012	%	95.10%	96.30%	96.30%	98.60%
Blue Drop Score 2011	%	96.80%	95.70%	96.00%	88.30%
System Design Capacity	kL/d	400	275 500	29 100	273 000
System Available Capacity	kL/d	400	194 570	29 100	160 000
System Input Value	kL/d	10	36 176	587	281
Capacity Utilisation	%	2.50%	83.65%	51.55%	51.97%
Resource Abstracted From		Witte River	Groundwater, Bethel & Nantes dams on Paarl Mountain Berg River via Victoria Dam, Spruit River & Antoniesvlei Diversion (Withoogte Dam)	Channel conveying water from the Voëlvlei Dam	Voelvlei dam
BDRR 2023	%	19.16%	31.80%	27.63%	18.44%
BDRR 2022	%	15.50%	33.60%	NI	NI

Key Performance Area	Weight	Saron
Bulk/WSP		-
Blue Drop Score 2023	%	84.58%
Blue Drop Score 2014	%	73.10%
Blue Drop Score 2012	%	95.00%
Blue Drop Score 2011	%	91.80%
System Design Capacity	kL/d	4 838
System Available Capacity	kL/d	4 838
System Input Value	kL/d	1 648
Capacity Utilisation	%	34.06%
Resource Abstracted From		Leeu River
BDRR 2023	%	23.17%
BDRR 2022	%	NI

Technical Site Assessment: Welvanpas WTP – 96.3%

13.11 George Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	94.95%
Blue Drop Score 2014	%	82.77%
Blue Drop Score 2012	%	98.12%
Blue Drop Score 2011	%	96.26%

Key Performance Area	Weight	George	Haarlem	Uniondale	Wilderness
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	95.15%	89.30%	94.50%	92.20%
Blue Drop Score 2014	%	83.33%	64.28%	76.18%	75.65%
Blue Drop Score 2012	%	98.60%	N/A	N/A	85.50%
Blue Drop Score 2011	%	96.30%	N/A	N/A	95.00%
System Design Capacity	kL/d	45 000	1 000	1 500	1 500
System Available Capacity	kL/d	45 000	720	1 500	1 500
System Input Value	kL/d	29 002	500	846	984
Capacity Utilisation	%	68.01%	69.44%	56.40%	65.60%
Resource Abstracted From		Garden Route Dam & Malgas Pumping Scheme	Kammanassie/ Haarlem Dam	Kammanassie River	Touws River
BDRR 2023	%	29.17%	17.70%	16.90%	19.18%
BDRR 2022	%	41.10%	31.60%	27.60%	25.90%

Technical Site Assessment: New George WTW – 84%

13.12 Hessequa Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	50.12%
Blue Drop Score 2014	%	55.18%
Blue Drop Score 2012	%	35.59%
Blue Drop Score 2011	%	14.10%

Key Performance Area	Weight	Albertinia	Garcia	Gouritsmond	Heidelberg
Bulk/WSP		-	-	-	Overberg Water
Blue Drop Score 2023	%	57.48%	48.13%	41.63%	82.07%
Blue Drop Score 2014	%	57.66%	43.96%	43.27%	72.75%
Blue Drop Score 2012	%	23.65%	NI	14.30%	68.94%
Blue Drop Score 2011	%	9.21%	NI	0.40%	15.40%
System Design Capacity	kL/d	2 000	180	150	5 000
System Available Capacity	kL/d	1 520	180	150	5 000
System Input Value	kL/d	583	180	247	1 054
Capacity Utilisation	%	38.35%	100.00%	164.60%	63.26%
Resource Abstracted From		Boreholes	Vet	Boreholes	Duiwenhoks
BDRR 2023	%	23.51%	23.60%	32.29%	29.43%
BDRR 2022	%	28.90%	35.30%	17.70%	37.40%

Key Performance Area	Weight	Jongensfontein	Melkhoutfontein	Riversdale	Slangrivier
Bulk/WSP		-	-	-	Overberg Water
Blue Drop Score 2023	%	29.98%	53.21%	55.48%	80.15%
Blue Drop Score 2014	%	45.50%	45.15%	51.53%	NI
Blue Drop Score 2012	%	14.95%	12.05%	27.75%	NI
Blue Drop Score 2011	%	0.40%	NI	26.90%	15.43%
System Design Capacity	kL/d	350	1 000	4 000	5 000
System Available Capacity	kL/d	1 133	1 000	4 000	5 000
System Input Value	kL/d	1 132	1 000	2 410	1 054
Capacity Utilisation	%	99.96%	100.00%	60.26%	63.26%
Resource Abstracted From		Fountain	Fountain	Korentepoort River	Duiwenhoks
BDRR 2023	%	57.02%	26.10%	43.81%	37.02%
BDRR 2022	%	34.40%	32.60%	35.70%	45.50%

Key Performance Area	Weight	Still Bay	Witsand
Bulk/WSP		-	Overberg Water
Blue Drop Score 2023	%	36.23%	77.39%

Key Performance Area	Weight	Still Bay	Witsand
Blue Drop Score 2014	%	44.90%	NI
Blue Drop Score 2012	%	20.45%	NI
Blue Drop Score 2011	%	27.38%	17.08%
System Design Capacity	kL/d	2 000	5 000
System Available Capacity	kL/d	2 000	5 000
System Input Value	kL/d	6 417	1 054
Capacity Utilisation	%	320.85%	63.26%
Resource Abstracted From		Olienhoutfontein, Grootsand and Hawe fountains	Duiwenhoks
BDRR 2023	%	61.30%	42.09%
BDRR 2022	%	57.90%	37.90%

Technical Site Assessment: Riversdale WTW – 77%

The Regulator note the dire state of management and drinking water quality in the Jongensfontein water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

13.13 Kannaland Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	25.79%
Blue Drop Score 2014	%	31.66%
Blue Drop Score 2012	%	28.47%
Blue Drop Score 2011	%	55.50%

Key Performance Area	Weight	Calitzdorp	Ladismith	Van Wyksdorp	Zoar
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	35.03%	23.93%	22.83%	22.48%
Blue Drop Score 2014	%	41.58%	32.39%	20.57%	25.46%
Blue Drop Score 2012	%	29.90%	29.50%	25.40%	21.20%
Blue Drop Score 2011	%	60.30%	70.30%	31.50%	35.80%
System Design Capacity	kL/d	2 160	2 500	600	1 400
System Available Capacity	kL/d	1 200	2 500	600	1 400
System Input Value	kL/d	1 000	3 083	93	983
Capacity Utilisation	%	83.33%	123.32%	15.50%	70.21%
Resource Abstracted From		Calitzdorp Dam	Boreholes & Swartbergrivier	Buffelsfontein River	Tierkloof Dam
BDRR 2023	%	33.44%	65.81%	75.54%	47.90%
BDRR 2022	%	74.60%	97.40%	97.20%	89.20%

Technical Site Assessment: Ladismith WTW – 72%

The Regulator note the dire state of management and drinking water quality in the Ladismith, Van Wyksdorp and Zoar water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

13.14 Knysna Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	78.85%
Blue Drop Score 2014	%	61.62%
Blue Drop Score 2012	%	92.00%
Blue Drop Score 2011	%	89.76%

Key Performance Area	Weight	Buffalo Bay	Karatara	Knysna	Rheenendal
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	72.94%	80.81%	78.95%	76.78%
Blue Drop Score 2014	%	62.62%	65.76%	59.60%	68.45%
Blue Drop Score 2012	%	85.90%	98.00%	94.60%	82.90%
Blue Drop Score 2011	%	84.00%	92.60%	90.40%	84.70%
System Design Capacity	kL/d	300	960	21 750	1 000
System Available Capacity	kL/d	300	277	21 500	1 000
System Input Value	kL/d	71	146	8 758	217
Capacity Utilisation	%	23.67%	52.71%	40.73%	21.70%
Resource Abstracted From		Goukamma River	Karataka River	Knysna River, Gouna River	Homtini River
BDRR 2023	%	32.34%	16.20%	22.97%	20.97%
BDRR 2022	%	20.90%	22.30%	21.90%	15.60%

Key Performance Area	Weight	Sedgefield
Bulk/WSP		-
Blue Drop Score 2023	%	78.66%
Blue Drop Score 2014	%	70.89%
Blue Drop Score 2012	%	77.10%
Blue Drop Score 2011	%	89.90%
System Design Capacity	kL/d	2 500
System Available Capacity	kL/d	2 500
System Input Value	kL/d	1 346
Capacity Utilisation	%	53.84%
Resource Abstracted From		Karatara River
BDRR 2023	%	23.60%
BDRR 2022	%	24.40%

Technical Site Assessment: Knysna WTW – 79%

13.15 Laingsburg Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	47.81%
Blue Drop Score 2014	%	26.06%
Blue Drop Score 2012	%	71.16%
Blue Drop Score 2011	%	80.54%

Key Performance Area	Weight	Laingsburg	Matjiesfontein
Bulk/WSP		-	-
Blue Drop Score 2023	%	54.71%	39.63%
Blue Drop Score 2014	%	27.59%	22.02%
Blue Drop Score 2012	%	73.30%	71.00%
Blue Drop Score 2011	%	83.70%	64.80%
System Design Capacity	kL/d	3 000	500
System Available Capacity	kL/d	1 585	7 884
System Input Value	kL/d	1 283	1 083
Capacity Utilisation	%	80.95%	13.74%
Resource Abstracted From		Boreholes	Boreholes
BDRR 2023	%	28.19%	37.85%
BDRR 2022	%	48.70%	69.00%

Technical Site Assessment: Laingsburg Reservoir – 74%

13.16 Langeberg Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	44.67%
Blue Drop Score 2014	%	72.30%
Blue Drop Score 2012	%	51.62%
Blue Drop Score 2011	%	32.39%

Key Performance Area	Weight	Ashton	Bonnievale	McGregor	Montagu
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	33.85%	48.45%	43.85%	42.75%
Blue Drop Score 2014	%	78.05%	69.99%	71.73%	64.06%
Blue Drop Score 2012	%	48.99%	48.31%	58.26%	43.31%
Blue Drop Score 2011	%	33.50%	33.50%	48.50%	29.48%
System Design Capacity	kL/d	11 910	20 000	2 000	6 000
System Available Capacity	kL/d	11 910	20 000	2 000	6 000
System Input Value	kL/d	5 242	20 000	1 017	2 993
Capacity Utilisation	%	44.02%	NI	50.87%	49.88%
Resource Abstracted From		Bree	Bree	Breede river	Bree
BDRR 2023	%	32.98%	42.61%	22.64%	31.99%
BDRR 2022	%	19.20%	19.70%	21.40%	34.80%

Key Performance Area	Weight	Robertson
Bulk/WSP		-
Blue Drop Score 2023	%	43.00%
Blue Drop Score 2014	%	64.06%
Blue Drop Score 2012	%	43.31%
Blue Drop Score 2011	%	29.48%
System Design Capacity	kL/d	10 800
System Available Capacity	kL/d	10 800
System Input Value	kL/d	7 332
Capacity Utilisation	%	67.89%
Resource Abstracted From		Breede River, Hoopsrivier Irrigation Scheme, Dassieshoek and Kooskok Dams
BDRR 2023	%	33.48%
BDRR 2022	%	26.80%

Technical Site Assessment: Ashton WTW – 70%

13.17 Matzikama Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	55.23%
Blue Drop Score 2014	%	48.64%
Blue Drop Score 2012	%	70.29%
Blue Drop Score 2011	%	32.98%

Key Performance Area	Weight	Bitterfontein	Ebenhaezer	Klawer	Kliprand
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	57.79%	55.43%	55.43%	52.60%
Blue Drop Score 2014	%	64.16%	44.61%	52.48%	37.79%
Blue Drop Score 2012	%	92.00%	63.10%	80.80%	64.50%
Blue Drop Score 2011	%	95.60%	32.00%	53.20%	60.70%
System Design Capacity	kL/d	1 728	2 592	1 728	60
System Available Capacity	kL/d	624	2 592	1 728	60
System Input Value	kL/d	390	2 384	205	60
Capacity Utilisation	%	62.50%	91.98%	11.86%	100.00%
Resource Abstracted From		Ground water	Olifants	Olifants	Kliprand Boreholes
BDRR 2023	%	16.99%	37.52%	20.57%	16.65%
BDRR 2022	%	32.40%	25.80%	23.00%	53.20%

Key Performance Area	Weight	Koekenaap	Lutzville	Lutzville West	Vredendal
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	49.30%	52.43%	53.71%	55.65%
Blue Drop Score 2014	%	52.81%	54.60%	54.10%	46.74%
Blue Drop Score 2012	%	81.80%	73.60%	69.20%	66.90%
Blue Drop Score 2011	%	33.40%	34.00%	29.60%	28.50%
System Design Capacity	kL/d	534	2 500	144	8 165
System Available Capacity	kL/d	288	2 500	140	8 165
System Input Value	kL/d	318	364	150	4 210
Capacity Utilisation	%	110.42%	14.56%	107.14%	51.56%
Resource Abstracted From		Olifants	Olifants	Olifants	Olifants
BDRR 2023	%	38.07%	31.06%	29.52%	31.01%
BDRR 2022	%	25.10%	35.00%	27.80%	34.00%

Technical Site Assessment: Vredendal WTW – 50%

13.18 Mosel Bay Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	87.37%
Blue Drop Score 2014	%	78.76%
Blue Drop Score 2012	%	95.60%
Blue Drop Score 2011	%	95.27%

Key Performance Area	Weight	Friemersheim	Hebertsdale	Lodewykstenk	Greater Mossel Bay
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	86.31%	82.93%	79.23%	87.43%
Blue Drop Score 2014	%	62.96%	74.66%	68.92%	79.04%
Blue Drop Score 2012	%	95.30%	90.50%	90.60%	95.80%
Blue Drop Score 2011	%	92.20%	91.90%	90.80%	95.30%
System Design Capacity	kL/d	1 000	2 000	200	55 000
System Available Capacity	kL/d	288	290	120	55 500
System Input Value	kL/d	151	134	39	25 330
Capacity Utilisation	%	52.43%	46.21%	32.50%	48.04%
Resource Abstracted From		Ernest Robertson Dam & Kleinbos Dam	Boreholes	Boreholes	Wolwedans Dam, Klipheuwel Dam, Ernest Robertson Dam
BDRR 2023	%	14.98%	12.79%	14.86%	24.31%
BDRR 2022	%	17.30%	30.00%	44.50%	28.40%

Key Performance Area	Weight	Ruiterbos
Bulk/WSP		-
Blue Drop Score 2023	%	81.83%
Blue Drop Score 2014	%	64.26%
Blue Drop Score 2012	%	91.10%
Blue Drop Score 2011	%	95.00%
System Design Capacity	kL/d	500
System Available Capacity	kL/d	115
System Input Value	kL/d	67
Capacity Utilisation	%	58.26%
Resource Abstracted From		Perdeberg River
BDRR 2023	%	12.15%
BDRR 2022	%	30.00%

Technical Site Assessment: Kleinbrak WTW – 80%

13.19 Oudtshoorn Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	63.91%
Blue Drop Score 2014	%	51.29%
Blue Drop Score 2012	%	64.58%
Blue Drop Score 2011	%	36.88%

Key Performance Area	Weight	De Rust	Klein Karoo Rural Supply Scheme	Oudtshoorn
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	54.33%	78.18%	60.18%
Blue Drop Score 2014	%	30.25%	63.33%	49.81%
Blue Drop Score 2012	%	47.40%	66.20%	64.70%
Blue Drop Score 2011	%	20.20%	26.60%	37.20%
System Design Capacity	kL/d	1 000	9 000	30 000
System Available Capacity	kL/d	395	9 000	20 000
System Input Value	kL/d	405	3 188	11 176
Capacity Utilisation	%	102.53%	35.42%	55.88%
Resource Abstracted From		Huisrivier	Boreholes	Koos Raubenheimer Dam
BDRR 2023	%	30.34%	23.62%	32.56%
BDRR 2022	%	47.30%	34.50%	53.30%

Technical Site Assessment: Dysselsdorp WTW (Klein Karoo Rural Supply Scheme) - 73%

13.20 Overstrand Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	99.99%
Blue Drop Score 2014	%	90.79%
Blue Drop Score 2012	%	96.82%
Blue Drop Score 2011	%	90.56%

Key Performance Area	Weight	Baardskeerdersbos	Buffeljags Bay	Buffelsrivier	Greater Gansbaai
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	99.70%	98.20%	99.99%	99.99%
Blue Drop Score 2014	%	63.90%	71.80%	87.20%	88.30%
Blue Drop Score 2012	%	91.60%	93.80%	95.00%	97.10%
Blue Drop Score 2011	%	93.70%	75.40%	95.10%	95.10%
System Design Capacity	kL/d	185	80	5 500	8 100
System Available Capacity	kL/d	185	28	5 500	8 100
System Input Value	kL/d	37	14	2 020	3 743
Capacity Utilisation	%	20.00%	50.00%	36.73%	46.22%
Resource Abstracted From		Boreholes	Borehole	Buffels River Dam	Klipgat & De Kelders Grotte Fountain, Kraaibosch & Franskraal Dams
BDRR 2023	%	9.57%	14.21%	15.08%	19.97%
BDRR 2022	%	12.80%	16.20%	16.70%	17.00%

Key Performance Area	Weight	Greater Hermanus	Kleinmond	Pearly Beach	Stanford
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	99.99%	99.99%	99.99%	99.99%
Blue Drop Score 2014	%	96.40%	85.60%	87.40%	90.90%
Blue Drop Score 2012	%	97.90%	95.00%	95.20%	92.70%
Blue Drop Score 2011	%	87.20%	93.10%	94.30%	95.20%
System Design Capacity	kL/d	38 000	5 800	1 440	1 000
System Available Capacity	kL/d	38 000	5 800	1 440	2 000
System Input Value	kL/d	11 154	2 260	380	720
Capacity Utilisation	%	29.35%	38.97%	26.39%	36.00%
Resource Abstracted From		De Bos Dam; Gateway BH Field (5 BHs); Volmoed and Camphill BH fields (7 BHs)	Palmiet River and Dorpsfontein	Pearly Beach Dam & Koekemoer Dam	Stanford Spring Kouevlakte Boreholes
BDRR 2023	%	18.44%	14.53%	13.39%	15.98%
BDRR 2022	%	20.70%	16.20%	13.80%	17.80%

Technical Site Assessment: Preekstoel WTP – 94%

13.21 Prince Albert Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	28.20%
Blue Drop Score 2014	%	34.18%
Blue Drop Score 2012	%	70.08%
Blue Drop Score 2011	%	70.72%

Key Performance Area	Weight	Klaarstroom	Leeugamka	Prince Albert
Bulk/WSP		-	-	-
Blue Drop Score 2023	%	19.83%	35.85%	27.53%
Blue Drop Score 2014	%	34.76%	39.82%	33.20%
Blue Drop Score 2012	%	74.10%	69.00%	68.90%
Blue Drop Score 2011	%	73.00%	69.70%	69.70%
System Design Capacity	kL/d	500	500	1 100
System Available Capacity	kL/d	500	500	1 100
System Input Value	kL/d	469	610	1 100
Capacity Utilisation	%	93.80%	122.00%	100.00%
Resource Abstracted From		Boreholes	Boreholes	Boreholes augmented by Dorpsrivier
BDRR 2023	%	53.85%	40.81%	51.68%
BDRR 2022	%	42.40%	43.30%	48.10%

Technical Site Assessment: Prince Albert WTW – 50%

The Regulator notes the dire state of management and drinking water quality in the Klaarstroom and Prince Albert water supply system. The WSI is placed under regulatory surveillance and the Municipal Manager is required to submit a **detailed corrective action plan within 20 days** of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvement as outlined in the Regulatory Comment.

