

A FRAMEWORK TO SUPPORT THE DEVELOPMENT OF MODEL BY-LAWS (NORMS AND STANDARDS) FOR WATER EFFICIENT SANITATION SOLUTIONS IN MUNICIPALITIES

Preyan Arumugam, Michael Sutcliffe, Susan Bannister, Andrea McGahey, Ismail Banoo and Teddy Gounden



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A Framework to support the development of Model By-laws (norms and standards) for Water Efficient Sanitation Solutions in municipalities

Final Report
to the Water Research Commission

by

**Preyan Arumugam¹, Michael Sutcliffe², Susan Bannister², Andrea McGahey², Ismail
Banoo¹ and Teddy Gounden¹**

¹ WASH R&D Centre, University of KwaZulu-Natal

² City Insight (Pty) LTD

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EXECUTIVE SUMMARY

Over the last decade, there has been progress around innovation and the integration of social assessments with technical evaluations of Water Efficient Sanitation solutions (WESS). This is principally a paradigm shift from ancillary sanitation approaches to inclusive sanitation that is focused on ensuring safe sanitation practices and encompasses various types of technological solutions. This is especially relevant given the increasing acknowledgment worldwide that only centralised solutions, especially in smaller urban centres, may not be enough to ensure complete sanitation coverage or sustainable service delivery.

In South Africa, service delivery delays are impacted by water scarcity (both from being a drought-prone country but also poor water management practices – South Africans on average use 37% more water per day than the global average). While moving away completely from centralised sanitation will take time, there is an urgent need to at least transition towards the inclusion of water-efficient sanitation solutions (WESS) as a service delivery option. WESS include non-sewered, off-grid or on-site and decentralised technologies and offer a sustainable response to challenges such as inadequate and unsafe sanitation, public health risks, environmental degradation and climatic impacts that result in disrupted services. Considering fast-growing cities, ageing infrastructure, poor management and performance of conventional wastewater treatment works, water insecurity and mismanagement, and extreme climatic events that result in destruction to bulk infrastructure, WESS ensures water savings by reducing reliance on water for flushing and conveyance. The sustainability criteria also promote resource recovery (water, energy and nutrients). From a national perspective, WESS implementation can assist with eradication of service delivery backlogs and open defaecation promoting public health and restoration of natural ecological bodies such as wetlands and rivers. In order for roll out WESS, an enabling regulatory framework through a model by-law is essential to aid in the adoption and implementation of these novel WESS.

WESS are applicable in most settlement types (e.g., urban, peri-urban, rural, and small towns) and in different contexts (schools, informal settlements, low-cost housing, social housing schemes, green buildings and estates, including commercial buildings, hospitals and prisons). For WESS to function in high density areas, elements including a skilled workforce, effective and safely managed emptying, transportation, treatment, and disposal services are critical. The planning for WESS requires a different viewpoint in terms of policy and institutional framework, finances, technology, stakeholder engagement and regulation. In addition, some non-sewered sanitation systems have limited capacity for handling greywater and so require complementary greywater management systems. The development of policies or standards can specify that these elements need to be catered for where WESS are used.

As a component of WESS, the case of non-sewered on-site sanitation is grouped into two categories, each with different technologies to ensure that excreta is safely managed across the service chain:

- On-site treatment systems (such as those products designed under the specifications of ISO/SANS 30500: *Non-sewered sanitation systems – Prefabricated integrated treatment units – General safety and performance requirements for design and testing*).
- On-site dry sanitation systems with faecal sludge management and appropriate treatment infrastructure.

The third category is off-grid or decentralised wastewater treatment systems managed by the specifications of ISO/SANS 24521 - sanitation systems which have partially or fully prefabricated treatment unit such as package plants and decentralised wastewater treatment. In this case, the treatment system can be retrofitted into existing communities and the raw wastewater is rerouted from existing sewer infrastructure.

In this project, WESS is further defined as solutions which manages (collects) and treats waste to the required design parameters for safe reuse on site. This includes sludge disposal or any other drainage or decanting from maintenance activities. WESS are a subset of non-sewered sanitation (i.e., there is no connection to trunk

sewer or municipal reticulation system) that can be off-grid (in terms of water and energy supply) and decentralised with drainage from the front-end through a drainage network consisting of reduced pipe diameters (such as D 110 mm or D 160 mm). WESS are designed to recirculate the treated liquid fraction for toilet flushing or onsite for irrigation (up to 2ML/d). Some WESS may only treat blackwater or treat a combination of black and greywater.

The Constitution of South Africa says that everyone has the right to access water and sanitation. It also provides a broad framework for the division of powers and functions across the three spheres of government. A comprehensive legislative overview of sanitation provision examined the constitutional distribution of powers and responsibilities within South Africa. Municipalities play a crucial role in this framework, particularly within the broader contexts of water, sanitation, environmental management, and human settlements.

WESS in the form of off-grid and decentralised sanitation solutions are highlighted as critical, especially as they address the needs of both low-income communities, who often live within informal settlements without direct sewer connections, and high-income groups, who may reside in estates also lacking easy access to sewer systems. However, several governance and institutional challenges that need to be addressed for effective implementation of these systems.

In this report, a framework is provided to assist and guide municipalities (metropolitan, district and local) with approval, adoption, and regulation of WESS that facilitate full treatment of the input/influent for safe reuse or disposal through developing new sanitation by-laws or adapting their existing water services by-laws. Establishing this comprehensive framework for model by-laws (norms and standards) is essential to guide municipalities in implementing WESS effectively.

The Framework covers the following with all sections having guidance notes to municipalities:

- Preface
- Introduction
- Developing By-laws and Policy
- Institutional and Regulatory Framework for WESS Implementation
- General
- Definitions and Terminology
- Technical Norms and Standards for WESS
- Framework for WESS Management and Operation
- Monitoring, Evaluation and Reporting
- Tariffing and Revenue
- Penalties, Non-Compliance and Enforcement Management
- User Responsibilities
- Processes and Procedures for Application
- Conclusion
- Schedules and Annexures
- References

It must be noted that developing effective by-laws for WESS requires a classification of WESS (perhaps an expanded definition to ensure what regulatory requirements are relevant for WESS), clearly defining the roles

and responsibilities of all involved parties, considering the ongoing needs of waste disposal, facility management, and monitoring. This includes indirect support functions like road infrastructure, which may have different requirements for WESS than for other utilities. When powers are split, particularly when ancillary functions like environmental health or road management fall outside the local municipality's jurisdiction, additional by-law amendments may be necessary to cover all WESS functions. It's also crucial to fully consider the institutional and financial arrangements of WESS, as these will impact existing municipal structures and finances. There needs to be a seamless fit between national policy and local government functions. This could involve providing guidance notes on how provincial and national bodies can best fulfil their monitoring and advisory roles for WESS and other water and sanitation policies.

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Reference Group	Affiliation
Mr Jay Bhagwan	Water Research commission (Senior Research Manager)
Prof Karthy Govender	Legal Advisor
Mr Phillip Majeke	Water Research commission
Ms Iris Mathye	Department of Water and Sanitation
Mr Ashton Busani Mpofu	Amabhungu Group
Ms Tabita Napakade	Department of Water and Sanitation
Mr Rajiv Paladh	Bosch Capital
Mr Nedon Ramsuran	eThekwini Water and Sanitation
Mr Abri Vermeulen	ACV Water

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CONTENTS

EXECUTIVE SUMMARY	i
ACKNOWLEDGEMENTS	iv
CONTENTS	v
LIST OF FIGURES	viii
LIST OF TABLES	viii
ACRONYMS & ABBREVIATIONS	ix
GLOSSARY	x
CHAPTER 1: BACKGROUND	1
1.1 INTRODUCTION	1
1.1.1 Enabling Regulatory Frameworks.....	1
1.2 PROJECT AIMS	4
CHAPTER 2: ANALYSIS OF POLICY AND LEGISLATION	5
2.1 INTRODUCTION	5
2.2 INTERNATIONAL CONTEXT	5
2.2.1 Stakeholders	7
2.2.2 Key factors to consider in the Framework	8
2.2.3 Examples of sanitation systems.....	9
2.3 SOUTH AFRICAN CONSTITUTIONAL AND LEGISLATIVE ISSUES	9
2.4 MUNICIPAL LEGISLATION.....	12
2.4.1 Delegations, authorisations, assignments and adjustments.....	13
2.4.2 Defining functions: mSCOA	15
2.5 WATER AND SANITATION LEGISLATION	16
2.5.1 Water Policy and legislation.....	16
2.5.2 Authority and providers	17
2.5.3 Sanitation Policy.....	18
2.5.4 Monitoring	20
2.5.5 Key Institutions.....	20
2.6 INTERGOVERNMENTAL PROCESSES	21
2.7 RELATED HUMAN SETTLEMENTS LEGISLATION	21
2.8 THE MUNICIPAL CONTEXT	24

2.8.1	Municipal capacity	24
2.8.2	Trends in provision of Free Basic Water and Indigents receiving free water	25
2.8.3	Trends in provision of Free Basic Sanitation and Indigents receiving free sanitation	25
2.8.4	Sanitation options	26
2.8.5	Differentiation across municipalities in terms of non-sewered sanitation	27
2.9	ANALYSIS OF EXISTING BY-LAWS	27
2.10	GOVERNANCE AND OTHER CONSTRAINTS ON THE DELIVERY OF DECENTRALISED/OFF-GRID SANITATION SOLUTIONS	30
2.10.1	Awareness and perception issues	30
2.10.2	Land-use planning	31
2.10.3	Zoning Regulations	31
2.10.4	Infrastructure Integration	31
2.10.5	Urban Development Policies.....	32
2.10.6	Stakeholder management.....	32
2.10.7	Compliance	32
2.11	SOLUTIONS	33
2.11.1	Temporary solutions	33
2.11.2	Revising current zoning regulation and creating inclusive zoning	33
2.11.3	Streamlining approvals	33
2.11.4	Clear guidelines and standards	34
2.11.5	Enhancing Land Use Planning.....	34
2.11.6	Policy Alignment and Capacity Building	34
2.11.7	Effective implementation strategies	35
2.12	CONCLUDING COMMENTS.....	35
CHAPTER 3: FRAMEWORK FOR MODEL BY-LAWS: WATER EFFICIENT SANITATION SYSTEMS ..		37
3.1	PREFACE	37
3.2	INTRODUCTION	38
3.3	DEVELOPING BY-LAWS AND POLICY	40
3.3.1	Development of By-laws	41
3.3.2	Rationale	42
3.4	INSTITUTIONAL AND REGULATORY FRAMEWORK FOR WESS IMPLEMENTATION.....	43
3.5	GENERAL.....	48
3.6	DEFINITIONS AND TERMINOLOGY.....	48
3.7	TECHNICAL NORMS AND STANDARDS FOR WESS.....	50

3.8	FRAMEWORK FOR WESS MANAGEMENT AND OPERATION	52
3.9	MONITORING, EVALUATION AND REPORTING	53
3.10	TARIFFING AND REVENUE	55
3.11	PENALTIES, NON-COMPLIANCE AND ENFORCEMENT MANAGEMENT	55
3.12	PROCESSES AND PROCEDURES FOR APPLICATION	56
3.12.1	Application to the WSA	56
3.12.2	Information to be submitted by the Professional Engineer / Professional Engineering Technologist with the Application	57
3.12.2.1	Relating to the Developer and Professional Engineer / Professional Engineering Technologist:	57
3.12.2.2	Relating to the Proposed Development:	57
3.12.2.3	Relating to the Proposed WESS:	58
3.13	CONCLUSION	58
3.14	SCHEDULES AND ANNEXURES	58
3.15	REFERENCES	59
	CHAPTER 4: CONCLUSIONS & RECOMMENDATIONS.....	60
4.1	CONCLUSIONS.....	60
4.2	RECOMMENDATIONS.....	60
	REFERENCES	61
	APPENDICES	63

LIST OF FIGURES

Figure 1: Challenges impeding the adoption of water efficient sanitation solutions (WESS) by water services authorities	3
Figure 2: Categorisation of Sanitation Services	6
Figure 3: Legislative competencies (City Insight, 2016).....	11
Figure 4: Authorisation, adjustment, delegation and assignment	14
Figure 5: Municipal employment trends: Total, Water and Sanitation 2006-2019	24
Figure 6: Trend in Water consumers compared to FBW and Indigent water provision: 2006-2022	25
Figure 7: Trend in Sanitation consumers compared to FBW and Indigent water provision: 2006-2022.....	26

LIST OF TABLES

Table 1: Examples of WESS and Services	10
Table 2: RDG proposed changes to powers and functions.....	15
Table 3: Water and sanitation functions included in mSCOA classification (National Treasury, MSCOA v6.3 released 2018).....	16
Table 4: Sanitation systems in South Africa	26
Table 5: Total consumers by non-sewered sanitation type	27

ACRONYMS & ABBREVIATIONS

AMCOW	African Ministers' Council on Water
CapEx	Capital Expenditure
CBO	Community Based Organisation
COGTA	Cooperative Governance and Traditional Affairs
CSO	Community Security Organisation
DWWTS	Decentralised wastewater treatment systems
DWS	Department of Water and Sanitation (previously the Department of Water Affairs – DWAF)
DFFE	Department of Forestry, Fisheries, and the Environment
FSTP	Faecal Sludge Treatment Plants
NDP	National Development Plan
NGO	Non-Governmental Organisation
NSS	Non-sewered sanitation
NSSS	Non-sewered sanitation systems (as prescribed by ISO 30500)
O&M	Operation and Maintenance
SABS	South African Bureau of Standards
SDGs	Sustainable Development Goals
VIP	Ventilated Improved Pit latrine
WASH	Water supply, Sanitation, and Hygiene
WESS	Water efficient sanitation solutions
WSA	Water Services Authorities

GLOSSARY

Non-sewered sanitation systems. Refers to products designed according to the specifications of SANS 30500. A prefabricated integrated treatment unit, comprising frontend (toilet facility) and backend (treatment facility) components that:

- a) collects, conveys and fully treats the specific input within the NSSS, to allow for safe reuse or disposal of the generated solid and liquid outputs, and the safe emission of air, noise and odour outputs;
- b) is designed to operate without being connected to a networked sewer or networked drainage systems.

Norms and Standards. A set of criteria and regulations, enforced by legislation and monitored by authorities, that dictate quality and performance in a given area.

Off-grid wastewater treatment system. A combination of sanitation technologies from the user-interface to the treatment unit that is not connected to any municipal water or electrical supply and reuses the treated liquid and/or solid output within the boundary of the property owner / body co-operation.

Water efficient sanitation solutions. (WESS) means sanitation systems which require low to no water, completely off-grid, non-sewered, on-site or are decentralised and utilise technologies that include using water saving devices, water-efficient processes and beneficial use of waste products.

Decentralised wastewater treatment systems (DWWTS). Various approaches for collection, treatment, and dispersal/reuse of wastewater for individual dwellings, industrial or institutional facilities, clusters of homes or businesses, and entire communities. They provide a range of treatment options from simple, passive treatment with soil dispersal, commonly referred to as septic or on-site systems, to more complex and mechanized approaches such as advanced treatment units that collect and treat waste from multiple buildings and discharge to either surface waters or the soil. They are typically installed at or near the point where the wastewater is generated. These systems, when

owned by the WSA and or its contracted Water Service Provider or Water Services Intermediary, as a part of their permanent infrastructure, can be managed as stand-alone facilities. These systems, when privately owned will need to be managed as stand-alone facilities by the infrastructure owners, operating as a Water Services Intermediaries with an SLA to the municipality and a water use authorisation in terms of the National Water Act.”

CHAPTER 1: BACKGROUND

1.1 INTRODUCTION

The United Nations Country snapshot of South Africa's progress towards Goal 6 of the Sustainable Development Goals (SDGs) indicates that only 72% have access to **safely managed sanitation services**¹ and that only 41% of domestic wastewater (combination of black and greywater) is safely treated². The 2024 General Household Survey revealed that 83,1% of South African households have access to improved sanitation (defined as either a flush toilet connected to a conventional sewer or septic tank, or a ventilated improved pit latrine). Bucket toilets were still used by 157,176 households while 140,247 households practice open defaecation (STATS SA, 2025). Filling that 28% gap for universal access to safely managed sanitation remains a challenge.

Water Services Authorities as defined by the Water Services Act (108 of 1997), has the mandate to ensure all consumers or potential consumers within its area of jurisdiction have progressive access to efficient, affordable, and sustainable water services.

WSAs must regulate water service provision and water service providers (WSPs) through by-laws, contract regulation, monitoring, and performance management. In 2025, service delivery backlogs remain, compounded by population growth, fast-growing cities, poor performing conventional wastewater treatment works, ageing bulk infrastructure and the historical inequalities in sanitation provision that created a desire for the gold standard of a "flushing toilet." The impacts of water scarcity, climate change impacts and poor management of water supply further makes traditional waterborne sanitation unsustainable. Moreover, the lack of adequate communication and planning between departments such as human settlements and housing with water and sanitation often results in unsafe and inappropriate sanitation services being rolled out with no consequence management.

The Joint Monitoring Programme (JMP) service ladder for sanitation states that:

"There are three main ways to meet the criteria for having a safely managed sanitation service (SDG 6.2). People should use improved sanitation facilities which are not shared with other households, and the excreta produced should either be:

- *treated and disposed of in situ,*
- *stored temporarily and then emptied and treated off-site, or*
- *transported through a sewer with wastewater and then treated off-site".*

1.1.1 Enabling Regulatory Frameworks

The National Development Plan (NDP) set the target that all South Africans should have access to affordable, reliable, and hygienic sanitation by 2030 aligning with SDG targets. The National Sanitation Policy (2016) and National Faecal Sludge Management Strategy (2023) guide the provision, management, and innovation in sanitation services.

In 2023, the Department of Water and Sanitation (DWS) established the National Sanitation Framework (NSF) which serves as a roadmap for government to deliver equitable and safe sanitation solutions across all settlement types (urban and rural). It represents a significant shift in how South Africa approaches sanitation by moving beyond simply building toilets but focuses on creating sustainable,

¹ <https://washdata.org/monitoring/sanitation>

² https://www.sdg6data.org/en/country-or-area/south%20africa#anchor_6.2.1a

dignified, and accessible sanitation systems that cater to the unique needs of different communities. The NSF provides the revision of the national minimum norms and standards as it relates to sanitation services thus ensuring more equitable provision of sanitation underpinned by the strengthened monitoring and compliance to these standards. Furthermore, the NSF provides for the strengthening of governance in the sector to improve collective efforts at improved integrated planning, monitoring, reporting, and execution through national and provincial sanitation coordination structures. The NSF further prohibits municipalities from providing bucket toilets as a sanitation solution, emphasises the need to accelerate efforts at removing the bucket toilet system (the provision of bucket toilets is prohibited in the minimum norms for sanitation), end open defaecation and eradicate sanitation backlogs by rolling out a range of support measures to poor performing municipalities, thus ensuring a turnaround of sanitation services.

The National Sanitation Integrated Plan (NSIP), published in early 2025, serves to act as an enabling environment through private sector buy-in, upskilling of regional offices/members, coordination through multisectoral engagement, pooling of funding allocations, resilient planning, disaster management and social inclusion and awareness creation. The National Sanitation Programme of Action (NSPA) is the NSIP implementation plan that strives for enabling access to inclusive, and safely managed sanitation and hygiene services. It is through addressing gaps in sanitation infrastructure but deploying context-specific and innovative solutions and utilising a sector-wide approach, that the NSPA will be realised and reduce the timeframe to achieving universal access to safely managed sanitation. It envisages that high, medium, and low-density settlements should be provided with sanitation systems that are appropriate in those settlement types regardless of race and economic status, and thus, solution choice is based on technical considerations such as population density, groundwater pollution risks, and economies of scale. In addition, new settlements and developments should use water efficient sanitation solutions (WESS).

The Revised Compulsory National Water and Sanitation Services Norms and Standards gazetted on 6 June 2025, have already created an enabling environment for the implementation of WESS. It defines “**Water efficient sanitation solutions**” (WESS) as “*sanitation systems which require low to no water, completely off-grid, non-sewered, on-site or are decentralised and utilise technologies that include using water saving devices, water-efficient processes and beneficial use of waste products.*”

Sub-regulation (7) (b) states that “*In providing basic sanitation service, a Water Services Authority must consider the following requirements: Water efficient sanitation solutions.*”

Moreover, Sub-regulation (8) mentions that “*a Water Services Authority must consider-*

- (a) *in high and medium density formal settlements:*
 - i. *waterborne sewered sanitation provided that the wastewater treatment system and works have adequate capacity and is performing to acceptable standards under the National Water Act (read with regulation 10); or*
 - ii. *alternative water efficient sanitation solutions instead of waterborne sewered systems in areas of dense formal and medium settlement where there is resource scarcity and or inadequate capacity or functionality in the sewer system and or the wastewater treatment works.*
- (b) *in low density or sparsely populated settlements: water efficient sanitation solutions.*

(9) Water efficient sanitation solutions in sub-regulation (7) must be shown to include off-grid, on-site sanitation options such as Non-sewered Sanitation Systems (NSSS) as well as Decentralised Wastewater Treatment Systems (DWWTS).”

Empty policies are like empty promises: they may sound good but they have no effect

However, lack of policy implementation results in innovation not being scaled up and used in communities where it is most needed. The main challenges that have impeded the adoption of WESS relate to regulatory, institutional, financial, operational, and social factors at the WSA level (Figure 1).

