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Teslim Mohammed Yusuf
Executive - Planning,
Monitoring and
Evaluation, EWSETA

INDUSTRY INSIGHT

EWSETA upskills water professionals to drive compliance

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Our water security status: from the horse's mouth (aka Dr Sean Philips)



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Supporting water security in South Africa's urban areas



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Thorne Zurfluh Engineering manager, APE Pumps & Mather+Platt

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Water is the lifeblood of any major city, but ensuring a stable supply has become an escalating challenge for South Africa's urban centres. Aging infrastructure, rapid population growth, and the intensifying impacts of climate change – including prolonged droughts and extreme rainfall – are placing immense pressure on already fragile water systems. **P6**

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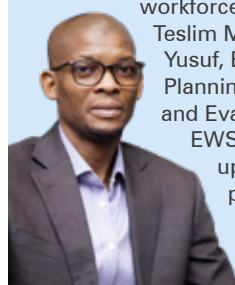


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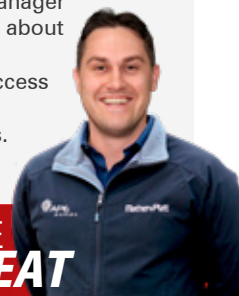
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INDUSTRY INSIGHT

In an era where water security is increasingly at risk, ensuring that South Africa's water sector operates with a skilled, accountable workforce is paramount. Teslim Mohammed Yusuf, Executive for Planning, Monitoring and Evaluation at EWSETA, discusses upskilling water professionals to ensure compliance. **P14**



Over the past five years, APE Pumps has quadrupled its turnover through organic growth. **WASA** speaks with engineering manager Thorne Zurfluh about the company's remarkable success and emerging industry trends. **P10**



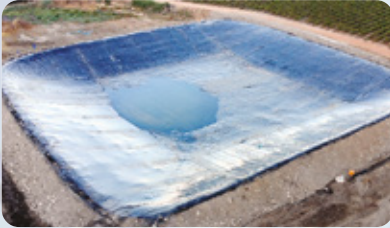
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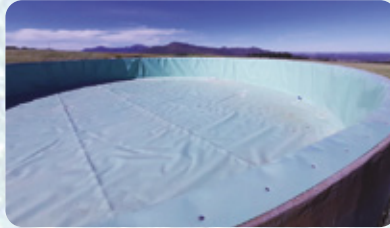
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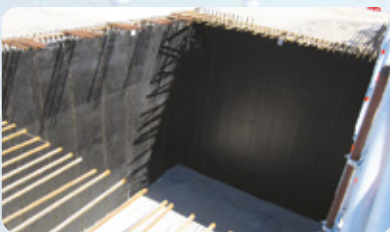
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COLLABORATION EVAPORATES DURING OUR VERY OWN WATER WAR AT THE INDABA

Last month's Water and Sanitation Indaba raised questions over whether municipalities, national government, and water boards can truly align and work together to effectively address the country's water and sanitation challenges.

Press releases from the South African Government Association (SALGA), the Department of Water and Sanitation (DWS) and the Association of Water and Sanitation Institutions of South Africa (AWSISA) started to fly into my inbox.

SALGA took umbrage with DWS's commitment to prosecuting non complaint municipalities, AWSISA wanted to clarify that water boards do not set tariffs without oversight.

It all began when SALGA's president – Bheki Stofile – made some the following comments:

- The majority of municipalities simply do not have the finances to provide basic services. 60% of the 257 municipalities in the country are bankrupt and insolvent.
- Theft, vandalism and the construction mafia have a dire impact on municipalities' ability to provide services and they do not have the muscle to fight organised crime.
- Municipalities cannot afford the water tariffs issued by water boards that are above inflation.
- Section 63 interventions from the Department of Water and Sanitation (DWS) have negative impacts on municipalities.
- Government must avoid criminalising municipalities, and instead, pursue joint solutions that address systemic service delivery challenges.

DWS Minister Pemmy Majodina replied in her speech at the Indaba: "We are not here to blame municipalities, but the fact is that the buck stops with you. You have grants (national government is transferring over R60 billion per year in grants to municipalities for water and sanitation services). There are projects that have been in the pipeline for nearly 20 years. This is unacceptable. We will continue to institute legal action against municipalities who pollute our rivers and do not cooperate with the DWS."

SALGA then sent through a strong worded press release stating: "The Minister's endorsement of punitive legal action against municipalities not only undermines collaborative problem-solving but also threatens to drain public resources, delay service delivery, and discourage skilled professionals from entering the local government sector."

Another comment was made about water boards: "Whose operational inefficiencies and unilateral tariff setting continue to erode municipal sustainability. Water boards often operate with limited oversight, yet their decisions have direct financial and reputational consequences for municipalities, which are ultimately held accountable by the public."

AWSISA fought back with their own press release stating: "It is inaccurate to suggest that water boards set their tariffs without oversight. Water boards follow a rigorous consultation process with SALGA, municipalities, and other customers in their areas of operation. These consultations are documented and recorded, proving the transparent process followed in proposing any tariff increases. Furthermore, water boards also consult with the National Treasury and the DWS before finalising tariffs, with DWS being the final arbiter."

AWSISA then added: "It is deceitful for SALGA to blame water boards for municipalities' failures. Water boards have consistently offered to collaborate with municipalities to resolve the country's water and sanitation challenges. However, SALGA's defensive stance has led it to ignore this offer of cooperation."

If only water balances, revenue collection and leaks were as easy to solve as writing press releases. ●

Kirsten



COVER OPPORTUNITY

In each issue, **Water & Sanitation Africa** offers companies the opportunity to get to the front of the line by placing a company, product or service on the front cover of the magazine. Buying this position will afford the advertiser the cover story and maximum exposure. For more information, contact Sindi Moni on +27 (0)82 212 4574, or email sindi@infrastructurenews.co.za.



You said it in WASA

The opinions and statements shared by thought leaders in the water industry to **Water&Sanitation Africa**.



"This regulation marks a transformative shift in professionalising the water workforce. No longer are operators seen as low-skilled workers; instead, they are now required to meet formal education and registration standards, much like engineers and scientists. This elevates water sector roles into recognised career paths, ensuring greater accountability, improved service quality, and enhanced public safety." **Teslim Mohammed Yusuf: Executive - Planning, Monitoring and Evaluation, EWSETA**

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"We play an important role in helping our customers run an efficient system and therefore assist them in selecting the best pump. Oversized pumps often operate inefficiently at partial load.

Correct sizing ensures the pump runs near its best efficiency point (BEP). Instead of running at a constant speed, variable speed drives (VSDs) adjust the pump speed to match the actual demand, significantly reducing energy use, especially in systems with fluctuating loads. Additionally, if a system runs on multiple pumps (for example three pumps), it is possible to save energy costs by switching off the third pump and allowing the system to run on two pumps during low demand periods." **Thorne Zurfluh, engineering manager, APE Pumps**

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"Let us be real: compliance sometimes gets a bad rap as being all about red tape. But at its best, it is about creating structures that serve people and the planet. Regulation 3630 proves that, especially in the water sector. By raising the standards, empowering professionals, and fostering accountability, it is setting the stage for a cleaner, safer, and more sustainable future. So, the next time you turn on your tap, think about the efforts behind that simple act—and the regulations that make it possible. Compliance might not always be visible, but its impact is everywhere." **Dr Lester Goldman, CEO, WISA**

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"Frankly, I don't care who owns the pipes or treatment plants as long as they deliver water on accessible and pragmatically affordable terms, bearing in mind that water safe for consumption typically has a cost. I'm tired of promises that stretch years into the future while my country thirsts today. I'm tired of hearing about "infrastructure challenges" when a simple, modular solution could bring immediate relief. Look, I understand municipalities are under immense pressure. They deal with old systems, tight budgets, and a growing population. But sometimes, I feel like they're building castles in the sky while their feet are sinking in mud." **Billy James, managing executive, NuWater**

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"A national average non-revenue water percentage of 47.4% means that, on average, municipalities do not obtain any revenue from almost half the treated water that they have to pay to produce or that they have to buy from the water boards, which in turns mean, firstly, a large portion of the money spent on developing water resource infrastructure is wasted. Secondly, it means that municipalities do not have sufficient funds to operate and maintain their water services, and thirdly, that municipalities are not able to pay the water boards for the treated water supplied by them." **Dr Sean Phillips, director-general, Department of Water and Sanitation (DWS)**

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"Turning focus to spatial planning and developments, the increasing demand for inner city accommodation because of migration of people to urban areas requires the planning of serviced human settlements in appropriate areas. Engineers need to be involved or at least contribute towards these developments. There is no denying the effect of failure of many municipal governments to maintain and enhance their infrastructure, in the face of increasing demand by growing inner city populations." **Wynand Dreyer, chair of the SAICE Advocacy Committee**

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“Before partnering with Dynamic Fluid Control, we encountered challenges related to air accumulation in pipelines – leading to inefficiencies, pressure fluctuations, and increased strain on critical infrastructure. Traditional air valves required frequent maintenance and were prone to premature failure, causing operational disruptions. The RGXII Air Valves addressed these issues through incorporating a self-cleaning mechanism, corrosion-resistant materials, and superior sealing capabilities.” **Kimolin Venkatasen, maintenance manager, Siza Water**

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“The use of recycled material from external sources in pressure pipe systems is strictly prohibited for a reason. It drastically compromises the performance and lifespan of the pipe, and when used for potable water, it could have serious health implications. Our industry cannot afford to cut corners for the sake of cost-saving. The long-term risks and financial consequences are simply too high.” **Jan Venter, CEO, SAPPMA**

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“As South Africa continues to face growing water scarcity, the mining sector’s evolving approach to water stewardship offers valuable insights for industries and municipalities alike. From embracing circular economy principles and advanced technologies to navigating complex legislation and prioritizing environmental responsibility, mines are proving that sustainable water management is both possible and essential.” **Steve Bartels, partner, SRK Consulting**

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“The upfront cost of water reuse is more expensive than simply using municipal water. However, water reuse provides valuable water security, safeguarding a business’ operations against intermittent water supply. Downtime due to water shortages can halt production processes, lead to lost revenue, unfulfilled orders, and increased operational costs.” **Wayne Taljaard, MD, WEC Projects**

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“Deep groundwater has re-emerged not just as a subject of scientific interest, but as a potential game changer in addressing water security, climate, and energy challenges. Globally, new frameworks are reshaping how we understand the water cycle, particularly the vast, ancient groundwater systems lying beneath the Earth’s surface.” **Yazeed van Wyk, research manager, WRC**

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“Despite President Ramaphosa requiring water use licenses be processed within 90 days, the reality remains that it takes years for some water use licenses to be administered. During the Cape Town drought of 2015 to 2019 it took an average of 792 days to obtain licenses for 56 groundwater schemes implemented to keep critical facilities (mostly hospitals and clinics) functional in the Day Zero scenario. One license remained outstanding for 1 256 days i.e., 3.5 years. And this was despite most of the water use being small (thus having insignificant impact, if any), having made special provisions with the authorities to fast-track the applications and the impending arrival of Day Zero.” **Dr Roger Parsons, a groundwater consultant**

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“Water boards successfully supplying SANS 241-compliant water hold little value if many municipalities struggle to reticulate that water effectively to communities. We are not pointing fingers, we believe that water boards and municipalities should work together. Water boards have the skills and experience to provide assistance. The primary goal of AWSISA is to ensure that all communities, no matter where they are located, receive water. We want to help municipalities improve their No Drop, Green Drop and Blue Drop scores that will ultimately improve water provision to communities. AWSISA can provide an advisory role to the sector on all matters from an IWRM perspective and support municipalities in water services provision.” **Dr Nndweleni Mphephu, director at AWSISA**

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VEGA

Supporting water security in South Africa's urban areas

Securing stable water supply is important for any major city



Water is the lifeblood of any major city, but ensuring a stable supply has become an escalating challenge for South Africa's urban centres. Aging infrastructure, rapid population growth, and the intensifying impacts of climate change – including prolonged droughts and extreme rainfall – are placing immense pressure on already fragile water systems.

Johannesburg is the largest city in the world that is not situated near a significant source of water. It therefore relies on an extensive network of reservoirs, pump stations, and pipelines to meet its water needs. Unfortunately, recent years have seen frequent supply disruptions due to aging infrastructure and power failures affecting pump stations. Durban, a coastal city with high rainfall variability, faces challenges from both droughts and floods. Severe storms overwhelm wastewater treatment plants, while dry spells reduce dam levels, forcing water restrictions. In East London, aging pipelines lead to frequent leaks and bursts, resulting in significant water losses before the supply even reaches consumers. Meanwhile, Cape Town, which narrowly avoided "Day Zero" in 2018, continues to walk a tightrope between supply and demand, with desalination, aquifer extraction, and water reuse initiatives helping to supplement the strained system.

In each of these cities, the need for real-time monitoring and precise control over water distribution has never been more critical. VEGA's range of pressure sensors and level instruments play a significant role in

ensuring that water systems operate efficiently, reducing losses and maintaining stable pressure levels to prevent service interruptions.

How pressure management can help major cities

In the pump rooms that regulate drinking water supply, maintaining optimal pressure is essential. Too little pressure and entire suburbs may go without water; too much, and pipes can burst, leading to expensive repairs and further disruptions. The VEGABAR 38 is a durable pressure sensor that ensures that pump stations operate at the correct pressure levels by providing continuous monitoring and early warning of any anomalies. Alongside it, the VEGAPOINT 23 acts as a reliable point-level sensor, detecting whether pumps are running dry, which can lead to damage and unplanned outages. By integrating these instruments, municipalities can ensure that water is delivered at constant pressure, preventing outages, shortages, and infrastructure failures.

Water towers, a familiar sight, especially in Johannesburg, serve as vital buffer storage to maintain a steady supply, especially during peak usage times.



The VEGABAR 38 is a durable pressure sensor that ensures that pump stations operate at the correct pressure levels by providing continuous monitoring and early warning of any anomalies

VEGA offers a broad range of pressure sensor technology that can be used to better water supply systems for major cities



These towers must be carefully managed to prevent overflow and ensure that sufficient reserves are always available. The VEGABAR 82, a high-precision pressure sensor, provides real-time measurement of water levels within the tower, allowing for automatic adjustments to maintain an optimal balance between supply and demand.

The VEGADIS 81, a remote display unit, enables operators to monitor tower levels

from a centralised control room, reducing the need for manual inspections and allowing for rapid response to fluctuations. This level of automation is particularly beneficial in cities like Cape Town, where water conservation remains a priority, and in Johannesburg, where high consumption rates require careful management to prevent shortages.

In the extensive network of pipelines that transport drinking water across

cities, pressure fluctuations can lead to significant losses and structural damage. Old pipes, particularly in cities like East London and Johannesburg, are prone to bursting under excessive pressure, leading to costly repairs and supply disruptions.

The VEGABAR 30 pressure sensor provides continuous monitoring along key pipeline sections, detecting pressure variations before they escalate into full-blown failures. The VEGAPOINT 21 complements this by serving as an overflow detection system, preventing excessive pressure buildup, and ensuring that water distribution remains smooth and efficient. By leveraging this technology, municipalities can reduce water losses, extend the lifespan of infrastructure, and ensure a reliable supply to residents and businesses.