13.22 Saldanha Bay Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	94.56%
Blue Drop Score 2014	%	69.38%
Blue Drop Score 2012	%	95.40%
Blue Drop Score 2011	%	87.69%

Key Performance Area	Weight	Hopefield	Langebaan	Saldanha Bay
Bulk/WSP		West Coast DM Bulk	West Coast DM Bulk	West Coast DM Bulk
Blue Drop Score 2023	%	96.90%	92.92%	94.97%
Blue Drop Score 2014	%	69.40%	69.40%	69.40%
Blue Drop Score 2012	%	95.40%	95.40%	95.40%
Blue Drop Score 2011	%	87.70%	87.70%	87.70%
System Design Capacity	kL/d	72 000	72 000	72 000
System Available Capacity	kL/d	72 000	72 000	72 000
System Input Value	kL/d	1 085	6 842	20 936
Capacity Utilisation	%	50.00%	50.00%	50.00%
Resource Abstracted From		Misverstand Weir on the Berg River	Misverstand Weir on the Berg River	Misverstand Weir on the Berg River
BDRR 2023	%	18.89%	18.89%	20.40%
BDRR 2022	%	27.20%	27.20%	27.20%

Technical Site Assessment: Swartland WTP – 92% and Withoogte WTP – 95%

13.23 Stellenbosch Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	84.65%
Blue Drop Score 2014	%	80.12%
Blue Drop Score 2012	%	95.56%
Blue Drop Score 2011	%	95.74%

Key Performance Area	Weight	Blackheath (City Of Cape Town)	Faure System (City of Cape Town)	Franschhoek	Stellenbosch CBD
Bulk/WSP		CoCT MM	CoCT MM	-	-
Blue Drop Score 2023	%	84.20%	89.45%	62.04%	63.04%
Blue Drop Score 2014	%	88.52%	81.51%	70.50%	77.63%
Blue Drop Score 2012	%	95.28%	95.28%	84.21%	98.25%
Blue Drop Score 2011	%	96.36%	96.79%	75.02%	97.11%
System Design Capacity	kL/d	430 000	500 000	2 000	49 000
System Available Capacity	kL/d	400 000	500 000	2 000	44 000
System Input Value	kL/d	1 675	1 990	357	22 550
Capacity Utilisation	%	71.75%	39.00%	17.85%	51.84%
Resource Abstracted From		Theewaterskloof dam via Kleinplaas balancing dam	Riviersonderend, Theewaterskloof dam	Mount Rochelle Fountain	Theewaterskloof dam
BDRR 2023	%	29.46%	19.66%	17.98%	23.25%
BDRR 2022	%	23.50%	22.50%	26.30%	39.90%

Key Performance Area	Weight	Wemmershoek (City of Cape Town)
Bulk/WSP		CoCT MM
Blue Drop Score 2023	%	87.72%
Blue Drop Score 2014	%	88.14%
Blue Drop Score 2012	%	95.28%
Blue Drop Score 2011	%	93.40%
System Design Capacity	kL/d	250 000
System Available Capacity	kL/d	170 000
System Input Value	kL/d	158 228
Capacity Utilisation	%	93.08%
Resource Abstracted From		Wemmershoek dam and Theewaterskloof dam
BDRR 2023	%	27.31%
BDRR 2022	%	35.20%

Technical Site Assessment: Paradyskloof WTW – 71%

13.24 Swartland Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	93.76%
Blue Drop Score 2014	%	74.26%
Blue Drop Score 2012	%	95.24%
Blue Drop Score 2011	%	92.89%

Key Performance Area	Weight	Swartland	Withoogte
Bulk/WSP		West Coast DM Bulk	West Coast DM Bulk
Blue Drop Score 2023	%	93.33%	96.48%
Blue Drop Score 2014	%	75.00%	70.50%
Blue Drop Score 2012	%	95.20%	95.20%
Blue Drop Score 2011	%	92.90%	92.90%
System Design Capacity	kL/d	29 100	72 000
System Available Capacity	kL/d	29 100	72 000
System Input Value	kL/d	12 810	2 050
Capacity Utilisation	%	51.55%	50.00%
Resource Abstracted From		Channel conveying water from the Voëlvlei Dam	Misverstand Weir on the Berg River
BDRR 2023	%	26.55%	18.89%
BDRR 2022	%	30.00%	23.00%

Technical Site Assessments: Swartland WTP – 92% and Withoogte WTP – 95%

13.25 Swellendam Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	58.59%
Blue Drop Score 2014	%	57.25%
Blue Drop Score 2012	%	85.16%
Blue Drop Score 2011	%	80.50%

Key Performance Area	Weight	Barrydale	Buffelsjagrivier	Suurbraak	Swellendam
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	57.11%	37.68%	54.01%	60.11%
Blue Drop Score 2014	%	53.71%	45.36%	48.41%	59.73%
Blue Drop Score 2012	%	79.90%	69.70%	NI	87.70%
Blue Drop Score 2011	%	57.30%	60.10%	NI	90.90%
System Design Capacity	kL/d	1 500	250	500	4 000
System Available Capacity	kL/d	1 500	250	500	6 000
System Input Value	kL/d	595	227	105	4 010
Capacity Utilisation	%	41.33%	90.80%	40.00%	66.83%
Resource Abstracted From		Huis e	Buffeljags Dam	Buffeljagsrivier	Klip River; Grootkloof Dam (Storage Dam)
BDRR 2023	%	20.97%	35.96%	21.39%	35.04%
BDRR 2022	%	29.80%	35.30%	21.10%	35.40%

Technical Site Assessment: Swellendam WTW – 68%

13.26 Theewaterskloof Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	89.56%
Blue Drop Score 2014	%	64.18%
Blue Drop Score 2012	%	71.50%
Blue Drop Score 2011	%	75.41%

Key Performance Area	Weight	Bereaville	Botrivier	Caledon	Genadendal
Bulk/WSP		-	-	Overberg Water	-
Blue Drop Score 2023	%	88.10%	96.55%	84.19%	78.25%
Blue Drop Score 2014	%	0.00%	70.90%	90.60%	50.80%
Blue Drop Score 2012	%	0.00%	61.70%	84.30%	68.70%
Blue Drop Score 2011	%	0.00%	76.40%	8.60%	75.30%
System Design Capacity	kL/d	350	1 600	11 900	300
System Available Capacity	kL/d	350	1 600	11 900	300
System Input Value	kL/d	172	1 017	4 380	259
Capacity Utilisation	%	49.14%	63.56%	56.46%	86.33%
Resource Abstracted From		Weir in the Sonderend Mountain and a borehole	Six boreholes	Sonderend River (OVM), Two boreholes and Bazil Newmark Dam (WSI)	Weir in the Upper Baviaans River
BDRR 2023	%	15.47%	15.98%	41.90%	28.79%
BDRR 2022	%	25.70%	16.10%	44.10%	44.00%

Key Performance Area	Weight	Grabouw	Greyton	Riviersonderend	Tesselaarsdal
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	92.05%	93.20%	88.95%	83.03%
Blue Drop Score 2014	%	57.90%	50.70%	61.70%	49.10%
Blue Drop Score 2012	%	65.30%	54.50%	58.10%	60.70%
Blue Drop Score 2011	%	64.10%	79.60%	67.50%	76.40%
System Design Capacity	kL/d	15 000	1 800	2 400	200
System Available Capacity	kL/d	15 000	1 800	2 400	500
System Input Value	kL/d	4 572	629	979	140
Capacity Utilisation	%	30.48%	34.94%	40.79%	28.00%
Resource Abstracted From		Eikenhof Dam	Wolwekloofweir and Gobos Weir	Olifantsbos and Sonderend River	Borehole
BDRR 2023	%	21.79%	16.78%	17.84%	22.00%
BDRR 2022	%	42.70%	29.20%	21.10%	21.70%

Key Performance Area	Weight	Villiersdorp	Voorstekraal
Bulk/WSP		-	-
Blue Drop Score 2023	%	**93.85%**	**94.65%**
Blue Drop Score 2014	%	53.30%	NA
Blue Drop Score 2012	%	68.90%	NA
Blue Drop Score 2011	%	58.90%	NA
System Design Capacity	kL/d	2 900	350
System Available Capacity	kL/d	2 900	350
System Input Value	kL/d	1 559	141
Capacity Utilisation	%	53.76%	40.29%
Resource Abstracted From		Elandskloof dam and two boreholes	Weir in Sonderend mountain and one borehole
BDRR 2023	%	25.57%	12.52%
BDRR 2022	%	29.30%	38.50%

Technical Site Assessment: Grabouw WTP – 82%

13.27 Witzenberg Local Municipality

Municipal Blue Drop Score		
Blue Drop Score 2023	%	80.95%
Blue Drop Score 2014	%	95.77%
Blue Drop Score 2012	%	97.63%
Blue Drop Score 2011	%	97.56%

Key Performance Area	Weight	Ceres WTW	Op die Berg WTW	Prince Alfred Hamlet WTW	Tulbagh WTW
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	80.86%	81.06%	81.36%	81.46%
Blue Drop Score 2014	%	95.84%	95.06%	95.09%	95.89%
Blue Drop Score 2012	%	98.44%	96.36%	96.51%	95.64%
Blue Drop Score 2011	%	98.75%	95.00%	98.19%	95.68%
System Design Capacity	kL/d	44 100	700	4 670	3 807
System Available Capacity	kL/d	44 064	700	4 670	3 807
System Input Value	kL/d	10 890	405	2 919	2 135
Capacity Utilisation	%	24.71%	57.83%	62.51%	56.08%
Resource Abstracted From		Ceres	Boreholes	Cutting Fountain Spring & PAH Waboomsriver	Moordeniskloof Fountain; Kleinberg River, Steinhal Fountain, BH (not in use)
BDRR 2023	%	22.52%	18.35%	22.66%	25.92%
BDRR 2022	%	24.80%	22.70%	25.00%	30.40%

Key Performance Area	Weight	Wolseley WTW
Bulk/WSP		-
Blue Drop Score 2023	%	80.46%
Blue Drop Score 2014	%	96.00%
Blue Drop Score 2012	%	96.99%
Blue Drop Score 2011	%	96.55%
System Design Capacity	kL/d	3 500
System Available Capacity	kL/d	3 500
System Input Value	kL/d	2 659
Capacity Utilisation	%	75.97%
Resource Abstracted From		Tierhokskloof Fountain; Artois River Channel
BDRR 2023	%	23.75%
BDRR 2022	%	28.30%

Technical Site Assessment: Ceres WTW – 80%

Witzenberg WTW: Pumpstation and motor control centre in mint condition

City of Cape Town: Mixing chamber receives softened influent, bypass and water from Melkbos.

14. NON-MUNICIPAL SYSTEMS: SANPARKS WATER MANAGEMENT PERFORMANCE

Singular Synopsis

SANParks provides drinking water to a total population of 5,800 persons in South Africa.

An audit attendance record of 100% affirms the SANParks commitment to the Blue Drop national incentive-based regulatory programme. SANParks has 13 water supply systems in total.

No water supply system scored a minimum of 95% when measured against the Blue Drop standards for the audited period and thus no system qualified for the prestigious Blue Drop Certification. The audit nonetheless established an accurate, current baseline from where improvement can be driven, and excellence be incentivised. No water supply system was identified to be in a critical state.

SANParks overall Blue Drop performance is characterised by particular strengths in KPA 1 Capacity management, KPA 3 Financial Management and KPA 5 Drinking Water Quality Compliance with scores >50%. The KPAs that require attention for all the water supply systems that are reflecting scores <50% are KPA 2 DWQ Risk Management (19% average) and KPA 4 Technical Management (30.5% average). SANParks need to improve on their risk management practices and embed it in their water supply business.

The SANParks BDRR/BDRRmax is 27.2 % in 2023. 12 (of 13) water supply systems are situated in the low risk category, and only 1 WSS in the medium risk category. No systems are situated in the high and critical risk categories.

The Regulator is optimistic that the 2023 Blue Drop report provides an updated residual basis from where a positive trajectory for water services delivery and improved performance will follow in the next BD audit. SANParks is encouraged to start preparation for the next Blue Drop audit cycle, which is planned to cover the financial year 2023/24 and released in 2025. The 2023 Blue Drop status for SANParks is summarised in the table below.

Table 251 - 2023 Blue Drop Summary

WSS Name	2014 BD Score (%)	2023 BD Score (%)	2023 BD Certified ≥95%	2023 Critical State (<31%)
Skukuza 1	NA	61.9%		
Skukuza 2	NA	56.8%		
Balule	NA	52.5%		
Crocodile Bridge	NA	53.7%		
GPP	NA	53.1%		
Kruger Gate	NA	50.6%		
Letaba	NA	53.0%	None	None
Malelane	NA	55.4%		
Nkuhlu	NA	53.5%		
Phabene	NA	58.6%		
Shingwedzi	NA	53.3%		
Lower Sabie	NA	58.4%		
Olifants	NA	53.4%		
Totals	**-**	**-**	**0**	**0**

The Department of Water and Sanitation acknowledges the excellence in water services management achieved for the Blue Drop Audit year of 2023. No Blue Drop Certificates are awarded to SANParks

Background to Water Delivery and Distribution Infrastructure

The total volume of water treated in SANParks is 2,442 kl/d. There are 13 WSSs, delivering water services through a water treatment delivery and distribution network comprising of:

- 13 WTWs with the bulk of the water treated and supplied by the Skukuza 1 and 2 WTWs with a total 864 kl/d followed by Lower Sabie with 480 kl/d; and
- 13 pump stations, 96 km bulk water supply lines, km reticulation pipe lines not known, and 30 reservoirs/ towers.

Table 252 - Summary of Capacities, Daily Production and SIV distribution according to plant sizes

	Micro Size Plants <500 kl/day	Small Size Plants 500 - <2,000 kl/day	Medium Size Plants 2,000 - <10,000 kl/day	Large Size Plants 10,000 - <25,000 kl/day	Macro Size Plants >25,000 kl/day	Unknown (NI)*	Total
No. of WTWs, Boreholes, Springs	11	2	None	None	None	None	13
No. of WSS	11	2					13
Total Design Capacity (kl/day)	3,790	2,280					6,070
Total Available Capacity (kl/day)	3,790	2,280					6,070
Average Daily Treatment Volume (kl/day)	1,662	780					2,442
Total SIV (kl/day)	1,562	787					2,349
Design Capacity Utilisation (%)	44%	34%	-	-	-		40%
Available Capacity Utilisation (%)	44%	34%	-	-	-		40%

** "Unknown" means the number of WTWs with NI (No Information) on design capacity or available capacity or SIV*

There is a total installed design capacity of 6,070 kl/d and a total available design capacity of 6,070 kl/d with all this capacity residing in micro and small-sized water treatment plants. Collectively, the 13 WTWs produce 2,442 kl/d and distributes 2,349 kl/d across the water networks. By comparing the available treatment capacity with the treated water volume, a spare treatment capacity of 3,628 kl/d is available to meet additional future demands. However, the WUE for SANParks is high (405 l/p/d) compared to the international WUE benchmark of 180 l/p/d, indicating a high ratio between effective water use and actual water abstraction.

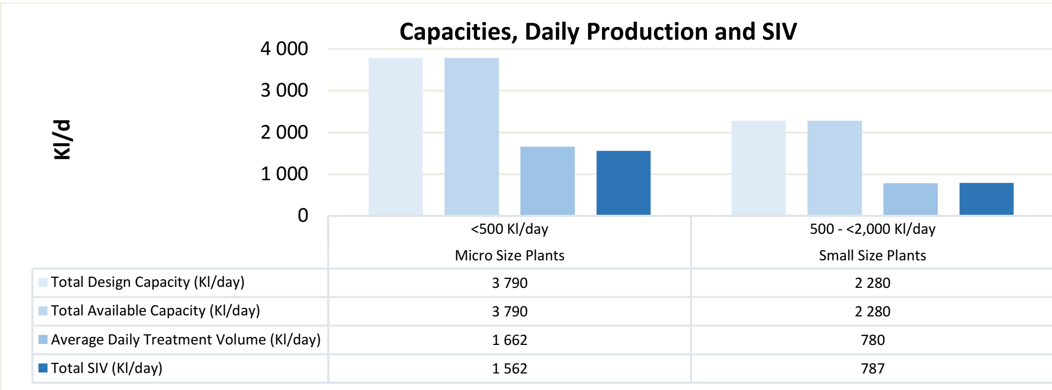


Figure 188 - Capacities, Daily Production and SIV Distribution for the micro and small sized WTWs

The total SIV in the SANParks is 2,349 kl/d and the average daily treatment volume is 2,442 kl/d and this indicates that the treated volume is slightly higher than the total SIV. The largest contributors to the total SIV for 3 WSSs are from Skukuza 1 and 2 and Lower Sabie with a total SIV contribution of 1,251 kl/d (53%). Diagnostic no. 2 to follow herein will unpack these statistics in more detail. The audit data shows that 5 systems have daily treated volumes that are exceeding the authorised daily abstraction volumes. The water distribution infrastructure is summarised in the table below.

Table 253 - Summary of Water Distribution Infrastructure

WSS Name	# WSS	Water Distribution Infrastructure: # Pump Stations (#)	Bulk Water Supply Lines (km)	Reticulation pipe lines (km)	# Reservoirs/ Towers
Skukuza 1	1	1	3	NI	3
Skukuza 2	1	1	2	NI	2
Balule	1	1	40	NI	2
Crocodile Bridge	1	1	2	NI	3
GPP	1	1	0	NI	4
Kruger Gate	1	1	0	NI	4
Letaba	1	1	5	NI	1
Malelane	1	1	10	NI	2
Nkuhlu	1	1	1	NI	4
Phabene	1	1	20	NI	1
Shingwedzi	1	1	5	NI	1
Lower Sabie	1	1	3	NI	2
Olifants	1	1	5	NI	1
Totals	**13**	**13**	**96**	**0**	**30**

Blue Drop Analysis

The 100% response for the 13 WSSs audited during the Blue Drop process demonstrates a firm commitment to water services management in the SANParks.

Table 254 - Blue Drop Comparative Analysis

BLUE DROP COMPARATIVE ANALYSIS				
Performance Category	**2012**	**2014**	**2023**	**Performance trend**
Incentive-based indicators				
WSSs assessed (#)	NA	NA	1 (100%)	None
Water supply systems assessed (#)	NA	NA	13 (100%)	
Blue Drop scores ≥50% (#)	NA	NA	13 (100%)	
Blue Drop scores <50% (#)	NA	NA	0 (0%)	
Blue Drop Certifications (#)	NA	NA	**0**	
Technical Site Assessment Score (%)	NA	NA	78%	

NA = Not Applied 0 = None

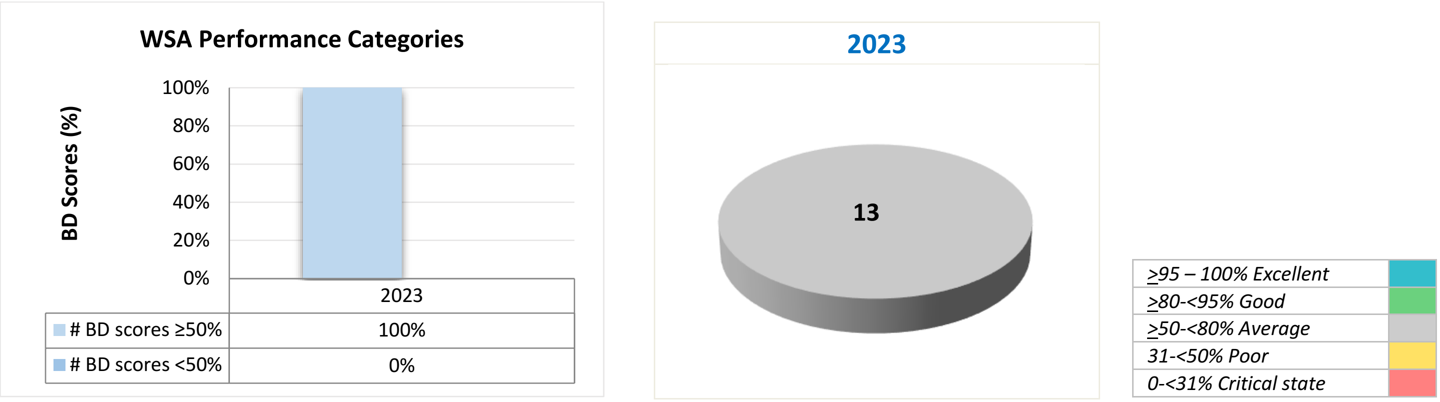


Figure 189 - Blue Drop analysis and No. Water Supply Systems in the Blue Drop score categories for 2023 (graph legend to right)

No trend analysis could be undertaken as SANParks was not assessed in the previous blue drop audit cycles. All system scores are in the >50-<80% (Average Performance) category. There are no systems in critical state (<31%).

BDRR Analysis

The Blue Drop Risk Rating (BDRR) analysis focuses predominantly on the water treatment function, with some risk indicators including water quality and risk management at reservoir and network systems. The BDRR formular was updated in 2021 to include an added risk indicator, E: Water Safety Plans, to address the risk assessment requirements outlined on SANS 241-2015. The BDRR now contains 5 risk indicators, i.e. design capacity (A), operational capacity (B), water quality compliance (C), technical capacity (D), and water safety plans (E).