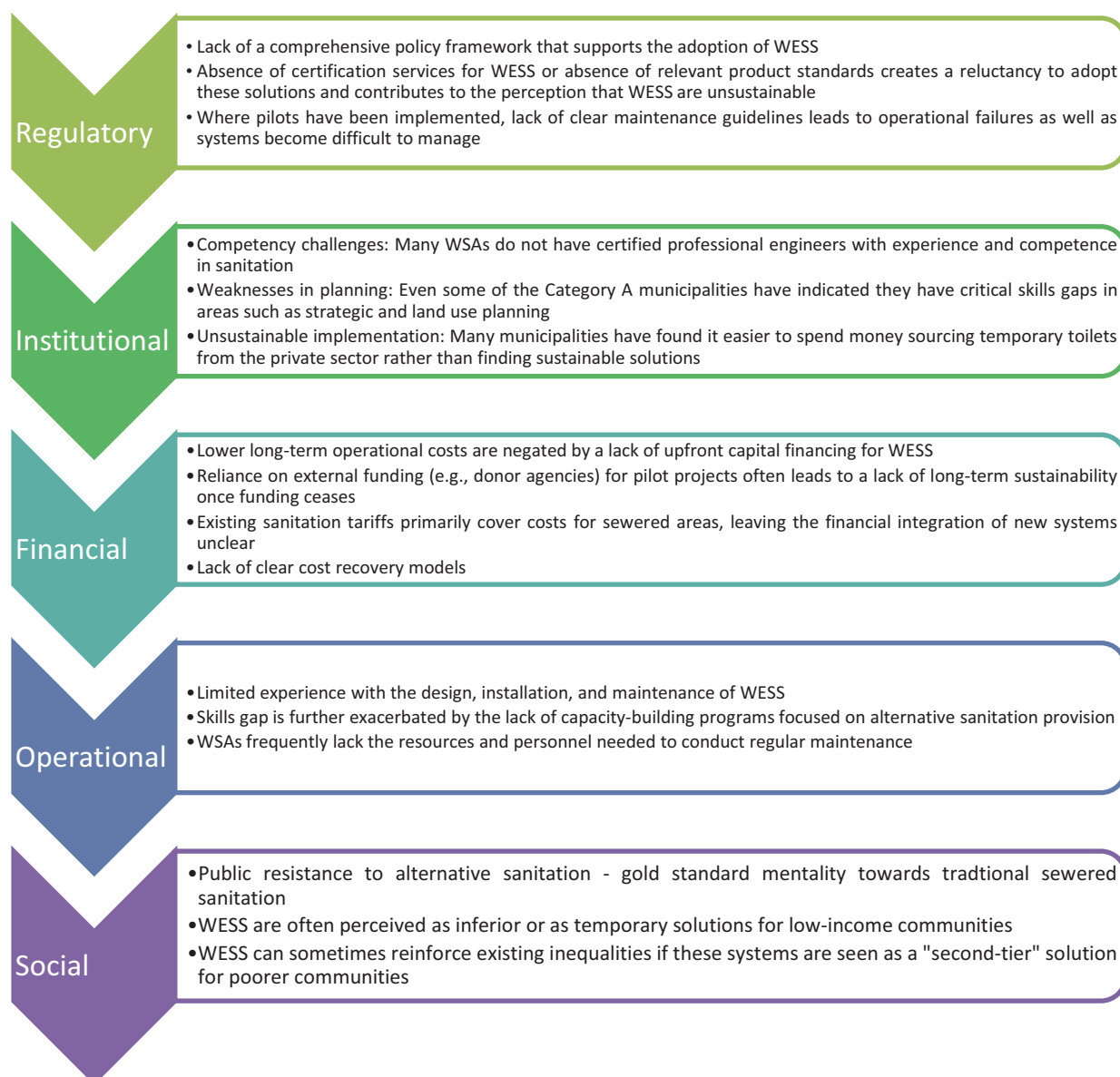


Figure 1: Challenges impeding the adoption of water efficient sanitation solutions (WESS) by water services authorities

The purpose of this project is to provide WSAs and WSPs with a draft framework for **adapting their existing or developing new water services by-laws** that will assist them in implementing, operating and maintaining Water Efficient Sanitation Solutions (WESS) for various contexts.

1.2 PROJECT AIMS

The project aimed to:

1. Review and align national, provincial (norms and standards, policy, relevant regulatory frameworks) with local policy and regulatory frameworks for managing off grid, decentralised and non-sewered sanitation systems in South African municipalities (Chapter 2).
2. Develop a model guideline / framework for setting by-laws (norms and standards) for the implementation of water efficient sanitation solutions in South Africa within different municipal contexts, as well as within different land uses (Chapter 3).
3. Communicate the developed guideline to all municipalities (and other relevant role players) and raise awareness of the model by-laws.

Consultations with WSAs and other stakeholders, including the contacting of all 257 municipal managers, was undertaken throughout the project. ***It should be noted that the Framework in Chapter 3 is the core objective of the work undertaken and it is written as a standalone chapter, including findings from the policy review in Chapter 2.*** It must be recognised that WSAs operate a variety of levels, with differential contexts, capabilities, functions and resources and, as a result, the framework provides notes to municipalities on issues, they should consider in developing or refining their bylaws to allow for WESS. This Framework and the overall work:

- Outlines application procedures and any relevant approvals (licenses, permits and certifications) from relevant regulatory bodies such as the Department of Water and Sanitation (DWS), Department of Forestry, Fisheries, and the Environment (DFFE), South African Bureau of Standards (SABS), local government departments, and other authorities responsible for regulating and licensing technology design, performance and installation, end-use application of the treated liquid fraction, sludge disposal etc.
- Lists the technical product standards and relevant management guidelines for the design, construction, installation, and operation of water efficient sanitation solutions.
- Lists the monitoring and evaluation requirements of these systems in relation to the established norms, standards, and guidelines for safe waste storage, treatment, and disposal.
- Clarifies the roles and responsibilities of national and local government, municipal authorities, property owners, body corporates, users, contractors, and service providers in the implementation, operation, and maintenance of water efficient sanitation solutions.
- Enables municipal authorities to enforce compliance through inspections, audits, and appropriate penalties or sanctions for non-compliance. Setting of sanitation tariffs for water efficient sanitation solutions.
- Lists some methods of how users of the technology can be educated to understand the systems to promote proper usage and maintenance practices

CHAPTER 2: ANALYSIS OF POLICY AND LEGISLATION

2.1 INTRODUCTION

This policy review examines the national, provincial and local policy and regulatory frameworks for managing water efficient sanitation solutions (which consist of off grid, decentralised and non-sewered sanitation systems) in South African municipalities. This includes an assessment of the degree of alignment between these different policy and regulatory frameworks, as well as a review of recent and proposed amendments. The review summarises key issues relating to model by-laws in the context of legislation and policy development. These include:

- International context
- SA constitutional issues
- Municipal legislation
- Water and sanitation legislation
- Other human settlements related legislation
- The municipal context, including an analysis of a selection of existing by-laws
- Governance and other constraints.

2.2 INTERNATIONAL CONTEXT

In a review of international literature, it is evident that the development of approaches around non-sewered sanitation relates principally to a paradigm shift from ancient and very simple sanitation approaches to inclusive sanitation that is focused on ensuring safe sanitation practices combining various technological solutions. This is especially relevant given the increasing acknowledgment worldwide that only centralised solutions, especially in smaller urban centres, may not be enough to ensure complete sanitation coverage (NIUA, 2019).

The 2021 African Sanitation Policy Guidelines, published by the Secretariat of the African Ministers' Council on Water (AMCOW) recognise the importance of multifaceted institutional, governance, and financial management systems in the sustainable and effective water supply, sanitation, and hygiene (WASH) service delivery. They note these systems are "receiving increasing attention as countries in Africa tackle the limited expansion - or even the shrinking - of sanitation service delivery" (AMCOW, 2021). Critically in all literature is the recognition that there are complementary roles for sewerred and non-sewered sanitation:

A mix of sewerred and non-sewered sanitation will be needed to reach the whole population of Africa, and both can provide the same benefits when appropriately matched to the situation. Waterborne sewerage has often been seen as the only legitimate form of urban sanitation, but in almost all urban areas in Africa, non-sewered sanitation also has a major role to play (AMCOW, 2021).

In 2017, AMCOW note that over 90% of all sanitation systems in sub-Saharan Africa were non-sewered. These WESS can be effective in providing safe sanitation if correctly designed, built, used and serviced. However, the African Sanitation Policy Guidelines recommend that policies allowing for non-sewered sanitation are supplemented by standards to ensure the required health and socio-economic benefits. WESS are applicable in most settlement types (e.g., urban, peri-urban, rural, and small towns) and in

different contexts, including in humanitarian situations. Figure 2 illustrates the sanitation services in sewer and non-sewered environments.

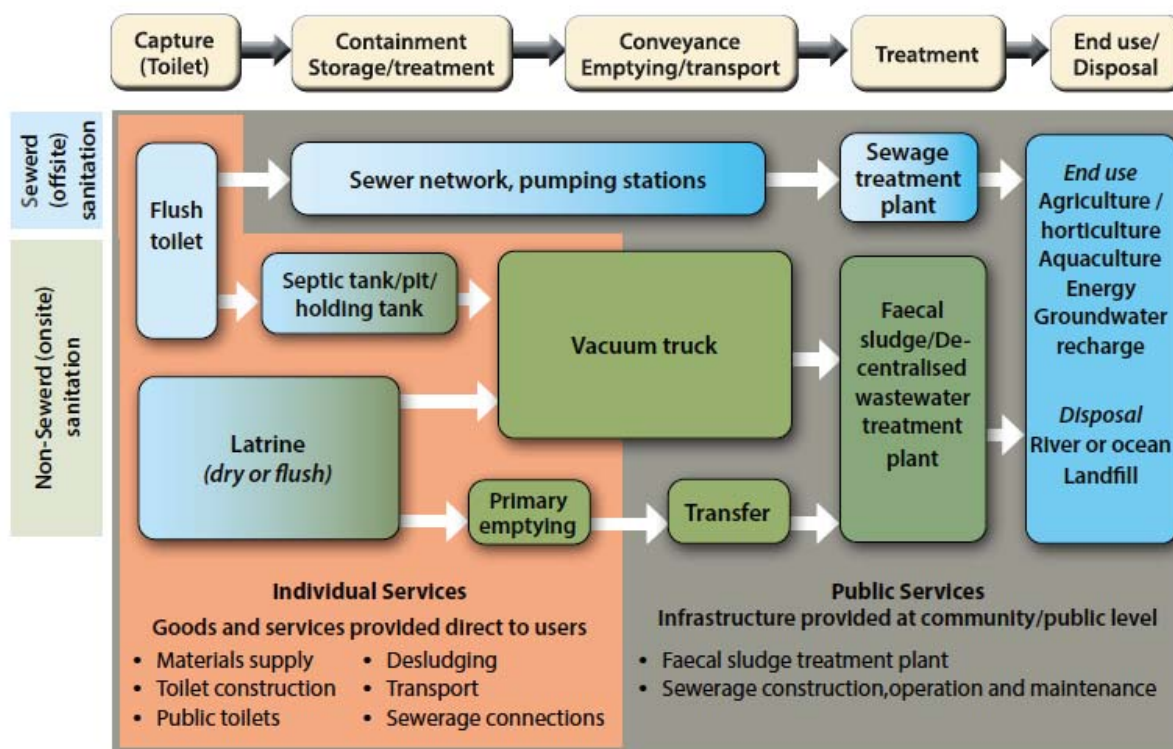


Figure 2: Categorisation of Sanitation Services

AMCOW (2021) also recognises the challenges around regulation of non-sewered sanitation. For many years, regulation has focused mainly on a few indicators related to sewered sanitation, while non-sewered sanitation received little, if any, regulatory oversight, except for the construction of containment facilities in some urban areas, and the operation of emptying services in a few instances (AMCOW, 2021).

With regard to the potential impact on non-sewered sanitation on climate change, decentralised and non-sewered sanitation have the potential to enhance the resilience and adaptive capacity of communities, and are more cost-effective and energy efficient. However, a challenge in the availability of climate finance is noted, with most funding available only for physical infrastructure and not nature and social infrastructure (Pawar, 2022).

A number of country case studies are available. In Bangladesh, Ethiopia, India, Kenya, Tanzania, and Uganda, the FINISH Mondial sanitation development programme focuses on the entire sanitation chain including ensuring a sanitation circular economy. It looks at resource recovery from the sanitation value chain through a circular economy approach for agriculture and energy need.

In India, less than half of the households have a toilet at home, with the 2011 Census noting that almost 50% of the population practice open defecation. Given that most Indian cities are only partially sewered, 48% of urban households use on site facilities such as septic tanks and pit latrines. There are also challenges around physical soil and terrain issues in developing piped systems. The country is therefore focused on a sustainable service delivery approach for sanitation that will include a hybrid approach focusing on a combination of centralised and decentralised sanitation systems (NIUA, 2017).

In Kenya, a review of market-based models and public-private partnerships (PPPs) in the development of WESS identified four business models:

- Construction of affordable, emptiable containment units based on standard designs
- Environmentally safe emptying services through performance-based financing
- Delegated operations and maintenance (O&M) of publicly owned faecal sludge treatment plants (FSTPs) (with an additional option of design-build-finance and O&M of FSTPs)
- Integrated services across market segments (Sara et al, 2023).

Unfortunately, WESS strategies and by-law equivalents in many of the international examples outside of continents such as Africa, Asia and Latin America are not always useful in a South African context. For example, while San Francisco is seen to be spearheading a city-wide installation of on-site non-potable water reuse systems (ONWS), a detailed reading of their relevant bylaw - Article 12C: Alternate water sources for non-potable applications – explicitly states that the approach is not applicable to systems at small residential buildings; is only applicable for buildings over 10000 square metres in size; greywater systems where greywater is collected solely for subsurface irrigation and does not require disinfection; and rainwater systems, where rainwater is collected solely for subsurface irrigation.

Through the review of literature on international examples, a useful comparison between centralised and decentralised models can be made. Centralised sewerage systems with underground drains are generally suitable for dense cities but difficult to scale as city grows. In addition, these systems require adequate water for effective operations and are relatively expensive to build and maintain. They also require extensive excavation along roads and private property. In contrast, a decentralised wastewater treatment is suitable for a range of population sizes, from single homes to entire neighbourhoods. These systems allow for the maximum local re-use of water, reducing fresh water needs and are much less expensive to install and maintain. They are also significantly more flexible and less complex, requiring basic skills to construct, operate and manage.

2.2.1 Stakeholders

A number of key stakeholders are identified by the AMCOW Secretariat which is useful for consideration in the development of model by-laws. These include:

- Public health authorities
- Ministry of Finance
- Water and sanitation utilities
- Education authorities
- Environment agencies
- Regulators
- Gender, women's affairs, and social welfare authorities
- Local government and municipal authorities
- Rural and urban development authorities
- Planning authorities
- Academics
- WASH NGOs and CBOs
- Agencies engaged in disaster preparedness and response (government and NGOs)
- Sanitation service providers (including the informal and formal sectors, professional and trade groups)

- CSOs
- End users in all contexts (e.g., urban areas, slum dwellers, refugee and IDP camps, rural and small towns), including women, girls, and people with disabilities
- Development partners active in the sanitation sector

2.2.2 Key factors to consider in the Framework

From the review of international literature, a few key concepts and notes can be extracted to inform the development of model by-laws.

- The African Sanitation Policy Guidelines note that for WESS to function in high density areas, elements including a skilled workforce, effective and safely managed emptying, transportation, treatment, and disposal services are critical. The planning for decentralised systems requires a different viewpoint in terms of policy and institutional framework, finances, technology, and stakeholder engagement (NIUA, 2019).
- In addition, some non-sewered systems have limited capacity for handling greywater and so require complementary greywater management systems. The development of policies or standards (or by-laws in this case) can specify that these elements need to be catered for where WESS are used. Non-sewered on-site sanitation is grouped into two categories, each with different technologies to ensure that excreta is safely managed across the service chain:
 - On-site sanitation with on-site treatment (such as those products designed under the specifications of ISO/SANS 30500: *Non-sewered sanitation systems – Prefabricated integrated treatment units – General safety and performance requirements for design and testing*)
 - On-site systems with faecal sludge management and appropriate treatment infrastructure (AMCOW, 2021).

Effective regulation is noted as critical, including the need for clear guidelines that are adapted to the local institutional and political context. These regulations include elements such as oversight of pricing and tariff setting, service quality, performance imperatives, work safety, promotion of investment, and enforcement of compliance by service providers. In addition, it is critical to ensure compliance with prescribed laws, regulations, rules, byelaws, guidelines, and standards (AMCOW, 2021).

Other factors to be included in the development of policies and related documentation include:

- The expected outcomes from sanitation systems and service levels for managing human excreta from various locations, taking into consideration specific needs of vulnerable groups.
- Permissible service levels for all types of settings.
- Service levels including:
 - Considerations around incremental improvements;
 - Managed services;
 - Minimum standards for different settings and situations (e.g., Humanitarian crises);
 - Priority areas for improvement;
 - Effective faecal sludge and wastewater management; and
 - Institutional wash priorities (for schools, health centres, etc.).

The 2017 Handbook on Decentralised Wastewater Treatment Module notes that a typical decentralised wastewater treatment module combines the following technical treatment steps in a modular manner:

- Pre-treatment – screen, grit chamber, oil and grease trap
- Primary treatment – in sedimentation ponds, settlers, septic tanks.
- Secondary treatment – in anaerobic baffled reactors, anaerobic filters or anaerobic and facultative pond systems
- Tertiary aerobic/facultative treatment – in horizontal gravel filters
- Tertiary treatment – in aerobic polishing ponds

The selection of appropriate technical configuration depends on wastewater volume, wastewater quality, local temperature, underground conditions, availability of land, costs, prescribed standards, acceptance of cultural and social conditions and the final handling of the effluent (discharge and (or) reuse (NIUA, 2017).

2.2.3 Examples of sanitation systems

A number of examples of sanitation systems are available and included in Table 1 for reference in this work (AMCOW, 2021). Further detail can be found in the 2017 Handbook on Decentralised Wastewater Treatment Module.

2.3 SOUTH AFRICAN CONSTITUTIONAL AND LEGISLATIVE ISSUES

The Constitution of South Africa says that everyone has the right to access water and sanitation. It also provides a broad framework for the division of powers and functions across the three spheres of government. Relevant sections include:

Powers and functions of municipalities

156. (1) A municipality has executive authority in respect of, and has the right to administer—
- (a) the local government matters listed in Part B of Schedule 4 and Part B of Schedule 5; and
 - (b) any other matter assigned to it by national or provincial legislation.
- (2) A municipality may make and administer by-laws for the effective administration of the matters, which it has the right to administer.
- (3) Subject to section 151(4), a by-law that conflicts with national or provincial legislation is invalid. If there is a conflict between a by-law and national or provincial legislation that is inoperative because of a conflict referred to in section 149, the by-law must be regarded as valid for as long as that legislation is inoperative.
- (5) A municipality has the right to exercise any power concerning a matter reasonably necessary for, or incidental to, the effective performance of its functions.

Table 1: Examples of WESS and Services

System	Type		Technology					
			Capture (toilet)	Containment	Conveyance	Treatment	End-use/disposal	
Non sewered sanitation	Onsite sanitation with onsite treatment	1.	Dry or flush toilet with onsite disposal	Dry or flush toilet	Single pit or VIP		Fill and cover / Arborloo	
		2.	Dry toilet or urine diverting dry toilet (UDDT) with onsite treatment in alternating or compost chamber	Dry toilet or UDDT	Fossa alterna, double ventilated improved pit latrine (VIP), Kumasi ventilated improved pit latrine (KVIP), or compost chamber	Manual emptying and transport	Soil conditioner	
		3.	Flush toilet with onsite treatment in twin pits	Pour flush toilet (squat pan or pedestal)	Twin pits for pour flush	Manual emptying and transport	Soil conditioner	
		4.	UDDT with onsite treatment in dehydration vault	UDDT	Faeces: dehydration in vault Urine: jerry cans or tanks	Dried faeces: manual emptying and manual or motorised transport Urine: manual or motorised transportation	Soil conditioner Liquid soil fertilizer	
	Onsite systems with faecal sludge management and offsite treatment	5.	Dry or flush toilet with pit, effluent infiltration, and offsite treatment of faecal sludge	Dry or flush toilet	Single pit or VIP	Manual emptying and transport	Faecal sludge treatment plant	Soil conditioner, solid fuel, building materials, irrigation surface water recharge, animal feed, water
		6.	Flush toilet with septic tank and effluent infiltration, and offsite faecal sludge treatment	Pour flush or cistern flush toilet	Septic tank (or anaerobic baffled reactor or anaerobic filter) connected to a soak pit or leach field	Motorised emptying and transport	Faecal sludge treatment plant	Soil conditioner, solid fuel, building materials, irrigation surface water recharge, animal feed, water
Sewered sanitation	Offsite systems with sewerage and offsite treatment	7.	UDDT with container-based sanitation with offsite treatment of all contents	UDDT and urine container	Faecal material: portable storage container or cartridge Urine: portable storage tanks or jerry cans	Faecal material: collection and motorised (or manual) transport of storage tanks Urine: Collection and motorised (or manual) transport of storage tanks	Treatment plant for sludge and effluent N/A	Soil conditioner, solid fuel, building materials, irrigation surface water recharge, animal feed, water Liquid fertiliser
		8.	Flush toilet with sewerage and offsite wastewater treatment	Pour flush or cistern flush toilet		Simplified or conventional gravity and pumped sewers	Wastewater treatment plant – for wastewater and wastewater sludge Waste Stabilisation Pond	Effluent: treated and used for irrigation or surface water recharge

Municipal fiscal powers and functions

229. (1) Subject to subsections (2), (3) and (4), a municipality may impose—
- (a) rates on property and surcharges on fees for services provided by or on behalf of the municipality; and
- (3) When two municipalities have the same fiscal powers and functions with regard to the same area, an appropriate division of those powers and functions must be made in terms of national legislation. The division may be made only after considering at least the following criteria:
- a) The need to comply with sound principles of taxation.
 - b) The powers and functions performed by each municipality.
 - c) The fiscal capacity of each municipality.
 - d) The effectiveness and efficiency of raising taxes, levies and duties.
 - e) Equity.

The Constitution allocates the management of water resources to national government, and the management of water and sanitation services for all citizens to municipalities (local government).

Schedule 4 details the functional areas of concurrent national and provincial legislative concurrence, with Part B listing local government matters. Schedule 5 provides detail on the functional areas of exclusive provincial legislative competence, with Part B again highlighting local government matters. In other words, Schedule 4B and 5B list all local government’s constitutionally derived powers and functions (Figure 3).

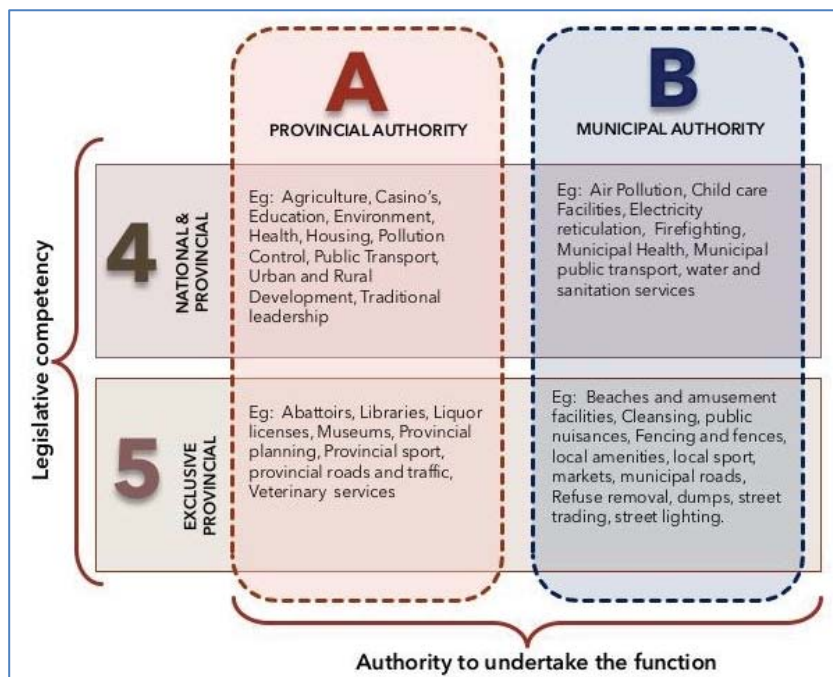


Figure 3: Legislative competencies (City Insight, 2016)

In the case of Water and Sanitation, Schedule 4B lists these as local government functions:

- Water and sanitation services limited to potable water supply systems and domestic waste-water and sewage disposal systems.

Municipalities may have any Schedule 4A and 5A functions assigned to them by national or provincial

legislation, if the function would be more effectively administered locally and if the municipality has the capacity to undertake it. Importantly the Constitution recognises the key developmental role that local government is meant to play.

At a policy level, the National Development Plan (NDP) makes a firm commitment to achieving a 'decent standard of living through the elimination of poverty and reduction of inequality'. The core elements of a decent standard of living identified in the NDP are housing, water, electricity and **sanitation**; safe and reliable public transport; quality education and skills development; safety and security; quality health care; social protection; employment; recreation and leisure; *clean environment*; and adequate nutrition.