The importance of a secure water and sanitation system cannot be overstated. Without a stable supply, economic activity slows, public health is jeopardised, and service delivery protests become more frequent. South Africa's metros are standing at a junction where investment in smart monitoring and automation is no longer optional—it is a necessity. By implementing advanced measurement and control solutions such as those provided by VEGA, cities can take proactive steps toward water security, ensuring that millions of residents have access to clean, safe water, both now and in the future. ●

Aging infrastructure is a problem for South Africa's water security



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RAISING THE BAR:

EWSETA UPSKILLS WATER PROFESSIONALS TO DRIVE COMPLIANCE

In an era where water security is increasingly at risk, ensuring that South Africa's water sector operates with a skilled, accountable workforce is paramount. **By Teslim Mohammed Yusuf: Executive - Planning, Monitoring and Evaluation, EWSETA**

The implementation of Regulation 3630, introduced by the Department of Water and Sanitation (DWS) in June 2023, underscores this priority by mandating that all South African water and wastewater treatment works be overseen by qualified and registered process controllers by June 2025.

This regulation marks a transformative shift in professionalising the water workforce. No longer are operators seen as low-skilled workers; instead, they are

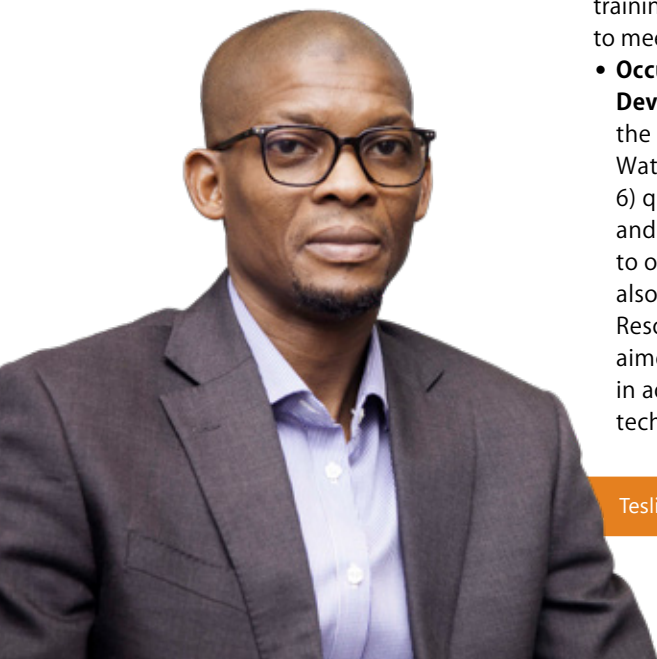
now required to meet formal education and registration standards, much like engineers and scientists. This elevates water sector roles into recognised career paths, ensuring greater accountability, improved service quality, and enhanced public safety.

As the Energy and Water Sector Education and Training Authority (EWSETA), we are playing a pivotal role in ensuring the sector's smooth transition to compliance by developing qualifications, facilitating targeted training, and upskilling existing workers to meet Regulation 3630's requirements.

• **Occupational Qualification Development:** EWSETA facilitated the creation and registration of the Water Works Management (NQF Level 6) qualification to equip supervisors and managers with the skills needed to oversee treatment plants. We are also developing an NQF Level 8 Water Resource Management programme, aimed at training senior professionals in advanced water management techniques.

• **Accredited Training Providers:** EWSETA encourages and facilitates QCTO-accredited training providers nationwide to deliver essential qualifications for water and wastewater treatment operators, Process Controllers, and technicians. This ensures that quality standards are met and that workers are properly prepared to comply with Regulation 3630. This will encourage continuous professional development through occupational skills programme and credit bearing short learning programme for the 30 credits requirements.

• **Recognition of Prior Learning (RPL):** Recognising that many experienced water sector employees lack formal qualifications, EWSETA supports RPL pathways that validate industry experience. By partnering with the Water Institute of Southern Africa (WISA) – the custodian of the Process Controller designation – we are ensuring seasoned operators can achieve professional registration without starting from scratch.



Teslim Mohammed Yusuf: Executive - Planning, Monitoring and Evaluation, EWSETA

These initiatives ensure that current and aspiring water professionals are equipped to meet Regulation 3630's standards while fostering a culture of excellence in water services.

Why professionalising the water workforce is crucial

The impact of Regulation 3630 will be transformative for South Africa's water sector. By professionalising water roles, the regulation directly enhances:

- **Water quality and safety:** With qualified professionals managing water treatment facilities, there is a reduced risk of errors that compromise drinking water quality or wastewater treatment standards.
- **Service delivery:** Trained Process Controllers bring expertise to ensure efficient plant operation, minimising costly disruptions and improving response times to infrastructure challenges.
- **Compliance and accountability:** Registered professionals adhere to industry standards and codes of conduct, ensuring greater transparency and responsibility in water operations.

EWSETA's contribution to professionalising the sector also aligns with national goals such as the Blue Drop (drinking water quality) and Green Drop (wastewater quality) certification programmes, which measure municipal performance and compliance with strict water standards. By supplying a skilled workforce, EWSETA directly enables municipalities to achieve higher scores in these critical assessments.

Water utilities and municipalities must urgently act to professionalise their personnel. EWSETA encourages employers to:

- Conduct skills audits to assess employee qualifications and identify gaps.
- Enrol employees in accredited training programmes or access RPL opportunities to ensure experienced staff meets certification requirements.
- Partner with EWSETA to tailor training initiatives that align with municipal needs and support long-term compliance.

For existing water professionals, this transition presents an opportunity to gain industry-recognised credentials, pursue career growth, and contribute to building a safer, more reliable water supply for all South Africans. ●

ABOUT EWSETA

Energy and Water Sector Education and Training Authority (EWSETA) is a skills development authority serving the energy and water sectors. It is one of 21 Sector Education and Training Authorities (SETAs) established in South Africa in terms of the Skills Development Act of 1998 – amended. It plays a crucial function in ensuring that the National Skills and Development Strategy is executed within the energy and water sectors.

The mission of EWSETA is: comprehensive research and a sound understanding of the skills demand and supply forces in its sector; coordinating, facilitating and providing quality assurance for sector relevant skills development programmes for its stakeholders, aligned with stated national skills development priorities; and establishing a sector skills pipeline with a positive impact on government's economic growth policies, employment creation and the eradication of poverty.

EWSETA's responsibility is to manage skills development through strategic sector skills planning within the framework of the National Skills Development Strategy III. This includes developing a sector skills plan and implementing the sector skills plan by: establishing learning programmes; approving Workplace Skills Plans and the Annual Training Report; allocating grants to employers, education and training, providers, and workers; monitoring education and training in the sector; registering learning programme agreements; and promoting learnerships and other training programmes.

The role of EWSETA also includes facilitating the creation of learnerships with employers in the sector via the following: finding workplaces where learners can do practical work; supporting people who create learning material; helping to wrap up learnership agreements; and registering learnership agreements.



Creating a Sustainable Tomorrow – Today

www.ewseta.org.za

DRIVEN BY EXPERIENCE, POWERED BY INNOVATION: OVER 70 YEARS OF PUMP EXPERTISE

Over the past five years, APE Pumps' organic growth in terms of turnover has quadrupled. **Kirsten Kelly** talks to Thorne Zurfluh (TZ), engineering manager at APE Pumps about the company's unprecedented growth and trends in the industry.



Founded in 1952, APE Pumps has been designing, developing, manufacturing and refurbishing pumps for over seven decades. Have you witnessed any major shifts in the pump industry?

TZ: Over recent years, we have seen a greater focus placed on energy efficient pumps. As electricity prices continue to rise, industries are under pressure to reduce their energy consumption to stay competitive.

We play an important role in helping our customers run an efficient system and therefore assist them in selecting the best pump. Oversized pumps often operate inefficiently at partial load. Correct sizing ensures the pump runs near its best efficiency point (BEP). Instead of running at a constant speed, variable speed drives (VSDs) adjust the pump speed to match the actual demand, significantly reducing energy use, especially in systems with fluctuating loads. Additionally, if a system runs on multiple pumps (for example three pumps), it is possible to save energy costs by switching off the third pump and allowing the system to run on two pumps during low demand periods.

Maintenance obviously also plays a huge role in

keeping pumps efficient. Worn components like seals, bearings, or impellers can drastically drop efficiency if not maintained. Clients provide APE with old pumps to bring to OEM specifications. We help clients with their service and maintenance cycles, advising them on when their pumps need to be maintained or taken out of service for an overhaul.

Some of our customers ask for regular condition monitoring, where we visit a client to test for the efficiency of pumps and do a vibration analysis as well as monitor temperature, energy efficiency, temperature, pressure and flow.

Another major trend is the rise of remote monitoring systems for pumps. By using IoT-enabled sensors and cloud platform, operators can continuously track pump performance, detect inefficiencies, and identify potential failures before they occur.

Following the April 2022 floods, APE Pumps was able to confirm via its remote monitoring system that pumps at a waterworks in Durban were still operating and were not damaged by the floods. They were able to disprove the need for another contractor to repair those pumps at a cost in excess of R10 million.

From an APE perspective, are there any other changes that you have been implementing to better suit your customers' needs?

It can take in excess of 12 weeks to fix and maintain very large pumps. We have been

working hard to decrease that turnaround time. As a South African OEM, APE is not dependent on imports from overseas territories. Every pump component needed is made at our factory in South Africa. This creates quicker turnaround times for delivery, guaranteed quality and better customer service.

We have also found that improving workflow can make a significant impact in terms of turnaround time. APE Pumps has purchased a process scanner that can track the movement of all incoming and outgoing parts within their factory. This is done to improve efficiencies, identify potential bottle necks and to give customers up to date information on the status of their new pump or repair.

In some of our service level agreements, APE can keep stock of brand-new units for a client so that we can implement a service exchange. The client will provide APE with an old pump to bring to OEM specifications and APE will give the client the new pump. Many companies are no longer keeping critical spares in stock, so we do this for them.

APE Pumps has also made significant technological investments to reduce outsourcing any part of the manufacturing process, thereby improving quality and turnaround time. These include:

- A centre lathe equipped to handle jobs ranging in lengths of up to 8 m and in varying diameters for components such as columns, shafts, and impellers (specifically for circulating water pumps)
- A key slotter for keyway cutting (a drive system feature on one of the group's



Thorne Zurfluh, a mechanical engineer at APE Pumps

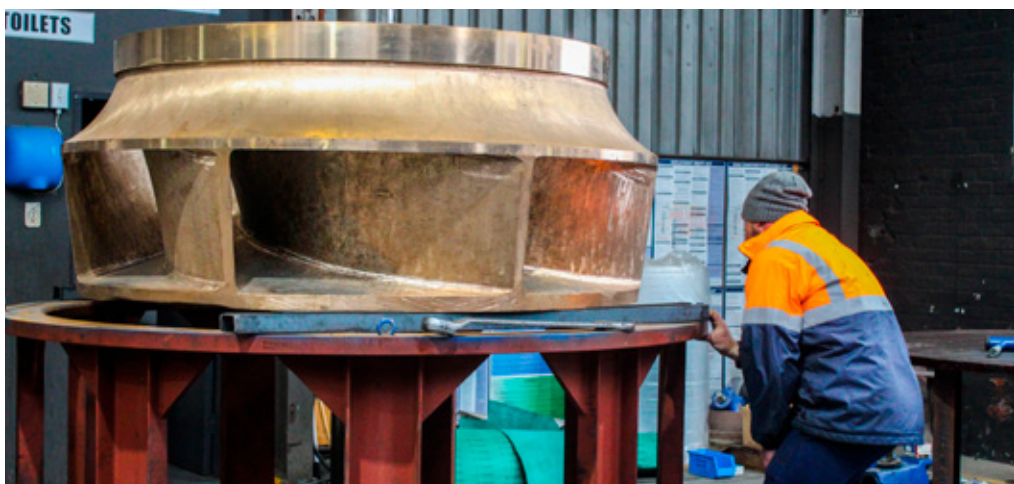
impeller-lines to enable rotation around the shaft)

- A 12-ton CNC horizontal boring machine for the final machining of larger impellers, which typically measure around 3 m in diameter
- A vertical boring machine for the machining of larger components with a Ø3500
- A 450-ton press that can split impellers off shafts
- A shot blasting machine to clean and prepare metal surfaces
- A 3D printer that can print various pump parts in different plastics, even carbon fibre reinforced plastic. This assists with rapid prototyping, where pump designs can be easily modified without expensive tooling. Impellers, veins and casings can be optimised for better efficiencies and material waste can be reduced.

• Dedicated 3D scanning room for their 3D scanner, it is equipped with large screens for viewing and comparing measurements, models, and drawings. Currently, the team is exploring artificial intelligence, using it to assist in writing code to automate various software functions as well as to fully utilise APE's extensive database when specifying and designing pumps for certain applications.

What kind of growth has APE Pumps seen over the past five years?

Aside from adopting new technology and better, improved methods of manufacturing pumps, the majority



of the equipment purchases are due to the substantial growth experienced by APE Pumps.

Over the past five years, our employee headcount has increased by 56% and our revenue has quadrupled. This is without including increased revenue from the 100% acquisition of Eigenbau and future 55% acquisition (waiting for competition commission approval) of a process engineering and turnkey contracting company.

We have grown because customers see the value of dealing with an original equipment manufacturer, giving guaranteed quality, reliability, and performance. Customers benefit from access to original design documentation, genuine spare parts, and expert technical support, reducing the risk of downtime and costly repairs.

Our workshop and

factory are expanding with our growing sales. But most importantly, we are continuously upskilling our staff. Currently, staff members are getting trained on the vault system with regard to record keeping and work flows as well as training on drawing software and programming.

While APE Pumps have many long serving employees, we have also employed a younger generation of talent. There is a serious culture of learning at APE Pumps. We like a two-way mentorship approach, where the 'old' teach the 'young' and vice versa, in modern versus tried and tested techniques. With 70 years of proven expertise, APE is uniquely positioned to capitalise on its legacy by embracing smarter technologies, streamlined processes, and innovative thinking to deliver even more efficient, responsive, and future-ready pump solutions. ●



Over the past five years, our employee headcount has increased by 56% and our revenue has quadrupled



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WHY COMPLIANCE IS NOT JUST A BUZZWORD ESPECIALLY IN WATER MANAGEMENT



Take a moment to think about why rules matter. Sure, they are sometimes inconvenient, but without them, things would quickly descend into chaos. Compliance – sticking to rules and standards – is what keeps the wheels turning smoothly in society. It keeps us safe, fair, and on the path to progress.

By Dr Lester Goldman, CEO, WISA

Nowhere is this more evident than in the water sector. Water is life, literally. How it is treated, distributed, and conserved impacts everything – our health, the environment, and even the economy. That is why getting compliance right in this area is more than just paperwork; it's a responsibility we all benefit from.

What compliance really does

At its heart, compliance is about trust and accountability. It's about making sure everyone does their part responsibly, whether it's companies following financial rules or organisations protecting the planet. It ensures that people and organisations step up and act responsibly. It's what builds trust, whether in business, government, or community efforts. Think of it as the foundation for fairness and progress. Imagine you're running a business, and you know you need to meet environmental standards or financial regulations. That compliance doesn't just keep you out of trouble – it shows your customers and stakeholders that you're serious about doing things ethically and transparently.