Table 255 - BDRR/BDRRmax Comparative Analysis

BDRR/BDRRmax COMPARATIVE ANALYSIS									
WSS Name	**# WSSs**	**# WBs/ WSPs**	**2022 (BD PAT)**	**2023 (BD Audit)**	**Performance Trend 2022 and 2023**	**BDRR Risk Category Split**			
						0-<50%	**50-<70%**	**70-<90%**	**90-100%**
Skukuza 1	1		NA	22.6%	NA	1			
Skukuza 2	1		NA	16.5%	NA	1			
Balule	1		NA	29.8%	NA	1			
Crocodile Bridge	1		NA	34.6%	NA	1			
GPP	1		NA	21.8%	NA	1			
Kruger Gate	1		NA	57.3%	NA		1		
Letaba	1	None	NA	28.6%	NA	1			
Malelane	1		NA	17.6%	NA	1			
Nkuhlu	1		NA	21.3%	NA	1			
Phabene	1		NA	20.7%	NA	1			
Shingwedzi	1		NA	39.2%	NA	1			
Lower Sabie	1		NA	18.7%	NA	1			
Olifants	1		NA	25.5%	NA	1			
Totals & %BDRR/BDRRmax	**13**			**24.3%**		**12**	**1**	**0**	**0**

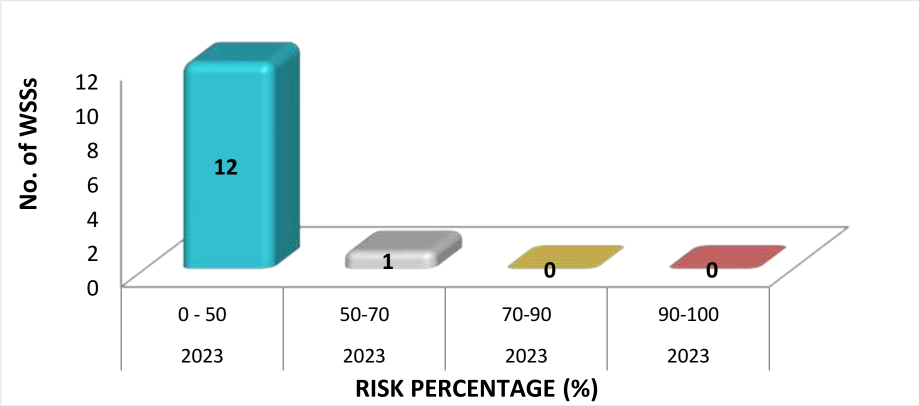


Figure 190 - a) WSS risk distribution for 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

No trend analysis could be undertaken as SANParks was not assessed in the previous blue drop PAT audit cycles.

Regulatory Enforcement

Water supply systems which failed to achieve the minimum Blue Drop target of 31%, are placed under regulatory focus. The Regulator requires these WSSs to submit a detailed corrective action (CAP) plan within 20 working days from publishing of this report. None of the 13 WSSs received Blue Drop scores below 31%, and hence no WSSs are being placed under **regulatory surveillance**, in accordance with the Water Services Act (108 0f 1997).

None of the water supply systems are in high and/or critical BDRR risk positions, which reflects on a positive status of the risk indicators, i.e. operational capacity, design capacity utilisation, water quality compliance, technical capacity, and water safety planning. Typically, WTWs in high and critical risk positions pose a serious risk to public health.

Performance Barometer

The **Blue Drop Performance Barometer** presents the individual WSS Blue Drop Scores, which essentially reflects the level of mastery that a WSS has achieved in terms of its overall water services business. The bar chart below compares the 2023 BD scores, ranked from highest to lowest performing WSS in 2023. All 13 WSSs are situated in the average performance category with the blue drop scores ranging from 50/6% to 61.9%. This provides a baseline for SANParks to improve on their blue drop scores in the next blue drop audit cycle.

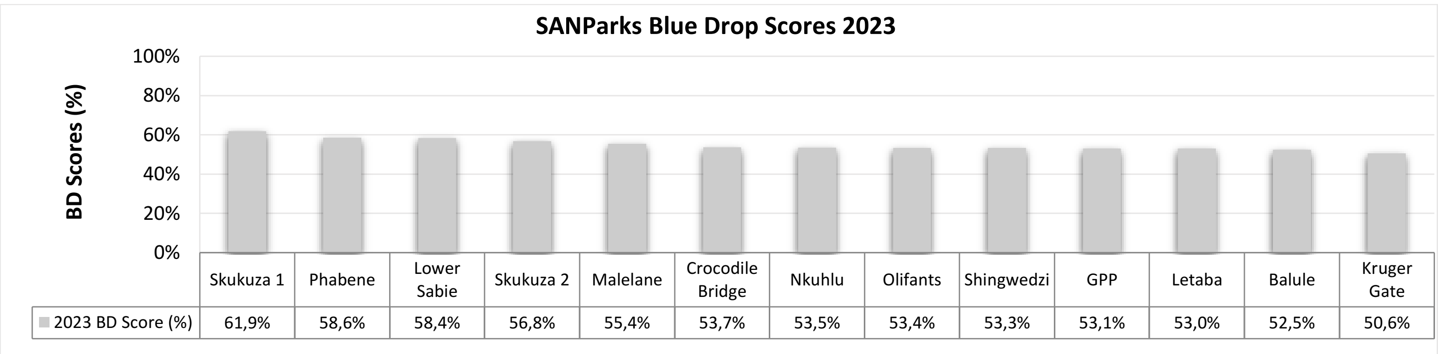


Figure 191 - a) Blue Drop scores 2023 (bar right; b) Colour legend

>95 – 100% Excellent	
>80-<95% Good	
>50-<80% Average	
31-<50% Poor	
0-<31% Critical state	

The **BDRR Risk Barometer** expresses the level of risk that a WSA poses in respect of its water supply system. The schematic below presents the BDRR in ascending order – with the low-risk WSAs on the left and higher risk WSAs to the far right. The analysis reveals that there are 12 low risks and 1 medium risk WSSs in the SANParks.

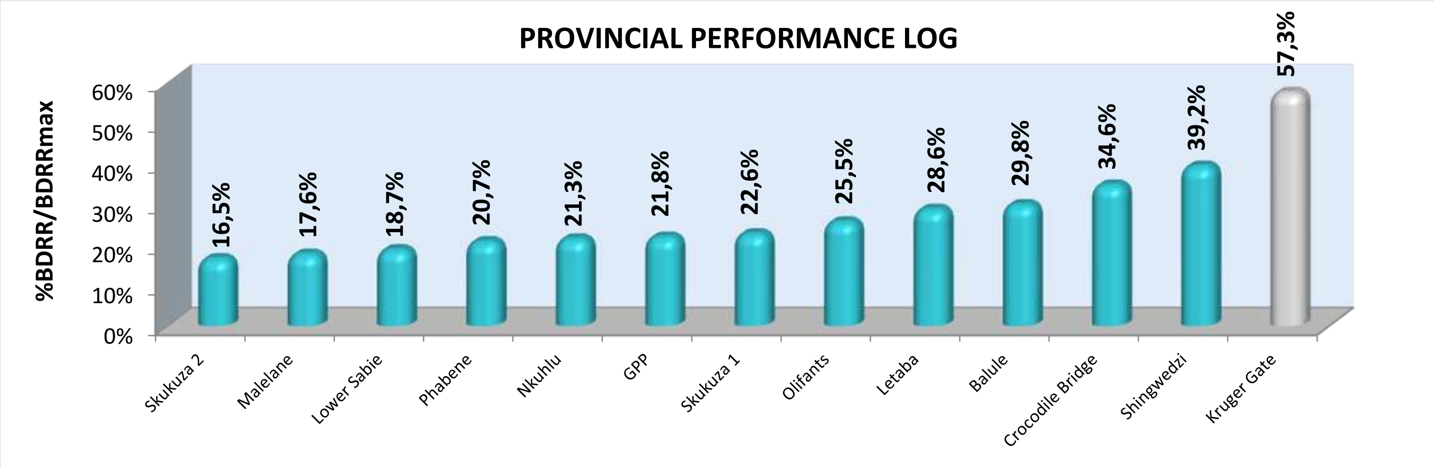


Figure 192 - a) %BDRR/BDRR$_{max}$ Risk Performance Profile/Log 2023; b) Colour legend

90 – 100% Critical risk	
70 - <90% High Risk	
50-<70% Medium risk	
<50% Low Risk	

KPA Diagnostics

The Blue Drop audit process collects a vast amount of data that yield valuable insight into the state of the water services delivery and water quality in SANParks. These insights have been captured into 5 thematic areas or 'Diagnostics', as discussed below.

Table 256 - Summary of the key diagnostic themes and reference to the respective Blue Drop KPAs

Diagnostic #	Diagnostic Description	Diagnostic Reference
1	**Technical Competence**	KPA 1, 2 & Bonus
2	**Treatment Capacity and Flow Distribution**	KPA 4 & Generic Audit data set
3	**Drinking Water Quality (DWQ) Monitoring and Compliance**	KPA 2 & 4 & Bonus
4	**Technical Site Assessments**	TSA and 2023 Blue Drop Watch Report
5	**Operation, Maintenance and Refurbishment of Assets**	KPA 3 & 4

Diagnostic 1: Technical Competence

Aim: This focus area assesses the technical human resources capacity that is available to manage and operate water treatment processes and maintain the related water infrastructure. Theory advocates that a correlation exists between human resources capacity and capability (sufficient number of appropriately qualified staff) and a WSI's performance. Thus, it is hypothesised that high HR capacity would translate to compliant water treatment plants and functional water supply network. Blue Drop assesses technical compliance on two levels: i) WTW plant supervision and process control staff and ii) Technical, scientific and maintenance staff.

(i) Plant Supervisors and Process Controllers

Findings: According to regulations, water treatment plants are classified as Class A, B, C, D or E plants. Similarly, Process Controllers and Plant Supervisors are registered as Class I, II, III, IV, V or VI Process Controllers. Higher classed plants require a higher level of Process Controllers due to technology complexity and strict water quality standards. Technical compliance of PCs and Supervisors is determined against the Blue Drop standards, as defined by Reg. 2834 of the Water Act 1956 (Act 54 of 1956) for the erection, enlargement, operation, and registration of water care works and draft Reg. 813 of the Water Services Act (No 108 of 1997). Regulation 2834 has been replaced by Regulation 3630 in 2023 but will only come in effect during the next Blue Drop audit cycle.

Table 257 - No. compliant versus shortfall in Supervisor and Process Controller staff

Institution Name	# WTWs	# WSSs	# Available Compliant Staff			Staff Shortfall		Ratio	2023 BD Score (%)
			PCs	Supervisor*	Total	PCs**	Supervisor		
SANParks	13	13	8	2	10	23	0	0.8	54.9%

* 2 Sups taken as available overall and roaming for the Class C & D WTWs

** PC shortfall is measured against Reg. 813 and may not be considered as applicable here as it appears to be inflated
Ratio depicts the no. of qualified staff divided by the no. of WTWs operated by this no. of staff. E.g., 10 compliant Sups + PCs, divided by 13 WSSs = 0.8 qualified staff per WSS
Note: "Compliant staff" means qualified and registered staff that meets the BD standard for a particular Class Works. "Staff shortfall" means staff that do not meet the BD standard for a particular Class of works (+1 for a shift) and/or staffing gaps exist at the respective WTWs.

Competent human resources are vital enablers in ensuring efficient and sustainable management of water services and delivery of safe water quality to consumers. For the SANParks in general, the operational competencies are found to be excellent for the Supervisory staff but not so for the PCs as indicated in the table and notes above.

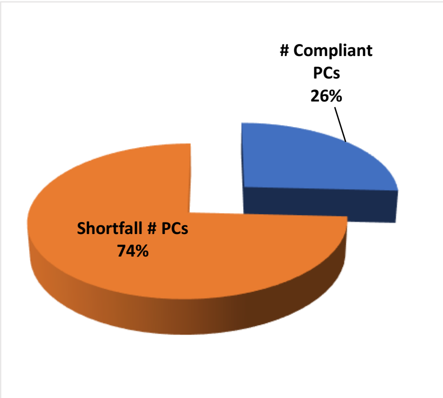


Figure 193 - Schematic illustration of compliant and shortfall of Supervisors (a) and Process Controllers (b)

Plant Supervisors: The pie charts indicate that 100% (2 of 2) of Plant Supervisors complies with the BD standard with no shortfalls.
Process Controllers: Similarly, 26% (8 of 31) of the PC staff is compliant for the SANParks and a 74% (23 of 31) shortfall in Process Controllers with the highest shortfall for Balule. The PC shortfall is measured against Reg. 813 and may not be considered as applicable here as it appears to be inflated - a case where roaming senior PCs should be allowed.

Blue Drop standards require of Class A and B plants to employ dedicated Supervisors per WTW and Process Controllers per shift per works, whereas Class C to E plants may share Supervisory staff across works. Shifts have been introduced to ensure optimal operations while addressing security risks, particularly as it relates to theft and vandalism. Telemetry also reduces the requirement for on-site staff during night shifts, but these relaxations have to be done within the DWS regulatory guidelines.

The Regulator expects correlation between the competence of an operational team and the performance of a WTW, as measured by the BD score. The result from the ratio analysis indicates a low ratio of 0.8 for SANParks.

(ii) Technical, Scientific and Maintenance staff

In addition to operational capacity (above), good management practice also requires access to qualified engineers, technicians, technologists, MISA appointees, scientists, and maintenance capability (below). Such competencies could reside in-house or accessible through term contracts and external specialists.

Table 258 - Summary of the maintenance capacity and no. of qualified and shortfall of Engineering, Technical and Scientific staff

Institution Name	# WTWs	# WSSs	Maintenance Arrangement
SANParks	13	13	Internal Team (only)

Institution Name	# WTWs	# WSSs	Qualified Technical Staff (#)					Technical Shortfall (#)	Qualified Scientists (#)	Scientists Shortfall (#)	Ratio*	2023 BD Score (%)
			Technicians	Technologists	Engineers	MISA appointees	Total					
SANParks	13	13	**0**	**1**	**1**	**0**	**2**	**2**	**1**	**1**	**0.2**	**54.9%**

* The single number ratio depicts the no. of qualified technical staff divided by the no. of WSSs that have access to the staff. E.g., 2 qualified staff, divided by 13 WSSs = 0.2 qualified staff per WSS
Note 1: "Qualified Technical Staff" means staff appointed in positions to support water services, and who has the required qualifications. "Technical Shortfall" is calculated based on a minimum requirement of at least 3 Engineers or more than 1 of each of Engineers, Technologists & Technicians; and at least one 1 Candidate Scientist and 1 Professional Scientist per WSI.
Note 2: "Qualified Scientists" means professional registered scientists (SACNASP) and candidate scientists appointed in positions to support water services. "Scientists shortfall" means that the WSS does not have at least one qualified SACNASP registered scientist and at least one 1 candidate scientist in their employ or contracted.

In terms of maintenance capacity, all the WSSs in the SANParks have a reasonable contingent of qualified technical/maintenance staff. The maintenance staff comprises of an internal maintenance team only.

In terms of qualified professional technical staff at SANParks the data indicates the following:

- A total of 2 qualified staff comprised of 1 Engineer and 1 Technologist, no Technicians and no MISA appointees (qualified); and 1 SACNASP registered scientist assigned to the 13 WSSs
- A total shortfall of 3 persons is identified, consisting of 2 technical staff and 1 candidate scientist
- The 13 WSSs do not have access to a credible laboratory that complies with the Blue Drop standards.

Ratio analysis has been done to determine the number of qualified technical and scientific staff assigned per WSS. It is expected that a higher ratio would correspond with well-performing and maintained water supply systems, as represented by the BD score. The result from the ratio analysis indicates a low ratio of 0.2 for SANParks.

One of the options to enhance operational capacity is through dedicated training programmes. The Blue Drop audit incentivises training of operational staff over the 2-year period prior to the audit date. The results are summarised as follows:

Table 259 - No. of WTWs with operational staff sent on training over the past 2 years and vice versa

WSS Name	# WTWs	# WTW staff attending training	# WTW without training
Skukuza 1	1	1	
Skukuza 2	1	1	
Balule	1	1	
Crocodile Bridge	1	1	
GPP	1	1	
Kruger Gate	1	1	
Letaba	1	1	
Malelane	1	1	
Nkuhlu	1	1	
Phabene	1	1	
Shingwedzi	1	1	
Lower Sabie	1	1	
Olifants	1	1	
Totals	**13**	**13 (100 %)**	**0 (0%)**

Figure 194 - %WTWs that have trained operational staff over the past two years

The results confirm that all the 13 WTWs had some of their operational staff attend training over the past 2 years (partial compliance). It stands to reason that investment in human capital through technical orientated training and skills development will mitigate some of the water quality failures and lower performances.

Diagnostic 2: Treatment Capacity and Flow Distribution

Aim: Diagnostic 2 deals with design and flow related dynamics, comprising of: i) design capacity and operational flow, ii) raw water abstraction, and iii) WUE and SIV.

(i) Design Capacity and Operational Flow

This diagnostic assesses the status of plant design capacity and daily water production at the WTWs, as well as SIVs as measured at the outflow from the WTW or inflow to the water distribution network. A capable WTW requires adequate installed design capacity and functional equipment to operate optimally. If the WTW design capacity is exceeded by the average daily production (treatment) volume, the WTW will not be able to deliver SANS compliant water quality. The available design capacity is typically exceeded when the water demand exceeds the installed design capacity, or when unit processes or equipment are dysfunctional, or when electrical supply problems render treatment and pumping of water defective. Typically, the production volume and SIV is the same if 1 WTW supplies 1 WSS, but different if multiple supply systems are feeding from a singular WTW.

Findings: Analysis of the design capacity and average daily production/ treatment volume indicate a total design capacity of 6,070 kl/d for the SANParks, with a total average daily treatment (operational) volume of 2,442 kl/d. Theoretically, this implies that 40% of the design capacity is used with 60% available to meet additional water demand.

All 13 WTWs have their full installed capacity available with no exceptions. In addition, 12 WTWs are operating within their design capacities with the exception of 1 WTW that is operating at its design capacity (100%). This risk is currently mitigated through operational optimisation and preventative maintenance regimes.

Table 260 - Summary of WTWs design, available and operational capacities, % use available capacity, and Total SIV towards the WSSs

WSS Name	# WTWs	# WSSs	Design Capacity (kl/d)	Available Capacity (kl/d)	Average Daily Production (kl/d)	Available Variance (kl/d)	% Available Capacity	Total SIV towards the WSS (kl/d)
Skukuza 1	1	1	1,560	1,560	657	903	42%	654
Skukuza 2	1	1	480	480	207	273	43%	207
Balule	1	1	720	720	123	597	17%	123
Crocodile Bridge	1	1	240	240	182	58	76%	182
GPP	1	1	480	480	89	391	19%	89
Kruger Gate	1	1	48	48	38	10	79%	38
Letaba	1	1	480	480	137	343	28%	137
Malelane	1	1	480	480	97	383	20%	97
Nkuhlu	1	1	48	48	38	10	79%	38
Phabene	1	1	480	480	109	371	23%	109
Shingwedzi	1	1	360	360	151	209	42%	151
Lower Sabie	1	1	480	480	480	0	100%	380
Olifants	1	1	214	214	134	80	63%	134
Totals	**13**	**13**	**6,070**	**6,070**	**2,442**	**3,628**	**40%**	**2,339**

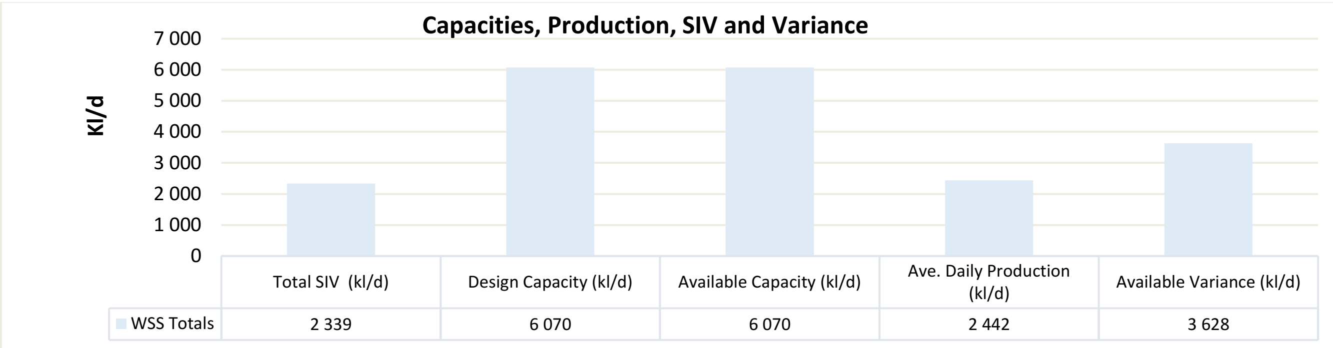


Figure 195 - WSS design, available and operational capacities, % available capacity, and Total SIV towards the WSSs

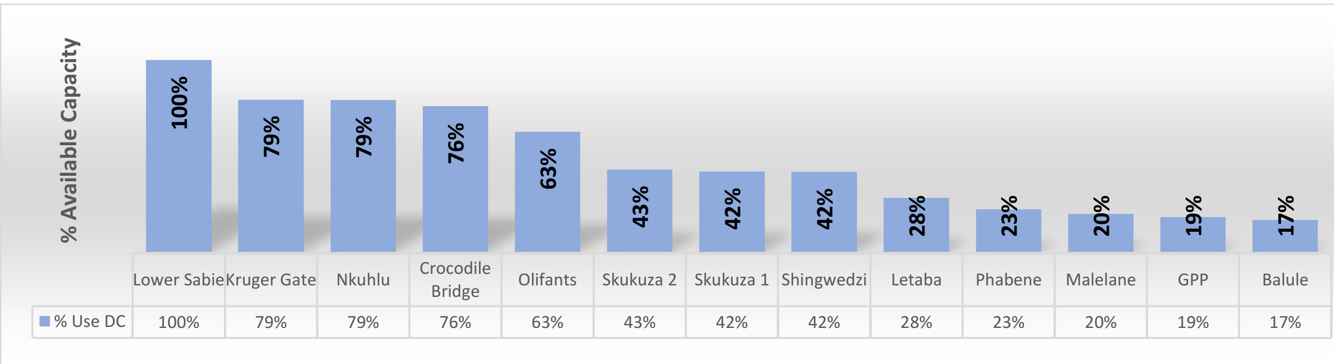


Figure 196 - WSS % available capacity

(ii) Raw Water Abstraction

This diagnostic takes a snapshot view of the status of water abstraction authorisations from natural water resources in SANParks. As per the National Water Act (Act no 36 of 1998), Water Use Licenses (WULs) mandate the maximum abstraction volumes of raw water, and the installation and monitoring of abstraction, inflow, and outflow meters, whilst the BD audit requires SANParks to report the flows on IRIS and to calibrate meters annually. Any defects in terms of abstracting water from a resource without an authorisation, or exceeding the authorised volume, or reporting inaccurate volumes, or not monitoring abstraction against authorised volumes, are considered to be a regulatory risk and contravention of the law.