Chapter 4 of the NDP (NPC, 2011) states that:

"Before 2030, all South Africans will have access to sufficient safe water and hygienic sanitation to live healthy and dignified lives. Standards for services provision will vary across the country... while local government will retain responsibility for ensuring adequate service provision in its areas, regional utilities will provide services where municipalities have inadequate technical and financial capabilities."

2.4 MUNICIPAL LEGISLATION

The key legislative environment for municipalities is defined through the Local Government: Municipal Demarcation Act of 1998; the Municipal Structures Act of 1998 that defined the key political structures of local government; the Municipal Systems Act of 2000 that provides for the administrative and planning context, defining also the key powers and functions of local government; the Municipal Finance Management Act; and the Municipal Property Rates Act, 2004.

The Municipal Structures Act (Section 84) describes how powers and functions should be shared and deals with the division of functions and powers between district (Category C) and local (Category B) municipalities. A district municipality has the following functions and powers relating to water and sanitation:

- (a) Integrated development planning for the district municipality as a whole, including a framework for integrated development plans of all municipalities in the area of the district municipality.
- (b) Potable water supply systems.
- (d) Domestic waste-water and sewage disposal systems.
- (n) Municipal public works relating to any of the above functions or any other functions assigned to the district municipality.
- (o) The receipt, allocation and, if applicable, the distribution of grants made to the district municipality.
- (p) The imposition and collection of taxes, levies and duties as related to the above functions or as may be assigned to the district municipality in terms of national legislation.

Section 84 (3) states that the Minister of DCoG may, after a consultative process, authorise a local municipality to perform a function or exercise the following powers:

- Electricity
- Water and sanitation
- Health.

However, while the Municipal Structures Act provides for these processes, there have been no regulations issued to guide the authorisation of any of the four primary functions that are currently ascribed to district municipalities. At most a set of transitional processes were used in the 1999-2000 period to assist in the process of establishing the first democratic municipal governments. It should also be noted that the sectoral legislation dealing with two of the major municipal trading functions – electricity and water/sanitation – did not directly address the constitutionally entrenched powers for these given to local government. In the case of

water/sanitation, whilst some municipalities were recognised as the Water Authorities, this power as an authority is in name only, as key water and sanitation licencing decisions are made by national government institutions.

This issue of the management of powers and functions has increasingly been part of a national discussion on improving cooperative governance and increasing delivery of services across South Africa. Various local government reform proposals have been put forward. Of importance for this project is the review of legislation that constrains effective local governance.

The National Development Plan (NDP) further elaborates on the lack of “*constructive relations between the three spheres of government*”. This is specifically linked to the issue of the division of powers and responsibilities, as well as a lack of “*coherent and predictable mechanisms for delegating and assigning functions [that] has created tensions and instability across the three spheres*” (NPC, 2012).

DCoG notes that research and field studies have consistently demonstrated that providing clarity on how powers and functions are managed, divided and governed across the two-tier local government system is imperative to improve governance and service delivery constraints.

The Municipal Systems Act provides the mechanism and procedures to enable municipalities to uplift their communities socially and economically and guarantees affordable universal access to basic services.

- Section 4(2)(d) of the Municipal Systems Act states that the council of a municipality, within the municipality’s financial and administrative capacity, has the duty to ensure that municipal services are provided to the local community in a financially and environmentally sustainable manner through consulting the local community about the level, quality range and impact of municipal services provided by the municipality, either directly or through another service provider; and the available options for service delivery.
- Section 4(2)(f) states that the municipality has a duty to provide communities equitable access to the municipal services to which they are entitled.
- Chapter 4 focuses on community participation, outlining the mechanisms, processes and procedures to be followed by the municipality in order to create conditions for the local community to participate in the affairs of the municipality.
- Sections 25 and 26 state that all municipalities are required to compile an IDP, which is described in section 25(1) as a single, inclusive and strategic plan for the development of the municipality.
- Chapter 8 focuses on municipal services and emphasises in section 73 that basic sanitation forms part of the right to basic municipal services. Section 73(1) states that a municipality must give effect to the provisions of the Constitution and (a) give priority to the basic needs of the local community; (b) promote the development of the local community; and (c) ensure that all members of the local community have access to at least the minimum level of basic municipal services.

2.4.1 Delegations, authorisations, assignments and adjustments

In 2007, COGTA published final guidelines relating to the assignment and delegation of functions from national or provincial government to local government (COGTA, 2007). These guidelines provided a uniform approach to the assignment and delegation of functions. COGTA captured the differences between authorisation, delegation and adjustment of functions in Figure 4.

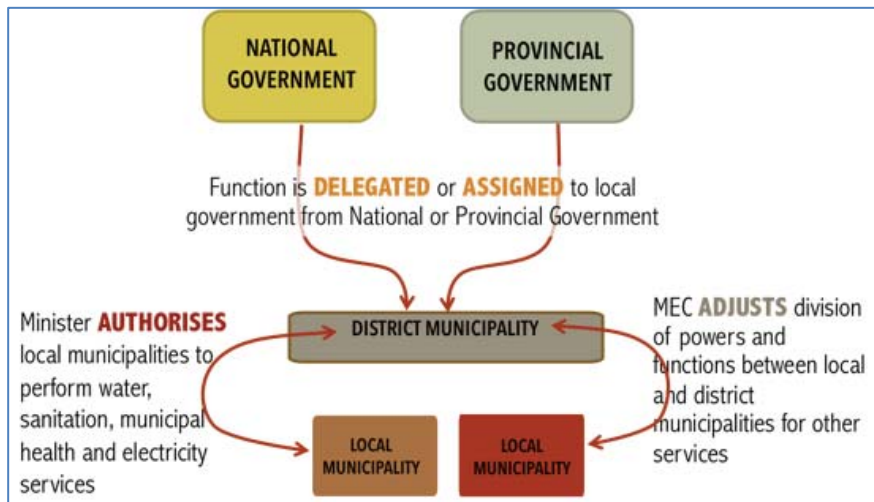


Figure 4: Authorisation, adjustment, delegation and assignment

Notwithstanding such policy directions, in a 2016 report commissioned by Department of Cooperative Governance (DCoG), it was found that “*despite the provisions in the Structures Act, many municipalities note that formal processes are not always followed in assigning functions, leaving municipalities to rely on informal agreements*” (City Insight, 2016).

Reference to a municipality having authority refers to the responsibility for ensuring that a function is exercised competently. It includes responsibility for administration; planning, revenue raising, policy development, appointment and monitoring of service providers. Critically, the sphere of government that performs the authority role does not necessarily need to also perform the provider role.

The provider role is the actual delivery of services to end-users and could involve responsibility for the operational, maintenance and capital requirements of the service. As the provider does not assume full responsibility for the role it is therefore accountable to other organs of state. For example, in the case of water and sanitation in the City of Mbombela, the municipality is the authority and also a provider, with a private sector agency – Silulumanzi – another provider.

The powers and functions allocated to district municipalities have a number of challenges associated with them. Firstly, the functions in the Municipal Structures Act, Section 84, are poorly defined and, in some cases, sets up a split authority, with districts and local municipalities sharing what should be a single function (firefighting and solid waste management are such examples), and in the case of water and sanitation, the division of responsibilities between local and national government also creates confusion and resultant backlogs in sanitation service provision.

Secondly, there are some minor functions where their inclusion as district functions are inappropriate. Thirdly, some potentially major functions, municipal roads and electricity specifically, have only been taken up by districts to a minimal degree and this then questions the merit of them being legislated as district functions. With regard to water and sanitation, some of the areas in which revisions could be made include (City Insight, 2022):

Table 2: RDG proposed changes to powers and functions

Functions and powers	Problem statement summary	Proposed change
Water supply and sanitation (CI 84(b) and (d))	Water and sanitation need to be kept together and definitions brought in line with Water Services Act.	Improve definition; accept that the function will be applied differentially; institute a process to review authorisations.

2.4.2 Defining functions: mSCOA

At a financial level, the municipal Standard Chart of Accounts (mSCOA) was introduced in order to benchmark the delivery of services more accurately across municipalities. The system is now operational and focused on how municipalities organise themselves, allowing also for a better evaluation of the Objects of Local Government as laid down in the Constitution.

mSCOA links measurable performance objectives to each budget “vote” in a municipality’s account, to ensure that municipalities are accountable to the community for service delivery as well as expenditure and revenue. In addition, the measurable performance objectives are broken down into specific objectives for sub-functions, to be published in the budget or SDBIP, and incorporated into the performance agreements of all managers in the municipality.

These mSCOA functions, and the further breakdown into sub-functions, cover all aspects of a municipality’s work, from service delivery to community development to issues of human resources and governance.

In Table 3, the list of Water and Sanitation functions contained in Schedule 4B and as defined through mSCOA are detailed.

Table 3: Water and sanitation functions included in mSCOA classification (National Treasury, MSCOA v6.3 released 2018)

mSCOA function	mSCOA definition of function	Schedule 4B and 5B / Section 84 functions covered
Waste Water Management	Waste water management encompasses a broad range of tasks that promote effective and responsible water use, treatment, and disposal and encourage the protection and restoration of watersheds.	<ul style="list-style-type: none"> • Local amenities (mSCOA – public toilets) • Water and Sanitation Management (mSCOA identifies the functions as waste water treatment; sewerage) • Storm water Management Systems in Built-up Areas
Water Management	Water resource management is the activity of planning, developing, distributing and managing the optimum use of water resources. It is a subset of water cycle management. Water resource management planning has regard to all the competing demands for water and seeks to allocate water on an equitable basis to satisfy all uses and demands.	<ul style="list-style-type: none"> • Water and Sanitation Management (mSCOA identifies the functions as water treatment; water storage) • Potable Water Supply Systems

2.5 WATER AND SANITATION LEGISLATION

There are a number of pieces of “sectoral” and financial legislation which indirectly impact on water and sanitation delivery at a municipal level.

2.5.1 Water Policy and legislation

The National Water Act of 1998 provides the legal framework for the effective and sustainable management of our water resources. It aims to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner. The Act notes that one of the main tools that national government uses for the protection, use, development, conservation, management and control of water resources, is water management strategies. It also requires that a catchment management agency (CMA) be established for each water management area.

Section 3 of the Water Services Act states that:

- Everyone has a right of access to basic water supply and basic sanitation.
- Every water services institution must take reasonable measures to realise these rights.
- Every water services authority must, in its water services development plan, provide for measures to realise these rights.

At a national level, the Act notes that:

- S3(2) the Minister is ultimately responsible to ensure that water is allocated equitably and used beneficially in the public interest, while promoting environmental values.
- S3(3) Minister, has the power to regulate the use, flow and control of all water in the Republic.

- Ch 4: The Minister may limit the amount of water which a responsible authority may allocate. In making regulations the Minister may differentiate between different water resources, classes of water resources and geographical areas. A responsible authority may not issue a licence to itself without the written approval of the Minister.
- Ch 6, Part 1: The Minister may, in writing and subject to conditions, permit a person to whom a power or duty has been delegated to delegate that function to another person.

The National Water Resource Strategy (NWRS2) sets out the vision and strategic actions for effective water management. It outlines the key challenges, constraints and opportunities in water resource management and proposes new approaches that ensure a collective and adequate response for the benefit of all people in South Africa (Government of SA, undated).

The NDP supports the decentralisation of functions such as water and sanitation, stating:

- *Before 2030, all South Africans will have affordable, reliable access to sufficient safe water and hygienic sanitation. Service provision arrangements will vary in different parts of the country, with different approaches adopted for densely built-up urban areas and scattered rural settlements. Local governments will retain responsibility for ensuring service provision in their areas and, in many cases, will continue to manage the services directly. However, alternative solutions such as community-based management, local franchising or the use of regional water utilities will be allowed if they would be more effective. Authorities responsible for water-resource management will coordinate their activities with local service providers, and monitor and support them.*
- Overall, the delivery of water and sanitation services in South Africa is a concurrent national and local function.

Overall, the Water Services Act (Act 108 of 1997) deals mainly with water services or potable (drinkable) water and sanitation services supplied by municipalities to households and other municipal water users. It also governs the provision of services to consumers. Section 3 of the Act states that “everyone has a right of access to basic water supply and sanitation”. Basic sanitation is defined as: *“the prescribed minimum standard of services necessary for the safe, hygienic and adequate collection, removal, disposal or purification of human excreta, domestic waste water and sewage from households, including informal households”*. Section 3 also states that services authorities must take reasonable measures to realise this right in their water services development plans, with a preference to basic water supply and basic sanitation facilities.

Regulation 2 of the Compulsory National Standards states that the minimum standard for basic sanitation services is –

- (a) *the provision of appropriate education; and*
- (b) *a toilet which is safe, reliable, environmentally sound, easy to keep clean, provides privacy and protection against the weather, well ventilated, keeps smells to a minimum and prevents the entry and exit of flies and other disease- carrying pests.*

Finally, in 2023 the National Water Amendment Bill was published seeking to amend the National Water Act 36 of 1998, so as to insert and amend certain definitions; further provide for the purpose of the Act etc.

2.5.2 Authority and providers

The Water Services Act drew a distinction between the Water Services Authority (WSA) and the Water Services Provider (WSP) functions. Section 6(l) clearly states that “no person may use water services from a source other than a water services provider nominated by the water services authority having jurisdiction in the area in question, without the approval of that water services authority.”

Public-private and public-community partnerships are critical to addressing the challenges in the provision of sanitation. In this regard, DWS are involved in partnering with mining houses in Limpopo and the Northern Cape

to implement mega infrastructure projects (SA Government, 2023).

The WSA function was to be delivered at a Category A and Category C (district municipality) level and included policy issues, planning, regulation, ensuring service provision and the monitoring thereof. There was agreement though, that on a short-term basis some Category B municipalities could be assigned the WSA powers. In general, all the major urban local municipalities (Category B) were authorised to continue to provide electricity, water and sanitation and health services.

Almost all WSAs in South Africa are currently both WSA and WSP (i.e. they have approved themselves as sole WSP, apart from Water Boards for bulk services). The Water Services Act requires the WSA and WSP functions to be managed and accounted for separately by municipalities, but this is generally not happening. The Act states that the key role of the WSA is to ensure that the WSP provides services which meet minimum norms and standards – and this is also generally not happening, as borne out by the results of the Drop assessments.

A policy has, however, now been developed regarding water and sanitation services provision to residents living on privately owned land (SA Government, 2024). The focus is to work collaboratively not just across government, but with civil society organisations focussing also on areas such as privately-owned farms.

2.5.3 Sanitation Policy

In 2016, Cabinet approved the National Sanitation Policy, whose pillars include planning, institutional arrangements, participation and ownership, skills and capacity, financial and economic aspects, as well as the sustainability of sanitation services.

Unfortunately, the focus of sanitation programmes has been largely on sewered systems. Bhagwan (The Source, 2021) notes the importance of the leading work done by “South Africa’s Water Research Commission (WRC), through its national initiative SaNiTi – the Sanitation Transformational Initiative – which has the objective of mainstreaming non-sewered sanitation (NSS) through a very different platform, that of a new Sanitation Industrial Pathway. The SaNiTi strategy incorporates elements of behaviour change, industrial development, policy development for NSS, technology standards and regulations, technology testbeds, and a sanitation academy that builds the next cohort of skills and artisans required to service this new frontier. The outcome will result in:

- NSS or off-the-grid sanitation that meets user needs and expectations
- Application of circular economy principles in which products in the value chain are recycled or reused, with the addition of other revenue streams
- Establishing market needs and demands Presenting an R&D pathway to achieve technical, policy and procurement targets in line with our vision
- Creating a sanitation manufacturing industry with new roles and employment.”

Bhagwan (2023) notes the importance of finding solutions through non-sewered approaches which could assist “many of the poorest, especially in the developing world. This is largely because of cost limitations and issues of water availability, putting these factors at the heart of the sanitation crisis. Examples of aspirational sanitation include ones where the system works without running water, electricity or an expensive sewer network (The Source, 2023). The sanitation service that supports the hygiene requirements of the informal community of Mofolo West is a completely off-grid (or decentralised) closed loop system.”

In terms of the Water Services Act, all WSAs must have an approved and up to date Water Services Development Plan. Some of the details relevant to the planning for WESS include:

- (a) of the physical attributes of the area to which it applies;*
- (b) of the size and distribution of the population within that area:*
- (c) of a time frame for the plan. including the implementation programme for the*

following five years;

(d) of existing water services;

(g) of the number- and location of persons within the area who are not being provided with a basic water supply and basic sanitation;

(h) regarding the future provision of water services and water for industrial use and the future disposal of industrial effluent. including—

(i) the water services providers which will provide those water services;

(ii) the contracts and proposed contracts with those water services providers;

(iii) the proposed infrastructure necessary;

(iv) the water sources to be used and the quantity of water to be obtained from

and discharged into each source (This does not apply if WESS herein are referred to systems which are closed-loop (i.e., do not discharge the treated effluent) and / or reuse the treated liquid fraction for irrigation onsite).

(v) the estimated capital and operating costs of those water services and the financial arrangements for funding those water services, including the tariff structures;

(vi) any water services institution that will assist the water services authority;

(vii) the operation, maintenance, repair and replacement of existing and future infrastructure;

(i) of the number and location of persons to whom water services cannot be provided within the next five years. setting out—

(i) the reasons therefor: and

(ii) the time frame within which it may reasonably be expected that a basic water supply and basic sanitation will be provided to those persons; and

(j) of existing and proposed water conservation, recycling and environmental protection measures.

The recently gazetted Revised Compulsory National Water and Sanitation services Norms and Standards provide guidance for WESS (DWS, 2025). In terms of WESS, WSAs are now instructed that they must consider the following requirements:

6(7)(b) Water efficient sanitation solutions;

6(8)(a)(II) Alternative water efficient sanitation solutions instead of waterborne sewerage systems in areas of dense formal and medium settlement where there is resource scarcity and or inadequate capacity or functionality in the sewer system and or the wastewater treatment works.

6(8)(b) in low density or sparsely populated settlements: water efficient sanitation solutions.

6(9) Water efficient sanitation solutions in sub-regulation (7) must be shown to include off-grid, on-site sanitation options such as Non-sewered Sanitation Systems (NSSS) as well as Decentralised Wastewater Treatment Systems (DWWTS).

6(10) A Water Services Authority may not unreasonably decline a property development to have a water efficient sanitation solution that is not connected to the central system where development will manage

the system as a Water Services Intermediary and where the water uses of the system is authorised under the National Water Act.

13(1)(b) plan for adequate sewer collection, wastewater treatment capacity and water efficient sanitation

16(10) WSAs must require greenfield developments or major brownfield redevelopments, prior to planning approval, to indicate the manner and extent in which water conservation and water demand management (WCWDM) and water efficient sanitation solutions (WESS) has been accommodated and accounted for in their selected technology options, in terms of efficient water use and off-grid sanitation.

26(2)(f) Water conservation and water demand management must include at least— (v) the progress made in the installation of water efficient devices.

These regulations are very important in bringing WESS into the mainstream of sanitation solutions and especially critical given that there are over 4000 informal settlements without such sanitation in municipalities across the length and breadth of South Africa.

2.5.4 Monitoring

Within the DWS, the “Institutional Oversight Unit (IOU)” has to ensure an enabling environment for the establishment, development, financing and audit of local and regional institutions for water resources management, and water services and stakeholder participation/empowerment, also focusing on governance, financial and stakeholder issues, amongst others.” This includes areas such as the development of institutional frameworks, communication of policies and guidelines, oversight of water boards and delegation of functions, and promoting awareness and building capacity.

The Blue, Green and No Drop Certification programmes are aimed at improving municipal drinking water quality, wastewater management as well as water conservation and demand management. These are noted as “unique responses that South Africa has developed ... the concept of incentive-based regulation ... which aim to induce changes in behaviour of individual institutions to facilitate continuous improvement and adoption of best practise management in drinking water, wastewater, and non-revenue water (van der Merwe-Botha and Quilling, 2024). DWS introduced these incentive-based regulation programmes in 2008. In 2014, DWS stopped the programmes. The Minister of Water and Sanitation, Mr Senzo Mchunu reintroduced the programmes in 2021 and the following year, DWS released a full Green Drop Report and Blue Drop and No Drop progress reports (SA Government, 2023).

The Blue Drop report is a comprehensive assessment of the state of all 958 water supply systems (WSS) in each of the 144 water services authorities (WSA) in the country. Of the 958 WSS, 277 (29%) located in 62 WSAs were identified to be in a critical state of performance. In 2014, 174 WSS in 33 WSAs were found to be in a critical state of occasionally exceeding the available supply of treated water.

The Green Drop report found that the percentage of municipal wastewater systems in a critical state of performance (i.e., discharging partially treated or untreated sewage into rivers) increased from 30% in 2013 to 39% in 2022 (SA Government, 2024). WWTWs in the high risk or critical risk category are resulting in high levels of pollution through discharging partially treated or untreated water into rivers and the environment. This has negative environmental implications and poses risks to human health, e.g., cholera outbreaks are normally associated with wastewater pollution of water resources

The No Drop report found that the national average for municipal non-revenue water increased from 37% in 2014 to 47% in 2023. Polluted water resources also raise the cost of water treatment.

2.5.5 Key Institutions

Some of the key institutions include:

- The Water Tribunal was set up to hear appeals against directives and decisions made by responsible authorities, CMAs or water management agencies about matters such as the issuing of licences to use water. It is an independent body and can hold hearings anywhere in the country.
- Catchment Management Agencies manage water resources at catchment level in collaboration with local stakeholders.
- Water User Associations are cooperative associations of individual water users who wish to undertake water-related activities at local level for their mutual benefit.
- Water Services Institutions including Water Boards provide water services (bulk potable and bulk waste water) to other water services institutions within their respective service areas. There are 15 water boards in South Africa.
- The Water Research Commission plays a vital role in water research by establishing needs and priorities, stimulating and funding research, promoting the transfer of information and technology, and enhancing knowledge and capacity building in the water sector (SA Government, undated).

2.6 INTERGOVERNMENTAL PROCESSES

Intergovernmental programmes have become the order of the day to try and improve water and sanitation access. For example, there is now a nationally coordinated task team consisting of the Departments of Water and Sanitation (DWS) and Cooperative Governance and Traditional Affairs (COGTA), and the South African Local Government Association (SALGA), which has been set up to initiate and coordinate Municipal Systems Act Section 78 processes in certain municipalities (SA Government, 2024). The purpose is to review service delivery mechanisms for water and sanitation services, in an effort to address the decline of these services as outlined in Blue Drop, Green Drop and No Drop reports which were recently released by DWS in 2022/23. The task team will focus on the 105 municipalities that are in the critical and poor performing categories in terms of the latest Blue and Green Drop reports.