Now imagine being in charge of water management, where every decision you make impacts public health. Compliance is what ensures every drop of water is safe, clean, and delivered sustainably.

Water sector challenges, and how compliance helps

Clean and reliable water doesn't happen by magic. It's a complex process, involving treatment plants, pipelines, ecosystems, and a dedicated workforce behind it all. Without clear standards, things could easily go wrong – contaminated water, failing infrastructure, or mismanaged resources.

Regulation 3630 steps in to address these issues. It professionalises roles like process controllers, who oversee how water and wastewater are treated. These professionals have long been unsung heroes, quietly ensuring every drop that reaches your glass is clean and safe.

Now, their expertise is acknowledged and recognised. Regulation 3630 requires them to meet qualifications and ethical standards, putting them on the same level as other industry professionals. It is a win-win for everyone.

Ripple effects of compliance

What does Regulation 3630 mean for you, me, and society at large? Quite a lot, actually:

- **Safer water:** Qualified controllers reduce the risk of contamination, protecting public health.
- **Environmental benefits:** Compliance helps manage water sustainably, preventing pollution and conserving ecosystems.

- **Economic boost:** Businesses thrive when water services are reliable.
- **Public confidence:** Knowing professionals are at the helm builds trust in water governance.
- **Career opportunities:** Recognising process controllers elevates the field, inspiring more young professionals to join.

Compliance as a force for good

Let us be real: compliance sometimes gets a bad rap as being all about red tape. But at its best, it is about creating structures that serve people and the planet. Regulation 3630 proves that, especially in the water sector. By raising the standards, empowering professionals, and fostering accountability, it is setting the stage for a cleaner, safer, and more sustainable future.

So, the next time you turn on your tap, think about the efforts behind that simple act – and the regulations that make it possible. Compliance might not always be visible, but its impact is everywhere. ●





WCWDM: MOVING BEYOND GENERIC INTERVENTIONS

A one size fits all approach to tackle problems around water conservation and water demand management (WCWDM) will not work. Solutions must be grounded in local realities and resource availability and tailor-made to suit specific areas. This is essential for sustainable water management and effective service delivery.

By Dr Harrison Pienaar, chairperson, WISA

One crucial message emerging from recent water sector conferences and dialogues is this: there is no universal solution.

It is senseless to focus on surface water resources in the Northern Cape when the province is highly dependent on groundwater. Strategies should be developed around aquifer zoning and protection, looking at recharge and abstraction rates.

In areas where there is a lot of mining activity, effluent reuse and water loss control should be low hanging fruits. It's imprudent to consider desalination in the inland areas of the country when it's a better option in the coastal areas.

Water conservation and demand management has changed

During the beginning of the industrial revolution, water conservation was all about building dams to capture and store water so that it could be distributed as needed. This is why there are a lot of intervention measures in terms of inter-basin transfers

However, the cost of incremental intervention measures for WCWDM for inter-basin-transfers is extremely high. This is also true for desalination due to its high energy demand. Less expensive options are water reuse, groundwater and water use efficiency. Water loss control remains the most cost-effective and impactful intervention across the board.

Today, water conservation largely centres around using less water and protecting the environment. Water conservation should be both an objective in water resource management and water services management as well as a strategy. It is around protecting resources.

Demand management is often perceived and understood in a limited context and usually equates to communication programmes and tariff increases. Demand management is the

development and implementation of clear cut, deliberate, tailor made strategies and initiatives associated to managing water usage.

Governance must be considered. National departments, water boards, municipalities, and local water user association all have their own distinct mandates and perspectives. This fragmentation often results in a lack of coordination and role clarity in WCWDM. What demand management means for a municipality, focused on reducing end-user losses, differs greatly from that of a water board, which is more concerned with bulk abstraction and treatment losses.

In conclusion, we need to consider the best intervention for a specific area. Ultimately, South Africa needs to abandon the "basket of options" approach, where every potential solution is explored simultaneously, regardless of context. As demonstrated in Windhoek, Namibia, success comes from clear, focused choices – sometimes between reclaimed water or no water at all. Commitment, coordination, and contextual decision-making are the keys to ensuring water security in a complex and often unpredictable environment. ●



HANDS-ON LEARNING FOR EMERGING WATER PROFESSIONALS

The Young Water Professionals Eastern Cape (YWP-EC) Branch hosted a technical tour of the East Bank Wastewater Treatment Plant, also known as the Nahoon Wastewater Reclamation Works.



The event was attended by 40 participants, including students from nearby tertiary institutions such as Fort Hare University and Walter Sisulu University, and young professionals working in related fields. Buffalo City Municipality (BCM) manage and operate the plant. Jonathan Clarke, a super intendent from BCM, led the site technical tour, guiding the delegation through the treatment process and providing a detailed explanation of each stage's function.

Nathoo Mbenyane Engineers (NME) generously sponsored the event, providing all necessary logistical support, including safety equipment, refreshments, and complimentary gifts

as a token of appreciation to BCM for facilitating the tour.

About the plant

The East Bank Wastewater Treatment Plant is a 40-megalitre (ML) capacity Conventional Activated Sludge treatment facility. The key treatment stages covered during the tour include:

- Primary Treatment: Removal of large non-degradable materials (such as rags) through a mechanical screening process at the inlet works.
- Secondary Treatment: Biological degradation of organic matter using aeration tanks and microbial processes to break down waste.
- Tertiary Treatment: Chlorine disinfection

before the treated water is discharged into the nearby Nahoon Beach. The technical tour provided valuable insights into the operations of a wastewater treatment plant, reinforcing the importance of sustainable water management. Attendees gained practical knowledge about the wastewater treatment process and its significance in environmental conservation. The YWP-EC Branch expresses gratitude to Buffalo City Municipality for hosting the event, Nathoo Mbenyane Engineers for their generous sponsorship, and all participants for their enthusiasm and engagement. ●

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A RUNNING TAP, A TRUSTING SOUTH AFRICA:

A different view on service delivery

Living in South Africa, you learn to listen to the rhythm of its neighbourhoods. Is it the joyful splash of kids in a filled pool or the frustrating sputter of an empty tap? Lately, I've heard too much of the latter, and it's got me thinking: we're missing the point.

By Billy James, managing executive, NuWater

Most South Africans don't know this, but we are a country that is water scarce, prone to mild to severe droughts with spouts of good rainfall. Notwithstanding this, we have

shortages due to technical or capacity constraints, which can be addressed in certain respects.

For example, Gauteng faces significant water shortage challenges, evidenced by residents hauling buckets from communal tanks and reports of clinics without running water. These challenges highlight a disconnect between large-scale infrastructure projects and the immediate, basic needs of communities. The emphasis on long-term, complex solutions often overshadows the urgent requirement for accessible water, revealing a struggle to effectively address the growing population's needs with existing, strained municipal systems.

We get caught up in grand schemes, multi-million-rand projects, and endless debates about who should own what. Don't get me wrong – those things matter. But when I see my fellow South Africans hauling buckets from a communal tank or hear stories of clinics without running water, I can't help but wonder if we've lost sight of the basics.

Frankly, I don't care who owns the pipes or treatment plants as long as they deliver water on accessible and pragmatically affordable terms, bearing in mind that water safe for consumption typically has a cost. I'm tired of promises that stretch years

into the future while my country thirsts today. I'm tired of hearing about "infrastructure challenges" when a simple, modular solution could bring immediate relief.

Look, I understand municipalities are under immense pressure. They deal with old systems, tight budgets, and a growing population. But sometimes, I feel like they're building castles in the sky while their feet are sinking in mud.

Partnerships

Here's where things get complicated for me. I work in the water space. I see the technical side, the complexities and how this may benefit the company I work for. I also see tangible solutions that can help communities right now. And yes, I'll admit, there's a conflict of interest here. Yet, I know the potential for private companies to play a role, and which comes with its concerns over management of services, but these can be mitigated.

What if, instead of focusing solely on these massive, long-term projects, governments and municipalities invested in smaller, quicker wins? What if they partnered with companies that can solve these problems, offering modular treatment units that can be deployed in weeks, not years? Imagine the impact, the trust they'd build. This is just a quick





NuWater is a technology-led engineering company specialising in the design, construction, financing, operation, and maintenance of water treatment plants. The company focuses on providing sustainable, mobile, adaptable, and efficient solutions for various sectors, including agriculture, municipal services, mining, food and beverage, industrial processes, and energy. NuWater employs advanced technologies such as ultrafiltration and reverse osmosis to treat contaminated water, making it suitable for drinking and industrial use.

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example of how the private sector could provide decentralised water treatment solutions.

I know this sounds like privatisation, but it isn't, it is partnering to provide solutions. And let's be honest: when your child is thirsty, you don't care who's filling the glass. You just want it filled. And if a private company can help fill that glass faster and more efficiently, then I say, let them, as long as they can do so at the same or more economically feasible rate.

And it's not just about the water itself. It's about the feeling of being seen, of being heard. It's about knowing that your local government cares enough to address your immediate needs, not just some abstract future ideal.

We need to shift our focus. We need to stop thinking in terms of grand gestures and start thinking in terms of running taps. We need to build trust, one drop at a time. Because, in the end, a running tap isn't just about water.

It's about dignity. It's about hope. And frankly, it's about time. South Africa has companies that specialise in providing water treatment solutions that can be part of that solution. And those charged with providing solutions or maintaining communities with water access should act now!

Help is out there, and solutions exist; it requires engagement and a shift from castles in the sky to foot marks in the sands to deliver clean water and promises to South Africans in a way that looks beyond grandiose brick and mortar and more in line with dignified living. Service delivery is defined as 'the process by which a company or organisation provides services to its customers, ensuring the service is effectively delivered, meets customer expectations, and aligns with agreed-upon standards.' Let us not allow this to devolve into a service payment without effective delivery anymore. I hope everyone's next glass is filled. ●

SMALL PRIVATE WATER OPERATORS: AN ESSENTIAL LINK IN ABIDJAN

Population growth in the ivory coast poses the challenge of ensuring universal access to drinking water. Despite national efforts, a network of small private water operators (SPWOs) plays an essential role in supplying the most vulnerable neighborhoods, where access to drinking water remains precarious.

By Michel Kelly-Gagnon and Gisèle Dutheil

They have become indispensable but struggle with formal recognition. A 2023 study carried out by the Montreal Economic Institute (MEI), in collaboration with Audace Institut Afrique (AIA), a professor from the University of Montreal (Canada), and a lecturer at the Université Sultan Moulay Slimane (Morocco), with the support of the Templeton World Charity Foundation, explores paths to their formalisation.

A small private water operator in action



Michel Kelly-Gagnon, president of the Montreal Economic Institute



Gisèle Dutheil, director of Audace Institut d'Afrique

Neighbourhood entrepreneurs

SWPOs work in the very neighbourhoods they serve; in the absence of reliable drinking water, they provide an accessible alternative adapted to local consumption habits. This model is based on selling small quantities of water that respond to the direct needs of poor households. During a water shortage, their role becomes more crucial, yet their activities take place on the margins of legality – limiting their access to finance and technical support.

A profitable sector despite being informal

The study showed that the 1067 SPWOs manage to generate stable revenue built on the trust they have established with their clientele. 50% of them report better remuneration efforts than their previous occupation, and 88% of SPWOs say they are in favour of formalising the trade.

Integrating these market factors into the institutional framework would provide several benefits:

- Access to financing: Legal recognition would allow SPWOs to invest in better infrastructure.
- Job security: Gradual integration into a regulatory framework would provide social protection to SPWOs and their employees.
- Improved water quality: Training in proper sanitary practices and the use of suitable containers would reduce the risk of contamination. However,

this training must remain flexible and adapted so as not to dissuade these entrepreneurs from signing on.

A complementary role

99% of SPWOs see their activity as complementary and not in competition with that of SODECI, the main distributor of drinking water in Côte d'Ivoire. By integrating these operators into an overall strategy, it would be possible to improve service for suburban and rural areas, often less well served by the official network.

Concrete solutions that could be considered include:

- Subcontracting mini-water networks installed by SPWOs.
- Partnership with the Office National de l'Eau Potable (ONEP) to ensure constant water access during a shortage.
- A pilot project was carried out in Abidjan that would identify, train, and register SWPOs.

A model for other countries to follow

Formalising SWPOs and integrating them into the water distribution system would be pragmatic and reduce the water inequality in Côte d'Ivoire. A hybrid model that combines flexibility with proximity could prove useful to other countries in an analogous situation. This is far from a "stop-gap measure" as this demonstrates that's public-private partnerships can sustainably transform water accessibility in struggling regions. ●

OUR WATER SECURITY STATUS: FROM THE HORSE'S MOUTH (aka Dr Sean Philips)



Five sluice gates opened at the Vaal Dam

Department of Water and Sanitation (DWS) director-general Dr Sean Phillips warns that South Africa is at a critical juncture in its water security journey.

While raw water supply is in balance with existing demands on a national scale, there are localised deficits such as:

- Integrated Vaal River System (IVRS) that provides water to Gauteng, caused by increased demand due to rapid urbanisation, high non-revenue water and a delay in the start of Phase 2 of the Lesotho Highlands Water Project.
- Mgeni System that supplies the Durban and Pietermaritzburg region, caused by increased demand due to rapid urbanisation, high non-revenue water and a delay in the start of Umkhomazi Water Project.

However, it is very possible that national demand could soon exceed supply due to:

- Higher levels of economic growth
- Continued urbanisation and population growth
- Failure to halt the huge water losses in municipal distribution systems

- Continued degradation of wetlands that are catchments, allowing water to enter rivers to fill dams and replenish underground aquifers
- Sewage and industrial pollution
- Climate change

The good news

Phase 2 of the Lesotho Highlands Water Project as well as the Umkhomazi Water Project are now underway. But there is a need to further improve planning, procurement and project management of national water resource infrastructure projects to ensure that they are implemented timeously

The National Water Resource Infrastructure Agency Act was passed by parliament last year. This enables more finance to be raised on the markets for national water resource infrastructure projects.

Furthermore, the establishment of wall-to-wall Catchment Agencies will result in improved management of water catchments, which is key to increasing

raw water security – all six have been gazetted and boards appointed.

We cannot keep building dams

There is a limit to the extent to which the construction of new dams can ensure water security. South Africa is already harnessing approximately 75% of our sustainably utilisable surface water resources.

Therefore, there is a focus on diversifying the water resource mix through:

- increased sustainable use of groundwater
- desalination of sea water

Dr Sean Phillips,
director-general,
Department of
Water and Sanitation





The 2022 and 2023 Blue Drop, Green Drop and No Drop Reports show a sharp decline in municipal performance since the last assessments in 2014

frequently come out of the tap and/or may not meet quality standards. The national average lies at 68%, but provinces vary greatly, with Gauteng and the Western Cape scoring over 90% and all other provinces scoring below 60%.

There are areas in the country that have high backlogs with regard to accessing even a basic level of sanitation; particularly in Limpopo, Mpumalanga and the North West Province.