Findings: Data pertaining to the daily abstraction volumes (kl/d), average daily treatment volumes (kl/d), the names of the WTWs exceeding the Daily Abstraction Volumes (Authorised) and Average Daily Treatment Volumes (Authorised) is captured in the tables below.

Table 261 - Summary of Abstraction Volumes (Authorised), Average Daily Treatment Volumes, and Variances

WSS Name	# WTWs	# WSSs	Daily Abstraction Volumes (Authorised) (kl/d)	Average Daily Treatment Volume (kl/d)	Average Variance (kl/d)
Skukuza 1	1	1	2,700	657	2,043
Skukuza 2	1	1	400	207	193
Balule	1	1	340	123	217
Crocodile Bridge	1	1	170	182	-12
GPP	1	1	60	89	-29
Kruger Gate	1	1	30	38	-8
Letaba	1	1	370	137	233
Malelane	1	1	350	97	253
Nkuhlu	1	1	12	38	-26
Phabene	1	1	280	109	171
Shingwedzi	1	1	200	151	49
Lower Sabie	1	1	199	480	-281
Olifants	1	1	210	134	76
Totals	**13**	**13**	**5,321**	**2,442**	**2,879**

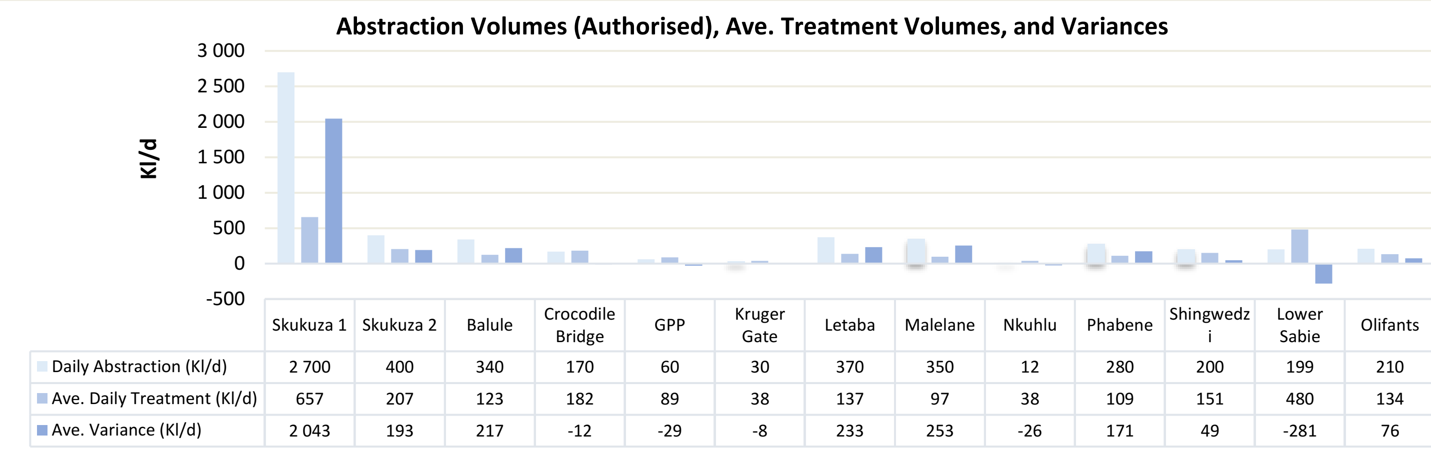


Figure 197 - Abstraction Volumes (Authorised), Average Daily Treatment Volumes, and Variances

The results conclude shows that 5 systems (Crocodile Bridge, Game Processing Plant, Kruger Gate, Nkuhlu and Lower Sabie) have daily production volumes that are exceeding the authorised daily abstraction volumes (negative average variance figures reflected in the table above). These WSS are not complying with the regulations and compliance will be required to show correction in the next Blue Drop audit cycle.

The Blue Drop audit requires an IWA water balance to determine the SIV into each water supply system, and to identify and quantify possible losses from abstraction to the end user or consumption points in the water delivery and water distribution networks. No water balances are in place for the 13 WSSs in SANParks.

(iii) Water Use Efficiency and System Input Value

The Department is committed to consider issues related to water scarcity and security, aiming to ensure there is sufficient water for the population, the economy, and the environment by increasing water use efficiency across all sectors. Water use for services sectors is specifically dealing with the quantity of water used directly by the consumer through the public distribution network and industries connected to the network.

This diagnostic assesses the water use efficiency (i.e., the average daily consumption in litres per person per day) and the individual and collective performance of the water supply systems. WUE indicates how effective is water used by consumers, i.e. the process between effective water use and actual water abstraction. This concept is closely related to the Department's No Drop Certification assessment, whereby WUE, NRW and water losses are targeted as part of Water Conservation and Water Demand Management strategies.

Findings: Both the Blue Drop audit and No Drop audits require an IWA water balance to determine the SIV into each water supply system, and to identify and quantify possible losses from abstraction to the end-of-use point.

WUE is calculated based on the SIV contributions, population served, and the average daily consumption, as summarised in the following table.

Table 262 - Summary of total SIV, total population served, average daily consumption, WUE status

Institution Name	# WSSs	Total Population	Total SIV (kl/d)	2023 WUE (l/p/d)	2023 Blue Drop WUE Range & Performance	
SANParks	13	5,800	2,349	405	>300	Extremely High

WUE (l/cap/day) performance categories

Colour	WUE Range	Performance
	>300	Extremely high per capita water use
	>250-300	Poor per capita water use
	>200-250	Average per capita water use with potential for marked improvement
	>150-200	Good per capita water use but some improvement may be possible subject to economic benefits
	<150	Excellent per capita water use management

For SANParks, 2,349 kl/d water is supplied to 5,800 consumers. An average 405 litre of water is used per person per day, which implies an extremely high per capita water use and is regarded as extremely high according to national benchmarks. No Drop Certification is specifically tasked with plans to curb water losses and improve NRW through water accounting assessments and water conservation and demand management.

Diagnostic 3: Drinking Water Quality (DWQ) Monitoring and Compliance

Aim: Blue Drop audits values the principles of "To measure is to know" and "To know is to manage". The primary objective of a water treatment plant is to produce final water quality that is safe for human consumption at the end of the distribution network. This standard can only be measured and achieved if operational and compliance monitoring and DWQ compliance is executed at the correct frequency, sample point, and determinand type. This diagnostic assesses the i) operational and compliance monitoring status, ii) drinking water quality compliance, and iii) risk defined compliance and laboratory credibility.

(i) Drinking water operational and compliance monitoring

Findings: A minimum level of 90% operational monitoring compliance is applied as benchmark, to give weight to the importance of sampling and monitoring of the raw water, process unit water, and final water across the treatment stream. Compliance monitoring is also informed by SANS 241:2015 and the requirement for risk-informed monitoring through the WaSP process at both the WTW final and distribution network. DWQ compliance is calculated against the population size and the mandatory limits set by SANS 241:2015 and the Blue Drop standards, as calculated and reported from data loaded in the IRIS.

Table 263 - Summary of the KPA 2 WTW operational and WSS compliance monitoring status

WSS Name	# WTWs	# WSSs	WTW Operational monitoring [KPA 2 sub-KPA 2.b)]		WSS Compliance monitoring [KPA 2 sub-KPA 2.c)]	
			Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]	Satisfactory [BD score ≥90%]	Not Satisfactory [BD score <90%]
Skukuza 1	1	1		1		1
Skukuza 2	1	1		1		1
Balule	1	1		1		1
Crocodile Bridge	1	1		1		1
GPP	1	1		1		1
Kruger Gate	1	1		1		1
Letaba	1	1		1		1
Malelane	1	1		1		1
Nkuhlu	1	1		1		1
Phabene	1	1		1		1
Shingwedzi	1	1		1		1
Lower Sabie	1	1		1		1
Olifants	1	1		1		1
Totals	**13**	**13**	**0 (0%)**	**13 (100%)**	**0 (0%)**	**13 (100%)**

The performance recorded in the table above stems from performance data as measured against the Blue Drop Standard expressed in KPA 2 and sub-KPAs 2.b) and 2.c). Overall, an unsatisfactory sampling and analysis regime is observed for both operational (100%) and compliance (100%) monitoring. The data indicates that None of the 13 WTWs (0%) are on par with good practice for operational monitoring of the raw and final water and the respective process units at the WTW. In terms of compliance monitoring, none of the WSSs (0%) are on par with good compliance monitoring practices, and all the WSSs (100%) are failing the Blue Drop standard. This is a deeply concerning observation. Compliance monitoring is a legal requirement and the only means to measure the DWQ performance of a water supply system. Operational monitoring is the cornerstone of day-to-day process adjustments and optimisation to ensure that the water treatment is efficient and delivers quality final water. The results indicate that 13 WTWs and WSSs are not achieving regulatory and industry standards.

(ii) Drinking water quality compliance

Findings: DWQ compliance is measured against the requirements of SANS 241:2015 under KPA 5 of the Blue Drop audit. The tables following summarises the results of the DWQ status for Microbiological and Chemical Compliance, which also carries the highest Blue Drop score weighting of 35% (of 100%).

Table 264 - Summary of the DWQ Status for Microbiological Compliance

WSS Name	# WSSs	Population	% Ave. Micro Compliance	# WSS Micro Performance Status		
				Excellent	Good	Unacceptable
Skukuza 1	1	2,000	99.99%	1		
Skukuza 2	1	600	99.99%	1		
Balule	1	300	99.99%	1		
Crocodile Bridge	1	150	99.99%	1		
GPP	1	50	99.99%	1		
Kruger Gate	1	50	91.67%			1
Letaba	1	300	99.99%	1		
Malelane	1	400	99.99%	1		
Nkuhlu	1	50	99.99%	1		
Phabene	1	300	99.99%	1		
Shingwedzi	1	300	99.99%	1		
Lower Sabie	1	300	99.99%	1		
Olifants	1	1,000	99.99%	1		
Totals	**13**	**5,800**	**99.35%**	**12**		

MICRO: Population <100,000		
Colour	Status	Percentage
	Excellent	>97%
	Good	>96 - <97%
	Unacceptable	<96%

MICRO: Population >100,000		
Colour	Status	Percentage
	Excellent	>99%
	Good	>98 - <99%
	Unacceptable	<98%

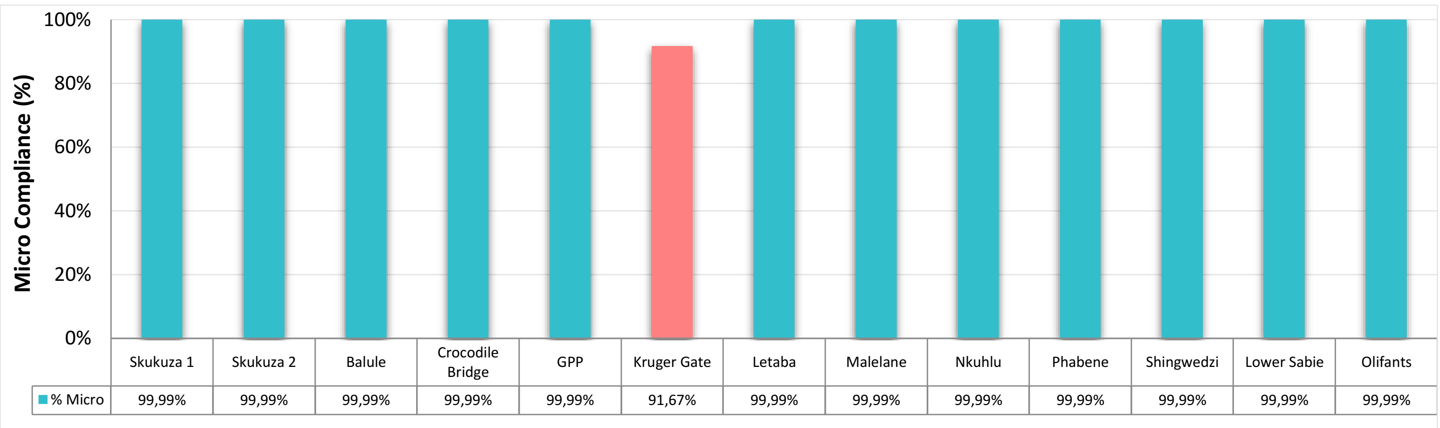
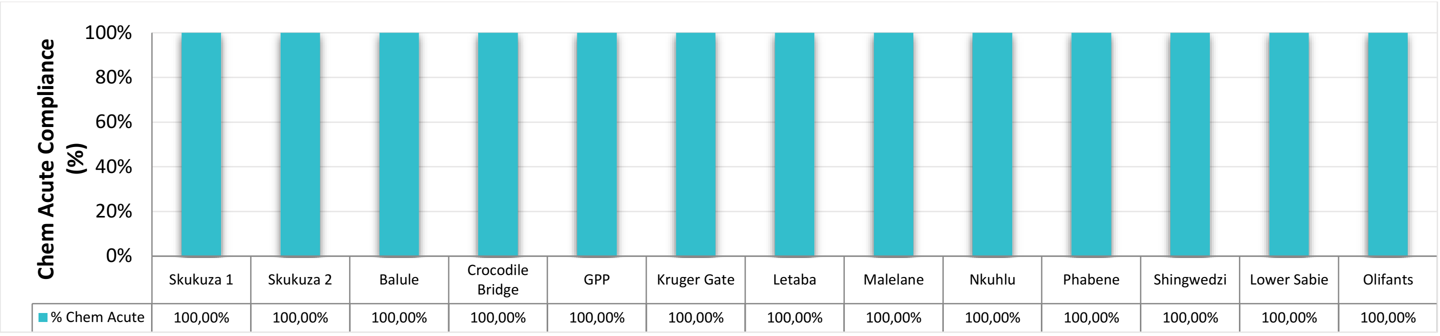


Figure 198 - Microbiological Drinking Water Quality Status

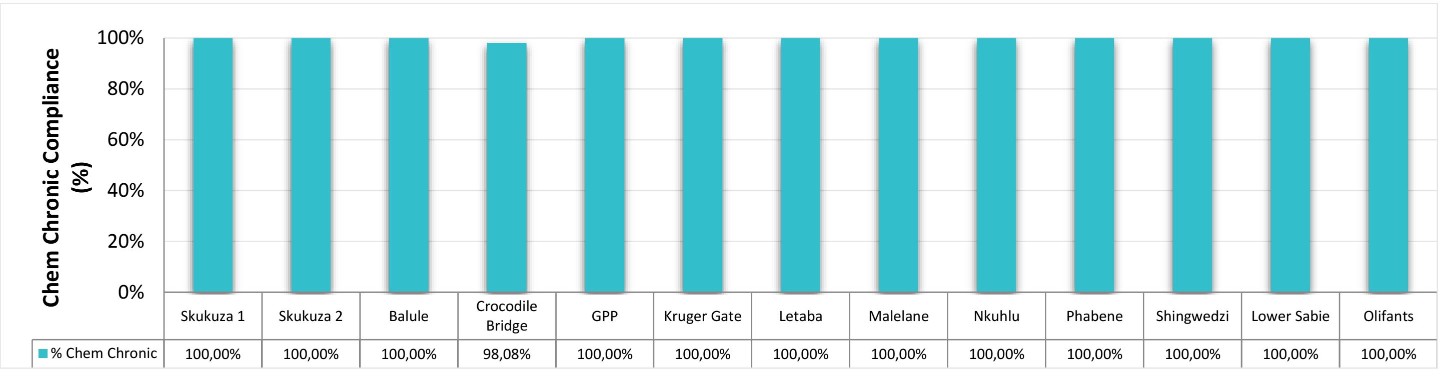
12 of 13 (92%) systems achieved excellent microbiological quality whilst only 1 of 13 (8%) systems have an unacceptable microbiological water quality status. The water in these systems pose a serious acute health risk to the community. Failure to produce water that meets microbiological compliance standards can be linked back to poor operations, defective infrastructure, inadequate dosing rates, absence of disinfection chemicals, lack of monitoring, lack of operating and chemistry knowledge, and several other root causes. WSIs that are not monitoring the final water quality at the outlet of the treatment plant or at specific end use points are required to develop a monitoring programme and resume with compliance monitoring as a matter of urgency.

Table 265 - Summary of the DWQ Status for Chemical Acute Health and Chronic Health Compliance

WSS Name	# WSSs	Population	% Ave. Chem Acute Health Compliance	# WSS Chem Acute Health Performance Status			% Ave. Chem Chronic Health Compliance	# WSS Chem Chronic Health Performance Status		
				Excellent	Good	Unacceptable		Excellent	Good	Unacceptable
Skukuza 1	1	2,000	100%	1			100%	1		
Skukuza 2	1	600	100%	1			100%	1		
Balule	1	300	100%	1			100%	1		
Crocodile Bridge	1	150	100%	1			98.1%	1		
GPP	1	50	100%	1			100%	1		
Kruger Gate	1	50	100%	1			100%	1		
Letaba	1	300	100%	1			100%	1		
Malelane	1	400	100%	1			100%	1		
Nkuhlu	1	50	100%	1			100%	1		
Phabene	1	300	100%	1			100%	1		
Shingwedzi	1	300	100%	1			100%	1		
Lower Sabie	1	300	100%	1			100%	1		
Olifants	1	1,000	100%	1			100%	1		
Totals	**13**	**5,800**	**100%**	**13**	**0**	**0**	**99.9%**	**13**	**0**	**0**



CHEM Acute Health: Population <100,000			CHEM Acute Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	>97%		Excellent	>99%
	Good	>95 - <97%		Good	>97 - <99%
	Unacceptable	<95%		Unacceptable	<97%



CHEM Chronic Health: Population <100,000			CHEM Chronic Health: Population >100,000		
Colour	Status	Percentage	Colour	Status	Percentage
	Excellent	>95%		Excellent	>97%
	Good	>93 - <95%		Good	>95 - <97%
	Unacceptable	<93%		Unacceptable	<95%

Figure 199 - Chemical Acute Health and Chronic Health Drinking Water Quality Status

Chemical acute health compliance shows that 13 (100%) systems have excellent water quality and none of the systems have an unacceptable chemical acute health compliance. Chemical chronic health compliance shows that 13 (100%) systems have excellent water quality and none of the systems have an unacceptable chemical chronic health compliance.

The Water Services Act upholds standards regarding the monitoring and reporting on drinking water quality and issuance of advisory notices to the public when significant DWQ failures are observed. The audit process applies a penalty when DWQ failures are noticed without issuing such Water Quality Alert Notices to forewarn water users of the status of (unsafe) water quality and to advise communities to source alternative water sources or methods to disinfect water used for drinking water purposes.