2.7 RELATED HUMAN SETTLEMENTS LEGISLATION

A number of pieces of related human settlements legislation can be referenced. These include:

- Environment
 - The National Environmental Management Act (NEMA) (No. 107 of 1998) is the overarching environmental legislation for the country.
 - Whilst “Environment and Conservation” are not directly seen as municipal functions, NEMA clearly provides for an important set of responsibilities for municipalities with regard to the environment.
 - In addition, there is there a wide variety of other legislation to address environmental issues, all of which impact on municipal powers and functions.
 - These Acts (mostly under the umbrella of NEMA) all seek to protect certain focused aspects of the environment and have an important influence on planning and service delivery and some have accompanying regulations.
 - In this regard NEMA’s most recent regulations from December 2014 (R982 to R985), collectively list various types and scales of activities and locations that require different types of environment authorisation.
- Energy

- While municipalities are responsible for electricity and gas reticulation, the Electricity Act (Number 4 of 2006) and the National Energy Act (Number 34 of 2008) do not outline clearly the roles and responsibilities of local government in the energy reticulation process.
- The Electricity Regulation Act 2006 defines the key Constitutional responsibilities of local government without actually focussing on local government's important and exclusive responsibility in that regard.
- Housing
 - The Housing Act Number 107 of 1997 has articulated the roles and responsibilities of all three spheres of government.
 - The role of municipalities is generally subordinate to that of national and provincial government, even though the Act says that municipalities should ensure that:
 - The inhabitants of its area of jurisdiction have access to adequate housing on a progressive basis;
 - Conditions not conducive to the health and safety of the inhabitants of its area of jurisdiction are prevented or removed;
 - Services in respect of water, sanitation, electricity, roads, stormwater drainage and transport are provided in a manner which is economically efficient;
- Transport
 - Section 11(1)(c) of the National Land Transport Act (Number 5 of 2009) lists the responsibilities of municipalities in transport provision.
 - These place a significant emphasis on municipalities to become the co-ordinating bodies for transport related issues in their area.
- Health
 - The Constitution states that municipal health services are a local government matter falling under the functional areas of concurrent national and provincial legislative competence.
 - The Municipal Structures Act provides further detail on the functional split of the municipal health function. In Section 84 it states: *(1) A district municipality has the following functions and powers: (i) Municipal health services.*
 - The National Health Act notes that every metropolitan and district municipality must ensure that appropriate municipal health services are effectively and equitably provided in their respective areas. It is the responsibility of the MEC to assign health services to a municipality. The Act defines 'municipal health services' as including:
 - a. water quality monitoring;
 - b. food control;
 - c. waste management;
 - d. health surveillance of premises;
 - e. surveillance and prevention of communicable diseases, excluding immunisations;
 - f. vector control;
 - g. environmental pollution control;
 - h. disposal of the dead; and
 - i. chemical safety.

- The Department of Health's regulations states that, in the case of VIPs, adequate basic provision of sanitation is one well-constructed VIP toilet to agreed standards per household and that the bucket system should be phased out. The standards also indicate that the responsibility for sanitation services lies with the local authority or, if not, the local water committee is the vehicle for sanitation development.
- The norms and standards advocate the linkage between the health sector and other development sectors, such as the DWS, to build capacity in hygiene education and training of community health committees.
- These standards indicate that the Environmental Health Officers (EHOs) should work with other sectors in development projects; work with local clinic staff for teamwork in motivating community committees to improve water and sanitation; work with health staff of clinics, NGOs and local government structures to provide hygiene education and training and build capacity of communities; empower committees through training, technical advice and continuing support and monitoring to undertake and manage their own development, including water and sanitation; provide information to schools on undertaking water and sanitation and personal and public health; monitor that sanitation and water systems do not create environmental problems; and assist communities develop the capacity to use the cycle of participation (assessment, analysis, and action) and provide particular assistance in preliminary assistance through environmental surveys.
- Disaster management
 - The promulgation of the Disaster Management Act, 2002 (Number 57 of 2002) created roles and responsibilities for Category A and C municipalities, who must develop the municipal disaster management framework to ensure an integrated and uniform approach to disaster management within the municipal area.
- Safety
 - The 2016 White Paper on Safety and Security notes that local government is a key role player in the delivery of safety and security to communities.
 - Municipalities must allocate funding for strategies for crime and violence prevention and must capacitate and resource the Directorate for Safety, Crime and Violence Prevention.
- Fire
 - The Constitution allocates the responsibility for fire services to local government (4B) with provincial and national oversight.
 - The sectoral legislation for fire is the Fire Brigade Services Act, 1987 (Act No. 99 of 1987) (FBSA). This Act has not been updated since 1994 and a 2016 White Paper was developed with the aim of revising it.
- Other related pieces of legislation
 - The Municipal Finance Management Act, 2003 (Act No. 56 of 2003) details requirements such as the appropriation of funds for expenditure, unspent funds etc.
 - The Intergovernmental Fiscal Relations Act (No. 97 of 1997) requires the Financial and Fiscal Commission to be consulted when any sphere of government intends to shift or delegate a function to another sphere of government.
 - The Division of Revenue Act (DORA) (No 1 of 2010) states that when a function is transferred, the resources to perform the function must also be transferred.
 - The Public Finance Management Act (PFMA) requires the financial implications of transferring functions to be taken into consideration.

- Various sets of national standards e.g., SANS 30500 defines non-sewered sanitation systems and requires general safety and performance requirements for design and testing; SANS 10400-Part Q deals with the sanitary waste and the healthy handling and treatment of effluent when there is no water-borne sewage system; SANS 24521:2020 focuses on guidelines for the management of basic on-site domestic wastewater services (van der Merwe and Quilling, 2024).

In addition, some legislation refers to ways in which municipalities could either be assigned municipal functions or could be more directly involved in the implementation of national legislation. Various sector departments also have regulations in place linked to powers and functions. The Department of Water and Sanitation set up the classification requirements for the water and waste water functions that municipalities provide.

2.8 THE MUNICIPAL CONTEXT

The previous section has outlined the policy and regulatory framework relating to the powers and functions of municipalities, with a focus on service delivery for water and sanitation. This section describes at a high level both the existing capacity of municipalities in performing those functions as well as the existing state of sanitation provision, across SA municipalities.

2.8.1 Municipal capacity

Figure 5 shows how municipal employment levels have changed from 2006 until 2019, showing:

- Municipal employment as a whole has grown from 204468 staff members to some 267824 persons, a growth of 31%;
- Employment of staff in the Water Departments has grown from 16282 persons to 21938 over the same period, a growth of 35%; and
- Employment of staff in the Sanitation Departments has grown from 7013 persons to 14101 over the same period, a growth of 101%.

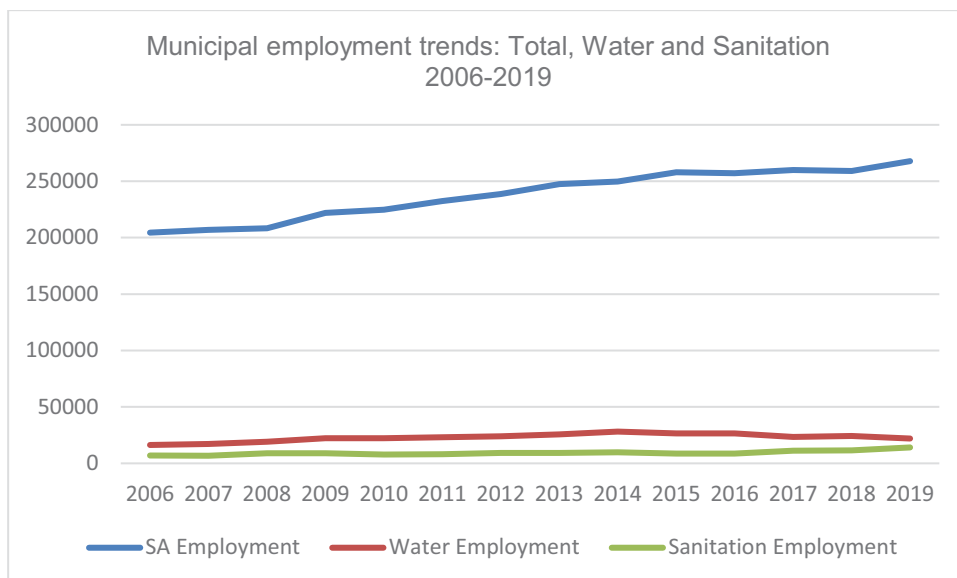


Figure 5: Municipal employment trends: Total, Water and Sanitation 2006-2019

2.8.2 Trends in provision of Free Basic Water and Indigents receiving free water

The overall number of consumers of water in South Africa has grown from around 9.1 million in 2006 consumers to around 15.3 million consumers in 2022. However, over the same period, those receiving Free Basic Water has reduced from around 6.9 million to only 2.8 million consumers. However, it should be noted that those receiving indigent support for water has grown from 2.0 million consumers in 2006 to 2.1 million consumers in 2022 (Figure 6).

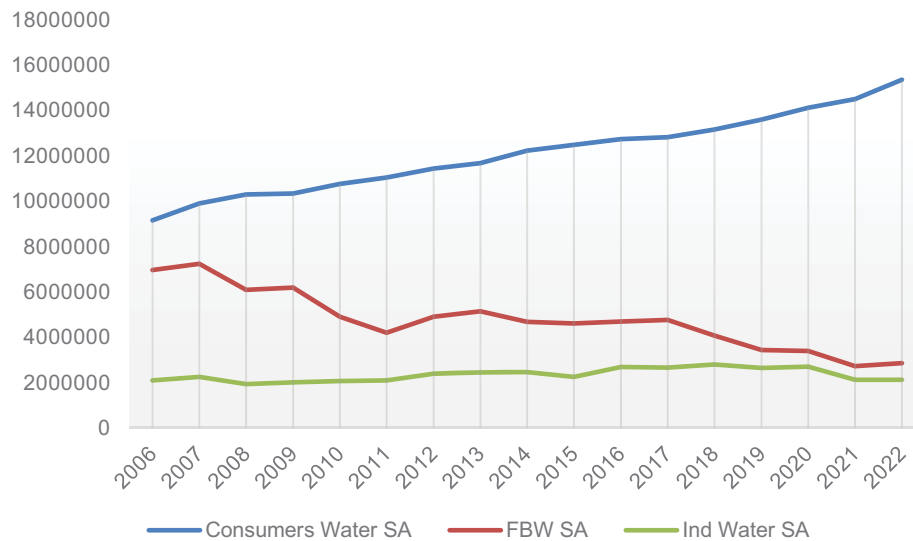


Figure 6: Trend in Water consumers compared to FBW and Indigent water provision: 2006-2022

2.8.3 Trends in provision of Free Basic Sanitation and Indigents receiving free sanitation

The overall number of consumers of sanitation in South Africa has grown from around 7.5 million in 2006 consumers to around 13.4 million consumers in 2022. However, over the same period, those receiving Free Basic Sanitation has reduced from around 3.7 million to only 2.6 million consumers and those receiving indigent support for water has grown from 1.6 million consumers in 2006 to 1.9 million consumers in 2022 (Figure 7).

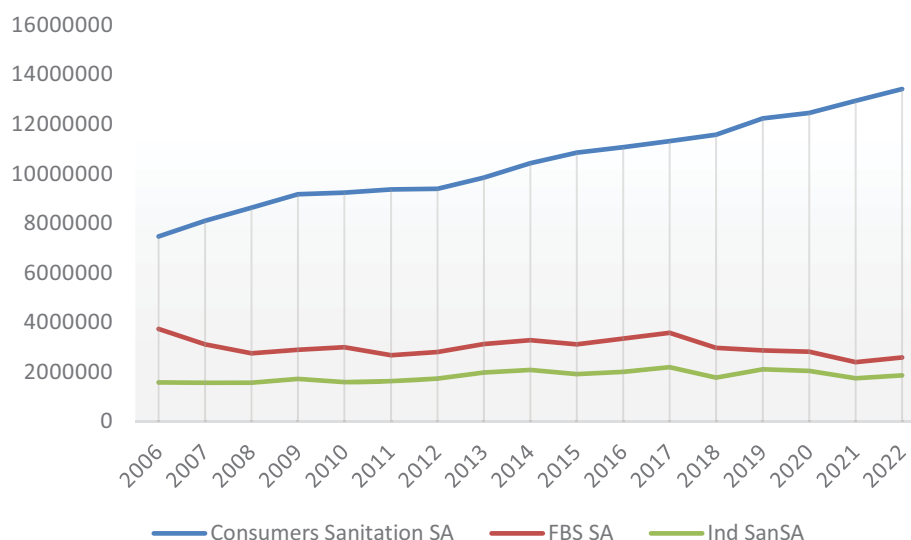


Figure 7: Trend in Sanitation consumers compared to FBW and Indigent water provision: 2006-2022

2.8.4 Sanitation options

Given these broad trends across South Africa, it is important to examine the distribution of sanitation options for domestic consumers. Table 4 indicates the aggregated breakdown, where one finds 62.5% of all domestic consumers relying on sewerage systems in municipalities and the remaining 37.5% relying particularly on ventilated improved latrine systems (26%), other forms (particularly non-ventilated pit latrines (8%), and septic tanks systems (3.1%). Just over 45000 (0,4%) consumers still rely on bucket systems.

Table 4: Sanitation systems in South Africa

Sanitation options	Number of consumers	%
Flush toilet connected to public sewerage system	8 102,766	62,5%
Flush toilet connected septic tank	405,248	3,1%
Bucket system	45,779	0,4%
Ventilated improved pit latrine system	3 369,791	26,0%
Other**	1 026,378	7,9%
Total number of domestic Consumer units	12 949,962	96,9%
Total Number of non-domestic consumer units	407,505	3,1%
Total number of consumer units	13 357,467	

** Other includes non-ventilated pit toilets (unimproved pit latrines), chemical toilets, Urine-Diverting Dry Toilets (UDDT) etc.

2.8.5 Differentiation across municipalities in terms of non-sewered sanitation

There is significant differentiation across municipalities in terms of these options. Table 5 shows for each of these sanitation options, the municipalities that make up a significant proportion of the total consumers living in each of these circumstances.

Table 5: Total consumers by non-sewered sanitation type

VIP (3.4 million consumers)	Other (1 million consumers)	Septic tanks (405,248 consumers)	Bucket system (45779 consumers)
<ul style="list-style-type: none"> • O.R. Tambo DM, 7.6% • Amathole DM, 6.8% • Mopani DM, 5.7% • Zululand DM, 3.9% • Bushbuckridge LM, 3.7% • iLembe DM, 3.4% • Chris Hani DM, 3.2% • King Cetshwayo DM, 3.0% • Harry Gwala DM, 2.9% • uMkhanyakude DM, 2.8% • Polokwane LM, 2.8% • Alfred Nzo DM, 2.7% • Ugu DM, 2.7% • City of Mbombela LM, 2.7% • uMzinyathi DM, 2.7% • Rustenburg LM, 2.6% • Nkomazi LM, 2.6% • Capricorn DM, 2.5% 	<ul style="list-style-type: none"> • eThekweni Metro, 23.0% • Greater Sekhukhune DM, 15.9% • Ekurhuleni Metro, 13.5% • Madibeng LM, 5.9% • City of Mbombela LM, 5.6% • Thembisile LM, 4.9% • Chris Hani DM, 4.8% • uThukela DM, 4.3% • City of Cape Town Metro, 4.3% • Emalahleni LM, 3.2% • Buffalo City Metro, 2.6% 	<ul style="list-style-type: none"> • eThekweni Metro 26.5% • uMkhanyakude DM 4.8% • Ekurhuleni Metro 3.2% • Midvaal LM 2.6% • Vhembe DM 2.6% • Dikgatlong LM 2.5% • Kouga LM 2.4% • Alfred Nzo DM 2.2% • Msunduzi LM 2.2% • Drakenstein LM 2.2% • Harry Gwala DM 2.1% • Mopani DM 2.0% 	<ul style="list-style-type: none"> • Nelson Mandela Bay Metro, 13.1% • Ngwathe LM, 12.65 • Kouga LM, 9.5% • Nala LM, 8.2% • Mafube LM, 6.8% • Nketoana LM, 6.0% • Ditsobotla LM, 5.0% • Dawid Kruiper LM, 4.6% • Siyancuma LM, 3.9% • Tokologo LM, 3.4% • Metsimaholo LM, 3.3% • Masilonyana LM, 3.3% • Mangaung Metro, 3.1%

Appendix A-G demonstrates the number of consumers who live in non-sewered households across the existing sanitation providers, as reported by StatsSA in the latest Non-Financial Census (StatsSA, 2022).

2.9 ANALYSIS OF EXISTING BY-LAWS

Municipalities exercise their executive and legislative authority in a number of ways, including by developing and adopting policies, plans, strategies and programmes; establishing and maintaining an administration; promoting and undertaking development; setting targets for delivery; providing municipal services or regulating the provision of municipal services; implementing national and provincial legislation and its own by-laws; preparing, approving and implementing its budgets; setting and collecting service charges and other fees; and so on.

As indicated above, municipalities have the responsibility to make policies and by-laws within their areas of legislated competence. These are defined in the National Policy Development Framework as follows:

- **By-law:** is passed by a Municipal Council since the Constitution bestows both the executive and legislative authority on this body in terms of Section 151(2), read together with Section 156(2) of the Constitution. A by-law serves as an original legislation in the context of a municipality. Municipal Councils are constitutionally empowered to pass and administer by-laws on matters listed in Part B of

Schedule 4 and Part B of Schedule 5 of the Constitution.

- **Policy:** can be defined as the organisation's stated position on internal or external issues. It provides the written basis for an organisation's operations and informs legislation, regulations and the organisation's governing document. A policy is typically based on a government's political priorities, usually contained in the governing party manifesto and part of its programme of action (The Presidency, 2020).

A municipality exercises executive and legislative authority within its boundaries. However, municipalities may also enter into written agreements which allow one municipality to exercise executive authority in another municipality's area of jurisdiction.

Only a member or committee of a municipal council may introduce a draft by-law in the council. All clauses must conform and adhere to applicable National laws and the Constitution. Before a by-law is passed, it must be published for public comment, and all members of the municipal council must have a reasonable amount of time to consider the by-law. To pass a by-law, the majority of council members must vote in favour of the by-law. Once a by-law has been passed by a municipal council, it must be promptly published in the Provincial Gazette. Municipalities should, where practical, also publish the by-law in local newspapers, or bring it to the attention of the local community in another way.

A high-level summary of existing municipal sanitation by-laws has been conducted to examine the degree to which they address the need for non-sewered systems. These include at a national level the National Sanitation Policy and DWAF Water and sanitation regulations; and at a municipal level policies and by-laws from municipalities including the City of Cape Town, City of Tshwane, Overstrand, Ugu, eThekweni, City of Johannesburg, Chris Hani, Harry Gwala, Ekurhuleni, Bitou, Sekhukhune and Alfred Nzo municipalities.

The review focussed on examining the degree to which the existing by-laws cover non-sewered sanitation solutions. It was limited to seeing the degree to which these by-laws and policies dealt with on-site sanitation (such as French drains) and also the circumstances under which many people live (informal settlements, etc.).

In general terms these by-laws pitch non-sewered solutions largely with reference to the sewer system or as "exceptional circumstances", such as definitions like the following:

- French drain: 63(1) The Municipality shall not permit the disposal of wastewater or other effluent by means of a French drain or soakage pit, unless exceptional circumstances prohibit the implementation of an alternative solution.
- (2) If an existing French drain is no longer required for the storage or treatment of sewage or if permission for its use is withdrawn, the owner must take steps to have it either completely removed or completely filled with soil or suitable material.
- "Drainage installation" means a system situated on any premises and vested in the owner thereof and which is used for or intended to be used for or in connection with the reception, storage, treatment or conveyance of sewage on that premises to the connecting point and includes drains, fittings, appliances, septic tanks, conservancy tanks, pit latrines and private pumping installations forming part of or ancillary to such systems;

Interestingly, in some cases pit latrines are not included in the definition of drainage installations:

- "Drainage installation" means an installation vested in the owner of a site and which is situated on such site and which is intended for the reception, conveyance storage or treatment of sewage and may include sanitary fixtures, discharge pipes, drains, ventilating pipes, septic tanks, conservancy tanks.

What is also found is a lack of understanding that the use of non-sewered means of sanitation control is not the result of planning, but the result of apartheid spatial reality, poverty and inequality. Statements such as the following do not understand this reality:

- Ventilated improved pit latrines 9. The Municipality may, at its discretion and on such conditions as it may prescribe, having regard to the nature and permeability of the soil, the depth of the water table, the size of and access to the site and the availability of a piped water supply, permit the disposal of human excrement by means of a ventilated improved pit latrine constructed and maintained in accordance with the specifications of the Municipality and located in a position indicated by the Municipality.

The prescriptive, rather than developmental, nature of by-laws is epitomised in statements including:

- 14. Sanitation of informal settlements: Levels of supply of sanitation to households
13.(1) The sanitation provided to domestic households must be in the form of one of the following methods:
 - a privately-owned urine diversion toilet;
 - if a municipal waterborne sewerage reticulation system is available, connection to such system; or
 - if a municipal waterborne sewerage reticulation system is not available, an on-site privately-owned sewage disposal system.

Many of the by-laws focus also on interim sanitation solutions, such as:

- Interim basic sanitation services should be provided in temporary informal settlements. These sanitation services should be appropriate, affordable, and practical in accordance with a progressive plan that addresses both land tenure and basic services. Where permanence of informal settlement is recognised, local government is obligated to ensure access to basic sanitation services.
- Sanitation services should be provided in informal settlements in consultation and with participation of the community. Community engagement process and mechanisms should be utilised in order to promote in situ upgrades of sanitation services in informal settlements. Community-based planning, implementation and operation and maintenance of interim informal settlements sanitation solutions is encouraged.
- Labour-intensive provision of sanitation in informal settlements is encouraged. Alignment with Expanded Public Works and Community Works programmes should be pursued to support labour-intensive sanitation provision.

Some of the by-laws regulate details of VIPs, including schematic diagrams of layouts. There are some attempts at recognising the need for off-grid and decentralised solutions but again they are seen as exceptions which should be of limited scope:

- With regard to non-centralised sewerage systems considered above, all the definitions above are characterised by the following commonalities:
 - It treats domestic wastewater containing all constituents normally associated with domestic wastewater;
 - It is a limited volume treatment;
 - It serves a limited extent waterborne sewerage area, development or settlement – being a collection of dwellings;
 - The limited sewerage network is not connected to the larger (“central”) sewerage system of the area’s utility, therefore it is “decentralised”; and
 - It is not an on-site (“dry”) sanitation system, such as ventilation improved pit (VIP) toilets, septic or conservancy tanks, which usually services a single house or building.

These descriptions of some of the issues in existing by-laws are not exhaustive but suggest the need to construct by-laws which focus directly on the context of poor sanitation which needs to be addressed, rather than decentralised/off-grid solutions being seen as temporary or small-scale measures complementing only where the sewer system does not reach.

Case Study: eThekweni

eThekweni is one municipality which has started mainstreaming innovative off-grid systems. In 2023, the eThekweni Council “approved sub-contracts with the University of KwaZulu-Natal (UKZN) and Project Preparatory Trust (PPT) for the piloting of innovative sanitation technologies in informal settlements. The new generation sanitation technologies that are part of the project include what is known as the Clear Full Recirculation Toilet, NEWGenerator and Aquonic Wastewater Treatment. The technologies are off-grid and utilise minimal water. Once implemented, they will go a long way towards promoting better hygiene and reducing contamination of the environment. They will also close the gap of poor access to the main sewer grid in informal settlements. The City partnered with the Water Research Commission under the South African Sanitation Technology Enterprise Programme (SASTEP) for the pilot project.”