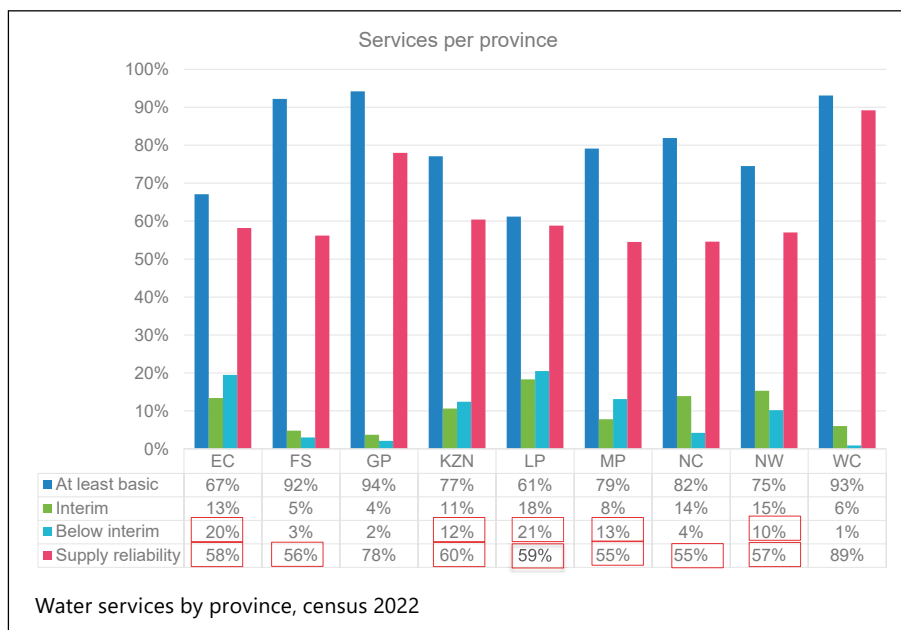
Blue Drop and Green Drop and No Drop Reports

The 2022 and 2023 Blue Drop, Green Drop and No Drop Reports show a sharp decline in municipal performance since the last assessments in 2014. With the widespread deterioration of municipal water services, South Africa is not on track to meet the Sustainable Development Goal (SDG) 6: Clean water and sanitation for all. These Drop Reports collect a large amount of information on municipal water and wastewater systems in all municipalities.

There are 144 WSAs, they are a municipality that has been appointed by the Minister of Cooperative Governance

Non-revenue water percentages per province

Province	Non Revenue Water %
Eastern Cape	50.6%
Free State	59.5%
Gauteng	49.2%
Kwa-Zulu Natal	60.5%
Mpumalanga	54.9%
Limpopo	57.7%
Northern Cape	49.0%
North West	55.6%
Western Cape	27.6%
National Average	47.4%



Water services by province, census 2022

- return flows from treated wastewater systems (water reuse)
- reuse of other poor-quality water such as acid mine drainage

Better water conservation and water demand management (WCWDM)

The average consumption of water per capita per day in South Africa is 218 ℓ/c/d while the international average consumption of water per capita per day is 172 of ℓ/c/d. This is alarming when considering the fact that South Africa is one of the 30 most water scarce countries in the world. This level of consumption is unsustainable.

Supply-side measures are necessary but not sufficient to avoid future water deficits. WCWDM must therefore be implemented more effectively, particularly in domestic

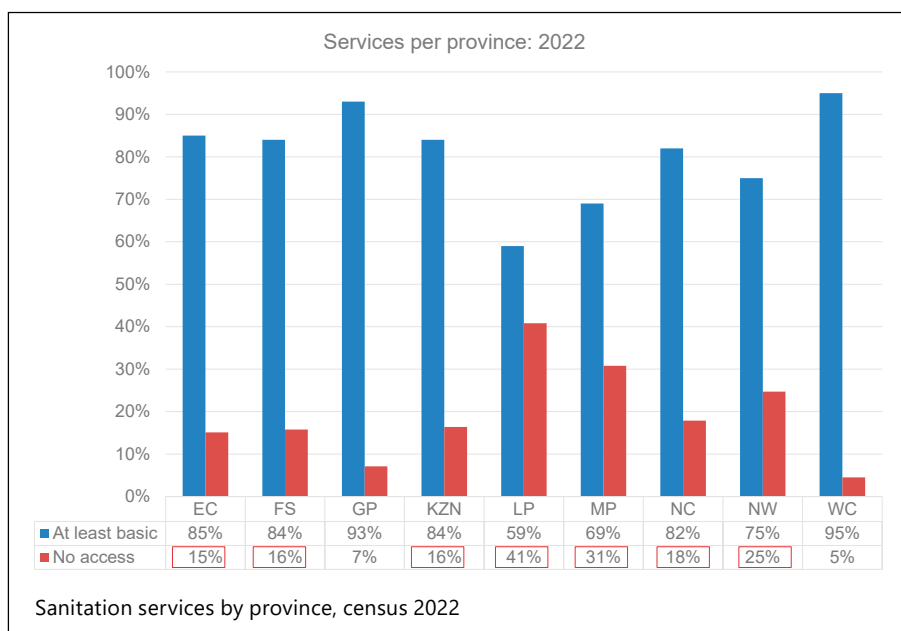
and general industrial use as well as by reducing physical losses in municipal distribution systems.

To date, the DWS as well as municipal WCWDM strategies have not been sufficiently effective, apart from the City of Cape Town.

State of water and sanitation services in South Africa

Nationally, over 90% of people in the country have a basic access to water. However, there are still some large backlogs, particularly in Limpopo and Eastern Cape.

The graph also indicates that there is a severe problem regarding the reliability of water services. Even though one may have access to a tap, water may not



Sanitation services by province, census 2022

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to be responsible for water services. The red and yellow areas on the map are the WSAs that were found to be in a critical or poor state of performance. It is apparent that at least half of the geographical area of the country has WSAs with drinking water systems that are in a poor or critical state of performance. The percentage of water supply systems with poor or bad microbiological water quality compliance increased from 5% in 2014 to 46% in 2023 this is resulting in increased risk of water borne diseases,

potentially life threatening diseases such as cholera and chronic diarrhoea.

The 2022 Green Drop Report found that 334 out of a total of 850 wastewater systems are in a critical state of performance. Approximately 80% of the geographical area in the country have WSAs with wastewater systems in a poor or critical performance. Around 66% of all municipal wastewater infrastructure is in a poor or critical condition.

There are 90 of the 144 water services (more than 60%) had at least one

critical wastewater system. Wastewater systems with critical or poor state of performance result in pollution through discharging partially treated or untreated water into rivers and the environment. The 2023 Green Drop Progress Assessment Report indicated further decline.

Again, according to the 2023 No Drop Report, almost 80% of South Africa's geographical area have non-revenue water greater than 40%. High levels of NRW, including physical losses, in Gauteng and Kwa-Zulu Natal are one of the reasons for water supply disruptions that have been experienced there.

Reasons for decline in municipal water services

These include:

- The non-adherence to standard operating processes for drinking water treatment and wastewater treatment
- Infrastructure in a poor condition due to a lack of maintenance
- Infrastructure not having sufficient capacity – such as overloaded wastewater treatment plants

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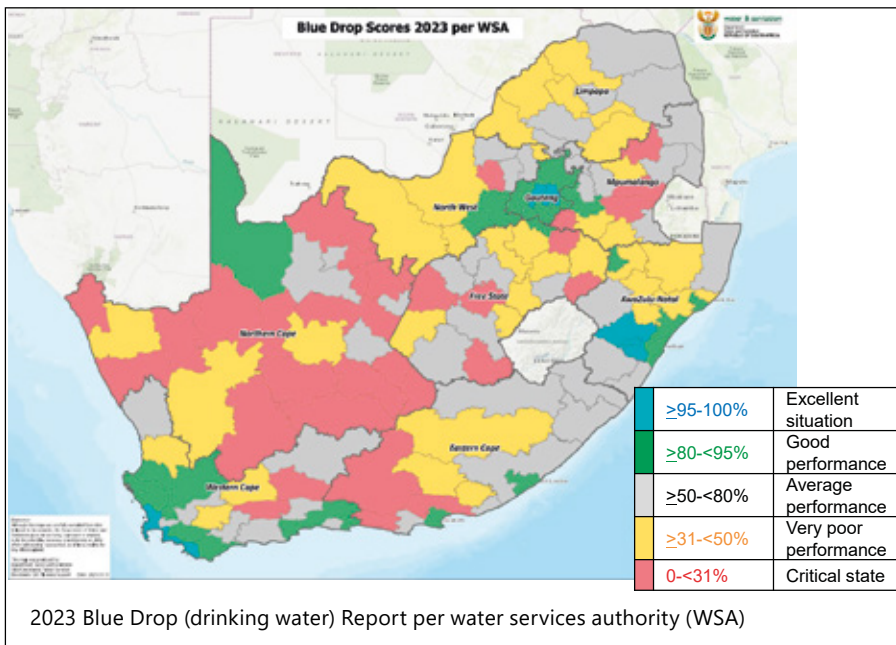
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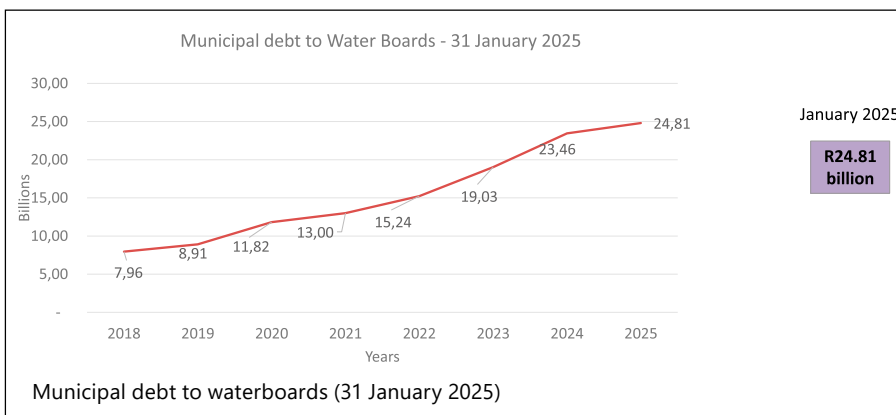
There is a clear correlation between a lack of skilled staff (plant managers, process controllers, technicians and scientists) and water and wastewater systems that are in bad or critical state. For example, Gauteng has the highest percentage of drinking water systems with excellent or good performance and the lowest shortfall of qualified staff; Northern Cape has highest percentage of drinking water systems with poor or critical performance and highest shortfall of qualified staff.

Vandalism and metal theft are an increasing cause of infrastructure failure, but this is partly a result of inadequate security being provided by municipalities.

Additionally, inefficiencies in billing and revenue collection systems prevent municipalities from securing the necessary funding for essential maintenance and the hiring of skilled personnel. Furthermore, even when adequate funds are available, municipal councils often fail to prioritise budget allocations for water services. National government is transferring over

R60 billion per year in grants to municipalities for water and sanitation services. This includes the portion of the equitable share which is meant to be used by municipalities to provide free basic water to the indigent, as well as various infrastructure grants which are meant to address historical infrastructure backlogs. But apart from those grants, the water services sector has to be self-financing through revenues from the sale of water.

A national average non-revenue water percentage of 47.4% means that, on average, municipalities do not obtain any revenue from almost half the treated water that they have to pay to produce or that they have to buy from the water boards, which in turns mean, firstly, a large portion of the money spent on developing water resource infrastructure is wasted. Secondly, it means that municipalities do not have sufficient funds to operate and maintain their water services, and thirdly, that municipalities are not able to pay the water boards for the treated water supplied by them.



The water boards which are worst affected have stopped paying the DWS for the raw (untreated) water supplied to them, which means that the funds available to DWS to maintain and operate the national dams and related infrastructure are insufficient.

This debt is a threat to the financial viability of the entire water value chain.

What can be done to change the status quo?

Four key actions are required:

- 1) Water and sanitation infrastructure grants to WSAs must be refocused on increasing access to a basic level of services
- 2) Support from national government to municipalities must be strengthened
- 3) The review of the local government funding model and water and sanitation conditional grants must be finalised
- 4) Reforms of water services at municipal level must be implemented

The funding gap caused by high non-revenue water must be addressed

Municipalities must:

- Prioritise budgets for maintenance and for reducing leaks in water distribution systems
- Ensure that all reported leaks are fixed quickly
- Close illegal water connections
- Replace old leaking pipes, including asbestos pipes (which are a danger to health)
- Improve management of their water systems (through pressure management for example)
- Strengthen metering, billing and revenue collection

If a municipality lacks sufficient capital, there is significant potential to partner with the private sector. By implementing the above measures, a sustainable revenue stream can be created and provide returns on private sector investments.

Addressing municipal debt owed to water boards

The Minister has been engaging premiers and mayors regarding municipal debt to water boards and this has resulted in commitments by some municipalities to pay their current invoices in full.

Credit control measures have been standardised and are being implemented by all the water boards. National Treasury has agreed to the withholding of equitable share allocations of non-paying



Phase 2 of the Lesotho Highlands Water Project is now underway



municipalities as a last resort and this is being implemented.

National Treasury has approved a write-off mechanism for historic debts in terms of which water boards can incrementally write off a municipality's historic debt on condition that the municipality pays its current accounts in full.

Reform of water and sanitation services

Revenue from the sale of water must be ring-fenced. All management functions related to the delivery of the water and sanitation services should be ring fenced with single point accountability.

These reforms are underway. This is done through a:

1. Water Services Amendment Bill that will shortly be submitted to cabinet for approval to be submitted to Parliament. The two key amendments include:
 - o Introducing an operating license for water service providers (WSPs)
 - o Clarifying the roles and responsibilities of WSPs and WSAs
 - o Minister may force separation of water services function from the municipal administration where there is persistent failure to meet license conditions, and require

municipality (as WSA) to contract with a licensed WSP

2. National Treasury's Reform of Metropolitan Trading Services Programme, that is a performance-based incentive grant component given to metropolitan municipalities that has submitted a
 - o A council approved water turnaround strategy
 - o A roadmap on institutional reforms for improved management and governance
 - o A water and sanitation business and investment plan that is

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consistent with the water services development plan

3. Phase 2 of Operation Vulindlela
 - o Develop a national water action plan and establish a coordination structure to ensure water security
 - o Implement institutional reforms to improve the management of water resources, including full establishment of the NWRIA and CMAs
 - o Strengthen the regulation and oversight of water service provision through the creation of an independent economic regulator for the water sector, covering the whole water value chain
 - o Create a separation between water service authorities and water service providers
 - o Require all metros to establish or appoint ring-fenced, professionally managed and independently licensed utilities (either external or internal) for water & sanitation and electricity
 - o Finalise review of the funding model for local government
 - o Finalise review of conditional grants to optimise their impact and effectiveness
 - o Support the introduction of private sector partnership in the water sector

WSAs: the current situation

The legislation governing municipal water services differentiates between the role of WSA and water service provider (WSP). WSAs are supposed to be the local regulators that ensure

that water services are provided in accordance with the national norms and standards legislation. WSAs are supposed to enter into service level agreements with WSPs, which are the bodies which actually provide the services. However, in almost all of our municipalities, the WSA and WSP function have not been separated, even though it is required by law.