Table 266 - Summary of Penalties Applied to WSSs for not Issuing Advisory Notices

Institution Name	# WSSs	# WSS No Penalty Applied
SANParks	13	13

No penalties were applied to all 13 (100%) WSSs.

(iii) Risk defined compliance and laboratory credibility

Findings: Risk-defined compliance standards aim to determine the compliance (to SANS 241) of those parameters that have been found to pose a risk in a specific WSS and need to be included in the routine monitoring programme or frequency as prescribed by SANS 241. The SANParks achieved an average Annual Risk Defined Compliance of 91.8%. Excellent risk defined compliance was achieved by 5 (38%) systems and bad compliance for 8 (62%) systems.

Table 267 - Summary of the DWQ Compliance for Risk Defined Compliance

WSS Name	# WSSs	Population	Ave. %Risk Defined Compliance	# WSS Performance Status		
				Excellent	Good	Bad
Skukuza 1	1	2,000	96.43%	1		
Skukuza 2	1	600	96.92%	1		
Balule	1	300	85.00%			1
Crocodile Bridge	1	150	87.30%			1
GPP	1	50	92.31%			1
Kruger Gate	1	50	95.00%	1		
Letaba	1	300	86.67%			1
Malelane	1	400	92.50%			1
Nkuhlu	1	50	92.31%			1
Phabene	1	300	96.92%	1		
Shingwedzi	1	300	86.67%			1
Lower Sabie	1	300	95.38%	1		
Olifants	1	1,000	90.00%			1
Totals	**13**	**5,800**	**91.80%**	**5**	**0**	**8**

The aim of operational determinand compliance is to determine the efficiency of the water treatment process, by monitoring those parameters which are used to control the treatment process. Although not necessarily a health risk, these parameters provide good information on the integrity of the WTW. The SANParks achieved an average % Actual Operational Determinand Compliance of 39%. No excellent and good risk defined compliance was achieved by any of the 13 systems. Bad risk defined compliance was achieved for all 13 (100%) systems.

Table 268 - Summary of the Treatment (Operational) Efficiency Index

WSS Name	# WSSs	Population	Actual Operational Determinand Compliance (% ave.)	# WSS Performance Status		
				Excellent	Good	Bad
Skukuza 1	1	2,000	35%			1
Skukuza 2	1	600	10%			1
Balule	1	300	10%			1
Crocodile Bridge	1	150	40%			1
GPP	1	50	40%			1
Kruger Gate	1	50	50%			1
Letaba	1	300	29%			1
Malelane	1	400	50%			1
Nkuhlu	1	50	50%			1
Phabene	1	300	50%			1
Shingwedzi	1	300	50%			1
Lower Sabie	1	300	40%			1
Olifants	1	1,000	50%			1
Totals	**11**	**5,800**	**39%**	**0**	**0**	**13**

SANParks provided no proof of the credibility of the SANParks Skukuza Laboratory and hence does not appear to have access to a credible laboratory for compliance and operational analysis. This laboratory is either accredited with SANAS, and/or has Proficiency Testing Scheme in place to ensure suitable analytical methods and quality assurance produce credible water quality data. The SANParks Skukuza Laboratory does not appear to be meeting the regulatory expectation that all WSIs have access to analytical services for compliance and operational monitoring.

Diagnostic 4: Technical Site Assessments

Aim: The Blue Drop process makes provision for a Technical Site Assessment (TSA) in order to verify the desktop evidence through field-based inspections. This assessment includes a physical inspection of the entire water treatment plant with all its process units, as well as the reservoir and spot checks of a pumpstation and pipelines. The technical assessment is coupled with an asset condition check to determine an approximate cost (VROOM) to restore existing infrastructure to functional status for the treatment facility (only).

Findings: The results of the SANParks TSA is summarised in the table below. A deviation of 10% between the BD and TSA score indicate a misalignment between the administrative aspects and the work on the ground. The Regulator regards a WTW with a TSA score of >80% to have an acceptable level of process control and functional equipment, and a TSA score of 90% as an excellent WTW that complies with most of the Blue Drop TSA standards. A TSA score of <30% indicates that the treatment facility and network fails in most regards, and is evident of dysfunctional infrastructure, failed process control, absence of record keeping and monitoring, and poor water quality.

The VROOM cost presents a ''Very Rough Order of Measurement" cost to return a WTWs functionality to its original design. More detail can be found in the Blue Drop Watch Report 2023.

Table 269 - %TSA and %BD score, and VROOM cost estimates total and split for civil, mechanical, and electrical

WSS Name	TSA Name	%TSA	2023 BD Score (%)	Civil cost estimate	Mechanical cost estimate	Electrical & C&I cost estimate	Total VROOM cost
Kruger Park - Skukuza 1	Skukuza 1	78.0%	**61.9%**	447,190	3,577,517	447,190	4,471,896
			Totals	**R447,190**	**R3,577,517**	**R447,190**	**R4,471,896**
			% Split of Cost Items	**10%**	**80%**	**10%**	**100%**

A deviation of >10% is noted between the BD and TSA score. For the individual WTWs assessed in the SANParks, a total budget of R4.472m is estimated, with the bulk of the work (80%) going towards restoration of the mechanical equipment.

Diagnostic 5: Operation, Maintenance and Refurbishment of Assets

Aim: Insufficient financial resources are often cited as a root cause to dysfunctional or non-compliant water treatment works and water networks. Knowledge and monitoring of fiscal spending are therefore a critical part of water services management and of the assets. This diagnostic investigates the status of financial information as pertaining to O&M budgets and expenditure, asset figures, and capital funding.

Findings: Financial information was presented during the audit process. Unfortunately, the budget and spend figures were not ringfenced for water only and the budget was way overspent. The results are discussed hereunder.

Capital, O&M Budget and Actual, and Asset Value

The capital budgets, O&M budgets, O&M actual expenditure, and current asset values are summarised below.

Table 270 - Summary of the capital budgets, O&M budgets, O&M actual expenditure, and current asset values

WSS Name	Capital budget available ®	O&M budget (R) (2021/22)	O&M expended (R) (2021/22)	% Expended	Total Current Asset Value ®
SANParks	R16,700,000	R8,020,000	R14,300,208	178%	R41,319,271

The Regulatory Comments following in this Chapter list the capital projects with secured funding for SANParks. The capital lists are deemed to be a definitive means to address water service inadequacies and ensuring water infrastructure investment. A total capital budget of R16.7m has been reported for the refurbishment and upgrades of the water supply system infrastructure.

For the 2021/22 fiscal year, the total O&M budget reported for the SANParks was R8m, of which R14.3m (178%) has been expended. Over-expenditure of 178% was observed. The budget and expenditure figures provided for were not ringfenced for water only.

The total current asset value for water infrastructure (networks, pump stations, treatment plants) is reportedly R41.32m for all systems in total.

O&M Cost Benchmarking

By combining the SALGA and WRC WATCOST models, an estimation of the maintenance cost required per asset type can be done, i.e. civil, buildings, pipelines, mechanical, electrical, and instrumentation.

Table 271 - SALGA-WRC annual maintenance budget guideline and cost estimation

Description	% of Current Asset Value	Asset Value Estimate	Modified SALGA Maintenance Guideline	Annual Maintenance Budget Guideline
Current Asset Value estimate	**100%**	**R41,319,271**	**15.75%**	**R892,496**
Broken down into:				
1. Civil Structures	46%	R19,006,865	0.50%	R95,034
2. Buildings	3%	R1,239,578	1.50%	R18,594
3. Pipelines	6%	R2,479,156	0.75%	R18,594
4. Mechanical Equipment	30%	R12,395,781	4.00%	R495,831
5. Electrical Equipment	11%	R4,545,120	4.00%	R181,805
6. Instrumentation	4%	R1,652,771	5.00%	R82,639
Totals	**100%**	**R41,319,271**	**15.75%**	**R892,496**
			Minus 20% P&Gs and 10% Installation	**R267,749**
			Total	**R624,747**

The model estimates that R0.893m (2.16%) is required per year to maintain the assets valued at R41.32m. Notably, this maintenance estimate assumes that all assets are functional. In cases where Blue Drop Certification is not being achieved, it can be assumed that some form of inefficiency or constraint is being experienced, and national benchmarks closer to 7% of the asset value is advocated (R2.89m).

The table below indicates the SALGA maintenance cost estimation in relation to the O&M budget, and O&M actual expended.

Table 272 - O&M cost estimates by the SALGA versus actual budget and expenditure figures

Cost Reference	O&M Cost Estimate	Period	% of Asset Value
Modified SALGA	R892,496	Annually, estimation	2.16%
O&M Budget	R8,020,000	Actual for 2021/22	19.4%
O&M Spend	R14,300,208	Actual for 2021/22	34.6%

The cost dynamics can be summarised as follows:

- The SALGA estimations for maintenance budgets is about 11.1% (Modified SALGA divided by O&M Budget) of the actual reported budgets for the 2021/22 fiscal year
- The actual O&M budget (19.4%) appears to be more than adequate when compared with the SALGA guideline (2.16%) or with the government benchmark (7%).

14.1 San Parks – Department of Forestry, Fisheries and Environment

Municipal Blue Drop Score		
Blue Drop Score 2023	%	57.12%
Blue Drop Score 2014	%	0.00%
Blue Drop Score 2012	%	0.00%
Blue Drop Score 2011	%	0.00%

Key Performance Area	Weight	Balule	Crocodile Bridge	GPP	Kruger Gate
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	52.45%	53.71%	53.05%	50.63%
Blue Drop Score 2014	%	NA	NA	NA	NA
Blue Drop Score 2012	%	NA	NA	NA	NA
Blue Drop Score 2011	%	NA	NA	NA	NA
System Design Capacity	kL/d	720	240	480	48
System Available Capacity	kL/d	720	240	480	48
System Input Value	kL/d	123	182	89	38
Capacity Utilisation	%	17.08%	75.96%	18.59%	79.42%
Resource Abstracted From		Olifants	Crocodile River	Sand River	Sabie river
BDRR 2023	%	29.75%	34.58%	21.78%	57.33%
BDRR 2022	%	NA	NA	NA	NA

Key Performance Area	Weight	Letaba	Lower Sabie	Malelane	Nkuhlu
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	53.00%	58.39%	55.39%	53.45%
Blue Drop Score 2014	%	NA	NA	NA	NA
Blue Drop Score 2012	%	NA	NA	NA	NA
Blue Drop Score 2011	%	NA	NA	NA	NA
System Design Capacity	kL/d	480	480	480	48
System Available Capacity	kL/d	480	480	480	48
System Input Value	kL/d	137	380	97	38
Capacity Utilisation	%	28.46%	100.00%	20.21%	79.17%
Resource Abstracted From		Letaba	Sabie River	Crocodile	Sabie River
BDRR 2023	%	28.62%	18.68%	17.58%	21.33%
BDRR 2022	%	NA	NA	NA	NA

Key Performance Area	Weight	Olifants	Phabene	Shingwedzi	Skukuza 1
Bulk/WSP		-	-	-	-
Blue Drop Score 2023	%	53.40%	58.59%	53.34%	61.89%

Key Performance Area	Weight	Olifants	Phabene	Shingwedzi	Skukuza 1
Blue Drop Score 2014	%	NA	NA	NA	NA
Blue Drop Score 2012	%	NA	NA	NA	NA
Blue Drop Score 2011	%	NA	NA	NA	NA
System Design Capacity	kL/d	214	480	360	1 560
System Available Capacity	kL/d	214	480	360	1 560
System Input Value	kL/d	134	109	151	664
Capacity Utilisation	%	62.76%	22.63%	41.94%	42.12%
Resource Abstracted From		Olifants	Sabie River	Shingwezi River	Sabie River
BDRR 2023	%	25.53%	20.67%	39.22%	22.59%
BDRR 2022	%	NA	NA	NA	NA

Key Performance Area	Weight	Skuluza 2
Bulk/WSP		-
Blue Drop Score 2023	%	**56.76%**
Blue Drop Score 2014	%	NA
Blue Drop Score 2012	%	NA
Blue Drop Score 2011	%	NA
System Design Capacity	kL/d	480
System Available Capacity	kL/d	480
System Input Value	kL/d	207
Capacity Utilisation	%	43.13%
Resource Abstracted From		Sabie River
BDRR 2023	%	16.48%
BDRR 2022	%	NA

Technical Site Assessment: Skukuza 1 WTW – 78%

Kruger Park staff and audit team – well done for a first audit

Skukuza WTW: Discipline in all aspects of operation, raw water extraction from the Sabie River

15. CONCLUSION AND WAY FORWARD

Diagnostic Summary and Recommendations

The Blue Drop 2023 results reveal vulnerabilities and deficiencies on institutional and governance level, as well as on technical aspects. Where these deficiencies are profound, i.e. in cases of poor Blue Drop scores, the consequence is ineffective or failed water services delivery. Specific trends and themes are observed to confirm a national picture and to guide water sector actors to address these in a systematic, possibly programmatic, approach to affect wide-scale turnaround.

Common Findings and Root Causes

The Regulator acknowledges the following issues and root causes pertaining to drinking water supply and water quality:

- Individual water treatment works in each province varies from poor to excellent. The technical site assessment scores indicate the average status of water treatment and network infrastructure - EC 57%, FS 63%, GP 82%, KZN 72%, LP 60%, MP 69%, NW 64%, NC 56% and WC 81%. Thus, provincially TSAs range from average to good with a nationally indicator of 67% (average). Nationally, 85% of the VROOM costs are attributed to mechanical equipment (51%) and civil infrastructure (34%), thereby confirming that dysfunctional mechanical equipment is the largest cost and a root cause for non-compliance to drinking water standards.
- In such cases where infrastructure are found to be in poor condition, the general root cause seems indicate a lack of maintenance, which is in turn caused by non-prioritisation of budgets for maintenance and operations, as well as poor billing and revenue collection, which often point to questionable leadership, management, and overall accountability.
- Non-adherence to standard operating processes for drinking water treatment, caused by municipalities failing to hire the necessary staff with the correct skills and qualifications as well as poor management practice. These factors are as important as infrastructure condition, if not more important, as contributors to poor performance
- DWS, COGTA and DHS allocate approximately R20 billion per annum in water and sanitation infrastructure grants to municipalities, but often this money must be used to repeatedly repair and refurbish infrastructure which has deteriorated rapidly due to a lack of maintenance by municipalities.
- Vandalism and metal theft are an increasing cause of infrastructure failure, but this is partly a result of inadequate security being provided by the municipalities. Municipalities do not have anti-vandalism strategies, contingency plans or means to secure infrastructure.

The Blue Drop findings and actions are summarised as follows, per KPA diagnostic:

Diagnostic 1: Technical Competence

Many of the metros, larger municipalities and waterboards fared well in terms of technical competencies, whereas smaller WSAs indicated a shortfall to total lack in technical skills. These vulnerabilities will be addressed via:

- WSIs will be required to update and maintain the registration of all Supervisors and Process Controllers on the IRIS system to ensure compliance with Blue Drop Standards, noting that the new Regulation 3630 came into effect in 2023
- Regulation 3630 was published in June 2023 with a two year grace period for water services institutions to come into compliance. DWS will work with sector partners to combine IRIS registration of supervisors and process controllers to ascertain that operational staff has the required competence to operate the specified treatment technology. Competence tests will be applied to grandparent process controllers.
- WSIs will be required to strengthen recruitment processes to ensure that registered, qualified, competent staff is appointed that has experience in the particular technologies to be operated – this aspect will receive increased regulatory focus
- The Regulator will require WSIs to put mentor programmes in place whereby qualified, experienced professionals serve as mentors and coach junior staff, and hold them to the highest standard of water service management
- Incentivise professional development for process controllers, supervisors, and water unit managers. This should be informed by Workplace Skills Plans and Skills Development Programmes. Registration as Professional Process Controller (PrPC) at WISA is also encouraged to facilitate professionalisation of process controllers and plant managers
- Developing partnerships with professional training/engineering/science/research institutes to strengthen technical skills and to upskill existing skills, especially in the application of microbiology, chemistry, laboratory results, process adjustments, mathematical calculations, design knowledge, and energy assessment.
- Intensify efforts around collaborative public-private partnerships to augment municipal capacity constraints and elevate water services delivery.

Diagnostic 2: Treatment Capacity and Flow Distribution

Several authorities cannot verify their WTW design capacity, do not monitor flows to- or from their WTWs, and do not have reliable SIV information from water flow logs, water balances, or billing documentation. WSIs are thereby limited in their ability to plan to meet medium-term water demand projections, or to confirm if spare capacity is available. This would present a serious impairment to economic growth initiatives. Furthermore, the lack of SIV figures implies severe gaps in water loss and water demand management, as well as NRW management. A programmatic approach will be followed to address these risks by targeting:

- Strengthen the regulatory requirement to verify design capacity and measure/report operational volumes of all WTWs – this is crucial to confirm available capacity in order to support new housing and business development
- Prioritising the refurbishment or restoring of infrastructure to their original design capacity and functionality
- Accelerate water loss reduction and NRW enhancement plans
- Identify new infrastructure and upgrade requirements to meet the 10-year demand.
- Water Use Licenses require that abstraction volumes to be measured and monitored. The Regulator will intensify their focus on these requirements in the short term future.

Diagnostic 3: Drinking Water Quality (DWQ) Monitoring and Compliance

Severe deficiencies were found in the monitoring of operational and compliance parameters at most institutions. The following interventions are required:

- WSIs must urgently correct failures in the disinfection process which leads to poor microbiological quality compliance. This hazard carries risk of public health events of potential epidemic proportions. Operational know-how needs to be improved on the disinfection processes
- Regulatory interventions need to be intensified to WSAs to identify, assess, rate and prioritise risks via the water safety planning process. The Blue Drop audit will increase the weight around KPA 2 (Risk Management) going forward
- Strict regulatory enforcement of DWQ compliance and Blue Drop standards.

Diagnostic 4: Technical Site Assessments

The TSA showed a highly variable result regarding process and asset functionality at WTWs across the country. While some drinking water treatment plants were excellent, others failed in all respects. Infrastructure operation and maintenance and regulatory interventions will involve:

- Prioritise anti-vandalism and anti-theft strategies
- Require strengthening of preventative repairs and maintenance programmes, budgets, and competence
- Require streamlining of procurement processes and internal planning for spare parts and water treatment chemicals such as chlorine
- Prioritise refurbishment of existing asset functionality by addressing the respective VROOM asset types, i.e. civils, mechanical, and electrical components
- Require minimum turnaround times to ensure fast turnover on repairs and replacement activities
- Implement more regular site inspections and condition assessments by DWS regional staff. WSIs will be required to conduct independent assessments every 6-12 months, by a subject expert professional
- Incentivise the update and improvement of quality asset registers to contain asset condition, remaining useful life and replacement cost, and use this information as part of the budget process
- Work with sector partners to strengthen Councillor induction programmes, and arrange field visits for Councillors, financial- and municipal managers to observe the typical risks and practicalities of drinking water management to support informed decisions at executive and policy levels.

Diagnostic 5: Operation, Maintenance and Refurbishment of Assets

The majority of institutions could not present completed and verifiable evidence in the form of budgets, expenditure, asset values, and production cost (Rand/m^3 treated). The Regulator will work with financial sector actors to:

- Preparation for the Blue Drop audit and participation by the financial officials to be a compulsory requirement enforced by WSA managers
- Dedicated allocation of budget and expenditure for water supply systems is imperative to formulate budgets, monitor expenditure and determine production costs – this will result in cost optimisation with the objective of achieving industry targets in Rand/m^3 treated and reticulated
- Regular meeting of technical and financial management to review the status of budget, expenditure, revenue collection and NRW
- Monitoring and reporting of production cost on a monthly basis and comparison with similar sized- and typology infrastructure
- Engage fund managers and WSIs in cases highlighted in this Report where vast amounts of capital funds (mostly grants) have been expended without positive outcomes or impact. Funding agents will be required to put measures in place to track such incidents timeously and intervene earlier in the project lifecycle.

The Way Forward

Following the Blue Drop audit findings, the Regulator intend to intervene as follows:

- ***Infrastructure Actions***

i. DWS together with COGTA and NT has developed an action plan which covers municipalities which have wastewater- and/or drinking water systems which scored less than 10% in the Green Drop and/or Blue Drop assessments (i.e. municipalities which are performing the worst in terms of their water quality and sanitation services)
ii. This plan has been approved by Cabinet and presented to COGTA MINMEC
iii. The plan covers 30 municipalities in 7 provinces, with Gauteng and KZN not having any municipalities with <10% Drop scores from the Green Drop and Blue Drop assessments
iv. DWS and COGTA are allowing municipalities to use their MIG and WSIG funding for repairs and refurbishment
v. However, this does not address the lack of routine maintenance by municipalities, which must be funded from municipal revenues. This can only be addressed by improving municipal billing and revenue collection and by prioritisation of budgets for maintenance by the municipal leadership
vi. MISA is offering support to municipalities to improve their infrastructure asset management and to undertake infrastructure condition assessments
vii. In most cases, funding for refurbishment or augmentation of infrastructure to address the Blue Drop infrastructure-related findings has already been allocated over the MTEF, mostly through DWS's RBIG and WSIG grants and DCOG's MIG grant, but also by the municipalities themselves and/or through support from the private sector in a few instances
viii. For those municipalities which do not yet have funding allocations to address the Blue and Green Drop infrastructure-related findings, DWS and COGTA will work with these municipalities to reprioritise their grant allocations to address the findings.