2.10 GOVERNANCE AND OTHER CONSTRAINTS ON THE DELIVERY OF DECENTRALISED/OFF-GRID SANITATION SOLUTIONS

All municipalities in South Africa were informed of this project to gain insights into issues related to non-sewered sanitation. Municipal managers were requested to share their high-level observations and experiences concerning governance and institutional challenges that might hinder the implementation of alternative sanitation solutions. The feedback received highlighted the following key issues and aspects to also be considered in the WESS processes:

- Awareness and perception issues
- Land-use planning
- Zoning Regulations
- Infrastructure Integration
- Urban Development Policies
- Stakeholder management
- Compliance issues

2.10.1 Awareness and perception issues

There is a lack of awareness, data and information for informed decision making both at municipal and consulting engineers’ level (municipalities rely on consulting engineers to a large extent to design and implement innovative solutions to avoid risk and liabilities with new technologies). In addition, perceptions around other NSS options based on previous negative experiences are a challenge, as well as limited experience or knowledge of the rollout of NSS at scale.

There is often some resistance to change with sanitation still seen as linear linked to huge networks. New NSS often seen as complex and difficult to manage at municipal level.

Municipal managers also raised challenges around public acceptance concerns with new technologies and adding additional burdens to households.

2.10.2 Land-use planning

Challenges around land tenure and inadequate land allocations were raised. For example, existing land use plans do not allocate sufficient space for decentralised sanitation infrastructure. Traditional sewer systems still currently dominate sanitation provision planning schemes, leaving no room/scope for NSS or alternative sanitation solutions. One response noted that *“Whilst a NSS provides an on-site solution to enable development to progress, it remains inefficient in comparison to sewer connections (for both the user and the utility). Thus, they are likely only practical for developments that are a significant distance from existing or planned sewer systems.”*

Site suitability is also a challenge i.e., the identification of suitable sites for NSS given competing land uses, environmental constraints, and community preferences for sanitation provision. It was noted that any packaged plant solutions should not be implemented in a way that distorts other spatial development objectives of municipalities – i.e., they should not encourage urban sprawl.

High-density urban areas are currently facing unique challenges in implementing NSS and decentralised sanitation systems due to space constraints and the need for efficient land use practice. Balancing population density with the need for adequate alternative sanitation infrastructure is crucial to the rollout and uptake of NSS systems.

Addressing the sanitation needs of informal settlements currently presents significant spatial planning and urban development challenges. The settlements lack any formal spatial planning and thus making it difficult to implement and sustainably implement NSS/decentralized sanitation systems.

2.10.3 Zoning Regulations

A number of challenges around zoning regulations were raised:

- **Restrictive Zoning:** The current local zoning laws most often favour centralised sewer systems and do not currently accommodate decentralised and/or off-grid sanitation solutions. Changing local and provincial zoning regulations to support NSS systems requires significant policy shifts and extensive stakeholder engagement.
- **Permitting and Approvals:** Obtaining operating or discharge related permits for decentralised sanitation projects are currently not well defined and complex. Streamlining the approval processes and updating local zoning codes to incorporate and recognize NSS/decentralised technologies is an essential first regulatory step. As an example, within eThekweni Municipality, current zoning codes and land use management regulations are governed by many documents, including the Spatial Development Framework (SDF), Land Use Management System (LUMS), and other such related specific zoning schemes. These documents outline how land can be used and developed, with zoning categories ranging from residential to commercial, industrial, and agricultural uses. None of these currently have NSS and others as part of spatial planning for sanitation provision.

2.10.4 Infrastructure Integration

The coordination with existing infrastructure poses many technical and logistical challenges i.e. Integrating NSS and decentralised systems with existing water infrastructure (e.g. current water reticulation supply network, stormwater drainage systems). In addressing this it was noted that spatial planning for NSS needs to include considerations of compatibility and seamless integration with existing infrastructure where applicable. In addition, planning for future expansion while incorporating decentralised sanitation solutions requires a forward-thinking approach. This involves anticipating population growth, urban sprawl, and infrastructure needs.

2.10.5 Urban Development Policies

Current urban development policies are outdated and still prioritising conventional sewer systems, which are in direct conflict with the goal of implementing NSS and decentralised sanitation solutions. These are hindering the uptake of new innovative sanitation technologies. Aligning these policies with the objectives of sustainable and alternative sanitation is urgently needed.

2.10.6 Stakeholder management

Challenges around navigating political and administrative processes, including aligning multiple stakeholders, departments and levels of government, were raised.

2.10.7 Compliance

A few compliance issues were also raised: where a full waterborne sewer is available the owner of a premises must be connected to the council's sewer system at his own expense. Only a trained plumber may install the connection to the municipal sewer in accordance with the municipality's specifications. If no sewer system is available the owner must use an alternative sewer disposal system, approved by the municipality. Possible alternative systems vary from VIPs, septic tanks, French drains, conservancy tanks up to private treatment plants. The owner is required to keep all drainage installations on his premises in a good working order. All drainage installations must be constructed of the correct SABS /ISO approved materials to ensure proper working of the drainage system. The municipality has the right to inspect and order rectification of all faulty systems and if not rectified in a reasonable time has the right to rectify the drainage system at the cost of the owner of the erf.

Other issues mentioned include:

- Difficulties with transitioning from pilot to scale due to funding constraints and a lack of technical expertise;
- Payment for services and revenue generation for municipalities;
- Poor enforcement of existing by-laws;
- NSS systems may require different service models, whilst others may require contracts, all of which have implications for SCM processes. For example, sustainable operation (requires a viable long-term operator that is incentivised to ensure maintenance)
- Ongoing monitoring by authority to ensure quality of operations is necessary
- Sub-standard conservancy tanks/ pits:
- Creating health and safety and environmental issues.
- Schedules: i.e., customers complaining the entire drain was not extracted.
- Disposal of unsuitable items in the conservancy tank stalling the sewer truck pump.
- Management of the payments to have conservancy tanks extracted, documenting and recording of the services rendered.
- Maintenance of the conservancy tanks.
- Lack of standard specifications for the construction of the conservancy tanks.
- Disposal of the waste water at oxidation ponds out of the sewer trucks.

2.11 SOLUTIONS

Despite the extensive challenges listed by municipal managers, a number of solutions were also proposed. These include:

- Temporary solutions
- Revising current zoning regulation and creating inclusive zoning
- Streamlining approvals
- Clear guidelines and standards
- Enhancing Land Use Planning
- Policy Alignment and Capacity Building
- Effective implementation strategies

2.11.1 Temporary solutions

The City has waived Development Charges (DC) for packaged plants to facilitate development projects while awaiting municipal connections. However, the goal remains to ensure these developments ultimately connect to the municipal sewer system once it becomes available.

To achieve this, municipalities must continue to expand their capacity, with funding sourced from service delivery rates rather than DCs. It is crucial that the financial model for sanitation services is not undermined by the introduction of packaged plants. In other words, the sewer system must be adequately prepared to handle any additional load if a packaged plant solution fails.

2.11.2 Revising current zoning regulation and creating inclusive zoning

In addressing the issue of zoning, two main proposals were provided. Firstly, the introduction of New Zoning Categories or Subcategories:

Decentralized sanitation zones: Establish new zoning categories specifically for areas where decentralized sanitation systems are suitable. These zones can be designated based on factors such as population density, environmental conditions, and existing infrastructure.

Mixed-use zones: Update existing mixed-land use zones to explicitly allow for the implementation of NSS technologies, ensuring that residential, commercial, and industrial areas can start to incorporate these systems.

The second zoning solution suggested flexibility in zoning regulations:

Flexible land use provisions: Revise regulation to allow more flexibility within zoning codes to accommodate innovative sanitation solutions. This could include provisions that permit temporary installations, pilot projects, and adaptive reuse of spaces for sanitation purposes.

Performance-based standards: Develop local performance-based standards rather than prescriptive ones. The municipal level standards should focus on the outcomes and impacts of sanitation systems (e.g., public health, environmental protection) rather than specific technologies or methods.

2.11.3 Streamlining approvals

Municipal managers provided solutions linked to the streamlining of the approvals process. This included a simplified permitting process with fast-track approval processes for NSS projects to reduce bureaucratic delays.

This could involve a streamlined review process with clear timelines and criteria for approval. Another solution focused on a one-stop shop for approvals – a centralised point of contact for all approvals related to NSS systems. This office would coordinate between different departments and agencies to expedite the approval process.

2.11.4 Clear guidelines and standards

There is a need for comprehensive guidelines that outline the requirements and procedures for implementing NSS systems. These guidelines should cover technical specifications, health and safety standards, and environmental considerations.

In addition, model ordinances should be developed that municipalities can adopt or adapt. These ordinances would should provide a template for incorporating NSS technologies into local zoning codes.

A number of municipalities noted challenges, and proposed solutions, around the use of systems that have been tried and tested. ‘Municipalities need to be able to implement systems which have been tried and tested and cannot afford to be part of trials of new systems, particularly for the growing informal settlements.’

2.11.5 Enhancing Land Use Planning

It was recommended that sanitation planning be integrated into broader land use and urban development plans and schemes e.g., Spatial Development Framework (SDF) and Land Use Management System (LUMS). This will ensure that NSS systems are considered in the context of overall urban growth and development strategies.

The use of Geographic Information Systems (GIS) and other data analysis tools to identify suitable locations for NSS systems was recommended, to assist in making informed decisions about where to implement these systems based on spatial and demographic data (updated STATSSA data).

Site suitability assessments should be conducted via environmental impact assessments to ensure that NSS systems are implemented in locations that minimise adverse environmental effects.

Community needs assessments were recommended – engage with local communities to assess their needs and preferences regarding sanitation solutions. This helps in identifying areas where NSS systems would be most beneficial and accepted by residents.

2.11.6 Policy Alignment and Capacity Building

Policy reform through the harmonization of existing policies was recommended to support the broader adoption of New Sanitation Solutions (NSS) technologies. This includes aligning urban development, public health, and environmental policies to ensure they complement and support NSS. Revising conflicting regulations and creating a cohesive policy framework are key to this effort.

To further encourage NSS adoption, incentive programs such as tax breaks, grants, or subsidies for projects implementing sustainable alternative sanitation solutions should be considered.

Capacity-building training programs for municipal officials, urban planners, and other stakeholders involved in sanitation planning and regulation were also suggested. These programs should address the technical, regulatory, and operational aspects of NSS systems.

Public awareness campaigns are recommended to educate communities about the benefits of NSS technologies. Gaining public support and acceptance is crucial for successful implementation.

For expanding informal areas, it is essential to develop or improve by-laws and policies that facilitate the adoption of decentralized and non-sewered sanitation options. Technologies such as DWWTS, UD’s, container-

based sanitation (CBS), Enviroloo, EcoSan, Mobisan, Loowatt, and Sanergy should be considered within these new frameworks.

2.11.7 Effective implementation strategies

The eThekweni response outlines a detailed implementation plan that includes the following key steps:

1. **Stakeholder Engagement** – Collaborate with stakeholders, such as community members, local businesses, environmental groups, and public health officials, to collect feedback and build consensus around proposed changes.
2. **Pilot Projects** – Launch pilot projects for New Sanitation Solutions (NSS) to test and refine new zoning regulations and guidelines. Utilize insights from these pilots to make amendments before a wider implementation.
3. **Monitoring and Evaluation** – Develop a framework for monitoring and evaluating the effectiveness of the revised zoning regulations and NSS implementations. Use the feedback obtained to continuously enhance policies and practices.
4. **Legislative Process** – Navigate the legislative process to formalize changes to zoning codes and regulations. Ensure compliance with all legal requirements and establish a clear pathway for adoption and enforcement.

Additionally, while untested options such as the "Big Red" on-site disposal system are heavily marketed for tourist facilities, they come with high costs and require regular maintenance. There is concern that system failures could lead private developers to rely on municipal services as a fall-back, potentially increasing pressure on tanker services and municipal sewer systems. Cape Nature's successful use of on-site sewage systems in nature reserves may offer valuable insights into environmentally friendly options.

2.12 CONCLUDING COMMENTS

This review provides a comprehensive legislative overview of sanitation provision, ranging from a global perspective to a focus on South Africa. While it briefly touches on the international context, its primary goal was to examine the constitutional distribution of powers and responsibilities within South Africa. Municipalities play a crucial role in this framework, particularly within the broader contexts of water, sanitation, environmental management, and human settlements.

Off-grid and decentralised sanitation solutions are highlighted as critical, especially as they address the needs of both low-income communities, who often reside within informal settlements without direct sewer connections, and high-income groups, who may reside in estates also lacking easy access to sewer systems. However, the review identified several governance and institutional challenges that need to be addressed for effective implementation of these systems.

Moreover, despite the Revised Compulsory National Water and Sanitation services Norms and Standards introducing the term WESS (DWS, 2025), a more concise definition is required in order to manage such systems. It is here proposed that WESS are solutions which manages (collects) and treats waste to the required design parameters for safe reuse on site. This includes sludge disposal or any other drainage or decanting from maintenance activities. WESS are a subset of non-sewered sanitation (i.e., there is no connection to trunk sewer or municipal reticulation system) that can be off-grid (in terms of water and energy supply) and decentralised with drainage from the front-end through a drainage network consisting of reduced pipe diameters (such as D 110 mm or D 160 mm). WESS are designed to recirculate the treated liquid fraction for toilet flushing or onsite for irrigation (up to 2ML/d). Some WESS may only treat blackwater or treat a combination of black and

greywater. This definition will be used in the framework to guide the development of model by-laws, sanitation policies or implementation guides for WESS in **CHAPTER 3**.

CHAPTER 3: FRAMEWORK FOR MODEL BY-LAWS: WATER EFFICIENT SANITATION SYSTEMS

3.1 PREFACE

This framework is designed as a guideline to assist municipalities (metropolitan, district and local) with developing or updating their own by-laws, sanitation policy and / or implementation guide for **water efficient sanitation solutions** or **WESS** which manages (collects) and treats waste to the required design parameters for safe reuse on site. This includes sludge disposal or any other drainage or decanting from maintenance activities. WESS are a subset of non-sewered sanitation (i.e., there is no connection to trunk sewer or municipal reticulation system) that can be off-grid (in terms of water and energy supply) and decentralised with drainage from the front-end through a drainage network consisting of reduced pipe diameters (such as D 110 mm or D 160 mm). WESS are designed to recirculate the treated liquid fraction for toilet flushing or onsite for irrigation (up to 2ML/d). Some WESS may only treat blackwater or treat a combination of black and greywater.

This framework does not pertain to faecal sludge management or faecal sludge treatment plants.

Establishing a comprehensive framework for model by-laws (norms and standards), sanitation policy and implementation guide is essential to guide municipalities with the adoption, approval and regulation of WESS effectively. This framework contains sections that assist with providing clarity on legal requirements, technical specifications (adherence to certain product standards to ensure the systems are designed properly), operation and maintenance procedures, sanitation tariffs, community engagement, emergency procedures and address risks leading to the delivery of safely managed sanitation services, improved public health, environmental protection, and ultimately better socio-economic conditions.

NOTE 1: Red text are guidance notes to municipalities.

NOTE 2: Blue text are proposed headings and texts to be inserted into model by-laws.

3.2 INTRODUCTION

The 2024 General Household Survey (GHS) reported 76,3% of the national population with access to safely managed sanitation services – that is defined by meeting “*hygiene standards*” and “*proper waste treatment*” (STATS, SA 2025). It is uncertain if this is a true representation of the performance or condition of the entire sanitation service - in other words, whether all human waste generated is actually safely treated for safe reuse or disposal. This is supported by the sanitation situational analysis presented in the National Sanitation Integrated Plan (NSIP) (DWS, 2025) who indicated that many water services authorities (WSAs) are underperforming across the sanitation service chain. Some of the main challenges relate to poorly constructed on-site sanitation systems that are not contained or left to overflow which leads to sewage run-off and environmental pollution. Moreover, there are hydraulically overloaded, poorly operated, maintained and managed conventional wastewater treatment works (WWTWs), directly resulting in poor performance and non-compliance. Ultimately, there remains a gap to achieving the United Nations Sustainable Development Goal (SDG) 6.2.1a target of universal access to safely managed sanitation.

Waterborne sanitation is still the most sanitation provision in cities and South Africa has a whole despite being a water scarce country. For new developments (low-cost and in situ formal upgrades of informal settlements as well as developed estates), access to bulk infrastructure is inherently limited by the fact that most WWTWs are operating above design capacity. This stalls development and / or results in illegal connections especially in informal settlements that are densely populated across urban centres. Other contributors to sanitation backlogs are inward migration of rural populations into cities and population growth in metropolitan cities and the consumer expectations for flushing toilets for a “flush toilet”, adding further pressure on already underperforming WSAs. Moreover, institutional challenges within WSAs with respect to lack of human resources and / or appropriate skilled staff including poor communication and planning across departments, such as human settlements, housing, land use and developmental planning and procurement with water and sanitation, often results in unsafe and inappropriate sanitation services being provided.

Over the last decade, there has been steady progress towards the innovation of safer and climate resilient sanitation products and service options, with the integration of social acceptance in the technical evaluation of these systems. Pilot demonstrations have been done in some municipalities in South Africa, even within areas where bulk infrastructure exists but require repair due to generally poor maintenance, or have been damaged from climatic events. Some of these sanitation systems have been designed with novel evacuation and conveyance mechanisms and do not connect to municipal sewage disposal i.e., are closed loop providing the opportunity for resource recovery (water reuse, energy production and/or nutrient recycling). Furthermore, there is potential for cost savings since the volume demand of water for flushing as well as conveyance of waste is significantly reduced compared to traditional flush toilets consuming 9- 12L/flush. Lastly, since the system is installed on-site or near to the point source of generation – it’s operating needs reduces the need for dilution and conveyance to the treatment unit and thus, the entire system is characterised as **water efficient**.

Based on the South African legislative review conducted by van der Merwe-Botha and Quilling (2024), the terminology introduced in the Revised Compulsory National Water and Sanitation Services Norms and Standards in terms of Section 9 (1) of the Water Services Act, Act No 108 of 1997 (gazetted on 6 June 2025) speaks to “**Water efficient sanitation solutions (WESS)**” which “*means sanitation systems which require low to no water, completely off-grid, non-sewered, on-site or are decentralised and utilise technologies that include using water saving devices, water-efficient processes and beneficial use of waste products.*” To expand on this definition, WESS in this context which manages (collects) and treats waste to the required design parameters for safe reuse on site. This includes sludge disposal or any other drainage or decanting from maintenance activities. WESS are a subset of non-sewered sanitation (i.e., there is no connection to trunk sewer or municipal reticulation system) that can be off-grid (in terms of water and energy supply) and

decentralised with drainage from the front-end through a drainage network consisting of reduced pipe diameters (such as D 110 mm or D 160 mm). WESS are designed to recirculate the treated liquid fraction for toilet flushing or onsite for irrigation (up to 2ML/d). Some WESS may only treat blackwater or treat a combination of black and greywater.

WESS has applications to service more than a single household including low-cost housing schemes, informal settlements, schools, estates, hotels, green buildings, airports and other similar developments. By incorporating sustainability criteria such as water and energy efficiency, WESS will contribute to effective water demand management, safe and acceptable sanitation delivery, environmental and public health protection and potential cost benefits from operating and maintenance requirements compared to traditional forms of sanitation. Moreover, unlike bulk infrastructure, it is not vulnerable to climatic events such as flooding.

However, presently the lack of localised regulations (i.e., alternative sanitation guidelines, policies and by-laws) or incentives from National Government to adopt alternative sanitation technologies have discouraged municipalities to uptake and adopt WESS to reduce their sanitation service delivery backlogs or eradicate open defaecation.

From a review of international literature, a number of key concepts and notes can be extracted to inform the development of model by-laws.

- The African Sanitation Policy Guidelines note that for WESS to function in high density areas, elements including a skilled workforce, effective and safely managed emptying, transportation, treatment, and disposal services are critical. The planning for decentralised systems requires a different viewpoint in terms of policy and institutional framework, finances, technology, and stakeholder engagement.³
- In addition, some non-sewered systems have limited capacity for handling greywater and so require additional complementary greywater management systems. The development of policies or standards (or by-laws in this case) can specify that these elements need to be catered for where WESS are used. Non-sewered on-site sanitation is grouped into two categories, each with different technologies to ensure that human excreta is safely managed across the sanitation service chain:
 - on-site sanitation with on-site treatment (such as those products designed under the specifications of ISO/SANS 30500: Non-sewered sanitation systems – Prefabricated integrated treatment units – General safety and performance requirements for design and testing)
 - on-site systems with faecal sludge management and appropriate treatment infrastructure.

Effective regulation is noted as critical, including the need for clear guidelines that are adapted to the local institutional and political context. These regulations include elements such as oversight of pricing and tariff setting, service quality, performance imperatives, work safety, promotion of investment, and enforcement of compliance by service providers. In addition, it is critical to ensure compliance with prescribed laws, regulations, rules, by-laws, guidelines, and standards.⁴

Other factors to be included in the development of policies and related documentation include:

- The expected outcomes from sanitation systems and service levels for managing human excreta from various locations, stakeholder engagement need (taking into consideration the specific needs of women and girls, and other vulnerable groups, including people living with disabilities), user preference, user education, dealing with non-compliance and mitigation measures in case of WESS failure; and
- Permissible service levels for all types of settings.

³ National Institute of Urban Affairs, 2019

⁴ African Sanitation Policy Guidelines

Service levels including:

- Considerations around incremental improvements, including shared sanitation, basic and safely managed services;
- Minimum standards for different settings and situations (e.g., humanitarian crises);
- Priority areas for improvement;
- Spatial limitations including land ownership, particularly in informal settlements;
- Effective faecal sludge and wastewater management; and
- Institutional WASH priorities (for schools, health centres, etc.).

In the case of decentralised wastewater treatment, the 2017 Handbook on Decentralised Wastewater Treatment Module indicates that a typical decentralised wastewater treatment module should combine the following technical treatment steps in a modular manner:

- Pre-treatment (screen, grit chamber, oil and grease trap);
- Primary treatment (sedimentation ponds, settlers, septic tanks);
- Secondary treatment (anaerobic baffled reactors, anaerobic filters or anaerobic and facultative pond systems);
- Tertiary aerobic/facultative treatment (horizontal gravel filters); and
- Tertiary treatment (aerobic polishing ponds or vertical gravel filters).

The selection of appropriate technical configuration depends on the following:

- Wastewater volume;
- Wastewater quality and organic load;
- Local temperature;
- Soil conditions;
- Topography and availability of land;
- Costs (capital and operating and maintenance);
- Prescribed technical and / or management standards;
- User acceptability and behavioural characteristics / current sanitation practices; and
- End-use application of the treated outputs (primarily liquid) ⁵

These are some of the key issues that must be considered in the development of sanitation by-laws, policies and / or implementation guides.

3.3 DEVELOPING BY-LAWS AND POLICY

To give effect to legislation as shared in section 2, Municipalities can use two routes:

⁵ Adapted from Handbook on Decentralised Wastewater Treatment Module, 2017

1. Developing by-laws to give effect to municipal policies. By-laws set out the relationship between the municipality, its service providers and/or consumers, and should provide clarity in respect of the rights and responsibilities of each of these stakeholders. By-laws are also a regulatory instrument against which a municipality can monitor its own performance or that of its service providers and intermediaries.
2. Developing procedures and processes through policy.