In most municipalities, the WSA has decided (which is within its rights to do), to deliver the service through internal delivery mechanisms. This has resulted in the creation of a technical department which is responsible for the management of water issues in the municipality. However, many of the key functions required to effectively deliver the service like revenue collection, customer relationship management, human resources and supply chain, are not within the management control of the water services department. Often, this department receives an annual budget that has no relationship whatsoever to the amount of revenue collected from the sale of water. Municipalities use revenue from the sale of water for other purposes. This means that the head of the department has no incentive to manage water services in such a way as to maximise or optimise revenue collection, for example, through prioritising the installation of meters.

In light of the amendments to the Water Services Act, it must be noted that municipalities can decide to retain internal WSPs, and several metropolitan

municipalities have opted to continue with internal WSPs. But they will ring fence them within the municipality, particularly in terms of revenue and control over management functions.

Increasing private sector involvement in the water sector

More than 60% of national water resource infrastructure projects are funded by private sector finance raised by the TCTA – establishment of the NWRIA will enable more private sector finance to be raised for national water resource infrastructure projects.

Innovative new financing mechanisms are also being developed such as green and blue bonds and are already being applied in catchment management such as the Water Bond put in place by Rand Merchant Bank and The Nature Conservancy in the Western Cape, which is financing the removal of alien vegetation that consume large amounts of water. The DWS and the water boards are implementing non-commercial partnerships with industrial sectors, such as the Olifants Management Model Project in Limpopo with mining houses. The Infrastructure Fund is assisting DWS, the water boards, and municipalities to put in place blended finance projects in the water sector.

As private sector involvement in municipal water services is very low compared to other countries, the Water Partnerships Office has been established to facilitate better partnerships with the private sector. This includes Build, Operate, Train and Own or Transfer (BOTT) models. Recently, the Water Partnerships Office issued an expression of interest for municipalities to participate in Water Reuse Programme as substantial green climate funding is available for its project preparation and blended financing.

South Africa's water and sanitation systems are under immense strain, with urgent reforms, investment, and better management needed at all levels. While there are promising developments – from infrastructure projects to legislative reforms and growing private sector involvement – success will depend on coordinated action, stronger local capacity, and a shift toward sustainable water use. Ensuring water security is not just a technical challenge, but a national imperative. ●



THE HIGH COST OF INACTION: SOUTH AFRICA'S WATER INFRASTRUCTURE CRISIS



South Africa's water infrastructure is deteriorating. The Department of Water and Sanitation (DWS) estimates that the country needs to spend over R90 billion a year over the next decade to repair and upgrade existing infrastructure, a clear indicator of the scale of the problem.

The government has secured R23 billion for seven large water infrastructure projects, recognising the urgency of the situation, but SAICE water experts say this is just a drop in the ocean for what is genuinely needed to stem South Africa's water crisis.

South Africa stands at a critical juncture in its infrastructure development, with water infrastructure at the forefront of this challenge. Water security is the foundation of economic stability and growth. Without reliable access to clean and affordable water, industries falter, agriculture suffers, communities struggle and investors reconsider investment in South Africa. From Nelson Mandela Bay and Komani in the Eastern Cape to the unfolding water shortages in Johannesburg, Gauteng, millions of South Africans

are grappling with dry taps, unreliable supply, and deteriorating infrastructure.

For millions living in poverty, unreliable access to clean water is not just an inconvenience. It poses a daily threat to health, livelihoods, and survival, not to mention revoking the constitutional human right to water, as enshrined as a fundamental human right in South Africa (supported by both the Constitution and the Water Services Act). Water insecurity has a ripple effect, with the potential of slowing the economy, disrupting education, worsening food shortages, and undermining the country's overall stability.

Segomotso Kelefetswe,
SAICE's advocacy contributor
on water infrastructure



Wynand Dreyer,
Chair of the SAICE
Advocacy Committee

So, what is the cost of inaction in terms of water security for South Africa?

The country's water infrastructure crisis has been exacerbated by rapid population growth, urbanisation, climate change, inefficient water management, poorly maintained infrastructure, and unequal distribution of water resources. Inadequate investment in water infrastructure – specifically underfunding of operations and maintenance – along with increasing water resource scarcity, have emerged as further major challenges. Solving them is not



Over 40% of the water produced and supplied to more than 80% of the country is lost to leaks due to insufficiently maintained infrastructure



Water plays a key role in production and industry, without a secure supply the economy is at risk

just an environmental necessity but an economic imperative. The fact is, without adequate water security, our economy will contract.

Despite the R156.3 billion being committed towards water and sanitation in the recent 2025 budget speech, it is understandable that water engineering experts from the South African Institution of Civil Engineering (SAICE) are justifiably concerned that the municipalities might lack the engineering expertise among other things to use these grants efficiently.

“In the absence of proper planning, feasibility studies and suitable technically driven procurement, such grants may be misspent or even unspent whether on upgrading, renewal or new infrastructure,” comments Wynand Dreyer, Chair of the SAICE Advocacy Committee.

The SAICE Water Division acknowledges the positive strides made by DWS in recent years. In his budget speech on 16 July 2024, David Mahlobo, Deputy Minister of DWS, highlighted that R98 billion has been spent by the department to support municipalities in infrastructure

development across 144 Water Service Authorities. This significant commitment to improving water infrastructure is encouraging, and SAICE fully supports these efforts.

However, although there are some encouraging developments, SAICE cautions that there are still serious challenges that need to be overcome. One only must look at recent history: between 2018 and 2022, expenditure at the DWS hovered between R17 billion for all water programmes, including new projects and maintenance. In contrast the budget for the 2023 to 2025 period of R69.3 billion in total failed to make a dent, falling R200 billion short of the necessary target.

“The imperative to fix and renew aged and defective infrastructure cannot be overemphasised. Our statistics on non-revenue water tell a damning story of neglect with over 40% of water produced and supplied to more than 80% of the country, lost due to aging and broken infrastructure because of leaks or unaccounted for water due to theft. We desperately need to see these numbers turned around,” emphasises Dreyer.

Flooding and pollution

Environmentally, dysfunctional wastewater treatment plants have played a significant role in untreated, or partially treated, sewage being discharged into the environment, including rivers and oceans. Lack of compliance and monitoring by competent authorities exacerbates the water crises. During minor floods, the impact of the degraded water flow into rivers is huge, with wastewater treatment plants discharges stimulating excessive reed growth, which in turn, alters riverbeds. The result is that instead of there being a 1:50 or 1:100-year chance of floods, developments in areas that were previously far away from the flood zones, now fall within these flood zones, increasing their risk of being flooded.

“This is detrimental to the environment as it pollutes the watercourses from which we abstract our drinking water, adding to the complexity and cost of purification, pollutes our oceans, and is, in turn, hazardous to our health and the seafood we eat. Not to mention exposing the risk of floods to many developments which previously were not at risk,” explains the Water Division.

Turning focus to spatial planning and developments, the increasing demand for inner city accommodation because of migration of people to urban areas requires the planning of serviced human settlements in appropriate areas. Engineers need to be involved or at least contribute towards these developments. There is no denying the effect of failure of many municipal governments to maintain and enhance their infrastructure, in the face of increasing demand by growing inner city populations.

“This situation requires holistic project management and implementation setup to ensure the project cycle can be used to contribute to success in restoring aging or collapsed infrastructure, plan better and operate the system properly. If the system is not robust, corruption, theft and vandalism remain the cancer of the system,” notes Segomotso Kelefetse, SAICE’s advocacy contributor on water infrastructure.

“A sphere of government needs to be encouraged to appoint properly qualified and professionally registered personnel with reputable track record or appoint a panel of experts to support the implementation, training and development with the eye to improve skill (capacity building) and also ability to retain the talent,” adds Kelefetse.

PPPs

Public Private Partnerships (PPPs) have the potential to bridge the skills gap but only if the initial project preparation (such as the feasibility studies and PPP procurement processes), is properly done by the municipality, with specialist assistance where required. PPPs hold the promise of leveraging limited government funding to crowd in project finance for bankable projects.

The increasing demand for inner city accommodation because of migration of people to urban areas requires the planning of serviced human settlements in appropriate areas

Dreyer explains, “SAICE have identified experienced engineering personnel who are willing and able to take on short-term assignments to add capacity to these initiatives and has wide-ranging learning programmes aimed at up-skilling engineering personnel in metros and municipalities. Many of these programmes are accessible online and through self-study.”

Kelefetse adds, “There are entities that have started to put in action a deliberate intention to encourage the public sector to support the government as part of ensuring that planned programmes do get to fruition. The process involves PPP but in a collaborative style as the private sector and public sector co-implement projects at a shared responsibility level, and we use a 50-50% split in terms of overall responsibility inclusive of management, funding contribution, implementation and further processes that even extend to municipal readiness.”

“It would be good to work towards various PPPs in a collaborative manner,

allowing the parties to work through a signed agreement to ensure we save time and cost. Secondly, funds allocated to projects in most systems goes towards the projects plus other costs, yet in collaboration setup, the full cost goes to the project as in Rand for Rand and that optimises the amount of money to be spent on the project. Thirdly, institutional arrangement must uphold the public procurement system with transparency, ethics, and accountability as key cornerstones,” advises Kelefetse.

“The optimal solution needs to be held at an institutional level with the amount of money lost or stolen being reduced. That is the only way the funds will get to do what it was originally intended,” says Kelefetse.

Looking forward, leadership both nationally and on a municipal level need to be informed and influenced to make the appropriate decisions on policy, budgeting and priorities around water resource management and development, to avert this looming water security crisis. ●



AIR VALVES BOOST INFRASTRUCTURE RELIABILITY AND MAINTENANCE PLANNING

Siza Water, a water utility, collaborated with Dynamic Fluid Control (DFC) to enhance system reliability, improve service delivery, and reduce maintenance efforts. Kimolin Venkatasen (KV), Maintenance Manager at Siza Water, discusses the impact of DFC's RGXII Air Valves on the utility's operations.



Kimolin Venkatasen, Maintenance Manager at Siza Water

How has Siza Water's adoption of RGXII Air Release Valves improved sewage management and operational efficiency?

KV: At Siza Water, we are committed to delivering high-quality services by investing in innovative solutions that enhance efficiency and reliability. The implementation of RGXII Air Valves has significantly improved sewage management by optimising air regulation within our pipeline network. By preventing air entrapment, these valves reduce the risk of blockages and pressure surges, ensuring a stable and efficient system. Their advanced design contributes to energy conservation and improved pump performance, which aligns with our goal of delivering innovative solutions while

maintaining high-quality infrastructure. The result is enhanced operational efficiency, reduced maintenance demands, and uninterrupted service to the communities we serve.

What were the main challenges that you faced before partnering with Dynamic Fluid Control, and how were they addressed?

Before partnering with Dynamic Fluid Control, we encountered challenges related to air accumulation in pipelines – leading to inefficiencies, pressure fluctuations, and increased strain on critical infrastructure. Traditional air valves required frequent maintenance and were prone to premature failure, causing operational disruptions.

The RGXII Air Valves addressed these issues through incorporating a self-cleaning mechanism, corrosion-resistant materials, and superior sealing capabilities. These enhancements have significantly reduced maintenance interventions, ensuring a more reliable and high-performing water and wastewater system that consistently serves our customers and stakeholders.

Can you describe the impact of the RGXII air valves on pipeline reliability and maintenance schedules?

Reliability is a key focus at Siza Water, and the RGXII Air Release Valves have played a critical role in improving system resilience. By ensuring optimal air release and preventing vacuum formation, these valves protect our pipelines from structural damage and reduce the risk of leaks. The RGXII boasts low pressure sealing capabilities of 7 Kpa (1 Psi), with a patented design that ensures reliable sealing. This helps us extend infrastructure lifespan by lowering maintenance costs and minimising disruptions. The durability and efficiency of these valves have optimised our maintenance schedules, allowing our teams to focus on proactive improvements rather than frequent reactive repairs, ultimately benefiting the communities we serve.

How has the partnership with Dynamic Fluid Control influenced Siza Water's ability to serve the community effectively?

At Siza Water, we prioritise people-centric solutions by working with trusted



partners who share our commitment to operational excellence. Our collaboration with Dynamic Fluid Control has enabled us to implement high-quality, innovative products that enhance system performance and reliability. Their technical expertise and responsive support has strengthened our ability to reduce operational challenges, allowing us to allocate more resources toward infrastructure expansion and service reliability. This has resulted in a more sustainable and efficient water and sewage system for our community.

What roles do innovative technologies like the RGXII air valves play in Siza Water's long-term strategic goals?

Technologies such as the RGXII Air Valves align with our commitment to delivering high-quality water infrastructure by reducing energy consumption, minimising maintenance costs, and ensuring the long-term sustainability of our operations. As we modernise our network, these innovations play a crucial role in enhancing service delivery, reducing water losses, and maintaining a resilient infrastructure that meets the needs of our growing communities.

How does Siza Water support the country's broader goals for sustainable water infrastructure?

Siza Water is dedicated to sustainability and responsible water management. We contribute to national sustainability goals by investing in modern, high-performance infrastructure that optimises water conservation, reduces environmental

RGXII air valves feature an innovative design with a self-cleaning system, corrosion resistance, and advanced sealing performance



impact, and improves operational efficiency. Additionally, our people-focused approach ensures that communities have access to reliable and sustainable water services, aligning with the broader goal of securing South Africa's water future.

What feedback has Siza Water received from the community or stakeholders regarding the improvements in water and sewage services?

The response from the community and stakeholders has been positive. Residents have noticed fewer service disruptions, and enhanced wastewater management. Additionally, the reduction in emergency maintenance incidents has strengthened stakeholder confidence in Siza Water's ability to deliver consistent and high-quality services.

Could you share an example of a specific project or system upgrade where RGXII valves were instrumental?

One of our key projects involved upgrading a major sewage pump station that was experiencing frequent air entrapment issues, leading to inefficiencies and increased maintenance

costs. By integrating RGXII air valves into the system, we successfully eliminated pressure surges, improved pump efficiency and reduced downtime. This upgrade has resulted in a more reliable and cost-effective sewage management process, improving service delivery to thousands of customers.

What lessons have you learned from this partnership (DFC and Siza Water), and how might they influence future collaborations or innovations?

Our collaboration with Dynamic Fluid Control has reinforced the importance of choosing the right partners who share our commitment to quality and innovation. We have learned that investing in advanced technologies not only improves efficiency but also reduces long-term operational costs. This experience will guide our future collaborations, ensuring we continue to prioritise durable, high-performance solutions that enhance infrastructure resilience. Additionally, the ongoing support and expertise from DFC has highlighted the value of strategic partnerships in driving long-term success.

What advice would you give to other utility providers considering advanced pipeline solutions like RGXII air valves for their operations?

For utility providers looking to improve pipeline efficiency and reliability, we strongly recommend investing in advanced air valve solutions like the RGXII series. These valves provide exceptional performance, lower maintenance costs, and ensure long-term system stability. It is crucial to align technology investments with sustainability goals and infrastructure longevity. Furthermore, selecting a trusted partner like Dynamic Fluid Control ensures that implementation is seamless, and ongoing support is readily available, maximising the benefits of these advanced solutions. ●



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AGRU manufactures fittings with outside diameters up to 3,500 mm in premium quality



Prefabricated components reduce installation costs and thus increase the project's cost efficiency

Customised parts enable significantly faster installation due to their precise fit



FITTINGS WITHOUT LIMITS

Piping, fittings, and their installation are often standardised but this is not always the case. As South Africa grapples with its water infrastructure the need for customised parts becomes more apparent.