- ***Support and Capacity Building Actions***

i. The effectiveness of capacity building measures is dependent on the municipal leadership being willing to implement advice and improvements
ii. In some municipalities, there are no people to train because the municipalities have not prioritised the hiring of qualified process controllers
iii. While the national government is providing funding for repairs and refurbishment, it cannot provide funding for routine maintenance – this must be funded from municipal revenue
iv. In those cases where the leadership of the municipality is not responding to directives, or taking advice, or not accepting or using support, performance can only be improved by addressing the leadership challenges.

MISA is building capacity in the municipalities by:

- Hiring engineers and making them available to the municipalities to assist them with engineering expertise
- Recruiting and allocating young graduate engineers and apprentices to municipalities
- Facilitating the training of process controllers
- Offering support to municipalities to improve their project management, contract management and asset management practices
- Assisting the municipalities with funding applications for infrastructure.

DWS is building capacity in the municipalities by:

- Councilor induction programmes, in collaboration with SALGA
- Training of process controllers and support with registration of process controllers
- Support with registration of wastewater and water treatment works
- Assistance with development of water services development plans and five-year reliability plans
- Assistance with the development of water safety plans, risk abatement plans, sludge management strategies, and operational and compliance monitoring plans.

- ***Financial Sustainability Actions***

i. In terms of the Local Government Fiscal Framework, municipalities obtain revenue from municipal property rates and from service surcharges on the sale of water and electricity, in addition to the equitable share and grants from national government
ii. However, municipal revenue from the sale of both water and electricity is under pressure - electricity revenues are under pressure due to load shedding, customers moving to off-grid solutions, and bulk electricity prices increasing more quickly than retail electricity prices

iii. With the relevant sector departments' support, including COGTA, NT is leading the review of the Local Government Fiscal Framework, to be completed by November 2024.

- ***Governance Interventions***

i. Half of the 30 municipalities which scored less than 10% in the Green/Blue Drop assessments are also on COGTA's list of 66 dysfunctional municipalities
ii. A quarter of the 30 municipalities are also on National Treasury's list of 79 municipalities in service delivery and financial crisis or in serious financial trouble and requiring intervention. NT has recommended that Provinces implement mandatory interventions in terms of Section 139(5) of the Constitution and Chapter 13 of the MFMA for these municipalities
iii. However, most Provinces have been non-responsive to these recommendations leaving the problems to worsen
iv. If Provinces fail to act, there is a likelihood of communities approaching courts to force national government to act in terms of Section 139(7) of the Constitution (refer Lekwa case study)
v. Whilst national interventions are provided for in the Constitution, the capacity to intervene at national level is limited and Provinces must lead the interventions
vi. COGTA in consultation with DWS will assess the access to skills and resources in South Africa to maintain 144 WSAs and if necessary, bring recommendations to Cabinet for reducing the number of Water Services Authorities by July 2024.

National Treasure is building capacity in municipalities by:

i. Ensuring that tariffs for trading services are set to be cost reflective and to recover the cost of providing the service
ii. Reconciling the general valuation roll (GVR) to the billing system for completeness of revenue, so that all customers that appear on the GVR also appear on the billing system
iii. Developing tariff policies to reduce disputes
iv. Improving indigent management
v. Assisting municipalities to institutionalise standard operating procedures for financial management
vi. Improving billing and revenue collection
vii. Issuing a transversal tender for smart prepaid meters for electricity and water to enable prepayment for water services, to be advertised early 2024
viii. Availing technical advisors under the Municipal Financial Improvement Programme (MFIP), as well as by Budget and Revenue Management technical advisors placed at 7 provincial treasuries and NT offices, and 22 municipal support technical advisors placed in districts.

- ***Legislative Amendments***

i. Water Services Act distinguishes between roles of WSA and WSPs. Only a municipality can be allocated the power and function for the WSA function, as allocated by Minister of COGTA, whereby a WSA is the primary Constitutional water role of municipalities
ii. WSA can approve any legal entity (municipality, municipal entity, another municipality, CBO, NGO, organ of state, private company, or water board) to function as a WSP in the municipality
iii. Almost all municipalities are currently both WSA and WSP, having approved themselves as sole WSP
iv. Water Services Act requires WSA and WSP functions to be managed and accounted for separately by municipalities, this is not happening
v. Key role of WSA is to ensure that WSP provides services which meet minimum norms and standards, this is not happening.
vi. DWS is therefore amending the Water Services Act to strengthen the WSA role in municipalities:
- Introduce an operating license system for WSPs, to be managed by DWS as the national regulator
- Introduce requirement that water services can only be provided by an entity (municipality or other entity) that has an operating license. This will enable WSAs to ensure that WSPs have minimum competency, capability, and performance levels
- Amend S63 of the Act, to enable the Minister, as a last resort, to force separation of the water services function from the municipal administration where there is persistent failure to meet license conditions, and require the Water Services Authority to contract with a licensed WSP (after a S78 Municipal Systems Act process)
- In such instances, the appointed licensed WSP will take over all the functions related to providing the water service, including billing and revenue collection, SCM and HRM
- Currently S63 of the Act is impractical because it does not provide for all these functions to be taken over – the amendments will enable the licensed WSP to be funded.

- ***Other Actions***

i. DWS is in the process of strengthening its regulation function and improving the consistency of its regulatory actions. This includes revising the norms and standards for water services, developing standardised regulatory protocols, publishing a public dashboard of municipal performance against a range of measures of water and sanitation performance, and linking support and regulatory action to the contents of the dashboard – the dashboard will be in place by March 2024

ii. DWS has established a Water Partnerships Office together with the DBSA and SALGA to facilitate more private sector involvement in the management and funding of municipal water services and to offer financial structuring and feasibility study support to municipalities to bring projects to market
iii. DWS and COGTA will promote cross-pollination between municipalities – good performing municipalities to assist poor performing ones
iv. DWS will develop guidelines and standard operating procedures for operations and maintenance of water and sanitation infrastructure by municipalities.
v. COGTA has gazetted municipal staff regulations and will develop prototype staff establishments. This is a multi-year project that commenced during 2022 and should be completed by July 2025.
vi. NT is currently leading a review of the entire conditional grants system. This review will be completed by 31 March 2024 and its implications will be phased in from the 2025 Budget process. It will identify how grant funding can be used efficiently and effectively, while creating the right incentives to encourage better management of resources and leveraging private sector resources and expertise.

Last but not least, the Department welcomes the participation of SanParks in the Blue Drop process and trust the results will guide the way for the Kruger National Park to become a world-class water services institution.

Water Services Institutions are hereby encouraged to commence immediately with the preparation for the next Blue Drop audit process.

I don't know where we should take this company, but I do know that if I start with the right people, ask them the right questions, and engage them in vigorous debate, we will find a way to make this company great."

Jim Collins

Drakenstein: Welvanpas raw water inlet work –clean, maintained, operated by a proud competent team

Saldanha: Withoogte WTW filter backwash – true excellence

16. BLUE DROP CERTIFICATION and AWARDS

2023 BLUE DROP CHAMPIONS

> ***Excellent teams don't believe in excellence -- only in constant improvement and constant change."***
> *Tom Peters*

For 2023, Blue Drop awards and acknowledgement are attributed to Water Services Institutions across the various Provinces as following:

BLUE DROP AWARDS and RECOGNITION	
BD Certifications to Municipalities [≥ 95% BD scores]	Gauteng [3 in total]: ✓ City of Johannesburg MM (Rand Water) - Greater Johannesburg WSS (98.1%) ✓ City of Ekurhuleni MM (Rand Water) - Ekurhuleni (97.1%) ✓ Midvaal LM (Rand Water) - Meyerton (95.1%) Western Cape [15 in total]: ✓ Berg Rivier LM (West Coast DM Bulk) – Velddrif (95%) ✓ City of Cape Town MM – Cape Town (98.1%) ✓ Drakenstein LM (City of Cape Town MM) – Hermon (95.7%) ✓ George LM – George Water Works (95.2%) ✓ Overstrand LM - Baardskeerdersbos Supply System (99.7%) ; Buffeljags Bay Supply System (98.2%) ; Buffelsrivier Supply System (99.99%) ; Greater Gansbaai Supply System (99.99%) ; Greater Hermanus Supply System (99.99%) ; Kleinmond Supply System (99.99%) ; Pearly Beach Supply System (99.99%) ; Stanford Supply System (99.99%) ✓ Saldanha Bay LM (West Coast DM Bulk) - Hopefield Supply System (96.9%) ✓ Swartland LM (West Coast DM Bulk) - Withoogte Supply System (96.5%) ✓ Theewaterskloof LM – Botrivier (96.6%) Mpumalanga [4 in total]: ✓ Mbombela-Umjindi LM - Karino Water Treatment Works (96.6%) ; Matsulu WTW (97.9%) ; Nelspruit Supply System (97.3%) ; Primkop WTW (96.2%) KwaZulu Natal [3 in total]: ✓ Ilembe DM (Umgeni Water) – Dolphin Coast Ballito - Sembcorp Siza Water (98.6%) ✓ Msunduzi LM (Umgeni Water) – Umsunduzi (97.94%) ✓ uMgungundlovu DM (Umgeni Water) - UW-uMgungundlovu DM (97.3%) North West [1 in total]: ✓ JB Marls LM – Potchefstroom (95.6%)

RECOGNITION OF TEAMS and INSTITUTIONS

Awards	Criteria	Winner	2nd runner up	3rd runner up
Best Performing Municipalities	%BD score - WSI	Overstrand LM (99.99%) – Western Cape	City of Cape Town MM (98.12%) – Western Cape	City of Johannesburg (98.10%) - Gauteng

RECOGNITION OF TEAMS and INSTITUTIONS

Best Performing Systems	%BD score - system	Overstrand LM in Western Cape: Buffelsrivier, Greater Gansbaai, Greater Hermanus, Kleinmond, Pearly Beach and Stanford (All 99.99%)	Overstrand LM in Western Cape: Baardskeerdersbos (99.7%)	Ilembe DM (Umgeni Water) – Dolphin Coast Ballito – Sembcorp Siza Water (98.6%)
Best Technical Site Assessment score	% TSA score	Faure WTW (98%) – City of Cape Town MM Western Cape	Vereeniging WTW (97%) – Rand Water Gauteng	Welvanpas WTW (96%) – Drakenstein LM WC;
Best Progress from 2014 to 2023	Highest %BD score increase 2014 to 2023	Victor Khanye LM (63.5% to 90.1% = 26.7%) - Mpumalanga	Theewaterskloof LM (64.2% to 89.6% = 25.4%) – Western Cape	Vhembe DM (39.4% to 63.8% = 24.4%) - Limpopo
Best Provincial Risk Managers	Lowest BDRR% WSI – Eastern Cape	Kouga LM (28.5%)	Ndlambe LM (34.9%)	Alfred Nzo DM (35.6%)
	Free State	Tswelopele LM (23.2%)	Metsimaholo LM (30.2%)	Dihlabeng LM (30.6%)
	Gauteng	City of Ekurhuleni MM & City of Johannesburg MM (29.2%)	Mogale City LM (29.4%)	Midvaal LM (30.0%)
	KwaZulu Natal	uMgungundlovu DM (28.2%)	Msunduzi LM (28.4%)	Newcastle LM (28.5%)
	Limpopo	Bela-Bela LM (34.1%)	Vhembe DM (35.1%)	Polokwane LM (39.7%)
	Mpumalanga	Victor Khanye LM (30.4%)	Govan Mbeki LM (32.4%)	Bushbuckridge LM (36.4%)
	Northern Cape	Thembelihle LM (24.8%)	Hantam LM (27.5%)	Kareeberg LM (38.2%)
	North West	Matlosana LM (25.3%)	JB Marks LM (26.8%)	Madibeng LM (30.8%)
	Western Cape	Overstrand LM (17.8%)	Saldanha Bay LM (19.4%)	Bergrivier LM (20.6%)
Best Risk Positions	Lowest BDRR systems	Baardskeerdersbos,(9.6%) - Overstrand LM Western Cape	Lidgetton West (11.8%) – Umgungundlovu DM KwaZulu Natal	Suiderstrand (12.1%) – Cape Agulhas LM Western Cape

RECOGNITION OF INDIVIDUALS and BLUE DROP CHAMPIONS

Province	Recognition	Name and Designation OR Audit Team	Award
Eastern Cape	Nelson Mandela Bay Metro Municipality	NMBM audit team	The Regulator was impressed by the professionalism of the audit team representing NMBM. The team included senior officials and decision makers as well as operational personnel, and it was evident that the Municipality operates as a well-oiled team. All representatives had detailed knowledge of individual plant infrastructure and the particular challenges of the distribution area. The Municipality has experienced an 8-year drought and a detailed drought mitigation plan is currently being implemented. Certain aspects of the Drought Mitigation Plan supersede the Blue Drop requirements. Monitoring points, determinands and frequency are determined according to the requirements of the integrated system – water is provided where it is needed – and as a result monitoring may appear erratic where it is, in fact, meticulously planned. Senior officials are involved at an operational level and decisions are made at the level of the integrated system rather than on a plant-per-plant basis. The Municipality is commended for responsible management which extends to sustainable management of the water resource.
Eastern Cape	Kou Kamma Municipality	Bramwill Prinsloo: Manager Water Services	The Regulator was extremely impressed by the renewed dedication of the personnel appointment for the management of water provision. He and his team have acknowledged their weaknesses and put in plans in place to improve the delivery of water to this remote area. The Regulator is also impressed that Bramwill made extra attempt to drive a long distance to provide much needed information that assisted their scoring. Connectivity in the region is a challenge yet he and his team are committed to improving matters but will be a long road as he admits there is a lot to do but they have already begun this process and is also engaging with NMB and Kouga municipalities to assist which speaks a lot to inter-governmental cooperation.

RECOGNITION OF INDIVIDUALS and BLUE DROP CHAMPIONS			
Free State	Matjhabeng LM	Charlene Smith	Charlene is commended for excellent presentation of BD information with all supporting documents uploaded on IRIS. Charlene communicated all information to relevant departments ensuring attendance by multi-disciplinary team which included finance, asset management, water demand management and senior management. In addition, the Blue Drop team, under Charlene's guidance prepared for the confirmation session and sent list of KPI to be discussed during confirmation session. Her honesty and mentoring of junior staff members to take over responsibility for Blue Drop compliance is commended as this will ensure the municipality continues to strive for Blue Drop Certification.
Free State	Dihlabeng LM	Audit team	The Dihlabeng municipality was represented by a multidisciplinary team. Representatives from executive management were present for almost the full first day. The Inspectors have observed excellent leadership and good team dynamics. The municipality can be proud of this Team, led by the Manager, Water and Sanitation. The Team has demonstrated its commitment towards the programme by uploading evidence for almost all the Blue Drop criteria, although some following the on-site assessment. Confirmation feedback notes were attended to and it was evident that there is not only commitment but a drive to improve.
Free State	Dihlabeng LM	Lawrence Ramulwela	Mr Ramulwela is the Manager Water and Sanitation. He is recommended for his strong leadership. He ensured attendance by a multi-disciplinary team including the Mayor, the Municipal Manager and the CFO. He engaged all the staff during the audits and the site visits. He gave employees the opportunity to be actively involved in the compilation of the water safety plans and plant audit and network inspection reports. Although the quality of the reports could be improved, it was evident that all efforts were made to follow the guidelines for compiling the reports. He and his team laid a firm foundation for future improvement. The manner in which he delegated the tasks and how he guided them clearly shows that he does not only understand the management systems very well but also that he wants to build the capacity of the team. His involvement on ground level is commendable.
Free State	Setsoto LM	Hendrik Coetzer	Hendrik Coetzer is responsible for the Ficksburg Water Supply System. He is commended for excellent recordkeeping and availability of information. The manner in which he prepares, organises and files records is outstanding. He was well prepared for the assessment, with evidence uploaded and all records systematically filed and presented to the Inspectors, including supply chain information and tracking of orders. He is furthermore commended for the outstanding manner in which he investigates incidents, identifying the root causes and various solutions, and finally formally motivating for repairs or replacements with a complete list of prices from suppliers. He keeps an updated list of equipment like pump sets, with photos and GPS coordinates. Many Supervisors will benefit from adopting the principals and procedures that he has implemented.
Free State	Tswelopele LM	Audit Team	Although the municipality was not presented by a multi-disciplinary team, the Technical Director, Technical Manager and Inventory Officer were available. The Inspectors were impressed with the preparedness of the WSI. Most evidence was uploaded well in advance and compiled in a clear and understandable manner. The Team is furthermore commended on efforts exerted to present to the Audit Team an overview of the water treatment supply systems. Meaningful information was provided on site assessments, risk management and Blue Drop progress. Although Supervisors and Process Controllers did not attend the assessment, they are very much involved in the process. Attendance registers of the water safety planning meeting and risk assessments show their participation. It was also heartening to see the dynamic between staff and management. Two process controlling staff members, together with the Technical Manager, took the Inspectors through the plant for the TSA. The good relationship between process controlling personnel and their principals is commendable.
Free State	Tswelopele LM	Piet Kale (Supervisor) and John Sekharume (Process Controller)	These two process control staff members were given the opportunity to lead the Blue Drop Team during the site inspection. They were accompanied by the Technical Manager, who was never stepping forward to answer questions. He allowed them to take the Audit Team through the process. The ease and confidence in which they presented themselves and with which they engaged with the Inspectors is surely strengthened by the management style. They displayed good knowledge of the plant and its operation. It was evident that they understand the process and the procedures, including the completion of the records and interpretation of the results. They could easily provide all on-site information requested by the Audit Team. The fruits of practical capacity building through good mentorship was displayed here.
Gauteng	Rand Water	(1) Mrs Lelethu Bungu - Water Quality Specialist: Bulk Distribution;	Nominations for acknowledgement of excellence in water management - The team is responsible for Rand Water's water quality assurance activities (production and the bulk distribution network). The activities include maintaining a water quality management system (water

RECOGNITION OF INDIVIDUALS and BLUE DROP CHAMPIONS			
		(2) Mr Siphiwe Sithole - Water Quality Advisor: Production; and (3) Ms Thobile Mpunzana - Water Quality Advisor: Production & Bulk Distribution	safety plan) for the entire organisation, maintaining water quality risk registers, defining and ensuring implementation of water quality monitoring programmes, water quality performance reporting, and assisting the organisation in ensuring legal compliance.
KwaZulu Natal	uMngeni-uThukela Water (previously Umgeni Water)	Mlondi Ngcobo (uMngeni-uThukela Water: Water & Environmental Services)	Mlondi is an awesome Blue Drop (& GD) Champion that always goes the extra mile to ensure that not only his organisation, but also where possible, his client's (Msunduzi LM & uMgungundlovu DM) interest are secured, and information is made available to the assessors. He also worked tirelessly to facilitate audit assessment venues, arrangements and follow up actions to ensure an effective audit for both his client municipalities.
KwaZulu Natal	uMngeni-uThukela Water (previously Umgeni Water)	uMngeni-uThukela Water team	The uMngeni-uThukela Water team are to be congratulated for being very well prepared, attending the BD audit as a complete team (various sections/departments), and constantly striving to show that a well-managed business approach is the best way of undertaking effective water services provision. Their high BD scores reflect the hard work they put into their water services.
KwaZulu Natal	Umgeni Water	The whole Umgeni Water Team	Umgeni Water were very impressive during the Blue Drop Audit process. It was very clear from the outset that one of the strengths of the organisation is its teamwork, which was displayed throughout the audit process. Umgeni Water has set up impressive internal systems that are focused on making sure water quality is maintained at a high standard. Everyone appears to understand how their role fits into ensuring water quality. Maintenance of their facilities, to keep all equipment in good working order, appears to be a strength, along with excellent operational monitoring systems.
Limpopo			None
Mpumalanga	Msukaligwa Local Municipality	Mr Jabu (JA) Mkwanazi Acting Superintendent	During an unplanned follow-up visit the following week after the audit to verify other information, Jabu enthusiastically invited us back to the Ermelo North WTW. On site we found a significant improvement in terms of housekeeping and general operation and the site was abuzz with activity. The personnel showed us the considerable improvement made during the last few days after the audit.
Northern Cape	!Kai !Garib LM	Wilheminah Moeng	Ms Moeng had been serving as supervisor of all water treatment works within the Municipality before being appointed or promoted to a different section that deals with Project Management within the Municipality. Ms Moeng is recognised for her effort to ensure that the Blue Drop assessment takes place within the municipality while she is appointed to a different position with different roles and responsibilities but still assisted the Blue Drop audit team to finalise the assessment without responsible team tasked with the responsibility. Ms Moeng shown exemplary leadership within the municipality by taking responsibility of the Blue Drop Assessment while Technical team which was supposed own the responsibility decided not to honour the invite to be assessed. Ms Moeng provided relevant evidence available such as design capacity, daily production and water treatment works technical reports undertaken during her time with the Technical unit while she was not obliged to assist the Blue Drop audit team however, she assisted the team to finalise the Blue Drop assessment and Technical Site Assessment.
Northern Cape	Siyathemba Local Municipality	Dalenca Human	Dalenca Human was appointed as water technician and registered as a process controller class V. However, the Blue Drop assessment team has established that she had more responsibilities than serving as a process controller. Mrs Human she coordinated all the Blue Drop assessment and ensure the provision of assessment evidence on her own. The responsibility of arranging Blue Drop assessment in most cases lie with a Water Services Manager but she has managed to pull all responsibilities as process controller who manages water treatment works at Prieska. The Department commends her effort of ensuring that all assessment and evidence was provided as per the Blue Drop assessment. Ms Human had to further approach Municipal Financial Section to provide clarity about financial and expenditure issues as per the Blue Drop requirements. Looking at her position within the municipality the Department has to recognise her effort to ensure that all required information and evidence is provided on behalf of the Municipality.
North West	Midvaal Water Company	Midvaal Water Company team	Midvaal Water Company demonstrated readiness and dedication to the Blue Drop Audits. The team was enthusiastic, competent and they highly organised. The team was well-represented by various expertise and were very knowledgeable. The plant is well managed and despite the poor raw water quality from the Vaal River, the plant produces an excellent quality drinking water to the consumers.