These instruments affect all department and divisions within a Municipality to operationalise viz; water, sanitation, treasury, spatial planning, housing and building approval, roads, etc.

3.3.1 Development of By-laws

The Municipal Council (at a full council meeting) approves by-laws. All clauses of the by-laws must adhere to National Regulations and the Constitution. The municipality (officials) or appointed service providers of the municipality implements by-laws.

The Municipal Systems Act (MSA) in Sections 12 and 13 sets out the processes that must be followed when a municipality develops by-laws. The following process is recommended in terms of Section 21 and 21A of the Act:

- The draft by-laws (and the official languages in which the notice calling for public comment should be published, if the Municipal Council has not done so already) be approved for consultation by resolution of the Municipal Council;
- The Notice calling for public comment is published in the official languages determined by the Municipal Council. The notice calling for public comment must include a statement:
 - Stating what is addressed in the by-laws published for comment;
 - Inviting the public to submit written comments in connection with the draft by - laws before or on a specified date or within a specified period;
 - To whom and how comments should be submitted (postal and physical address, fax number and e -mail address);
 - That copies of the draft by-laws may be obtained from the office of the Municipal Manager against payment of a nominal fee;
 - That the draft by-laws are available for inspection at the offices, the satellite offices and library of the municipality every weekday between the hours of 8:00 and 16:00, and on the official website of the municipality;
 - The notice calling for public comment be published for public comment in the Provincial Gazette for a period of at least 14 (fourteen) calendar days;
 - Radio broadcasts covering the area of the municipality informs the community of the proposed by -laws and provide information on where the by-laws are available for inspection of the public participation process embarked on by the municipality and how comments may be made;
- The municipality at this stage must embark on a public participation process involving all its communities.
- The draft by-laws with or without amendments must be submitted to the Municipal Council for adoption by council resolution and promulgation thereof;
- The final by-laws are published in terms of a Notice for public notice in the Provincial Gazette and take effect on the date of this publication or on a future date stated in the Notice.

In terms of the content of WESS by-laws, the following areas should be addressed:

- Application procedures and any relevant approvals (licenses, permits and certifications) from the Department of Water and Sanitation (DWS), Department of Forestry, Fisheries, and the Environment (DFFE), South African Bureau of Standards (SABS), local government departments, and other authorities responsible for regulating and licensing technology design, performance and installation, reuse water for irrigation, sludge disposal etc. This should include application forms and formats required by the municipality;
- Technical standards and guidelines for the design, construction, installation, and operation of off grid, decentralised and non-sewered sanitation systems. Designs and installations should be done and approved by appropriately registered professional engineer(s) or professional engineering technologist(s);
- Mechanisms for safeguarding public and environmental health through monitoring by the water services authority - the performance and compliance of WESS to the established norms, standards, regulations and guidelines for safe waste storage, treatment, and disposal;
- Clarifying the roles and responsibilities of national and local government, municipal authorities, property owners and home owners' associations, body cooperates, end-users, contractors, and technology/service providers in the implementation, operation, and maintenance of WESS inclusive of ownership of WESS and who is liable for any non-compliance;
- WSA's enforcement of compliance through inspections, audits, and appropriate penalties or sanctions for non-compliance;
- Building capacity within WSAs to effectively regulate WESS.
- Setting of sanitation tariffs for WESS including developmental charges, rates, availability charges, monitoring charges etc.;
- Contractual Agreements for operation and maintenance as well as financial guarantees in case of non-compliance, case of emergency or WESS failure inclusive of arrangements for possible municipal intervention in such cases;
- Engage with all relevant stakeholders to ensure that the WESS provided demonstrates inclusivity and equitable access to safe sanitation and;
- Education of users to increase community awareness and understanding of WESS to promote proper usage and maintenance practices but also to establish user acceptance.

3.3.2 Rationale

The following sections describe the reasons for the development of by-laws for WESS:

- South Africa must transition from greater reliance on water-borne sanitation systems to water-efficient sanitation in light of water scarcity from prolonged periods of drought, fast-growing cities, ageing infrastructure that is inadequately maintained, poor management and performance of WWTWs, water insecurity and mismanagement, and extreme climatic events such as flooding that result in destruction to bulk infrastructure.
- Shifting to this new approach to sanitation reduces water for flushing and conveyance, will contribute to eradication of sanitation service delivery backlogs and open defaecation promoting public health and restoration of natural ecological bodies such as wetlands and rivers.
- In order to make this transition, an enabling regulatory framework through by-laws is essential to aid in the adoption and implementation of water efficient sanitation solutions (WESS).

Van de Merwe-Botha and Quilling (2024) have proposed three approaches for unlocking implementation of WESS through regulation and policy:

- Short term option (<5 years): Rapid adaption and strengthening of existing DWS regulation by:
 - Identifying quick changes to existing regulation (adapt, change, or strengthen), to ensure that efficient water use, and where possible, off-grid services form part of the sanitation solutions being investigated for new greenfield developments,
- Medium term option (5-10 years): Entrenching WESS in DWS regulation by:
 - Following on 1 - Identify more extensive changes regulations & guidelines or develop new - require WESS as part of sanitation solutions for all developments (brownfield & greenfield),
- Long term option (>10 years): Entrenching WESS in sectoral regulation by:
 - Following on 1 & 2 – Change or strengthen DWS & non-DWS regulations, guidelines and standards or develop new regulatory documentation, e.g., SANS, to facilitate enactment of WESS and WESS-related concepts.

DWS, the driver and leader in the sector, will require involvement of various other departments and other government agencies. The Revised Compulsory National Water and Sanitation Services Norms and Standards (DWS, 2025) aims to foster innovation and drive implementation of alternative and sustainable sanitation options but lack of appropriate municipal by-laws have stifled WESS scale-out. At the same time, a number of water services authorities (WSAs) are in the process of developing by-laws to address contexts in which sewers and bulk services do not exist yet, however, these tend to be limited to larger Category C (metropolitan) municipalities. Thus, there is a need for model by-laws and sanitation policies that would provide all municipalities with a basis upon which they could amend their existing or develop a separate by-law or policy catering for their needs and local contexts.

Until such model by-laws exist, this framework is designed to guide municipalities (metropolitan, district and local) with the approval, adoption, and regulation of WESS. Establishing a comprehensive framework for model by-laws (norms and standards) is essential to guide municipalities in implementing these WESS effectively. This framework contains sections that assist with providing clarity on legal requirements, technical specifications (adherence to certain product standards to ensure the systems are designed properly), operation and maintenance procedures, sanitation tariffs, community engagement, emergency procedures and address risks leading to the delivery of safely managed sanitation services, improved public health, environmental protection, and ultimately better socio-economic conditions.

3.4 INSTITUTIONAL AND REGULATORY FRAMEWORK FOR WESS IMPLEMENTATION

Regulation of WESS shall be governed by legislation, policies, by-laws, and South African National Standards (SANS) governing water and sanitation services and technologies.

The main legislation and policies relevant with respect to this model by-law include:

- Water Services Act 108 of 1997;
- National Water Act 36 of 1998;
- Groundwater Strategy (2016);
- Municipal Systems Act (MSA) 32 of 2000;
- National Sanitation Policy, 2016;
- National Water and Sanitation Master Plan, 2018;

- National Water Security Framework for SA, 2020; and
- National Sanitation Framework, 2023.

Importantly, the key regulatory framework is described in both the Water Services Act (DWS, 2023) and the Revised Compulsory National Water and Sanitation Services Norms and Standards in terms of Section 9(1) of the Water Services Act (DWS, 2025). The Water Services Act (No 108 of 1997) governs the provision of services to consumers. Section 3 of the Act states that “*everyone has a right of access to basic water supply and sanitation*”. Basic sanitation is defined as: “*the prescribed minimum standard of services necessary for the safe, hygienic and adequate collection, removal, disposal or purification of human excreta, domestic waste water and sewage from households, including informal households.*”

In terms of the Water Services Act, all WSAs must have an approved and up to date Water Services Development Plan (WSDP) and some of the details relevant to the planning for WESS include:

- (a) of the physical attributes of the area to which it applies;
- (b) of the size and distribution of the population within that area;
- (c) of a timeframe for the plan. including the implementation programme for the following five years;
- (d) of existing water services;
- ...
- (g) of the number- and location of persons within the area who are not being provided with a basic water supply and basic sanitation;
- (h) regarding the future provision of water services and water for industrial use and the future disposal of industrial effluent. including—
 - (i) the water services providers which will provide those water services;
 - (ii) the contracts and proposed contracts with those water services providers;
 - (iii) the proposed infrastructure necessary;
- ...
- (v) the estimated capital and operating costs of those water services and the financial arrangements for funding those water services, including the tariff structures;
- (vi) any water services institution that will assist the water services authority;
- (vii) the operation, maintenance, repair and replacement of existing and future infrastructure;
- (i) of the number and location of persons to whom water services cannot be provided within the next five years. setting out—
 - (i) the reasons therefor: and
 - (ii) the time frame within which it may reasonably be expected that a basic water supply and basic sanitation will be provided to those persons; and
- (j) of existing and proposed water conservation, recycling and environmental

protection measures.

The Revised Compulsory National Water and Services Norms and Standards (DWS, 2025) provide guidance for WESS. In terms of WESS, WSAs are now required to consider the following requirements:

6(7)(b) Water efficient sanitation solutions;

6(8)(a)(II) Alternative water efficient sanitation solutions instead of waterborne sewer systems in areas of dense formal and medium settlement density where there is resource scarcity and or inadequate capacity or functionality in the sewer system and or the wastewater treatment works.

6(8)(b) in low density or sparsely populated settlements: water efficient sanitation solutions.

6(9) Water efficient sanitation solutions in sub-regulation (7) must be shown to include off-grid, on-site sanitation options such as Non-sewered Sanitation Systems (NSSS) as well as Decentralised Wastewater Treatment Systems (DWWTS).

6(10) A Water Services Authority may not unreasonably decline a property development to have a water efficient sanitation solution that is not connected to the central system where development will manage the system as a Water Services Intermediary and where the water uses of the system is authorised under the National Water Act.

13(1)(b) plan for adequate sewer collection, wastewater treatment capacity and water efficient sanitation

16(10) WSAs must require greenfield developments or major brownfield redevelopments, prior to planning approval, to indicate the manner and extent in which water conservation and water demand management (WCWDM) and water efficient sanitation solutions (WESS) has been accommodated and accounted for in their selected technology options, in terms of efficient water use and off-grid sanitation.

26(2)(f) Water conservation and water demand management must include at least— (v) the progress made in the installation of water efficient devices.

These regulations are critical in bringing WESS into the mainstream of sanitation solutions. This is particularly important given that there are over 4000 informal settlements without adequate sanitation in municipalities across South Africa.

In addition to the water and sanitation legislative environment, municipalities must also frame their WESS by-laws in ways that address other important legislation, such as the following:

- Acts framed under the umbrella of National Environmental Management Act (NEMA) 107 of 1998⁶ seek to protect certain focused aspects of the environment and have an important influence on planning and service delivery. The legal requirement for environmental authorisations in terms of development are outlined by Section 24⁷ of NEMA which states that “*the potential consequences for or impacts on the environment of listed activities or specified activities must be considered, investigated, assessed and reported on to the competent authority or the Minister of Minerals and Energy, as the case may be, except in respect of those activities that may commence without having to obtain an environmental authorisation in terms of this Act*”. It should be noted that some of these Acts have accompanying regulations.
- Housing is not a constitutionally-granted municipal function, however, the Housing Act 107 of 1997 has articulated the roles and responsibilities of all three spheres. The role of municipalities is generally

⁶ Environmental Conservation Act No 73 of 1989; National Environmental Management Act No 107 of 1998 and its regulations (NEMA); National Environmental Management Act: Air Quality Act No 39 of 2004; National Environmental Management: Biodiversity Act No 10 of 2004; National Environmental Management: Integrated Coastal Management Act No 24 of 2008; National Environmental Management: Protected Areas Act No 57 of 2003; National Environmental Management: Waste Act No 59 of 2008; National Forestry Act No. 84 of 1998; National Heritage Resources Act No 25 of 1999; National Water Act No 36 of 1998

⁷ Also refer to Sections 24(5) and 44 pertaining to Environmental Impact Assessments.

subordinate to that of national and provincial government, even though the Act says that municipalities should ensure that:

- The inhabitants of its area of jurisdiction have access to adequate housing on a progressive basis;
- Conditions not conducive to the health and safety of the inhabitants of its area of jurisdiction are prevented or removed;
- Services in respect of water, sanitation, electricity, roads, stormwater drainage and transport are provided in a manner which is economically efficient;
- Section 11(1)(c) of the National Land Transport Act 5 of 2009 lists the responsibilities of municipalities in transport provision, and such would require municipalities to address the transport needs associated with WESS.
- The National Health Act 61 of 2003 notes that every metropolitan and district municipality must ensure that appropriate municipal health services are effectively and equitably provided in their respective areas. The Health Act defines ‘municipal health services’ as including: water quality monitoring; food control; waste management; health surveillance of premises; surveillance and prevention of communicable diseases, excluding immunisations; vector control; environmental pollution control; disposal of the dead; and chemical safety.
- The promulgation of the Disaster Management Act 57 of 2002 created roles and responsibilities for Category A and C municipalities, who must develop the municipal disaster management framework to ensure an integrated and uniform approach to disaster management within the municipal area.
- In addition to being reflected in WSDPs, WESS need to also take into account Spatial Planning and Land Use Management Act 16 of 2013⁸.

The following list covers all legislation of relevance in terms of the delivery of basic services in the built environment, and which has indirect or direct relevance to these model by-laws include:

- General legislation and policy:
 - The National Development Plan (NDP): Vision 2030;
 - Broad-Based Black Economic Empowerment Act, 2003: Promotes economic inclusion in housing development;
 - Expropriation Act, 13 of 2024: Mechanism for acquiring land for public purposes;
 - Integrated Urban Development Framework (IUDF), 2016: Promotes sustainable and connected urban growth;
 - Local Government: Municipal Systems Act, 2000: Strengthens municipal capacity to manage housing services;
 - New Urban Agenda (2016): Promotes sustainable urban development globally; and
 - Sustainable Development Goals (SDG 11): Focuses on inclusive and sustainable cities and housing.
- Environmental, disaster and climate change legislation:
 - Climate Act 2024: development of an effective climate change response;

⁸ Refer to S7 a (ii), S7 a (iv), S12 (1)h, Schedule 1 (g) and S53

- Disaster Management Act, 2002 (57 of 2002);
- Fire Brigade Services Act, 1987 (99 of 1987) (FBSA); and
- National Environmental Management Act (NEMA) (107 of 1998).
- Financial legislation:
 - Division of Revenue Act (DORA) (annual);
 - Intergovernmental Fiscal Relations Act (97 of 1997);
 - Municipal Finance Management Act, 2003 (56 of 2003); and
 - Public Finance Management Act (PFMA).
- Energy:
 - Electricity Regulation Act (4 of 2006); and
 - National Energy Act (34 of 2008).
- Health:
 - National Health Act, 2003;
- Transport:
 - National Land Transport Act (5 of 2009).
- Planning:
 - Spatial Planning and Land Use Management Act (SPLUMA), 2013; and
 - Traditional leadership and communal areas: Traditional Leadership and Governance Framework Act, 2003.
- Housing:
 - Housing Act, 1997;
 - Housing Consumer Protection Measures Act, 1998;
 - Housing Development Agency Act, 2008; and
 - Less Formal Township Establishment Act, 1991.
- Waste:
 - National Environmental Management: Waste Act 2008 (Act 59 of 2008) as amended by the National Environmental Management: Waste Amendment Act (26 of 2014) and the National Environmental Management Laws Amendment Act (25 of 2014).

The policy co-ordination of the various public organisations involved in the planning and delivery of basic services is essential. It is necessary to consider at least four mutually related factors which are required for by-laws development:

1. Physical infrastructure such as water supply, sanitation, roads, electricity and communications;
2. Social infrastructure including schools, hospitals, clinics and welfare organisations;
3. Economic infrastructure which is the employment, production and trading base including access to markets and finance; and
4. Institutional infrastructure being organisational and civil administration structures at all levels. These should provide access to ordinary people to the processes of democratic local, regional and national government.

Note to municipalities: *Relevant stakeholders should be identified by the municipality.*

These could include:

- *Traditional and Government authorities;*
- *Community based organisations such as churches, youth environmental groups, formalised non-governmental organisations;*
- *Political leaders e.g., ward councillors, MEC*
- *General members of the public;*
- *Businesses and particularly sanitation service providers;*
- *Industry associations;*
- *Financial institutions and insurers*
- *Media*

3.5 GENERAL

The Municipality of (“the municipality”) hereby publishes the *Water Efficient Sanitation Solutions (WESS) By-Laws*. They have been promulgated by the municipality in terms of section 156(2) of the Constitution of the Republic of South Africa, 1996 and in accordance with section 13(a) of the Local Government: Municipal Systems Act, 2000 (Act 32 of 2000).

These by-laws shall be operational from the date of its publication in the xx Notice.

3.6 DEFINITIONS AND TERMINOLOGY

Note to municipalities: *These definitions have been extracted from the Revised Compulsory National Water and Sanitation Services Norms and Standards. Government Gazette 52814, No. 6292 gazetted on 6 June 2025.*

Additional definitions can be included as required by each Municipality.

In this by-laws / sanitation policy, a word or expression to which a meaning has been assigned in the Act bears that meaning, and must be read in conjunction with the principal National Water Act, unless the context otherwise indicates —

“**Basic sanitation service**” means the provision of a basic sanitation facility which is environmentally sustainable, easily accessible and affordable to a household and a consumer, the sustainable operation and maintenance of the facility, including the safe removal of human waste, greywater and wastewater from the premises where this is appropriate and necessary, and communication and local monitoring of good sanitation, hygiene and related practices.

“**Consumer**” as defined in the Act.

“**Decentralised wastewater treatment system**” refers to various approaches for collection, treatment, and disposal/reuse of wastewater for individual dwellings, industrial or institutional facilities, clusters of homes or businesses, and entire communities. They provide a range of treatment options from simple, passive treatment with soil dispersal, commonly referred to as septic or on-site systems, to more complex and mechanized approaches such as advanced treatment units that collect and treat waste from multiple buildings and discharge to either surface waters or the soil. They are typically installed at or near the point where the

wastewater is generated. These systems, when owned by the WSA and or its contracted Water Service Provider or Water Services Intermediary, as a part of their permanent infrastructure, can be managed as stand-alone facilities. These systems, when privately owned will need to be managed as stand-alone facilities by the infrastructure owners, operating as a Water Services Intermediaries with an SLA to the municipality and a water use authorisation in terms of the National Water Act.

“effluent” means human excreta, domestic sludge, domestic wastewater, greywater or wastewater resulting from the commercial or industrial use of water that has been treated to standards issued under the National Water Act prior to discharge.

“Front end” or user-interface means the toilet facility provided to or installed by the user.

“greywater” means wastewater resulting from the use of water for domestic purposes but does not include human excreta.

“Off-grid wastewater treatment system” refers to a combination of sanitation technologies from the user-interface to the treatment unit that is not connected to any municipal water or electrical supply and reuses the treated liquid and/or solid output within the boundary of the property owner / body co-operation.

“Indigent households” households lacking the necessities of life as defined by the Indigent Policy of National Treasury.

“Informal settlement” means human settlement areas that do not comply with municipal town planning scheme requirements.

“Non-sewered sanitation system” refers to an ISO 30500 product that consists of a frontend (toilet facility) and backend (treatment unit) that collects, conveys, and fully treats the human excreta, flush water, anal cleaning material to allow for safe reuse or disposal of the generated solid and liquid outputs, and the safe emission of air, noise and odour outputs, and is designed to operate without being connected to a networked sewer or networked drainage systems.

“on-site sanitation” means a sanitation system in which excreta or wastewater is stored, collected and / or treated where they are generated in accordance with (e.g., on the property, community or in the household) this may include gravity sewers, settled sewers or simplified sewer systems.

“Sanitation service chain” (or sanitation value chain) means human excreta captured, contained (pit or tank), emptied, transportation (of sludge) treatment beneficial use or safe disposal of faecal sludge.

“SANS 30500” means the South African National Standard for non-sewered sanitation systems.

“the Act” means the Water Services Act, 1997 (Act No. 108 of 1997), as amended.

“the National Water Act” means the National Water Act, 1998 (Act No. 36 of 1998).

“User connection” means a connection through which a consumer can gain access to water services or connect to sanitation services and includes a consumer installation and a bulk or communal connection.

“User sector” means the applicable category of users, being users categorised into at least either—

- a. domestic.
- b. industrial; or
- c. commercial sectors.

“wastewater” means water from the domestic, commercial or industrial use of water containing waste or water that has been in contact with waste material.

“Water efficient device” means a product that reduces the excessive use of water.

“Water efficient sanitation solution” refers sanitation systems which require low to no water, completely non-sewered, off-grid or decentralised and utilise technologies that include using water saving devices, water-efficient processes and beneficial use of waste products.

“Water Services Authority” (WSA) as defined in the Act.

“Water Services Intermediary” as defined in the Act.

“Water Services Provider” as defined in the Act.

“Wastewater treatment system” means the pipes, sewers, pump stations and treatment work that collect, reticulate and treat wastewater from residents, businesses and industries before discharging or re-using the final treated effluent and biosolids.

“Wastewater treatment works” means a process, or combination of unit processes, undertaken to render effluent acceptable to return to the environment or for re-use. A wastewater treatment works includes but are not limited to conventional wastewater treatment works, oxidation ponds, package plants and reclamation plants.

3.7 TECHNICAL NORMS AND STANDARDS FOR WESS

As guided by the Revised Compulsory National Water and Services Norms and Standards (DWS, 2025).

1. In providing sanitation services to its citizens, a WSA must ensure that all users are provided with a safely managed sanitation service such that the treatment option selected facilitates full treatment of the specified input within the system to allow for safe reuse (recirculated water) or disposal of the outputs (effluent or ash).
2. The WSA must ensure that when selecting a WESS for high to medium density formal settlements and low density or sparsely populated settlements that population density and economies of scale are fully considered.
3. A signed application form must be submitted to the WSA by the WESS owner.
4. If the WESS is designed as a closed-loop system (i.e., not discharging but recirculating the treated effluent for toilet flushing), then that application is exempted from a water use licence.
5. If a WESS is reusing the treated effluent for irrigation onsite, then that system must at least adhere to and be monitored in accordance to the General Authorisations as listed in the Revised General Authorisations (DWS, 2013).⁹ All other reuse quality must adhere to the South African Water Quality Guidelines.¹⁰
6. A privately-owned WESS may only be installed on premises with the prior permission of the WSA. Installation of WESS must be done by a qualified plumber and/or electrician.
7. Whenever a WESS is installed at a single household, such systems must comply with the requirements of SANS 30500 for Class 1 or Class 2 NSSS. The WESS must be installed and maintained in accordance with the manufacturer’s instructions, the National Building Regulations as guided by SANS 10400 or any other relevant standard.

⁹ WSAs are allowed to enact stricter limits based on their local context.

¹⁰ South African Water Quality Guidelines (Volume 1: Domestic use. 1996); South African Water Quality Guidelines (Volume 2: Recreational Use. 1996); South African Water Quality Guidelines (Volume 3: Industrial Use. 1996).