To help meet this growing requirement, AGRU, a plastic parts manufacturer, has a new range of completely customised parts in various materials. The range includes PE 100-RC, PP, PVDF, and high-performance plastics like ECTFE.

AGRU's customised parts range extends into specialised use. They employ electrically conductive materials and advanced

fluoropolymers for when chemical resistance and purity affect a project. Their PE 100-RC pipe is ideal for trenchless gas and water pipelines, while PVDF-UHP and ECTFE are used in the semiconductor and pharmaceutical industries.

All products are subject to strict quality assurance in accordance with ISO 9001, ISO 14001, and ISO 45001. This meets the global demand for cleanroom-compatible solutions, AGRU collaborates with fabrication shops in Austria, Dubai, Korea, China, Singapore, and the USA. These facilities produce, among other things, ultra-pure pipe isometry for applications with the highest purity requirements. AGRU is responding to growing markets in the high-tech industry, where high-purity piping systems enable semiconductor production.

Digital design and state-of-the-art manufacturing

Technologically, AGRU relies on CAD and BIM-based design, followed by precise CNC machining and welding techniques such as infrared welding, butt welding, electrofusion welding, and extrusion welding. Finite

element analysis and hydrostatic performance tests ensure that every component is perfectly matched to its application. The company's in-house manufacturing capacities allow AGRU to produce fittings and special components up to 3,500 mm in diameter – even when dealing with particularly complex geometry or cleanroom requirements.

Versatile fields of application

The practicality of their customised parts range is exemplified by a wastewater treatment plant modernisation project, where machined electrofusion couplers made of PE 100-RC ensures a homogeneous, leak-free piping system with minimal installation effort—even in confined spaces and under high groundwater conditions. However, the range of applications extends far beyond showcase projects: pressure piping for horizontal directional drilling, ultra-pure process piping in cleanrooms, and chemical applications with aggressive media are also part of the portfolio.

Looking ahead to 2025, AGRU plans to expand its technological lead. "Our fittings combine the expertise from thousands of projects with innovative technology," emphasizes Ing. Albert Lueghamer, Head of Application Engineering. "This ensures safe solutions tailored precisely to our customers' needs – in terms of size, purity, and precision." ●



For high-purity applications, ready-to-use pipe isometries are produced in specialised fabrication shops around the globe

RECYCLED PLASTIC IN PIPE MANUFACTURING: THE DANGERS AND OPPORTUNITIES

The move toward circular business practices has led to an interest in using recycled material wherever possible. This is economically and environmentally sound, but the use of recycled material has its limits, specifically when using recycled plastics in water pipes. **By Duncan Nortier**



Jan Venter, CEO of SAPPMA



Peter Sejersen, technical manager of The European Plastic Pipes and Fittings Association (TEPPFA)

Testing a 315 mm twin wall pipe with 50% recycled material



The Southern African Plastic Pipe Manufacturer Association (SAPPMA) is firm that recycled plastic cannot be used in pressure pipes. Pressure pipes are used to transport drinking water, gas, and wastewater when a system cannot rely on gravity. These pipes must be able to withstand pressure for extended periods of time and be reliable in the long term – 50 years or more.

Plastic and its use have been at the centre of sustainability issues, so why is it that recycled plastic is not an answer for these circumstances?

Under pressure

Peter Sejersen, technical manager of The European Plastic Pipes and Fittings Association (TEPPFA), says, “the first issue we run into is that not all plastic for recycling is made equal. It is difficult to control the quality, and cleanliness of this plastic so recycling it would yield a plastic that is not as durable as virgin material.”

TEPPFA is the European equivalent to SAPPMA, and even when relying on Europe’s robust recycling initiatives there is room for error. “Having full control over the quality of plastic used in recycling makes a positive impact – however, recycled plastic still doesn’t match the durability of virgin plastic,” adds Sejersen.

Jan Venter, CEO of SAPPMA, cautions that using recycled plastics in high-density polyethylene (HDPE) pressure pipe violates both international and national standards (ISO/SANS 4427-2). The practise is not only illegal but also poses a

significant risk to public health and infrastructure reliability. Despite repeated warnings, the association reports that the use of sub-standard “80/20” pipes – made with 80% virgin material and 20% recycled material – is still prevalent in the local market.

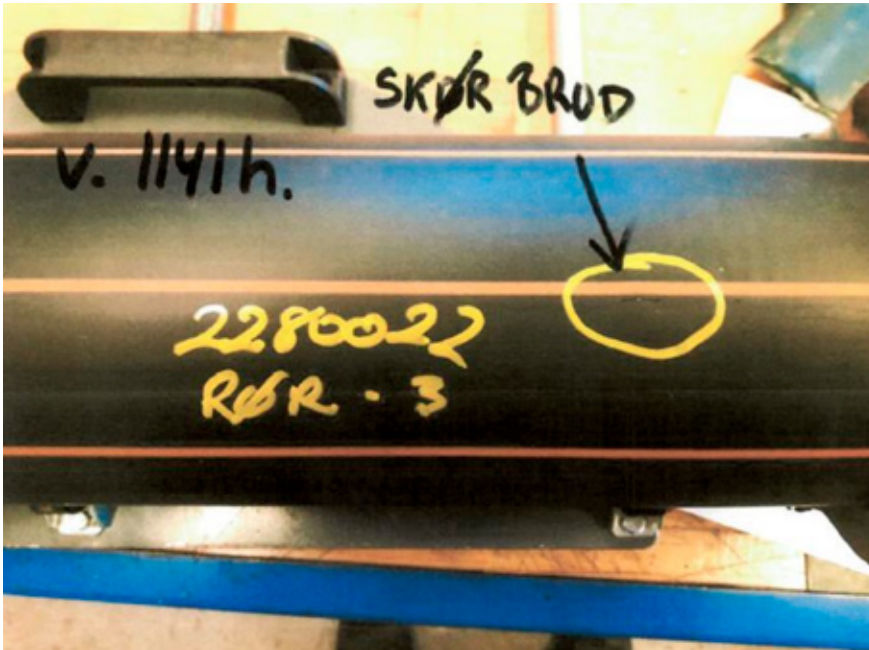
He points out that the relevant HDPE pipe standards only allow for the inclusion of reprocessed material originating from a manufacturer’s own, in-house production scrap. Since no pipe manufacturer generates 20% internal waste, any pipe labelled as 80/20 will, by default, contain external recycled material – making it non-compliant with the national product standards and SAPPMA’s Code of Conduct.

Tests using recycled plastics

Pipes must undergo a pressure test to test their “hoop strength,” and this is where plastic made for this purpose shines. A pilot study in Denmark



This PVC 200 mm pipe used 45% recycled plastic in its middle layer. While this pipe did pass the 1000 pressure test, it is still not suitable to transport drinking water due to the possibility of material migration



The 110 mm pipe with recycled material showed a brittle failure, this illustrates that this pipe is not suitable for pressured environments

tried three different 110 mm pressure pipes, one with 25%, one with 60%, and one with 75% recycled materials. All three failed the pressure test. The study then repeated this with a 25% recycled material pressure pipe using pelletised plastic and this did allow the pipe to pass the 1000-hour pressure test, but Sejersen adds, “only barely.” It is important to note that this pipe had a ‘brittle failure’ as opposed to a ‘ductile failure’ once again highlighting that recycled material is not suitable for pressure pipes.

Other pipes with varying degrees of recycled material were tested:

- 315 base, 200 mm connection pipe using 60% recycled material. One connection passed, the other failed the 1000-hour pressure test.
- PE Twin Wall, 315 mm pipe. One with 100% recycled material in the outer layer, and one with 50% in the outer layer. Both production runs failed the 1000-hour pressure test.
- PP 200 mm pipes with 45% recycled material. These failed the 1000-hour pressure test.
- PVC 200 mm with 45% recycled material on the middle layer: This passed the pressure tests.

Sejersen stresses that, “Some of the products did pass the pressure test, if only barely, but it is also important to note that recycled material is not suitable for drinking water pipes.

Drinking water must be clean and be free from any plastic migration from the pipes. When using recycled materials, you do not know the source and it could be coming from packaging materials from pesticides or other toxic substances. These substances will migrate into drinking water making it unsafe.”

“The use of recycled material from external sources in pressure pipe systems is strictly prohibited for a reason. It drastically compromises the performance and lifespan of the pipe, and when used for potable water, it could have serious health implications. Our industry cannot afford to cut corners for the sake of cost-saving. The long-term risks and financial consequences are simply too high,” Venter warns.

The opportunities of recycled plastic

While not suitable for pressure pipes or drinking water pipes, recycled plastic can be used in non-pressure pipes not used for drinking water. Non-pressure pipes are used for sewers, stormwater, as well as land and building drainage.

“As the world embraces circularity and sustainability, there is a definite use for recycled plastics in non-pressure pipes. Our tests show the theme to be perfectly suited for this job,” says Sejersen, “it is also important to understand why we

should look at recycled plastic where possible.”

“The manufacturing of plastic pipes accounts for nearly half of the carbon dioxide of an entire project including installation,” says Sejersen. From this understanding, the use of recycled materials where possible becomes imperative to carbon savings. This is also where the introduction of biobased materials or chemical recycling – a process that transforms plastic to oil – can be used to mitigate the harm of plastics used in pressure pipes. “While non-pressure pipes can benefit from recycled plastics, we must still look into reducing the impact of pressure pipes by means other than traditional recycling.”

In Europe, plastic production is decreasing while in Africa it is increasing. Drawing on Europe as an example, in 2022 they produced 400 Mega Tonnes (MT) of plastic, while recycling 50 MT of plastic in the same year. South Africa produces about 2,5 MT of plastic per year and recycles 430 000 tonnes (0,4) MT. Both places are comparable as Europe recycled 19% of its plastic production, and South Africa recycled 17% of its total production.

This figure shows that there is room to grow, and using recycled plastics in non-pressure pipes is a step forward to reduce South Africa’s carbon impact. ●

CONSEQUENCES OF USING RECYCLED PLASTIC IN PRESSURE PIPES INCLUDE:

- **A drastically shortened operating life**, resulting in unexpected and costly failures.
- **Disruption of critical services** due to premature pipe bursts or leaks.
- **Health risks**, especially when used to convey drinking water.
- **Legal and reputational risks** associated with transgressing standards.



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Lessons from the mining sector

While mining operations depend on water, so do the communities in which they operate. **Kirsten Kelly** speaks to Steve Bartels – a partner at SRK Consulting – about water stewardship, and lessons learnt from the mining sector.

The mining industry uses water for mineral processing, dust suppression, cooling systems, tailings management as well as drilling and rock cutting. “Without water, a mine will shut down, water is critical to their existence. So wherever

possible, water is recycled back into a mine’s processes. They use a lot of technology to either utilise less water in their processes or recycle that water. Furthermore, many mines have surface water catchment systems and often make use of groundwater resources. Depending on a region’s hydrogeology, an underground mine may have to manage significant water inflows simply to maintain operations and often find a way to divert that water to other uses. A lot of mines have embraced the principles of the circular economy,” says Bartels.

He adds that it all comes down to a water balance. “Mines will evaluate the inputs of water, the amount of water already in the system, how much water their processes consume and the volume of water that can be either recycled or added

to the system again. “Because of their reliance on water, mines have become increasingly conscious of how they use this resource.”

Large scale water reuse

Bartels believes that while many South African mines and other industries may have embraced water reuse, South Africa lags in large-scale water reuse adoption. This is compared to global leaders in water recycling, such as Singapore and Israel – where wastewater is treated and reused for industrial processes, irrigation, and even potable water supplementation. “It is not a pleasant thought to imagine that the water you are drinking has already gone through a number of other people’s bodies, but we need to remember that the natural water cycle works the



Steve Bartels, partner at SRK Consulting

same way. There are many technologies available to treat water to potable standards, in fact, treated wastewater is often of a higher quality than the water in our rivers and dams."

As a water stressed country with a growing population, it is shortsighted to not fully explore water reuse on a larger scale. The recharge of water is not infinite. South Africa receives significantly less rainfall than the global average. The country's average annual rainfall is about 464 mm, which is well below the global average of approximately 990 mm. Rainfall distribution is highly uneven, with the eastern regions receiving more precipitation (up to 1 000 mm annually) and the western parts, such as the arid Karoo and Namib Desert, getting as little as 100 mm per year.

"Day Zero in Cape Town in 2018 would have been less severe if existing wastewater treatment plants had been equipped with technology to treat wastewater for reuse. Fortunately, today, the city is in the process of implementing three water reuse schemes; the Atlantis water resource management scheme, the Cape Flats managed aquifer recharge scheme and the Faure new water scheme," states Bartels.

Bartels further comments on the eutrophic conditions resulting from the discharge of poorly treated wastewater, which has led to the excessive growth of hyacinth and water lettuce in many of South Africa's dams. "If we consider water reuse and look at our wastewater as an actual resource, our water quality would improve."

Technology

Generally, the technology required for water reuse is expensive and has a high energy requirement. When balancing the cost of a water reuse project with the need to save water, one needs to consider both the operational, maintenance and capital expenditure of the project. There is also always an environmental trade off. For example, the brines from desalination plants and reverse osmosis plants need to be disposed of and many chemicals are used to treat effluent for reuse.

But Bartels adds that technology is progressively making water reuse more efficient and cost effective, reducing environmental impacts. "SRK Consulting recently held a global conference where I attended a workshop on filtered tailings plants. Tailings are often made into a paste and then pumped to a storage facility. However, this process uses a lot of water. Typically, tailings are pumped into a dam, solids are settled out and the water is reclaimed through penstock lines and filtered back into the plant. Overseas, tailings go through a filtered press, removing the water and creating a filter cake that could be dry stacked or taken to a waste dump facility, improving water recovery. Furthermore, tools including artificial intelligence and digital mapping are stepping in to mitigate and manage essential tailings dam infrastructure."

"There are cases where mines cover the cost of municipalities conveying partly treated wastewater to



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facilities to use in a mine's processes," he states.

Legislation

Mines have also learnt to navigate a detailed legal framework and have even formed their own standards around waste and water management. The Water Act, Waste Act and National Environmental Management Act (NEMA) are three key pieces of legislation that govern the mining industry's approach to water use and waste management. "One would consult NEMA when developing environmental impact studies, the Waste Act when managing tailings

and classifying waste as well as determining the appropriate barrier systems and management required. The National Water Act will determine how much water a mine will extract from the environment, how and where water should be stored as well as the quantity and quality of effluent that can be discharged into the environment. This is rigorously controlled by a mine's water use license," explains Bartells.

Most mining houses responsibly manage their water use and are signatories to the International Council on Mining and Metals – a CEO-led leadership organisation, on

the premise of improving sustainable development in the mining and metals industry. The ICMM has developed a Water Stewardship Framework, which includes practical guidance, adopts a catchment-based approach to water management.

"Then there is the Global Industry Standard on Tailings Management (GISTM) that has a huge social responsibility component around protecting the environment as well as the communities' surrounding mines," says Bartells.