RECOGNITION OF INDIVIDUALS and BLUE DROP CHAMPIONS			
North West	Moses Kotane LM	Mr David Mpete Acting Superintendent	During the TSA audit, Mr Mpete was very enthusiastic and explained the process with passion. He is a person who clearly understand the process and what each unit is supposed to achieve. The question about workplace satisfaction, Mr Mpete he stressed about lack of availability of treatment chemicals, operational monitoring instruments. He reported this lack by his institution as something that gives him sleepless nights. Which is rare as most people in that question they mention politics, etc, but his concern was for him to do what he loves which is to treat water and ensure consumers have potable water safe for human consumption. The other take away observed from Mr Mpete was his observation between types of suppliers called during the plant construction phase and those that are called thereafter to fix/repair or replace pumps. His observation was spot on in a sense that during construction/refurbishment, pumps are installed using laser shaft alignment despite the fact that he didn't know the device by name but he knew that to install a pump you need that device so that a pump and a shaft is well aligned to avoid breakdowns later on). But the fact he is well aware of why there are constant pump breaks, this was a great observation and at the time the plant supervisor was equally impressed of this observation because as the assessment team we caution the dangers associated with that and safety hazard thereof. Mr Mpete he will be going to retirement in a year or two and we asked him to update his registration since it was a rejected Class V. His comments were that he will pursue that however his focus now is that there are two graduates with BSC and if he can mentor them to be skilled enough to be class V before he retires, provided proper instruments are procured he will retire happily. This left an impression that he is someone who is concerned about safety of his consumers above everything else.
Western Cape	Theewaterskloof LM	Ms Roseline Myburgh	The role which Ms Rose Myburgh at the Theewaterskloof municipality impacted positively in their performance in the recent Blue Drop assessments in reducing their risk rating and increasing their average blue drop score form previous years. She was proactive in her approach and continuously communicated with the assessors on requirements. Prompt responses from her and even attending the confirmation session during sick leave from home under trying loadshedding conditions are commended.
Western Cape	Cape Town Metropolitan Municipality	Mr Kotze and Dr Naicker	The Cape Town Metro once again indicted their professional approach in managing their potable water supply following the recent BD assessment. Information was readily available and provided upfront, while any outstanding information was promptly provided. All role players from the individual plants and reticulation system division contributed during the assessment, but specific reference is made to Mr Hennie Kotze and Dr Swastika Surujlal-Naicker for facilitating all sessions and site visits in a professional manner. We regard these two people pivotal in managing Cape Town's Blue Drop programme.
Western Cape	Overstrand LM	Whole Team	The Overstrand Municipality impressed with the cooperative way in which they provide potable water to their customers with their service provider, Veolia Water. During the assessment, it was clear that their relationship is built on trust and mutual respect, with continuous communication between the two entities being key to their operations. The Regulator experienced a well prepared team during the assessment and all information provided was relevant to the process.

"It always seems impossible until it's done."
Nelson Mandela

Bergriver: Piketberg WTW raw water pumpstation – deteriorating raw water quality, but staff displayed good knowledge of this risk via the water safety plan

Clarification - essential to remove suspended solids to provide a clear, high quality potable water to consumers

ANNEXURE A: BLUE DROP CALCULATIONS

PARAMETER	DESCRIPTION	CALCULATION	REFERENCE
Blue Drop Scores	A BD % is awarded to an individual WSS based on audit results considered against 5 KPAs. The individual scores aggregate as a single (weighted) BD score for the WSI. The score is weighted against the SIVs of the individual WSSs.	1) System BD score (%) = Sum (Scores x KPA sub weights) for each of the 5 KPAs Example: KPA 1 sub weight = 15% of 100% for all 5 KPAs; KPA 1 sub-weights are 20% each for sub-KPAs 1.a) to 1.e) as per BD Requirements in the scorecard KPA 1 = (100% x 0.2) + (100% x 0.2) +(90% x 0.2) + (100% x 0.2) + (100% x 0.2) = 98% Contribution of KPA 1 to the overall BD score = (98% x 0.15) = 14.7% (out of 15%) 2) WSI BD score (%) = Sum ((SIV / Total SIV) x System BD score) Example (WSA - 2 Systems): WSA BD score = ((200,000 kl/d / 255,000 kl/d) x 66.4%) + ((55,000 kl/d / 255,000 kl/d) x 86.6% = 70.7%	Introductory Provincial and National Chapters
Blue Drop Risk Rating	BDRR and %BDRR/BDRRmax The BDRR value is based on 5 (weighted) risk indicators, i.e. the design capacity, operational capacity, water quality compliance, technical skills and water safety plan skills. The %BDRR/BDRRmax provides the variance of a BDRR value against the maximum BDRR value that could potentially be reached if all 5 risk indicators are in critical state	See section to follow this table titled CALCULATION OF BDRR	Introductory Provincial and National Chapters
Technical Site Assessments	The TSA % reflects the physical condition of the delivery network, the water treatment plant, and part of the distribution network. The intention of the TSA is to verify the evidence and findings presented during the BD audit through the physical inspections of randomly selected sites	Singular TSA scores per WSS inspected, non-weighted, as calculated via the TSA scorecard.	BD scorecards
	TSA and BD score comparison	% Deviation (TSA & BD score) = % score difference Example: TSA score = 44% and BD score = 38% = 6% deviation or difference	Diagnostic 4
Technical Competence	Ratios to do a comparative analysis “Qualified Technical Staff” - staff appointed in positions to support water services, and who has the required qualifications. “Technical shortfall” means the number of staff who are in technical support positions. “Qualified Scientists” - professional registered scientists (SACNASP) appointed in positions to support water services. “Scientist’s shortfall” means the number of scientists in scientific positions that are professional registered and qualified in technical support positions but not qualified. “Shortfall” is calculated based on a minimum requirement of more than one of each of Engineers, Technologists & Technicians or at least 3 Engineers; and at least one 1 candidate & professional Scientist per WSI or more than 1 professional Scientist per WSI.	Ratio - A : B (2 elements) or A : B : C (3 elements) etc Example 1: WTW staff - No. Supervisors : No PC = 1 : 3 (based on 2 shifts) Example 2: If WSI has no qualified technical staff, the shortfall would be 3 or 4 qualified technical staff; Similarly, If WSI has 1 qualified technical staff, the shortfall would be 2 or 3 qualified technical staff Example 3: If WSI has no qualified scientific staff, the shortfall would be 1 qualified scientist & 1 candidate scientist; Similarly, If WSI has 1 qualified scientist, the shortfall would be 1 candidate scientist	Diagnostic 1
Treatment Capacity	System Input Volume (kl/d) is the WTW Input Volume towards the Water Supply System (This equates the outflow of the WTW/ inflow to the	WTW to single WSS: WTW SIV (kl/d) = WSS SIV (kl/d) WTW to multiple WSSs: Total WTW SIV (kl/d) = WSS 1 SIV (kl/d) + WSS 2 SIV (kl/d) etc	Diagnostic 2

PARAMETER	DESCRIPTION	CALCULATION	REFERENCE
	WSS from the Bulk Water Supplier, e.g. Water Board or Private WSP)	Multiple WTWs to single WSS: Total WSS SIV (kl/d) = WTW 1 SIV (kl/d) + WTW 2 SIV (kl/d) etc	
Drinking Water Quality Compliance	% Mean, % Minimum and % Maximum of the DWQ Compliance: C overall, C1a, C1b, C2a & C2b as linked to the BDRR calculation process % Mean, % Minimum and % Maximum of the DWQ Risk Defined Compliance and Treatment (Operational) Efficiency Index	1) Mean (arithmetical average) = Mean (Range of values) Example: Mean (24% + 71% + 91%) / 3 = 62% 2) % Compliance = # Compliant samples / Total # Samples tested *100 Example: %Compliance = 42 compliant samples / 50 total samples tested = 84% compliance	Diagnostic 3
Operation & Maintenance & Refurbishment of Assets	O&M Cost Benchmarking using: - WRC WATCOST model: calculated breakdown of assets into civil, buildings, pipelines, mechanical, electrical, instrumentation. - SALGA model: calculate annual maintenance cost per asset type based on benchmark of 15.75% of asset value	1) Current asset value (100% = Civil structures (46%) + Buildings (3%) + Pipelines (6%) + Mechanical equipment (35%) + Electrical equipment (8%) + Instrumentation (2%) 2) Modified SALGA maintenance guideline: 15.5% = Civil structures (0.5%) + Buildings (1.5%) + Pipelines (0.75%) + Mechanical equipment (4%) + Electrical equipment (4%) + Instrumentation (5%) Example (Civil structures) = (0.46 x R20,000,000) X 0.005) = R46,000	Diagnostic 5
VROOM	Estimation of cost required to restore existing infrastructure to its original design capacity and operational functionality by addressing civil, mechanical, and electrical failures or defects. The cost is derived from an algorithm that uses the BD Inspector's impression of the condition of the hardware, for each process unit inspected. Cost estimations are done for the treatment plant only, NOT for the supply network.	With reference to the earlier 'Technical Site Assessments' parameter: The following is extracted from the TSA scorecard and inserted into the IRIS scorecard: VROOM cost ratio in R million per Ml/d % cost estimates for Civil, Mechanical and Electrical deficiencies.	BD scorecards Diagnostic 5

CALCULATION OF BDRR

A. First BDRR formular

In 2015, the Department used the experience built-up during the previous four Blue Drop assessments to formulate a Blue Drop Risk Rating (BDRR) that represents a progressive combination of incentive and risk-based regulation. The BDRR allows for uniform measurement of all systems across the country with regards to treatment capacity, process control and water quality compliance and to answer the following questions:

- Does the system have sufficient capacity to meet safe drinking water quality limits?
- Is the WSA complying with technical (process controller and maintenance staff) requirements?
- Is the WSA complying with SANS 241 (or any limits set by the Department)?
- Is the WSA managing drinking water quality according to the principles of risk management?

The original BDRR formula was: **BDRR = 0.25A + 0.25B + 0.5C**

Where the weighting factor is based on the following three risk indicators:

- A: Treatment Capacity = Population X Operational Capacity
- B: Process Control = Process Controllers + Supervisor + Maintenance Team
- C: Water Quality Compliance = Population X [(0.8*(0.5Micro + 0.2Chem + 0.3Risk)) + (0.2*(0.6WSP + 0.2Monitoring + 0.2Full SANS))] where
    - ✓ Micro = Microbiological compliance
    - ✓ Chem = Chemical compliance
    - ✓ Risk = Risk-defined monitoring
- WSP = Water Safety Plan (Yes/No/Partial)
    - ✓ Monitoring = % Monitoring compliance
    - ✓ Full SANS = Full SANS, risk-based monitoring programme (Yes/No/Partial)

The BDRR calculation is weighted against population size considering the population risk factor i.e. the larger the population served by the water supply system, the larger the impact should any hazardous event occur in the system, viz. the number of people who may be impacted. The BDRR formular was used by the DWS to determine the level of risk at which water services and water quality was delivered to the citizens of South Africa thereby facilitating implementation of regulatory actions to improve water quality where critical and high risks were identified.

B. Alignment of BDRR with DWS Risk-based Regulation

The DWS Risk-based Regulation allows for four key risk indicators that apply to *Blue Drop* (water), *Green Drop* (wastewater), and *No Drop* (water use efficiency):

- A: Design capacity
- B: Operational flow
- C: Compliance
- D: Technical skill of the supervisor, process controllers and maintenance team

The Green Drop Cumulative Risk Ratio (CRR) was the first to have been developed and has a successful track record that allows for identification of high risk treatment plants. One of the reasons why the CRR has enjoyed high uptake and impact, was that it is used as part of the wastewater risk abatement plan (W_2RAP) [the equal of the Water Safety Plan]. The (existing) formula calculates the Green Drop Risk rating as follows: **CRR = A x B + C + D** *Where:*

- A: Installed design capacity: Larger plants present a higher risk
- B: Operational capacity: Plants operating above its capacity present a higher risk
- C: Effluent quality compliance: A high number of non-compliant effluent quality parameters present a higher risk
- D: Technical skills: Poor technical, management and maintenance skills base present a collective and individual high risk.

C. Updated BDRR Formular

The updated BDRR formular adopts the same approach with an added risk indicator, E: Water Safety Planning, to address the risk assessment requirements outlined in SANS 241. The updated BDRR formular is:

BDRR = (A x B) + C + D + E

Where the weighting factor is based on the following five risk indicators

- A: Design Capacity: Larger plants present a higher risk as they supply water to a larger population
- B. Operational Capacity: Plants operating above its installed capacity present a higher risk as its capability is compromised to deliver safe drinking water
- C: Water Quality Compliance: C1 Microbiological (70%) + C2 Chemical (30%)
- D: Technical Skills: Poor technical, management and maintenance skills base present a collective and individual high risk.
- E: Water Safety Plan: The absence of a WSP, risk-defined monitoring programme based on full SANS 241 assessment and implementation of actions to reduce risk, would represent a high risk due to non-compliance with SANS 241 requirements and lack of risk-management procedures.

The proportional risk allocation between the components is 35 : 35 : 20 : 10 for A/B : C : D : E.

Therefore full BDRR formular **= (35% (A*B)) +[35% C (70% C1 (Micro compliance X monitoring compliance) + 30% C2 (Chemical compliance x monitoring compliance)] + 20% D + 10% E.**

The benefits of the updated BDRR formular are:

- Aligned with CRR and DWS Risk-based approach
- Simplified calculation which uses available information on IRIS
- Provide calculation of baseline BDRR for each plant based on size
- Includes Risk Rating Indicator for *Water Safety Planning* – requirement for SANS 241
- Provides a quick, scientific-based impression of national WTW risk profiles
- Standardised, uniform approach - rates all plans on equal level

A ***BDRR value*** is calculated for each municipal water supply system in South Africa, as provided in this Blue Drop PAT Report. The municipal BDRR profiles are usually sent to the respective Executive Mayors from the Minister's office, to inform the political principals of the facilities that reside in the high and critical risk space.

A ***BDRR %deviation*** is used throughout the Report and calculated using the following formular:

BDRR% deviation = BDRR / BDRRmax x 100

Where ***BDRRmax*** = Maximum BDRR of System

The ***BDRR %deviation*** is a calculated unit of measurement of risk which indicate the variance of a BDRR value before it reaches its maximum BDRR value. This unit of measurement allows DWS to compare all sized and types of plants equally.
All water supply systems are categorised according to their risk rating placing them in one of four categories as per table below.

BDRR Categorisation:

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

The higher the ***BDRR %deviation*** value, the closer the BDRR risk is to the maximum value it can obtain.

- Example 1: a 95% BDRR %deviation value means the supply system has only 5% space remaining before the system will reach its maximum critical state (100%) – this is a highly undesirable state, and the supply system is categorised as a critical risk system.
- Example 2: a 25% BDRR %deviation value means the supply system holds a low and manageable risk position and is not close to the limits that define a critical state (90-100%) – this is a desirable status and the supply system is categorised as a low risk system.

The rationale and weighting of each risk indicator is outlined below.

Risk Indicator A: Design capacity and Risk Indicator B: Operational Capacity in terms of design

Weighting factor for Criteria A and B

A = CAPACITY	
Category / Description	Weighting Factor
Unknown / Multiple sources	**6**
>25	**5**
>10 to 25	**4**
>2 to 10	**3**
>0.5 to 2	**2**
< or = 0.5	**1**
B = % OPERATIONAL CAPACITY IN TERMS OF DESIGN CAPACITY	
Category / Description	Weighting Factor
> 150% or Unknown	**5**
>100 – 150%	**4**
>50 – 100%	**3**
>10 – 50%	**2**
0 – 10%	**1**

Criterion A represents the design capacity of the treatment plant.

Every water treatment plant must be classified with DWS as per Regulation 2834. The classification of the treatment plant is based on a number of components, including size, complexity and electrical consumption, as per set criteria. The plant classification certificate is available on IRIS and supporting evidence provided by the WSA during plant registration is used to determine the risk rating for criterion A.

The risk rating is allocated according to the size of the treatment plant with higher risk rating given for a larger plant and lower risk rating for a smaller plant. The rationale is that a larger plant serves a larger community and therefore presents a higher risk if the plant is not functioning or is producing unsafe drinking water than a smaller plant which serves less people. The risk rating for criteria A remains the same provided the capacity stays the same, and all plants which have the same design capacity range will have the same maximum BDRR.

Risk Indicator B represents the % operational capacity in terms of design capacity.

The daily production versus the design capacity of the treatment plant is an important indicator to determine if the plant can provide sufficient, safe drinking water to all the consumers now and in the near future. When the plant is operating above its design capacity, major unit processes are overloaded and cannot achieve their operational limits which leads to water quality failures. Once daily production approaches 90% of design capacity, the WSA must plan, budget for and implement upgrades to the treatment facility to ensure there is sufficient supply, not only for human consumption, but also for economic activities such as mining, agriculture and industries.

Criterion B reports on the percentage operational flow in terms of design capacity. The ideal value is between 50 – 100%; higher values indicate the plant is overloaded and lower values indicate the plant is receiving too little flow which may also compromise performance due to lack of retention time (flocculation, sedimentation).

Risk Indicator C: Water Quality Compliance

In South Africa, the SANS 241:2015 is the definitive reference on acceptable limits for drinking water quality parameters and provides limits for a range of water quality characteristics and water meeting this standard is deemed safe for lifetime consumption. In addition, the SANS 241: 2015 standard stipulates the frequency of sampling as well as the number of sample points required per supply system to ensure sufficient coverage of the network. The frequency and number of required sample points is dependent on the population size as outlined in Table 1 of SANS241:2015. Monitoring compliance is therefore critical to guarantee the safety of the supply at all points in the network.

Risk Indicator C is directly linked to the safety of the drinking water in the supply systems as it reports on compliance against the microbiological and chemical determinands and on the monitoring compliance.

Risk Indicator C: Water Quality compliance = C1(70%) + C2 (30%)

Both microbiological and chemical compliance accounts for monitoring compliance to ensure compliance is based on minimum required number of samples based on population size.