8. If permission for a privately-owned WESS for a premises (estate, green building or commercial building) is granted, the following conditions apply:
 - the developer must appoint a professional engineer or professional engineering technologist at the commencement of the project and such professional engineer or professional engineering technologist –
 - is responsible for the design and selection of the WESS;
 - must supervise the construction, installation and commissioning of the WESS; and
 - is responsible for the operational control, monitoring and maintenance of the WESS for a period of five years in terms of a service contract to the satisfaction of the WSA.
 - the developer must lodge a financial guarantee with the WSA in an amount equal to 1.5 times the total cost of the WESS for a period of five years.
9. The WSA may prescribe additional requirements for privately-owned WESS.
10. If the WESS requires connection to the municipal electrical supply, then back-up power supply must be provided to ensure continuity of services.
11. A WESS operation must not be disturbed by any external source of electromagnetic field, nor must the electromagnetic field of the WESS disturb the operation of external electrical equipment.
12. If the WESS is connected to a municipal water supply, then backflow shall be prevented (installation of a non-return valve RPZ must be done). It is the responsibility of the owner of the WESS to ensure that alternative water storage devices such as rain water tanks are included in the system installation.
13. In the case where a WESS is a closed loop, then reuse pipes conveying treated effluent must be clearly marked.
14. End-user education must be done prior to and after each WESS installation to ensure safe use and operation of the system. Infographics and signs must be added to the system for alarms / when the system is not in operation due to maintenance or failure.
15. Maintenance activities must be in accordance with the manufacturer's instruction and the appropriate skill level and qualification must be employed in compliance to SANS 30500.
16. Whenever a Water Services Provider or Intermediary is providing sanitation services using WESS that are outside the scope of a SANS 30500 product, then such systems must be managed by the guidelines provided in SANS 24521 or any other relevant standard.
17. If approved by the WSA, the developer of a new sectional title development or private township must, at his, her or its own cost, construct the WESS consisting of approved sewage reticulation system, including any pump-stations and rising mains, and wastewater treatment work which is adequate to serve all households and any common areas within the development as required.
18. Where the WSA's waterborne sewage collection network is available to serve the development, the developer must at his, her or its own cost connect the internal sewage reticulation system to the WSA's sewerage collection network.
19. Where the WSA's waterborne sewage collection network is not available to serve the development, the developer must install a suitable on-site privately-owned WESS.
20. The removal of waste sludge from the WESS should be arranged through a registered waste disposal contractor and disposed of in a manner that promotes sustainability (not into a sewer manhole or landfill) or in such a manner as approved by the Department of Water and Sanitation in consultation with the WSA Health Department. Sludge beneficiation options are encouraged. Adequate access to allow for the removal of waste sludge must be provided.

Note to municipalities: In addition to the municipality selecting through an open and transparent procurement process the specific water efficient products to be authorised for use in the municipality, the municipality must also authorise all public or private service providers undertaking maintenance activities to be undertaken in providing, maintaining and monitoring water efficient products.

Options available to the Municipality:

- Full purchase and self-servicing
- Full purchase and service provider serviced
- Rental option for asset and service

3.8 FRAMEWORK FOR WESS MANAGEMENT AND OPERATION

The municipal by-law should include guidelines for system use and maintenance by property owners and users that must be aligned to the National Building Regulations (NBR) and approval process.

As per the NBR, only SABS approved products can be installed OR any technologies validated by the municipality in terms of the by-laws and regulations.

It must be stipulated that all WESS, household or communal on private property must receive Municipal approval in terms of building regulation statutes, as well as approvals from environmental health, water services and other key departments. This approval must also define regular monitoring and reporting to the municipality by the property owner or body corporation.

Note to municipalities: An WESS installation is considered an intermediary function – should follow the normal procurement processes. Such systems can be managed as Water Services Intermediaries.

The following elements must therefore be present before a person will be a water services intermediary:

- There must be an obligation to provide water services;
- The obligation must exist in terms of a contract, whether specifically agreed or implied; and
- The obligation to provide water services is not the main reason why a contract exists between the parties.

Examples of intermediaries are:

- Farm workers living on employers' farm: Employment contracts with farmers often states or implies that the farm worker may reside on the property, with such residence including provision of water services.
- Mines or other large industries' (e.g., ESKOM, Transnet, ISCOR, etc) workers living on employers' land usually located far from established settlements: Employment contracts often includes housing with associated water services provision on the employer's land and housing compounds.
- Church owned land (missionary towns developed and owned by churches): Employment contracts often includes housing with associated water services provision on the employer's land and housing compounds.
- Property developers who develop and sell properties services by WESS. Ownership of WESS can be transferred to body corporates after development and sale of estate.
- Body corporates of sectional title (flats and complexes including private residential estates), and lease agreements. Such contracts can state that the provision of water services to the leased property will

be the responsibility of the lessor or lessee. Where the contract states that the lessee will be responsible for securing access to water services and such access can reasonably be secured the lessor will not be a water services intermediary.

By its legal definition, intermediaries operate without a contract with the WSA by providing water services incidental to its main purpose and contract.

If the WESS is to be managed by the manufacturer or supplier of the WESS, then a Service Level Agreement must be in place for operation and maintenance of the WESS for a minimum of 3 years.

3.9 MONITORING, EVALUATION AND REPORTING

Note to municipalities: *It must be decided where the regulatory responsibility for WESS should be located i.e., in the Building Regulations division or the Water Services division. It is recommended that this should be established in water services department however, whatever is chosen, the key requirement is that these units need to be well capacitated to execute these functions. If the WESS is located within the Water Services division and is reusing the treated liquid for irrigation, then it may be regarded as a Water Services Works in which case any organisation operating the WESS will need to comply with Regulation 3630 in terms of section 9 of the Water Services Act (Act 108 of 1997). If the WESS is a completely closed-loop system, then it may not be regarded as a Water Services Works and compliance to Regulation 3630 may not apply.*

According to Regulation 3630, any facility in South Africa which treats water and/or wastewater – including non-municipal plants on mines, manufacturing sites, housing estates, etc. owned by the private sector – should comply with the following requirements:

- *obtain a classification certificate (NB: this is not a Water Use Licence) from the Department of Water and Sanitation (DWS)*
- *have process controller and operational & maintenance (O&M) support services in place, and*
- *employ or contract a registered Professional Process Controller as supervisor.*

The monitoring of WESS for compliance with the by-law or policy shall adopt an adaptive management approach through an iterative process of decision-making in granting approvals and entering into agreements. Monitoring of a WESS must be conducted by a professional engineer or professional engineering technologist who is authorised by relevant authorities or the WSA, and will have overall responsibility for the control and monitoring of the WESS for compliance with relevant standards.

Samples must be analysed by a SANAS accredited laboratory. The results must be reported in writing by the laboratory directly to the WSA with a copy to the Professional Engineer / Professional Engineering Technologist responsible for the operation and maintenance service contract for the WESS.

In the event of monitoring results reflecting non-compliance with effluent quality requirements, or in the event of specific incidents of plant or process failure or malfunction having occurred, resulting in non-compliance, details of the steps taken to rectify the position shall be reported to the WSA immediately.

Financial Guarantees:

- *The purpose of the financial guarantees through a bank is to hold the developer or other operator (for example the body corporate where they operate the system) responsible for the performance of the WESS, for at least a five-year period, for achieving compliance, at all material times. In the event that there is inadequate compliance with the GA the sum held under the bank guarantee may be used by the WSA to alter or replace all or part of the installed WESS.*

- *Single household installations will not require such a bank guarantee as it is the responsibility of the property owner / user of the WESS. The property owner or body corporate is responsible for insuring their WESS at the time of installation as part of their comprehensive homeowner's insurance.*
- *The monitoring and compliance protocols to be applied to the Financial / bank guarantee will be based on a scientific assessment of both the WESS design and the performance of the system together with the risks to the receiving environment associated with any non-performance of the WESS. As such, the protocol might well vary from one situation to another taking into account the individual circumstances of a particular installation.*
- a) For all WESS, performance monitoring must be conducted as per legislation or as stipulated by the WSA. Analysis needs to be done by accredited service provider. Data must be provided to the WSA within a month of sampling.
- b) Right of entry must be granted to the WSA for random inspection.
- c) An authorised official of the WSA may, when entering any property / premises—
 - a. inspect, monitor or investigate any part of those premises relating to the installed WESS such as water supply, energy supply and / or drainage system as well as where chemicals of any nature are handled, stored or disposed of;
 - b. question the owner or any occupier of the building;
 - c. take photos of the premises;
 - d. take samples;
 - e. seize pertinent evidence relating to water quality; or
 - f. do anything necessary to implement the provisions of this by-law.
- d) The operation and maintenance of the WESS and all costs pertaining to it remains the responsibility of the owner of the premises, unless the WESS is subsidised as determined in accordance with the WSA's by-laws relating to credit control and debt collection.
- e) All data must be uploaded on the WSA data management system within a month for performance tracking, compliance and scheduling of maintenance / repairs of individuals systems.
- f) For safety compliance, the owner of the WESS must provide an annual compliance certificate to the WSA that is issued by an Independent Municipal Accredited Assessor.
- g) During period of non-compliance, the WSA must be immediately informed and the mitigation measure must be communicated to the WSA within a week.
- h) If during a scheduled or unscheduled maintenance activity requires discharge from a privately-owned WESS and the quality does not comply with the General Limit Values as set by the Department of Water and Sanitation's General Authorisations in terms of Section 39 of the National Water Act, the WSA may instruct the owner of such plant to discharge into an approved WSA facility on such conditions as the WSA may prescribe.
- i) If it becomes apparent that a privately-owned WESS is not compliant with the water quality required for recirculation or reuse in irrigation set by the Department of Water and Sanitation General Authorisations in terms of Section 39 of the National Water Act, the WSA may instruct the owner of the plant to remove and replace the WESS at his or her own cost.
- j) If the owner fails to act within the required time, the WSA will remedy the situation and any costs incurred by the WSA in the course of remedying the contravention as contemplated in subsection (4), may be recoverable in terms of the Credit Control and Debt Collection By-law of the WSA, including use of the Bank guarantee and /or an additional fine deemed appropriate by the WSA.

- k) Impact of granted approvals will be evaluated in consultation with XXX and adjustment of such approvals implemented where necessary.
- l) The municipality's performance reporting system must be amended to include the monitoring of water efficient sanitation and how this process would include municipal and non-municipal service providers in this process. Here, provision must be made for regular inspections and audits.

3.10 TARIFFING AND REVENUE

- a) Property owners serviced with WESS that is within the boundaries of their property and where there is no connection to the municipal sewer system must not be billed for sewage disposal tariffs. However, sewage disposal fees are applicable for greywater disposal if no on-site greywater treatment system is installed.
- b) Property owners serviced with WESS that is within the boundaries of their property and where there is connection to the municipal sewer system as an emergency may be billed for availability charges related to sewage disposal tariffs but at a reduced rate as stipulated by the WSA.
- c) Property owners serviced with WESS that are connected to the municipal sewer system as an emergency are liable to pay the applicable sewage disposal fees.
- d) The municipality shall impose a fixed charge for monthly monitoring of every WESS to ensure regulatory compliance with relevant SANS product standards or irrigation limits.
- e) If the WESS is non-compliant, then it is the property owner's or body corporation's or supplier as per agreement will be responsible for any penalties, fines and remedial measures in terms of the by-laws for non-compliance and repair / replace the system as required.

Note to municipalities: *The municipality's budgeting, tariffing and other financial by-laws or processes must include:*

- *Funding mechanisms for sanitation projects and validation testing, including subsidies and cost recovery.*
- *Tariff structures and user fees.*
- *Financial incentives for adopting sustainable sanitation solutions.*
- *Billing processes such as for users or property owners serviced with water efficient sanitation systems separately from the sewage disposal tariffs.*

Fees can be charged according to licensing fees (service provider or owner of the product), monitoring fees (user for compliance) and penalties (if applicable). The WSA can decide on the bands for each category.

For new developments, fees can be costed based on value of the property.

3.11 PENALTIES, NON-COMPLIANCE AND ENFORCEMENT MANAGEMENT

Note to municipalities: *Include mechanisms to address non-compliance; penalties for violations, such as improper waste disposal or unauthorised installations, and failed systems.*

- a) The by-law serves as an agreement between the WSA and its customers and may form the basis for legal enforcement should any of the parties not comply with the requirements of the by-law.
- b) Non-compliance with this policy shall constitute an offense which will carry a penalty fine for WESS owners.

- c) Any person (user or owner of the WESS) who is convicted of an offence under this by-law shall be liable to a fine of an amount not exceeding XX or to imprisonment for a period not exceeding three years, or to both such fine and imprisonment.
- d) Failure to comply with the terms of this by-law or any terms of any condition or notice shall constitute a continuing offence and a person failing to comply with the terms of such condition or notice shall be guilty of a separate offence for each hour during which he or she fails to comply with such terms.
- e) If a system is found to be in disrepair, the WSA will have the right to implement repairs and maintenance and the WESS owner will be liable for the costs.
- f) The WSA will have the right to declare a site unsafe for use, in which case the owner will be liable for all costs associated to the decommissioning, and provision of alternative sanitation services.

- **User Responsibilities**

Ensuring standards and competency levels are met by service providers (such as plumbers and sampling and laboratory personnel) must be detailed in the by-law. Provisions for reporting system failures or health hazards must be covered.

- a) For maintenance activities to be undertaken by the property owner or user, then such activities must be trained to the user through a user manual or engagement with the user upon installation of the WESS. The maintenance and user manuals must be available at the property at all times.
- b) The WESS owner must supply monthly reports to the municipality with respect the WESS performance in terms of the Irrigation Limits (if reusing the treated effluent for irrigation on land up to 2 ML/d) or SANS 30500 (if recirculating the treated liquid for toilet flushing).

***Note to municipalities:** Municipalities need to make provision for a number of possible user groups. These would range from contexts where the facility is on private property and is owned operated and maintained by a private sector company or individual. At the other end of the spectrum would be a publicly-owned facility, built, owned, operated and maintained by the municipality or other public sphere. In between these two areas where the user responsibilities are clear, might be a range of possibilities such as where a municipality may contract a private company to establish such a facility on state or even privately-owned land such as in an informal settlement. In all of these contexts, the municipality would need to address the issues of who the users are who take responsibility for each step in the establishment, maintenance and renewal/upgrading of such a facility, including addressing establishment fees, servicing costs, tariffs, ongoing maintenance, monitoring and the like.*

3.12 PROCESSES AND PROCEDURES FOR APPLICATION

The following implementation guide is proposed for a WSA to define requirements for implementation, management, oversight and regulation of WESS.

3.12.1 Application to the WSA

In the process of seeking planning permission and / or approval in terms of the NBR from the WSA in the case of a proposed development involving / requiring the provision of WESS or in the case of the proposed installation of a WESS on an existing (developed) property, application must be made to the WSA for approval to install such a system.

Any approval that may be granted will be in writing and will be deemed to be subject to the conditions and minimum requirements detailed by the WSA plus any other requirements that may be imposed in instances where special circumstances exist as may be deemed necessary by the WSA.

If approved, the WSA will register the WESS and institute periodic inspection and sampling of the installed WESS for the purpose of effluent compliance auditing for which a charge will be levied in accordance with the WSA's tariff of charges, including a fine as may be determined by the WSA. (Any further cost incurred by the WSA, such as additional audits due to non-compliance, will be at the rate based on the full cost for the service rendered, as required in the "Polluter Pays" principle of the National Environmental Management Act).

The development, together with all future extensions and/or alterations and/or sub-divisions, will be subject to the limitations imposed by the approval issued and the relevant by-laws.

3.12.2 Information to be submitted by the Professional Engineer / Professional Engineering Technologist with the Application

3.12.2.1 Relating to the Developer and Professional Engineer / Professional Engineering Technologist:

- Name and address of the developer;
- Name, Address and professional registration number of professional engineer / professional engineering technologist;
- Confirmation that his / her appointment covers the design / selection and supervision of the installation, construction and commissioning of the WESS;
- Confirmation that the developer agrees to issue the financial guarantee.
- Confirmation that the professional engineer / professional engineering technologist has been contracted to provide an operation and maintenance service for the first five years of operation of the WESS; and
- Confirmation that the Management Rules of the Body Corporate in case of residential property, will incorporate a clause in this implementation guide, binding the Body Corporate for a service contract commitment not only for the first five years of operation but on an ongoing basis, for the life of the WESS.

3.12.2.2 Relating to the Proposed Development:

- Physical Address of property / subdivision;
- Property description and size (area);
- Number of dwelling units proposed on the site;
- Description of dwelling unit type(s);
- Details of any industrial or commercial undertakings;
- Anticipated daily quantity of blackwater that will be generated on the development site;
- Anticipated daily quantity of greywater that will be generated on the development site;
- Estimated maximum instantaneous peak rate of inflow to the WESS;
- Plans to be submitted showing:
 - Position of all buildings; and
 - Position of the WESS and end-use application of the treated liquid fraction.

3.12.2.3 Relating to the Proposed WESS:

- i. A clear description and / or illustration of the WESS, as well as descriptions / illustrations of the unit parts including design capacity;
 - ii. A clear and detailed specification of the WESS intended purpose, its range of use, limiting factors, and operational criteria, which should include; geographic or geological conditions under which it may function; full application / design specifications in terms of hydraulic loading, biological loading, sizing of the units for applied loads and installation conditions.
- Names and addresses of the manufacturers / suppliers of the main components of the WESS;
 - Estimated cost of design, supervision, installation, construction and commissioning of the WESS (the actual full cost is to be certified at time of commissioning);
 - Measures to be taken to provide for mechanical, electrical, operational or process failure and malfunction of the WESS including details of all back-up systems;
 - Measures to be taken to avoid or mitigate nuisance or complaint arising from the operation of the WESS and to ensure protection of public health and safety, including the proposed method of disposal of WESS by-products / waste materials (sludge, scum, membrane rejects);
 - Measures to be taken to educate the users in order to ensure the optimal operations of the WESS. Flushing of pads and other materials (such as newspapers, anal cleaning cloth or plant leaves) that block and damage rotating equipment must be avoided including biocidal materials such as detergents, unless otherwise accounted for in the WESS design and stated by the manufacturer.

3.13 CONCLUSION

South Africa's sanitation landscape is changing and the adoption of water efficient sanitation solutions (WESS) offers the opportunity to provide sustainable sanitation delivery while also promoting resource recovery. This framework is intended to assist municipalities with the managing such systems. However, this framework must undergo an extensive legal review to determine which sections can be translated into model by-laws.

3.14 SCHEDULES AND ANNEXURES

The by-law must reference compliance with existing legislative and municipal regulations and policies in the following areas:

- Spatial planning and land-use – Planning for proper land-use for these technologies.
- Sanitation Tariffs – A framework for fair and affordable sanitation tariffs. - Proposed mechanisms for subsidizing services for low-income communities and the provision of incentives (such as reduced sanitation charges) for middle to higher income communities/estates going off grid or who are adopting water efficient processes.
- Templates for licensing applications, permits, and compliance checklists.
- Emergency Procedures and Risk Mitigation - Outlined protocols for responding to sanitation-related emergencies. - Assessment of potential risks and proposed measures to mitigate them.
- Rental and Service agreements
- Detailed technical specifications and guidelines.

- References to relevant national and international standards.

3.15 REFERENCES¹¹

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¹¹ All relevant Acts and Regulations must be cited. These references are only limited to those cited in the text.

CHAPTER 4: CONCLUSIONS & RECOMMENDATIONS

4.1 CONCLUSIONS

- Water efficient sanitation solutions (WESS) are a dynamic shift in sanitation service delivery providing the ability to reduce the potable water demand for flushing and conveyance in sewer infrastructure.
- The 2025 Revised Compulsory National Water and Sanitation Services Norms and Standards mandates the inclusion of WESS by Water Services Authorities (WSAs) as a basic sanitation service however, adequate planning from a spatial point of view, budgeting and procurement as well as tariffing and revenue generation is required. This requires defined roles and responsibilities from each department.
- The framework for WESS by-laws, together with its suggestions on draft model by-laws is designed to allow for a stand-alone by-law or one where sections get inserted into existing by-laws. Importantly, it indicates that there are a wide range of issues, other than technical descriptions of WESS facilities that must be considered by municipalities in developing by-laws allowing for WESS.

4.2 RECOMMENDATIONS

- The complex set of powers and functions, roles and responsibilities of all actors must be clearly identified in the development of by-laws for WESS, particularly given the need for ongoing disposal of waste, management of facilities, monitoring and the like, including also issues which are indirectly required to support the implementation of WESS. For example, a road which is built for a potential sewer might not have the same requirements as a road built to cater for the removal of waste from a WESS. Whilst most responsibilities might rest with the local municipality (Category B) in cases where powers and functions are split, and where ancillary functions like environmental health, roads, stormwater and the like are not within that municipality, a separate set of by-law amendments may need to be developed to cover some aspects of the range of necessary WESS functions.
- Importantly, the institutional and financial arrangements of WESS, which relate to other municipal by-laws, must be fully considered given the impacts such systems would have on changing municipal institutional and financial arrangements.
- Given the importance of municipal institutional arrangements in the development of the complex range of possible WESS and other water and sanitation by-laws, care should be taken by national DWS and its allied organisations such as WRC, to ensure that there is a seamless fit between policy roles of national government and powers and functions of local governments in particular. This could entail developing guidance notes on how the range of monitoring and other functions could, in the case of WESS and other water and sanitation policy proposals, best be affected by provincial and national spheres given their monitoring and advisory roles.