"As South Africa continues to face growing water scarcity, the mining sector's evolving approach to water stewardship offers valuable insights for industries and municipalities alike. From embracing circular economy principles and advanced technologies to navigating complex legislation and prioritizing environmental responsibility, mines are proving that sustainable water management is both possible and essential. While SRK Consulting has a strong mining division focused on mineral extraction, we also offer expertise in environmental, social and governance matters, supported by specialists in soil contamination, groundwater, hydrology, and geohydrology. Our global presence enables us to take a holistic approach and assist clients across industries with effective water management," concludes Bartells. ●



NEW STORMWATER PIPES FOR ZIMBABWE

Tefoma Construction selected Rocla's spigot and socket stormwater pipes for use on the Mbudzi Interchange Project that is currently being constructed south of Harare in Zimbabwe.

Robert Hill, sales manager of the Infrastructure Specialist Group of companies (ISG) which includes Rocla says: "Our spigot and socket stormwater pipes were selected for this project due to Rocla's reputation for the design and manufacture of high quality and durable stormwater solutions. The spigot and socket system is specifically designed to handle high-pressure environments while maintaining their structural integrity despite any demanding conditions."

"We know that Rocla products undergo rigorous quality assurance testing to comply with industry standards, and this makes them a highly recommended source of supply. Both the Harare City Council and the project consultant approved Rocla's spigot and socket option. No project is without its challenges and there were a few logistical issues that had to be overcome in the delivery of the pipes, but Rocla's team ensured that they were delivered on time," adds Chris Muzondo, Commercial Manager of Tefoma Construction.

The original Mbudzi Roundabout had become an inefficient and outdated traffic system. As a result, the Zimbabwe Government's Ministry of Transport and Infrastructural Development has embarked on a project to develop a modernised Mbudzi traffic interchange in order to alleviate severe congestion and reduce travelling time. The Mbudzi Interchange Project entails the modification of the Mbudzi Roundabout with the development of a flyover, and which includes the building of 15 bridges with 13 directly on the interchange itself.

"We supplied 29 x 1200 mm pipes and 29 x 1350 mm of 100D spigot and

socket stormwater piping which in total measured 141 m. The spigot and socket design ensures easy installation with a reliable watertight connection that minimises the risks of leaks making them the perfect choice for such projects," adds Hill.

Spigot and socket stormwater system

The spigot and socket pipes comprise a rubber ring joint pipe which is a watertight pipe for use in sewer applications where aggressive groundwater is kept out of the system, or aggressive system contents are kept within. The spigot and socket type joint is formed with a widening of the wall of the pipe on one end.

The rubber ring system used comprises a rubber 'O' type ring, which is located on the tip of the spigot end of the pipe. When the pipes are joined, the rubber ring is compressed and rolls away from the tip down the barrel.

No lubrication is required, nor should it be used. The seal is formed between the socket (or female end) and the outside of the spigot (or male end).



Robert Hill, Sales Manager for Infrastructure Specialist Group of companies (ISG)



Spigot and socket stormwater pipes were selected for this project due to Rocla's reputation for the design and manufacture of high quality and durable stormwater solutions

Stormwater and sewer pipes are manufactured and tested according to the requirements laid out in SANS 677 (concrete non-pressure pipes) and SANS 676 (concrete pressure pipes).

The pipes are supplied in lengths of 2.44 m or 1.22 m and in 50D, 75D and 100D strength classes. Customised special strength designs can be accommodated.

The Rocla spigot and socket stormwater solutions have also recently been applied to the main sewer line repairs at Queen Nandi Drive, KwaZulu Natal after recent flooding in the area, as well as to projects in Cape Town and Mozambique. ●



As water scarcity intensifies, businesses are rethinking how they use every drop. **Kirsten Kelly** talks to Wayne Taljaard, the MD of WEC Water about water reuse.

REUSE RETHINK: saving water, securing operations

“**T**he upfront cost of water reuse is more expensive than simply using municipal water. However, water reuse provides valuable water security, safeguarding a business’ operations against intermittent water supply. Downtime due to water shortages can halt production processes, lead to lost revenue, unfulfilled orders, and increased operational costs,” says He adds that water reuse plays a significant role in attaining Sustainable

Development Goal (SDG) 6: clean water and sanitation. “By treating and reusing water, businesses and communities reduce their reliance on freshwater sources, protect ecosystems, and contribute to long-term environmental stewardship. It is far too easy to discharge effluent down a drain and make it someone else’s problem. Companies that actively reduce their discharge volumes and reuse water not only protect their operations from disrupted water services, but also demonstrate a strong commitment to environmental responsibility and social sustainability.”

Tackling the cost of reuse

Taljaard believes that a company should firstly conduct a water audit; looking at where water is used in their systems and day to day operations and the quality and quantity of water needed. “In reuse, water treatment can be tailored to fit the intended use – saving resources by not over-treating water where it’s not necessary. For instance, water

used for cleaning floors and equipment may not need to be as highly treated as water used as a raw material in a manufacturing process.”

By matching the treatment level to the specific application, the company can save on treatment costs, reduce freshwater demand, and lower wastewater discharge.

However, the opposite applies to domestic potable reuse that must be SANS 241 compliant. There has to be zero risk of contamination with multiple treatment barriers in place.

“Unfortunately, many of our wastewater treatment plants are not running efficiently and effectively. Therefore, any post treatment steps for water reuse could be significantly more expensive. To drive down the cost of water reuse at a municipal level, wastewater treatment plants should run as optimally as possible,” explains Taljaard.

With package plants, the cost of water reuse will always be impacted by scale. When looking at the cost per litre, treating



Wayne Taljaard,
MD of
WEC Water

50 m³ of wastewater will always be far more expensive than treating 500 m³ of wastewater.

Projects

Over the years, WEC Water has been involved with multiple water reuse projects. Most recently, they have installed a small treatment plant at a shopping centre for grey water recovery, assisted mines in reusing water in their processes and for dust suppression and have worked on a housing development in Zambia where wastewater is treated to be reused for irrigation.

One of WEC Water's most prominent water reuse solutions is an off-grid, non-sewered sanitation system (NSSS) that treats black water and basin water to a standard suitable for flush water. The NEWgenerator is a compact, off-grid, modular sewage treatment solution that can be housed inside a refurbished shipping container. It incorporates an anaerobic bioreactor to treat biological matter and breakdown solids, ultrafiltration to remove solids, sequential nutrient capture tanks, and chlorine disinfection. The NEWgenerator has been installed at various schools and undergone extensive pilot testing at different sites around South Africa.

WEC Water have recently been awarded a zero liquid discharge (ZLD) project for a large industrial client. ZLD is a strategic wastewater management system that ensures that there will be no discharge of industrial wastewater into the environment. It is achieved by treating wastewater through recycling and then recovery

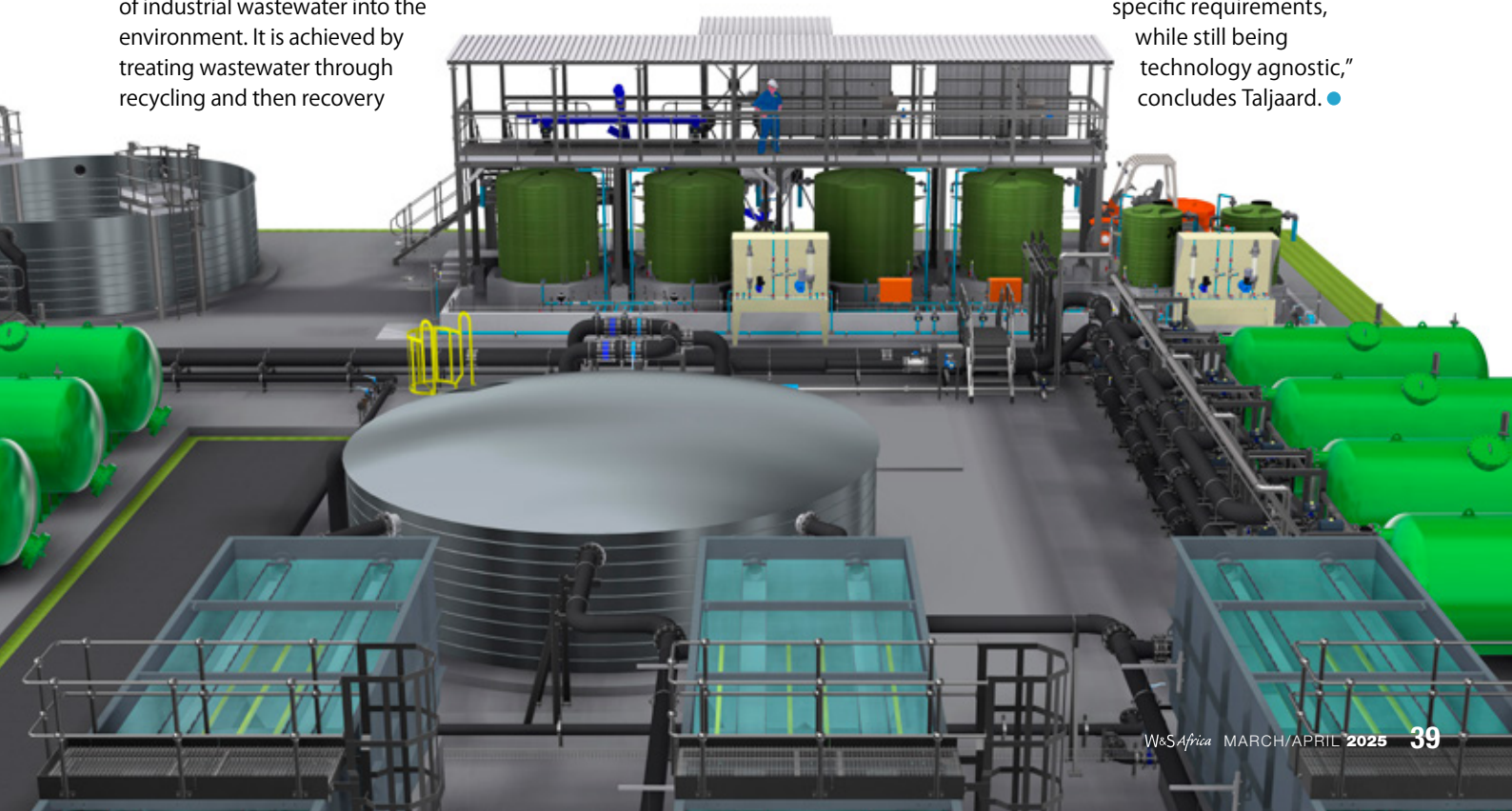


and reuse for industrial purpose. "There is a growing interest in ZLD technologies across industries such as mining, power generation, and manufacturing, as companies seek resilient and responsible water management solutions to adapt to stricter environmental regulations and the increasing threat of drought," states Taljaard.

He adds that water reuse is not a plug and play solution, and technologies and approaches will differ with every case. "There is an expectation that contractors should take on the bulk of the financial risk of projects such as these, but in theory, the client is generating this wastewater and there needs to be a shared risk. The Durban Water Recycling Project is a great example of a large scale water reuse project. There is enough industrial activity in South Africa that can create a healthy demand for treated wastewater. I am encouraged to see a

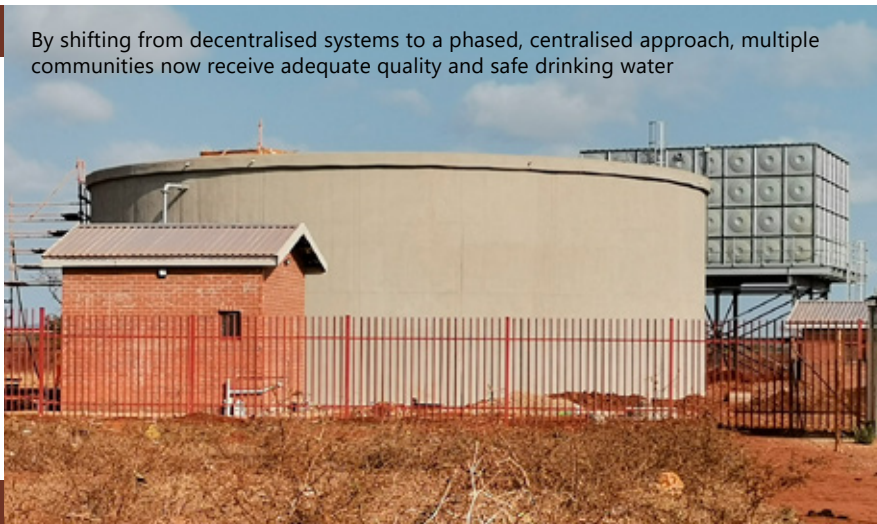
request for proposal for a public private partnership for the design, finance, construction, operation and maintenance of a wastewater treatment plant in Umkomaas and Umdloti that will include a water reuse element. There is certainly a growing appetite for large scale water reuse projects."

When implementing a water reuse project, WEC Water provides a turnkey service. The company specialises in engineering bespoke options that are designed to meet the exact requirements of a client, finding solutions for projects in complex locations with complex operating parameters. "We walk the path with our clients from a project's inception. The WEC Assist program even assists clients with the operation and maintenance of a client's plants once commissioned. Our experience in different industries gives us the ability to tailor a solution to match a client's specific requirements, while still being technology agnostic," concludes Taljaard. ●



A major upgrade to the Masibekela water treatment works supports Sustainable Development Goal 6, improves efficiency, and ensures reliable, safe drinking water for villages long affected by scarcity and outdated systems.

By shifting from decentralised systems to a phased, centralised approach, multiple communities now receive adequate quality and safe drinking water



Centralised water network transforms access in Driekoppies region

“**O**ur recent work on the Masibekela water treatment works, under the Sibange Regional Water Scheme Project, which feeds multiple villages, including Sibange, Madadeni, Ntunda and Sikhwhlane, underscored the importance of creating a centralised water network.

“While some areas had dedicated systems in the form of package plants that would deliver between one and two megalitres a day, most residents in the area did not have access to clean drinking water. The package plants were also exhausted owing to limited sources, while some communities were served by water tankers and others had their supply rationed,” James Mhanda, an engineer at Lubisi Consulting Engineers, states.



Reliable access to clean water for Mpumalnga’s communities, fostering public health, and supporting sustainable growth

Phased and centralised

By shifting from decentralised systems to a phased, centralised approach, multiple communities now receive adequate quality and safe drinking water. “This initiative aligns closely with Sustainable Development Goal 6, which aims to ensure the availability and sustainable management of water and sanitation for all. It also revealed that centralising water supply is not just a logistical choice, but an essential strategy for sustainable development,” adds Mhanda.

By establishing comprehensive water treatment works, interconnected pipelines, pump stations, and strategically placed reservoirs, the region is moving closer to a future where every household has reliable access to safe drinking water.

Mhanda adds that feasibility studies undertaken during the project emphasised the need for robust infrastructure, including primary and secondary pipelines and reservoirs. These systems facilitate gravity-fed delivery, reducing energy costs and enhancing overall efficiency. Lubisi Consulting Engineers also prescribed the implementation of real-time water quality monitoring systems to ensure that the water supplied to surrounding communities from this project meets stringent health standards before reaching consumers.