Expanded Formular is $C = (C1a \times C1b) + (C2a \times C2b)$

Where:

- **C1: Microbiological compliance = C1a X C1b**
  - ✓ **C1a**: micro compliance, different weighting based on population size
  - ✓ **C1b**: micro monitoring compliance (MNR%) – monitoring compliance against registered programme, based on population size as per Table 2 in SANS 241-2: 2015
- **C2: Chemical compliance = C2a X C2b**
  - ✓ **C2a**: chemical compliance against all required determinands, different weighting based on population size
    - The chemical quality of the water supply must comply with the excellent requirements set by the Blue Drop Programme for all chemical-health determinands listed in the 2014 Blue Drop Limits, derived from SANS241:2006 and 2011 and includes, NO_3- and NO_2- as N, SO42-, Sb, As, Cd, Cr, Co, Cu, CN-, Pb, Hg, Ni, Se, V, DOC or TOC, and Total THM.
    - Performance assessment is based on the following:
    - Excellent Compliance (95% for <100 000 population) & (97% for >100 000 population)
    - Good Compliance (93% for 100 000 population) & (95% for >100 000 population)
  - ✓ **C2b**: chemical monitoring compliance calculated against Blue Drop requirements:
    - Actual monitoring occurs according to registered monitoring programme (>80%)
    - Number of samples: One sample each at treatment plant final and one distribution point, both of which must be analysed for at least 80% of determinands listed above (13 of the 17 determinands) i.e. at least 26 data points are required.

Weighting for Ca – water quality compliance

Ca= WATER QUALITY COMPLIANCE* Micro (70%) + Chemical (30%) compliance based on population – data from IRIS	
Category / Description	Weighting Factor
Population <100 000	
<94% or No Information	**9**
94 < 95%	**7**
95% < 96%	**5**
96% < 97%	**3**
97% < 98%	**2**
≥ 98%	**1**
Population >100 000	
<96% or No Information	**9**
96% < 97%	**7**
97% < 98%	**5**
98% < 99%	**3**
≥ 99%	**1**

Weighting for Cb - monitoring compliance

C1b: Microbiological Monitoring compliance – results provided by IRIS, based on registered monitoring programme which is aligned with the required no. of sample sites for population as per SANS 241	
Category / Description	Weighting Factor
>80%	**1**
50% - 80%	**2**
30% - 49%	**3**
<30%	**4**
C2b: Chemical Monitoring Compliance – calculated based on % of determinands monitored / total no. of determinands as per Blue Drop requirements	
Category / Description	Weighting Factor
>80%	**1**
50% - 80%	**2**
30% - 49%	**3**
<30%	**4**

Risk Indicator D: Technical Skills

Under Section 9 (1) of the Water Services Act (108 0f 1997), regulations relating to Compulsory National Standards for Process Controllers and Water Service Works stipulate the requirements for registration of all water and wastewater treatment plants. Regulation 2834 outlines the requirements for:

- Classification of water and wastewater treatment plants: based on size, complexity, and electrical consumption,
- Classification of process controllers and supervisors: based on qualifications and years of experience,
- Required number and classification of staff per shift based on the classification of the plant: more complex plants requires more skilled process controllers per shift.

Based on the shift patterns, the WSAs must align with the Regulation to ensure treatment plants are effectively operated and maintained for sustainable water services delivery.

Risk Indicator D: Technical Skills evaluates the compliance of technical staff against Blue Drop requirements as outlined below:

Technical skills evaluation as per Blue Drop requirements

Works Class	Class Of Process Controller Per Shift	Class Of Process Controller for Supervision*	Operations And Maintenance Support Services Requirements*
E	Class I	Class V*	THESE PERSONNEL MUST BE AVAILABLE AT ALL TIMES BUT MAY BE IN-HOUSE OR OUTSOURCED - electrician - fitter - instrumentation technician
D	Class II	Class V*	
C	Class III	Class V*	
B	Class IV	Class V	
A	Class IV	Class V	

**does not have to be at the works at all times but must be available at all times. If the Water Services Institution or owner of a waterwork has no person of this class employed on that work, a contractor / consultant with the required qualifications as prescribed in Schedule III in respect of that particular class of persons, shall be appointed to visit the work weekly.*

Risk indicator D is calculated from three separate components which each carry the same weighting (1/3 of total)

- Compliance for process controllers: required number and class of process controllers per shift for specific class of plant.
- Compliance for supervisor: Class V required, either at the plant or available at all times.
- Compliance for maintenance team, subdivided into 3 sections, each with equal, proportional weighting:
  - civil team: plumbing qualification / trade test.
  - mechanical team: millwright or similar mechanical qualification.
  - electrical team: electrical qualification / trade test

Weighting Factor for Criteria D

D = TECHNICAL SKILLS	
Category / Description	Weighting Factor
Supervisor + Process Controllers + Maintenance Team	**1**
Supervisor + Maintenance Team but no Process Controllers	**2**
Process Controllers + Maintenance Team but no Supervisor	
Process Controllers + Supervisor but no Maintenance Team	
Supervisor & no Maintenance Team & no Process Controllers	**3**
Process Controllers but no Maintenance Team & no Supervisor	
Maintenance Team but no Supervisor & no Process Controllers	4
No Supervisor + no Process Controllers + no Maintenance Team	**5**

Risk Indicator E: Water Safety Plans

The concept of using risk management processes to manage water supply systems effectively was introduced by the World Health Organisation (WHO) in 2004 and described as Water Safety Planning. The WHO states:

"The most effective means of consistently ensuring the safety of a drinking-water supply is through the use of a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer. In these Guidelines, such approaches are called water safety plans (WSPs)." (WSP Manual,2007)

Since then more than 93 countries have adopted Water Safety Planning as a method for drinking water quality management with more than 70 countries having policies and regulations requiring Water Safety Plans.

In South Africa, the WaSP is a requirement for Blue Drop Certification with a scoring of 35% for comprehensive WSP and response monitoring. The National Drinking Water Standard, SANS241:2015 is closely aligned with the Water Safety Plans risk based approach with following specifications to ensure delivery of safe drinking water at all times:

Water quality risk assessment:

- At least annually or when quality changes
- Identify problem determinands + increase frequency of monitoring for problem determinands based on level of risk
- Risk-based monitoring programme unique to each supply system
- Routine compliance monitoring: based on population size and area
- Response monitoring: Incident Management Protocol to address incidents
- Verification of water quality: calculation of indices
- Water Safety Plan: adopt and implement

The Water Safety Plan is therefore a critical component of drinking water management and forms part of the BDRR calculation.

Risk Indicator E evaluates the following three critical components which are required for effective risk management:

- Completeness of the WSP as per World Health Organisation Water Safety Planning Manual,
- Development and adoption of risk-based monitoring programme as per SANS 241:2015, and
- Proof of implementation of the findings of the WSP to ensure there is continuous risk management and movement towards an overall lower risk rating.

The requirements are divided into 11 sub-elements that are evaluated to calculate the risk rating for this indicator as illustrated below.

Weighting Factor for Criteria E

E – WATER SAFETY PLAN	
i. Signature from Technical Director / Municipal Manager, ii: Risk prioritisation method, iii: Risk assessment of catchment, iv: Risk assessment of plant, v: Risk assessment of network, vi: Final risk rating, vii: Mitigating measures for all high and medium risks. viii: Full SANS 241 analysis of raw and final water, ix: Identification of risk determinands, x: Addition of risk determinands to monthly compliance monitoring as per SANS 241 - frequency based on category of risk (acute/chronic/aesthetic) xi: Proof that >25% of mitigating measures have been implemented – proof in form of purchase order, pictures, water quality results, tender document, etc	
Description	Weighting Factor / Calculation
No WSP	5
WSP contains X sub- elements	5 – (X / 55)
Note: if shortcomings for any of the sub-elements, then a higher risk rating is given.	

D. Multiple systems

In many supply systems, there are more than one source of water and more than one water treatment plant. These multiple sources will all feed into one network and will therefore be combined. To calculate the BDRR for such multiple systems, the input data sheet makes allowance for selection of multiple systems. A BDRR score is then completed for each water source/treatment plant i.e. scores for A, B, C, D and E are calculated for each water source/treatment plant. A combined BDRR score is then calculated based on the proportion of flow supplied by each water source/treatment plant.

In summary, a proportional scoring is given for each risk indicator and for the system as a whole based on quantity of water provided by each water source/treatment plant.

ANNEXURE B: BLUE DROP AUDIT PROCESS FLOWCHART

1	The Lead Inspector contact the WSA and WSP to confirm dates, venue, logistics for audits, using the template DWS letter and BD criteria annexure	
2	The Lead Inspector contact his/her audit team to plan, assign tasks, and engage DWS members on skills development focus areas	
3	Each inspector obtain access to IRIS via the IRIS Helpdesk to study their WSI evidence before the audit event & to print a pdf of the WSI data	
4	Each Inspector familiarise themselves with the IRIS BD scorecard, the excel-BD worksheet and the TSA/VROOM scorecard	
5a	The Lead Inspector prepopulates the excel worksheet with the most critical data from IRIS and may download information in pdf from IRIS to assist during audit. Leads may ask inspectors to assist but avoid duplication. All Panel Inspectors will have access to the IRIS	
5b	The Lead Inspector cross check if the IRIS systems check out with the BDPAT systems. If not, complete a **Variation Report** and send to Maryna to update IRIS or to seek clarity. This same process applies if the Inspector find more or less systems during the audit process	
6	The Lead Inspector distribute the pre-populated BD worksheet and pdf summary to panel members, and ensure full readiness by each inspector	
7	The **main audits** are undertaken using the prepopulated excel worksheet and PDF data summary from IRIS	
8	The Lead Inspector consolidates individual worksheets from panel members and complete a draft BD scorecard on IRIS, with auditor comments. The TSA is submitted as an excel file. Madi auditors to submit their individuals worksheets as PoE to support claims. The Lead notifies the Moderator that the interim BD IRIS scorecard and excel TSA	The Moderator moderates the BD scorecard (with Moderator comments) on IRIS and notify the Lead Inspector to either 1) correct shortfall and return for further moderation, or 2) inform the
9a	The Lead Inspector addresses shortcomings or concerns from the Moderator and update the IRIS BD scorecard and TSA for further moderation	
	OR	
9b	The Lead Inspector notifies the WSI that their preliminary BD results are ready for viewing on IRIS (or share as and IRIS Confirmation Report) and request the WSI to prepare for the Confirmation Audit. The Lead provides the WSI with a **date, time and electronic link for this audit event**	The Lead or assigned Inspector keep attendance registers, photos, and recording records of the audit
10	The **virtual confirmation sessions** are undertaken by using the IRIS moderated scorecard, with each Inspector still supporting their respective audits using the consolidated excel	
11	The Lead Inspector confirm the final scorecard on IRIS with his/her team, write up the Regulatory and TSA comment (& photos) and notifies the Moderator that the final moderation is due	The Moderator moderates the final BD scorecard on IRIS and revert back to the Lead Inspector if any shortfalls to be
12	The Moderator sign off and lock the final BD scorecard, TSA scorecard, and IRIS Report card	The Moderator moderates the final IRIS scorecards & sign off the final report and Regulatory Comment
13	IRIS office organise and export data according to the BD Report layout, and the BD author commences with writing the various BD 2023 Report/s	The Moderator moderates the final IRIS scorecards & sign off the final report and Regulatory Comment
14	DWS quality assurance, followed by the publication and release of the BD Report by the Minister	
15	The Moderator engages the Lead Inspector if any queries after publication of BD audit report/ results. The Lead Inspector investigates and communicate corrections to the Moderator and BD author needed. The BD author engages DWS management and update the Report. IRIS publishes an Erratum to the BD Report.	The Moderator moderates the final IRIS scorecards & sign off the final report and Regulatory Comment

ANNEXURE C: GUIDE TO READING THE REPORT CARD

The following is an example of a typical report card that appears in the Blue Drop Report 2023. Results are provided in colour coded format – each colour has a specific meaning and performance reference.

Municipal Blue Drop Score		
Blue Drop Score 2023	**%**	**82%↑**
Blue Drop Score 2014	**%**	**64%**
Blue Drop Score 2012	**%**	**45%**
Blue Drop Score 2011	**%**	**26%**

The WSI BD score is a **Performance Indicator** of the overall water business of the organisation. See colour legends below.
Arrows: Depict the current BD status of the plant. A ↑ arrow shows improvement, ↓ shows digress, → shows unchanged situation

Key Performance Area	Weight	System Name
Bulk/ WSP		<Name>
Capacity Management	15%	100%
DWQ Risk Management	20%	86%
Financial Management	10%	72%
Technical Management	20%	76%
DWQ Compliance	35%	70%
Bonus	10%	80%
Penalties	10%	0%
Disqualifiers		None
Blue Drop Score 2023	**%**	**82%**
Blue Drop Score 2014	%	**64%**
Blue Drop Score 2012	%	**45%**
Blue Drop Score 2011	%	**26%**
System Design Capacity	kl/d	28,000
System Available Capacity	kl/d	28,000
System Input Volume	kl/d	20,000
Capacity Utilisation (%)	Kl/d	77%
Average Daily Consumption ()	l/p/d	176
Resource Abstracted From		Mhlongo River
Microbiological Compliance	%	98%
Chemical Compliance	%	97%
Risk Defined Compliance	%	95%
VROOM	Rand	R12,831,000
BDRR 2023	%	71%
BDRR 2022	%	76%

Colour codes	Appropriate action by institution
≥95-100%	Excellent situation, need to maintain via continued improvement
80-<95%	Good status, improve where gaps identified to shift to 'excellent'
50-<80%	Average performance, ample room for improvement
31-<50%	Very poor performance, need targeted turnaround interventions
0-<31%	Critical state, need urgent intervention for all aspects of the water services business

A system is disqualified from BD Certification if it defaulted to respond to a Notice/Directive

The final BD score - same colour legends as above

WTW Outflow to the WSS or Daily Treated Flow/ Operational Capacity

Capacity Utilisation calculated as dividing the SIV ty by the system Available Capacity

Water Use Efficiency calculated by dividing the SIV by the Population (see legend below)

DWQ compliance with SANS 241:2015 and the BD requirements as audited under KPA 5. A system is disqualified from BD Certification if microbiological and/or chemical compliance not "Excellent" status

WUE (l/cap/day) performance categories

	>300	Extremely high per capita water use
	250-300	Poor per capita water use
	200-250	Average per capita water use with potential for marked improvement
	150-200	Good per capita water use but some improvement may be possible subject to economic benefit
	<150	Excellent per capita water use management

%BDRR/BDRR max legend:

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

Understanding the drop representation for each supply system

Quality of Drinking Water Drop Definition	
Colour Drop	**Indication of Drop**
	Blue Drop Certified
	Water complied excellently with standard; safe to drink Micro >97% Chemical >95%
	Water safe to drink but some chemical parameter compliance required improvement Micro >97% Chemical <95% (or no information)
	Water generally safe to drink but with recorded some microbiological failures Micro <97% Chemical >95%
	Water did not comply according to expected standard targets Micro >90% but <95% Chemical >90% but <95%
	Compliance levels too low; there were extended periods when the water did not comply with standard / or no monitoring to confirm actual quality of tap water Micro <90% Chemical <90%

ANNEXURE D: ACRONYMS

ACRONYMS	DESCRIPTION	ACRONYMS	DESCRIPTION
AC	Asbestos Cement	**NA**	Not Assessed or Not Applied
AGSA	Auditor General of South Africa	**ND**	No Drop
AW	Amatola Water	**NDP**	National Development Plan
BD	Blue Drop	**NI**	No Information
BDC	Blue Drop Certification	**NGO**	Non-Government Organisation
BDPAT	Blue Drop Progress Assessment Tool	**NLA**	National Laboratory Association
BDRR	Blue Drop Risk Rating	**NQF**	National Qualifications Framework
BH	Borehole	**NMB**	Nelson Mandela Bay
BWS	Bulk Water Supplier	**NT**	National Treasury
CAP	Corrective Action Plan	**NTU**	Nephelometric Turbidity Units
CAPEX	Capital Expenditure	**NWA**	National Water Act
CBD	Central Business District	**NRW**	Non-Revenue Water
CBO	Community Based Organisation	**O&M**	Operation and Maintenance
CFO / CEO	Chief Financial/Executive Officer	**OHS**	Occupational Health and Safety
CoJ	City of Johannesburg	**OPEX**	Operating Expenditure
CoCT	City of Cape Town	**OW**	Overberg Water
CoE	City of Ekurhuleni	**PA**	Process Audit; Performance Agreement
COGTA	Cooperative Government and Traditional Affairs	**PC**	Process Controller
CoM	City of Mbombela	**PMFA**	Public Financial Management Act
CoT	City of Tshwane	**PMU**	Project Management Unit
CRR	Cumulative Risk Ratio; Capital Replacement Reserve	**PoE**	Portfolio of Evidence
CSIR	Council for Scientific and Industrial Research	**PrPC**	Professional Process Controller
CVW	Central Vaal Water (formerly Bloem Water)	**PTS**	Participatory Testing Scheme
DAV	Dissolved Air Flotation	**R**	Rand
DBSA	Development Bank of Southern Africa	**RBIG**	Regional Bulk Infrastructure Grant
DCG/DCOG	Department of Cooperative Governance	**Reg**	Regulation
DFFE	Department of Forestry, Fisheries and Environment	**RO**	Reverse Osmosis
DHS	Department of Human Settlements	**RR**	Risk Register
DM	District Municipality	**RW**	Rand Water
DPW	Department of Public Works	**RWSS**	Rural Water Supply System
DR	Doctor	**SACNASP**	South African Council for Natural Scientific Professions
DWQ	Drinking Water Quality	**SAHRC**	South African Human Rights Commission
DWS	Department of Water and Sanitation	**SALGA**	South African Local Government Association
ECSA	Engineering Council of South Africa	**SANAS**	South African National Accreditation System
EDAMS	Water Management Engineering Management and Design System	**SANParks**	South African National Parks
FAR	Fixed Asset Register	**SANS/SABS**	South African National Standards/ Bureau of Standards
FY	Financial Year	**SCADA**	Supervisory Control and Acquisition Data
GD	Green Drop	**SCM**	Supply Chain Management
GG	Government Gazette	**SHEQ**	Safety Health Environment Quality
GVR	General Valuation Roll	**SIV**	System Input Volume
HOD	Head of Department	**SLA**	Service Level Agreement
HRM	Human Resource Management	**SWPN**	Strategic Water Partners Network
IAM	Infrastructure Asset Management	**The Act**	Water Services Act 108,1997
IDP	Integrated Development Plan	**TSA**	Technical Site Assessment
IMP	Incident Management Protocol	**UPS**	Utility Power Supply
IMQS	Infrastructure Management Quality Solutions/Software	**USDG**	Urban Settlements Development Grant
IR	Incident Register	**UW**	Umgeni Water; uMhlathuze Water; uThukela Water

ACRONYMS	DESCRIPTION	ACRONYMS	DESCRIPTION
IRIS	Integrated Regulatory Information System	**VROOM**	Very Rough Order Of Measurement/Magnitude
ISO	International Standards Organisation	**VSD**	Variable Speed Drive
IWA	International Water Association	**WaSP**	Water Safety Plan
JW	Johannesburg Water	**WAL**	Water Abstraction License
KPA	Key Performance Area	**WB**	Water Board
kl	kilo litre	**WCDM Bulk**	West Coast District Municipality Bulk
km	kilo metre	**WCDM**	Water Conservation Demand Management
kWh	kilo Watt hour	**WF**	Weighting Factor
L/c/p or L/p/d	Litres per person/capita per day	**WHO**	World Health Organisation
LM	Local Municipality	**WISA**	Water Institute of South Africa
LNW	Lepelle Northern Water	**WQ**	Water Quality
MCPP	Municipal Capability and Partnership Programme	**WQMS**	Water Quality Management System
MFIP	Municipal Financial Improvement Programme	**WRC**	Water Research Commission
MFMA	Municipal Financial Management Act	**WSA**	Water Services Authority; Water Services Act
MIG	Municipal Infrastructure Grant	**WSDP**	Water Services Development Plan
MINMEC	Ministers and members of Executive Councils Meeting	**WSP**	Water Services Provider
MISA	Municipal Infrastructure Support Agent	**WSI**	Water Services Institution
Ml	Mega litre	**WSIG**	Water Services Infrastructure Grant
Ml/d	Mega litres per day	**WSIP**	Water Services Improvement Programme
MM	Metropolitan Municipality; Municipal Manager	**WSS**	Water Supply System
MSA	Municipal Structures Act	**WSSA**	Water and Sanitation South Africa
MTEF	Medium Term Expenditure Framework	**WTP/W**	Water Treatment Plant/Works
MW	Magalies Water; Midvaal Water	**WUA**	Water Use Authorisation
MWH	Mega Watt Hour	**WUE**	Water Use Efficiency
		WUL	Water Use License
PROVINCES			
EC	Eastern Cape	**NW**	North West
FS	Free State	**NC**	Northern Cape
GP	Gauteng	**KZN**	KwaZulu Natal
LP	Limpopo	**WC**	Western Cape
MP	Mpumalanga		

ANNEXURE E: LIST OF TABLES

ANNEXURE F: LIST OF FIGURES

City of Johannesburg and Rand Water: Clean and well maintained pumpstation at Illovo Reservoir

Rand Water: Upgrading of bulk water pipelines to meet current and future demand *(open source)*