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APPENDICES

Appendix A: Number and proportion of domestic consumers who do not receive sewerage sanitation across the Sanitation Service Providing municipalities, based on 2022 Non-Financial Census

Province	Category A/C	Water Service Provider	Non-sewer	%	
EC	Buffalo City Metro	Buffalo City Metro	83657	33.5	
	Sarah Baartman DM	Blue Crane Route LM	2495	22.8	
		Dr. Beyers Naude LM	4454	28.2	
		Kou-Kamma LM	1732	16.4	
		Kouga LM	15620	46.2	
		Makana LM	3003	13.4	
		Ndlambe LM	13708	49.1	
		Sunday's River Valley LM	3475	29.0	
	Chris Hani DM	Chris Hani DM	157726	69.8	
	Joe Gqabi DM	Joe Gqabi DM	71965	79.1	
	O.R. Tambo DM	O.R. Tambo DM	256424	81.5	
	Amathole DM	Amathole DM	228292	90.5	
	Alfred Nzo DM	Alfred Nzo DM	99750	80.3	
	Nelson Mandela Bay Metro	Nelson Mandela Bay Metro	6133	2.5	
	FS	Xhariep DM	Kopanong LM	115	0.8
			Letsemeng LM	3838	33.0
Mohokare LM			1170	9.8	
Lejweleputswa DM		Masilonyana LM	2101	12.0	
		Matjhabeng LM	800	0.6	
		Nala LM	3759	16.8	
		Tokologo LM	7016	75.0	
Thabo Mofutsanyane DM		Tswelopele LM	0	0.0	
		Dihlabeng LM	3423	9.6	
		Maluti-A-Phofung LM	83754	67.4	
		Mantsopa LM	512	3.0	
	Nketoana LM	3854	18.2		
	Phumelela LM	2806	22.1		

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Province	Category A/C	Water Service Provider	Non-sewer	%
		Setsoto LM	7394	31.8
	Fezile Dabi DM	Mafube LM	4516	18.1
		Metsimaholo LM	6500	14.4
		Moqhaka LM	2308	6.7
		Ngwathe LM	7584	16.8
	Mangaung Metro	Mangaung Metro	30594	11.3
GP	Sedibeng DM	Emfuleni LM	7526	2.9
		Lesedi LM	3864	8.8
		Midvaal LM	13829	36.3
	West Rand DM	Merafong City LM	28419	36.7
		Mogale City LM	7982	9.9
		Rand West LM	5018	7.5
	Ekurhuleni Metro	Ekurhuleni Metro	180704	18.1
	City of Johannesburg Metro	City of Johannesburg Metro	61924	5.7
	City of Tshwane Metro	City of Tshwane Metro	13633	2.2
KZN	Ugu DM	Ugu DM	97247	72.8
	uMgungundhlovu DM	uMgungundhlovu DM	69232	80.6
		Msunduzi LM	79248	47.9
	uThukela DM	uThukela DM	86551	64.6
	uMzinyathi DM	uMzinyathi DM	92733	89.1
	Amajuba DM	Amajuba DM	19154	77.0
		Newcastle LM	27074	30.4
	Zululand DM	Zululand DM	135223	81.7
		Abaqulusi LM	0	0.0
	uMkhanyakude DM	uMkhanyakude DM	114366	92.0
	King Cetshwayo DM	King Cetshwayo DM	102437	86.3
		uMhlathuze LM	46376	51.8
	iLembe DM	iLembe DM	118372	80.7
	Harry Gwala DM	Harry Gwala DM	107538	87.4
	eThekwin Metro	eThekwin Metro	378681	43.9
LIM	Mopani DM	Mopani DM	200237	77.8

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Province	Category A/C	Water Service Provider	Non-sewer	%
	Vhembe DM	Vhembe DM	76929	55.7
	Capricorn DM	Capricorn DM	82941	87.7
		Polokwane LM	95181	53.8
	Waterberg DM	Bela-Bela LM	4784	20.5
		Lephalale LM	10382	37.2
		Modimolle-Mookgopong LM	2245	8.5
		Mogalakwena LM	17050	39.5
		Thabazimbi LM	1537	4.5
	Greater Sekhukhune DM	Greater Sekhukhune DM	240461	88.1
MP	Gert Sibande DM	Albert Luthuli LM	41194	79.3
		Dipaleseng LM	1215	8.7
		Dr. Pixley Ka Isaka Seme LM	7099	31.5
		Govan Mbeki LM	10028	8.9
		Lekwa LM	5255	15.1
		Mkhondo LM	16480	44.3
		Msukaligwa LM	926	2.4
	Nkangala DM	Dr JS Moroka LM	53625	83.9
		Emakhazeni LM	1138	10.1
		Emalahleni LM	36233	25.9
		Steve Tshwete LM	12564	16.7
		Thembisile LM	67209	94.3
		Victor Khanye LM	3465	14.2
	Ehlanzeni DM	Bushbuckridge LM	127601	94.6
		City of Mbombela LM	147940	71.6
		Nkomazi LM	94241	92.4
		Thaba Chweu LM	10312	32.5
NC	ZF Mgcawu DM	!Kheis LM	3561	67.1
		Dawid Kruiper LM	6696	25.2
		Kai !Garib LM	1038	20.3
		Kgatelopele LM	1852	30.5
		Tsantsabane LM	4146	30.0

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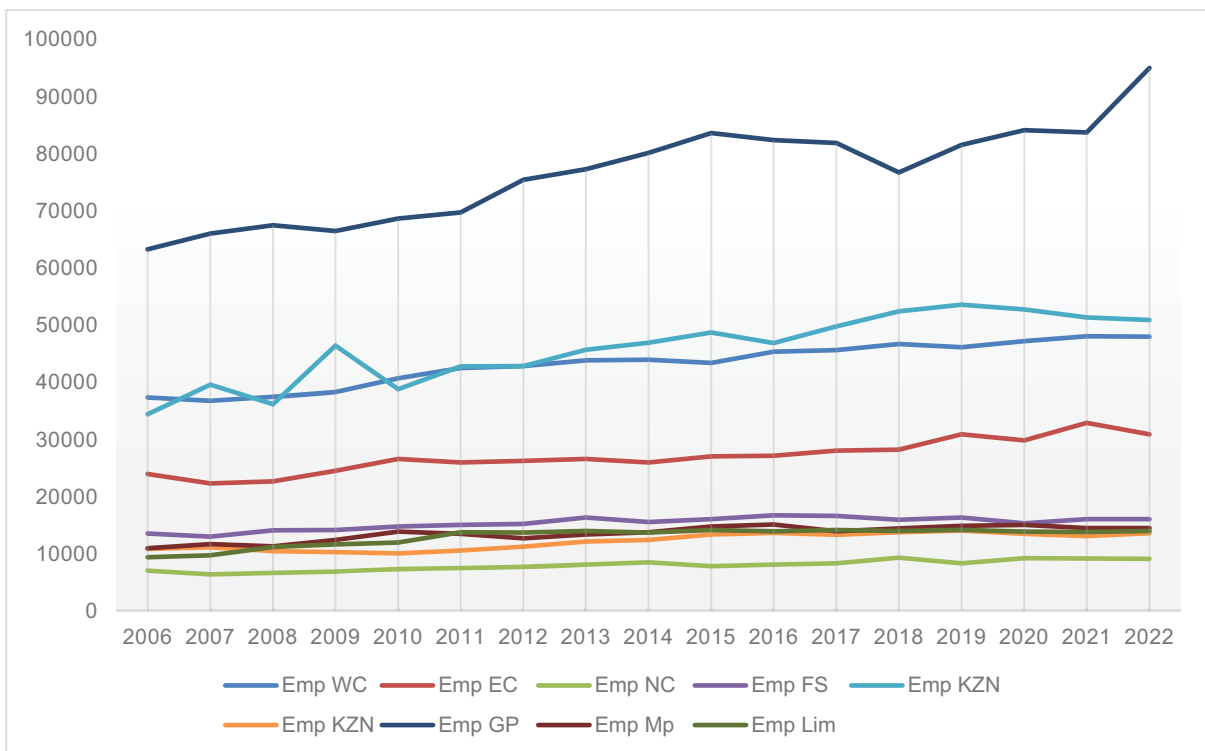
Province	Category A/C	Water Service Provider	Non-sewer	%
	John Taolo Gaetsewe DM	Ga-Segonyana LM	12635	57.8
		Gamagara LM	3377	18.5
		Joe Morolong LM	19042	90.9
	Namakwa DM	Hantam LM	3074	65.0
		Kamiesberg LM	1917	61.0
		Karoo Hoogland LM	1493	64.7
		Khâi-Ma LM	1956	82.9
		Nama Khoi LM	4680	38.0
		Richtersveld LM	1294	31.6
	Pixley Ka Seme DM	Emthanjeni LM	611	7.2
		Kareeberg LM	1192	48.5
		Renosterberg LM	180	6.1
		Siyancuma LM	1793	19.9
		Siyathemba LM	873	21.5
		Thembelihle LM	1450	39.2
		Ubuntu LM	627	19.6
		Umsobomvu LM	130	1.6
	Frances Baard DM	Dikgatlong LM	10580	79.5
		Magareng LM	2563	40.1
		Phokwane LM	5432	27.9
		Sol Plaatjie LM	1978	2.8
NW	Bojanala Platinum DM	Kgetlengrivier LM	5093	28.3
		Madibeng LM	82505	64.1
		Moretele LM	51987	95.1
		Moses Kotane LM	21445	75.8
		Rustenburg LM	92524	31.6
	Ngaka Modiri Molema DM	Ditsobotla LM	21328	54.8
		Mahikeng LM	0	0.0
		Ramotshere Moiloa LM	3425	21.6
		Ratlou LM	23097	100.0
		Tswaing LM	2390	15.6

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Province	Category A/C	Water Service Provider	Non-sewer	%
	Dr Ruth Segomotsi Mompati DM	Greater Taung LM	5746	93.2
		Kagisano-Molopo LM	0	#DIV/0!
		Lekwa-Teemane LM	2412	13.1
		Mamusa LM	5107	33.7
		Naledi LM	3384	20.5
	Dr Kenneth Kaunda DM	City of Matlosana LM	18308	9.9
		JB Marks LM	13754	19.3
		Maquassi Hills LM	2817	12.6
WC	City of Cape Town Metro	City of Cape Town Metro	48048	6.9
	West Coast DM	Bergrivier LM	2148	21.7
		Cederberg LM	886	14.9
		Matzikama LM	4377	26.4
		Saldanha Bay LM	1320	3.9
		Swartland LM	1635	7.1
	Cape Winelands DM	Breede Valley LM	935	4.0
		Drakenstein LM	10231	13.4
		Langeberg LM	295	1.9
		Stellenbosch LM	1263	2.7
		Witzenberg LM	6115	31.7
	Overberg DM	Cape Agulhas LM	3856	36.4
		Overstrand LM	0	0.0
		Swellendam LM	475	7.2
		Theewaterskloof LM	1036	6.6
	Garden Route DM	Bitou LM	2237	9.8
		George LM	7789	11.3
		Hessequa LM	0	0.0
		Kannaland LM	235	5.2
		Knysna LM	6239	22.3
		Mossel Bay LM	8691	22.2
		Oudtshoorn LM	1454	8.8
	Central Karoo DM	Beaufort West LM	1954	13.6

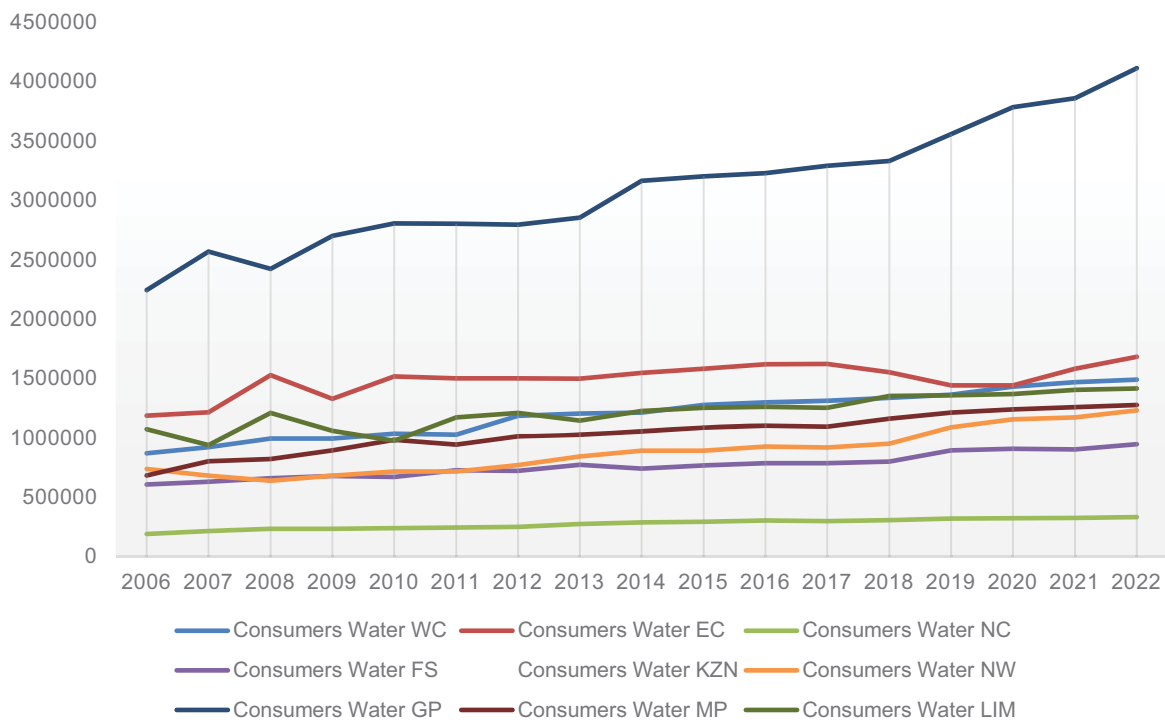
Province	Category A/C	Water Service Provider	Non-sewer	%
		Laingsburg LM	68	4.7
		Prince Albert LM	536	19.6
			4847196	37.4

Appendix B-G illustrates the provincial breakdowns of non-Financial census information relating to municipalities in South Africa: 2022

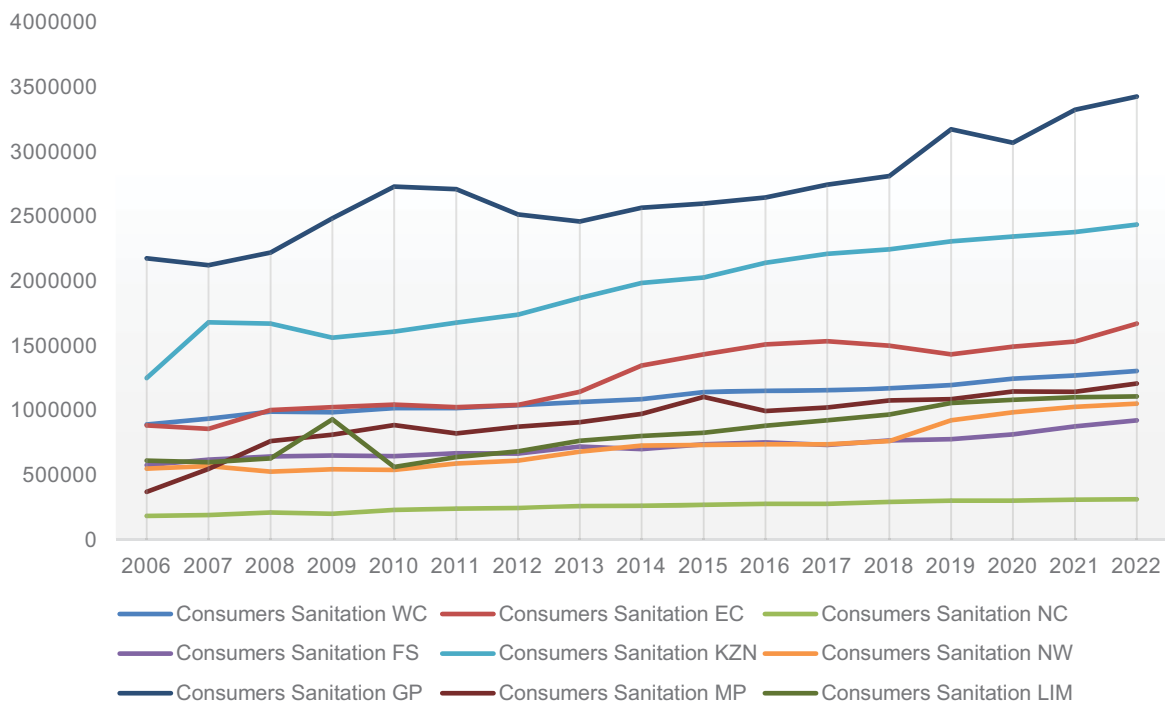


Appendix B: Municipal employment by Province

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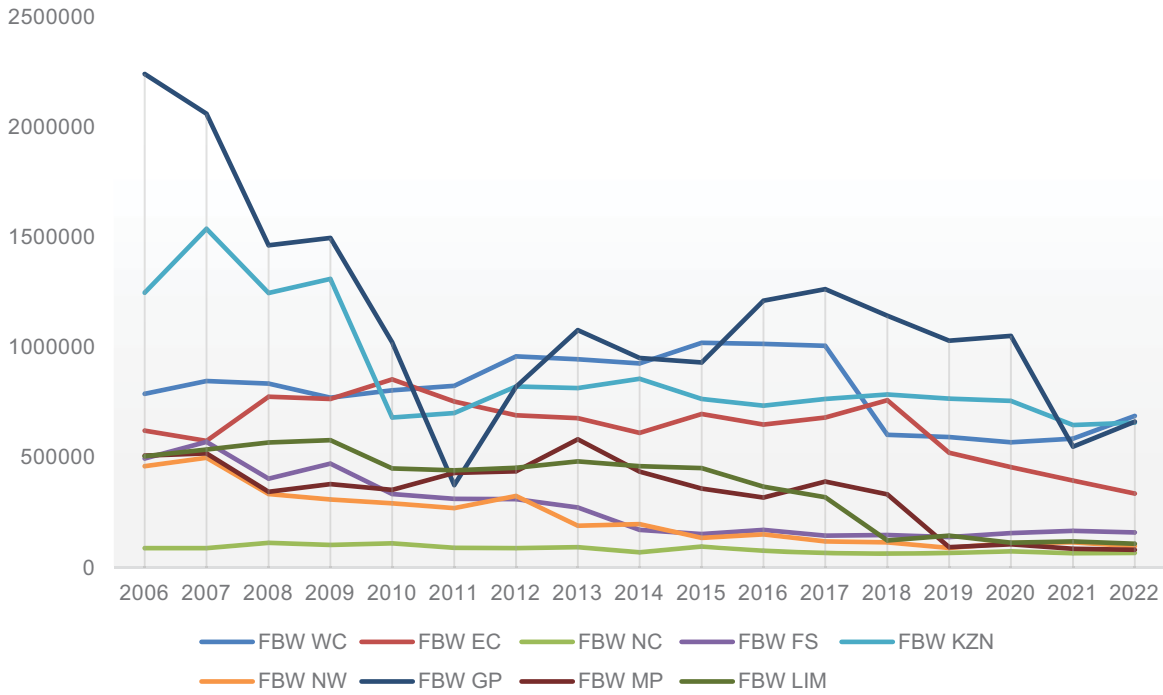


Appendix C: Total Water consumers by province

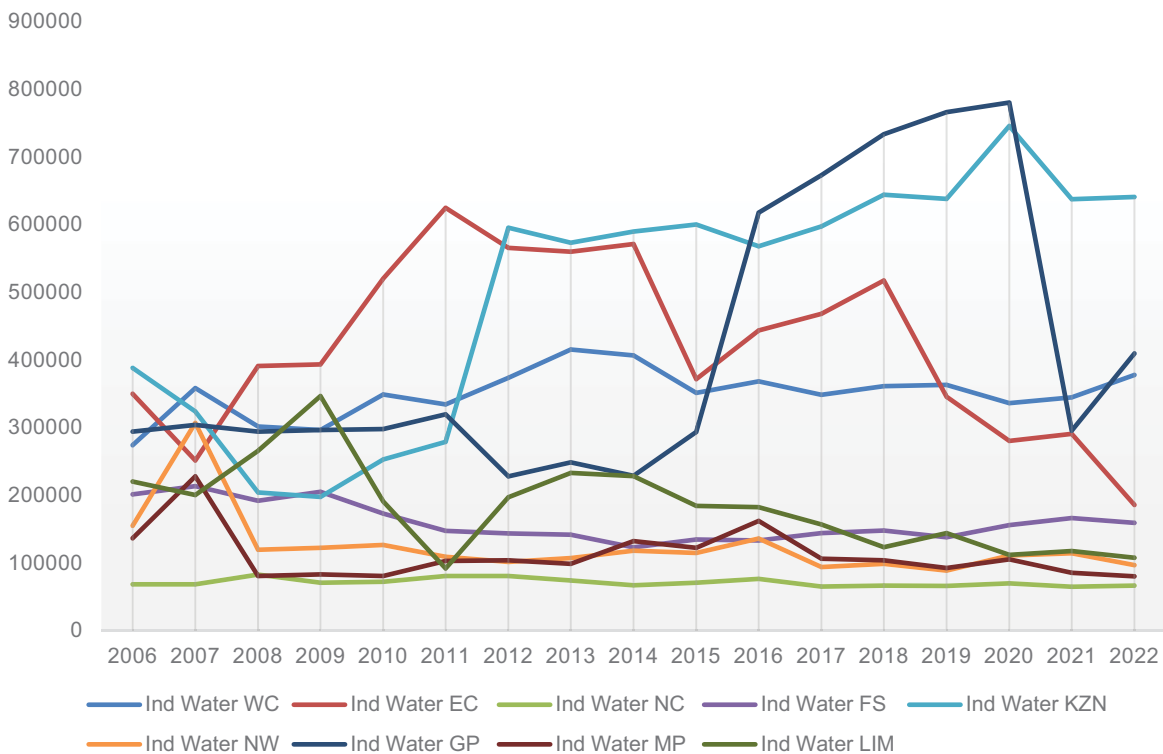


Appendix D: Total Sanitation consumers by provinces

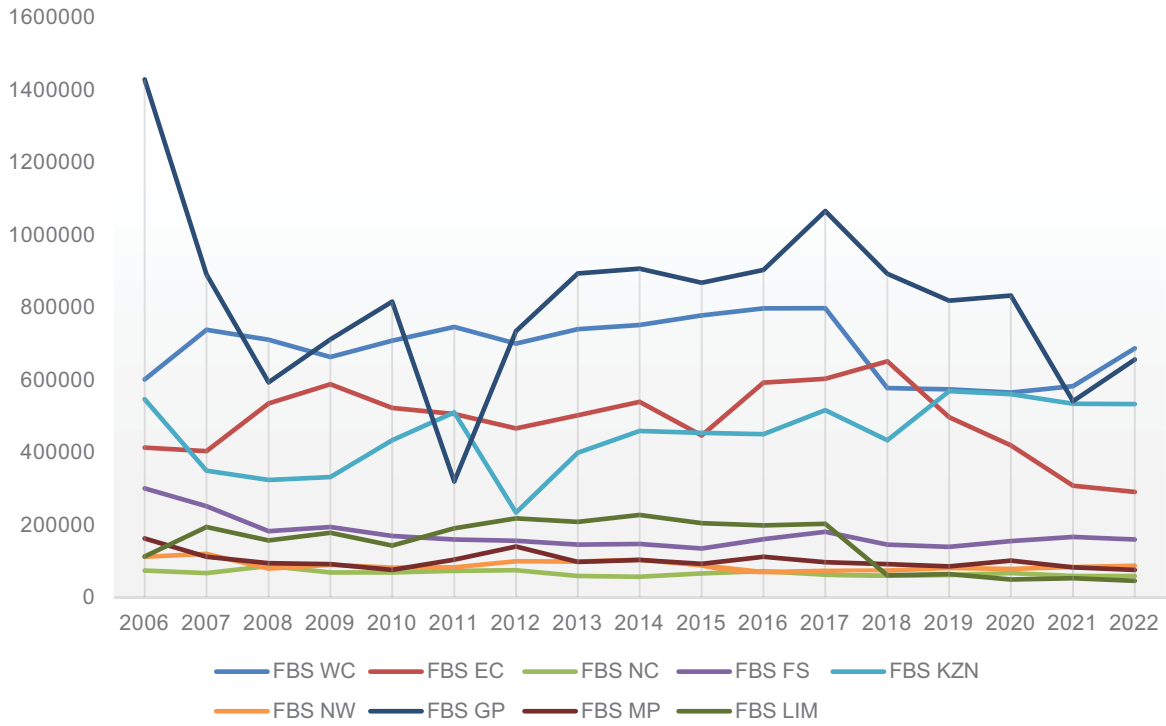
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Appendix E: Trends in consumers receiving Free Basic Water (FBW) across all municipalities: 2006-2022



Appendix F: Trends in Indigent consumers receiving Free Water across all municipalities: 2006-2022



Appendix G: Trends in consumers receiving Free Basic Sanitation across all municipalities: 2006-2022