“The transition to centralised water supply systems represents a proactive approach to managing one of our most vital resources,” he notes. By investing in comprehensive infrastructure development, Mpumalanga is ensuring reliable access to clean water for its communities, fostering public health, and supporting sustainable growth.

“As we move forward, continuous assessment and adaptation will be key to meeting the evolving needs of populations while safeguarding our environmental resources,” Mhanda concludes. ●



James Mhanda, Engineer at Lubisi Consulting Engineers



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Melting ice can seem far removed from South Africa, but it threatens our coastlines and water security

MELTING GLACIERS: SHOULD AFRICA CARE?

The United Nations has designated 2025 as the International Year of Glaciers' Preservation. But the the image of vast ice sheets melting might seem like a problem for Greenland or Antarctica, not Africa.

However, Africa is *deeply* affected, often more than places closer to the ice. Currently, the only remaining glaciers on the continent exist on Mount Kilimanjaro (Tanzania), Mount Kenya (Kenya), and the Rwenzori Mountains (Uganda and the Democratic Republic of Congo). If climate change continues at its current pace, all three will disappear by the 2040s, according to a new multi-agency report published this month by the World Meteorological Organization (WMO), with support from the United Nations.

Africa is exceptionally vulnerable to climate variability and change compared with many other regions. Over

Mountain glaciers account for 60% of the water flow of the Earth



the past 60 years, Africa has observed a warming trend that has become more rapid than the global average. The continent is experiencing deadly heatwaves, heavy rains, floods, tropical cyclones, and prolonged droughts.

Alarmingly, glaciers and permafrost (frozen ground) can trap organic matter – plants, soil, microbes – from thousands of years ago. When glaciers melt, this trapped material is exposed to oxygen and microbes. As it decomposes, it releases carbon dioxide (CO₂) and methane (CH₄) – both powerful greenhouse gases. This has the potential to release up to 1 600 billion tons of carbon currently locked in glaciers and permanently frozen ground.

Glaciers, water, and you

The United Nations Educational, Scientific and Cultural Organization (UNESCO), a specialised agency within the United Nations, says “glaciers play an integral part in regulating weather patterns, and a providing water, whether it seems that way or not we all live downstream.”

Amani, director of the Division of Water Sciences and secretary of UNESCO's Intergovernmental Hydrological Programme

UNESCO released a report stating that retreating glaciers could threaten the lives of 2 billion people. Abou Amani, director of the Division of Water Sciences and secretary of UNESCO's Intergovernmental Hydrological Programme, adds, "25% of the Earth's surface is made of mountains, this provides 60% of the annual freshwater flow, and the unprecedented rates of glacial retreat threaten the global climate as well as the billion people who rely on them as a water source."

Glaciers are not just the large ice blocks floating in the Arctic, but rather any collection of ice and snow that moves. Alpine glaciers are the focus of discussions around climate change. Amani says, "When we speak about how climate change affects the Earth, we must also discuss how the Earth affects climate change. These alpine glaciers also influence the global climate, regulating temperatures and currents, the disappearance of these glaciers would affect the entire world."

Although Africa's glaciers are small in comparison to glaciers found in other parts of the world, they still have a vital role in the continent's ecosystems and water systems, contributing to river flow in dry seasons, and supporting agricultural practices and livelihoods in the areas. The Rwenzori Mountains feed into river systems that provide water to communities in Uganda and the Democratic Republic of Congo, while Mount Kenya helps sustain ecosystems and agriculture in the surrounding region. Importantly, South Africa does rely on glacial water. The Drakensberg region and Lesotho, which supplies water to South Africa, rely on glacial accumulation and melt for their 'water budget.' A global increase in



Global food security is at stake; glacial retreat is not a localised problem

temperatures could lead to these systems not providing the water that South Africa relies on worsening droughts and further stressing an already water-scarce region.

Rising sea levels also threaten the coasts of South Africa, which are economic hubs and are home to a sizable portion of the country.

Agriculture

The UNESCO report makes specific warnings about global food production. "We live in a global society; food is not region-dependent and relies on global logistics. The glacial retreat is a direct threat to feeding the people of the planet," adds Amani. The loss of these natural water producers threatens communities who rely on them for agriculture and cultural

practices. UNESCO posits that the loss of these glaciers would pose a direct threat to livelihoods, and cultures, leading to social harm on top of social harm.

While we face the reality of climate change UNESCO says that it is important that there is a global unity to fight climate change. "Preserving our environment as we move to climate-reliant practices and relying on the circular economy, are all ways we can reduce the more severe impact of climate change. It takes the entire planet to change the climate, it will take the entire planet to stop it," says Amani.

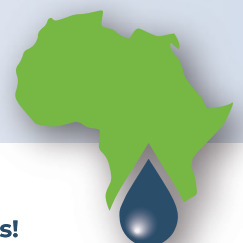
South Africa must face climate change head-on, understanding that melting glaciers in countries far away, and close to home, impact the entire world. ●



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Mines in South Africa, especially those extracting gold, platinum, and chromium, often extend beyond one kilometer deep. However, strict commercial and operational confidentiality makes access difficult, limiting independent scientific and hydrogeological research at such depths

DEEP GROUNDWATER:

A hidden asset or a Pandora's box?

Deep groundwater has re-emerged not just as a subject of scientific interest, but as a potential game changer in addressing water security, climate, and energy challenges.

Globally, new frameworks are reshaping how we understand the water cycle, particularly the vast, ancient groundwater systems lying beneath the Earth's surface.

By Yazeed van Wyk, research manager, WRC

Research into this so-called "hidden hydro geosphere" is challenging long-held assumptions that all groundwater eventually discharges to rivers, lakes, or oceans. These deep, often saline, and isolated waters, some dating back hundreds of millions of years, are untouched by modern recharge and may lose life adapted to extreme conditions.

They also contribute to geochemical cycles and contain critical resources

Yazeed van Wyk,
research
manager, WRC

like helium, hydrogen, and lithium, increasingly vital to the global energy transition. As interest in carbon sequestration, radioactive waste disposal, and deep subsurface exploration grows, so too does the need to understand the rates and processes that govern these ancient (fossil formation) water systems.

But for all its promise, this hidden hydro geosphere is also a potential Pandora's box. Tapping into it without a clear understanding could risk contamination, irreversible changes to deep geological systems, or long-term environmental damage. What we do not know about deep groundwater may prove just as dangerous as what we do.

Pandora's box

This is where the use of multiple tracers, both environmental and artificial, becomes necessary. Just as oceanographers have long used the concept of residence time for different dissolved components to understand ocean circulation, hydrogeologists are now adopting similar approaches to decipher the complex age structure of groundwater systems. Ages derived from physical flow



Research into this so-called "hidden hydro geosphere" is challenging long-held assumptions that all groundwater eventually discharges to rivers, lakes, or oceans

models often differ from those derived chemically, and integrating these perspectives allows for more robust interpretations. Environmental tracers, including stable isotopes, radiocarbon, tritium, and noble gases, allow us to identify not only the "mean" age of a groundwater body but also its youngest and oldest components. It is often the youngest drop, not the average age of groundwater, that holds the key to understanding an aquifer's vulnerability. Even so-called ancient and safe aquifers may be at risk if young, potentially contaminated water is able to infiltrate through protective layers like the vadose zone and reach deeper groundwater systems. Conversely, noble gas isotopes such as ^4He , ^{21}Ne , and ^{129}Xe have revealed the presence of billion-year-old water in systems like Kidd Creek in Canada and Moab Khotsong in South Africa's Witwatersrand Basin, offering a rare glimpse into Earth's deep geologic past and even its prebiotic condition.

This global conversation is particularly relevant to South Africa, where deep

groundwater is typically defined as anything deeper than 100 to 300 meters. Despite this shallow definition compared to international contexts, we know surprisingly little about the nature, quality, and flow dynamics of these deeper zones let alone those at kilometre depths. This knowledge gap has major implications in a water-scarce country where pressures on surface water and shallow aquifers are intensifying. In this context, understanding deep groundwater should not be seen as a mere academic exercise but essential for national planning and policy. Deep aquifers could serve as strategic reserves during prolonged droughts, augment water supplies for remote or industrial regions, or support low-carbon geothermal energy systems. They also pose legal and regulatory challenges that South Africa's water governance frameworks must begin to anticipate.

Deep drilling

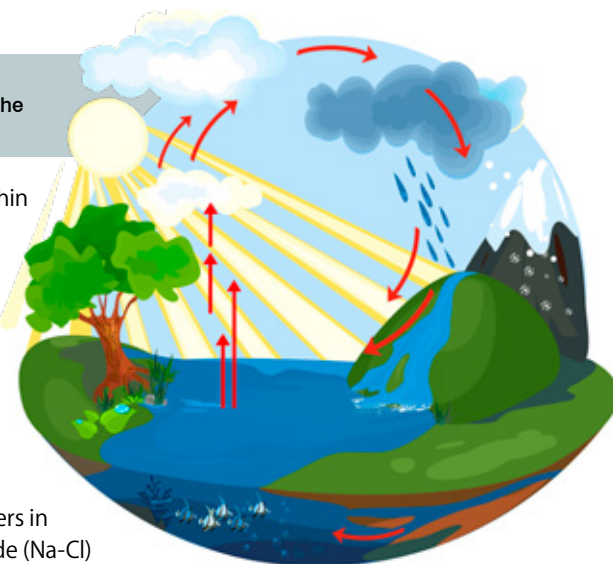
While mines in South Africa particularly gold, platinum, and chromium operations often reach depths of one kilometer or more, these mines are typically governed by strict commercial and operational confidentiality. As a result, accessing such sites for independent scientific study can be challenging, limiting opportunities for hydrogeological research at depth.

That is what makes a recent deep drilling initiative into the Bushveld Igneous Complex (BIC) particularly significant. Unlike mining driven access, a WRC funded project, conducted by Stellenbosch University, was structured specifically for hydrogeological research. The initiative drilled to depths of 950 m and successfully characterised deep,

Globally, new frameworks are reshaping how we understand the water cycle

fracture-controlled aquifers within the eastern limb of the BIC. Groundwater inflows between 800 and 950 m were observed, with geophysical logging and borehole imaging confirming the role of dykes and faults as conduits for structurally controlled flow. The shift from calcium magnesium bicarbonate (Ca-Mg-HCO_3) waters in shallow zones to sodium chloride (Na-Cl) dominated waters at depth indicates long residence times and mineral rich, isolated systems. The data also suggests that shallow and deep aquifers are likely to disconnect a key finding for groundwater protection. What makes this borehole even more valuable is that it is being preserved for future tracer studies, including noble gas analysis once conditions stabilise. Interestingly, drilling also revealed methane and other gases, even dark, odorous fluids hinting at deeper geothermal or abiogenic processes. These surprises raise new questions about gas migration, fluid pathways, and heat flow in one of the world's largest layered intrusions.

Without such scientific baselines, policymakers may be flying blind. While the research only captured a snapshot of what lies below, it provides the first formal hydrogeological characterisation of deep fractured aquifers within the Bushveld Complex and establishes a foundation for future research, including groundwater resource assessments, geothermal energy exploration, and



improved geological conceptual models. What is more, this opens the possibility of strategically deploying multiple tracers in future deep boreholes across the region not only to assess recharge dynamics and mixing processes but also to define the vulnerability of these systems to anthropogenic activity.

The integration of tracer data makes it possible to identify not just average groundwater ages, but also the critical youngest and oldest fluid components. Understanding this age structure is crucial for evaluating the feasibility and long-term safety of initiatives such as deep waste repositories, hydrogen extraction, and investigations into the deep biosphere.

If South Africa is to meet its water and energy goals under the National Water Resource Strategy or align with the Sustainable Development Goals (SDGs), deep groundwater research must move from the margins to the mainstream. Scientific evidence from projects like these can help refine licensing, prioritise areas for strategic reserve development, and set more realistic protection zones for vulnerable aquifers. The BIC, long known for its mineral wealth, is now revealing insights about deep groundwater storage, flow, and connectivity in fractured rock settings that might reshape how we define "secure" water sources in the decades ahead. Whether these sources are a hidden asset or a Pandora's box may well depend on how effectively we use our tracer tools to look closely into their complex past and how wisely we act to preserve their uncertain future. ●



Deep groundwater is typically defined as anything deeper than 100 to 300 m

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WHAT LIES BENEATH: DRILLING A BOREHOLE INTO THE GAUTRAIN TUNNEL

Groundwater is an invisible resource and is misunderstood. It accounts for 13% of South Africa's water use, yet half of the country's municipalities, particularly those in drier areas, are reliant on it for their water supply. **By Dr Roger Parsons, a groundwater consultant**



Despite being the only source of water for many, groundwater is mostly relegated to a distant second place by the water supply fraternity. Dams are easier to manage, and desalination seems to be an obvious solution to some, despite both having significant drawbacks.

But every so often, groundwater makes headlines, as it has recently, after a borehole was drilled into a Gautrain tunnel between Park and Rosebank stations. This has sparked a great deal of comments and opinions, many of which are inaccurate.

The drilling of a borehole into the Gautrain tunnel could have been a massive disaster, for the contractor if they had hit the powerlines; and

for the commuters if the train had hit the drilling stem and bit as it penetrated the tunnel. Calls for new laws to prevent this happening again are pointless. Land use above the tunnel is already restricted by means of a servitude which, according to available information, restricts the drilling of boreholes. The landowner ignored this (either intentionally or otherwise), as did the neighbors and the drilling contractor. It is not yet clear whether a consulting hydrogeologist was involved.

While we debate what needs to be done, we should not forget that the current frenzy of drilling in and around Johannesburg is a direct result of failures in service delivery. One only has to read the papers to appreciate this. But two wrongs do not make a right.

Groundwater and the law

The National Water Act 36 of 1998 (NWA) does not require permission to be obtained before drilling a borehole. It focuses on the registration and licensing of water use. Some municipalities have such a requirement in their by-laws, but these are often ignored (again either intentionally or otherwise) and generally not enforced – until a crisis arrives. The relevant by-laws can be hard to find and confusing.

In Cape Town, the water by-laws amended in 2018 are readily accessible; while in Johannesburg regulations concerning borehole drilling are primarily outlined in the Public Health By-laws (2010) and the City of Johannesburg Land Use Scheme (2018), rather than the Water Services by-laws. The City of



Tshwane has prohibited the drilling of boreholes in areas underlain by dolomite, because of the increased risk of sinkhole formation, but I could not find this in any of their by-laws; only as statement on their drilling application form. Nonetheless, written permission typically must be sought from the relevant authority at least 14 days before the intended date of drilling.

As the NWA has a tiered approach to water use authorisation to manage and protect our water resources, I suggest municipalities publish a land use hazard map that can be used to manage the drilling of boreholes. Without exception, municipalities do not have any hydrogeological expertise. This limits their ability to make informed decisions. However, with consultation, preparation of a land use hazard map would be a simple task.

In the case of the Gautrain incident, the servitude associated with the tunnel could be included on the land use hazard map; as would mining shafts, dolomitic areas, sensitive surface water features, contaminated areas, and any other potential hazards. Zones could be demarcated where no municipal permission is required to drill a borehole, municipal permission is required, and a hydrogeological assessment is required before drilling

can start. Such an approach would be more effective than promulgating new laws and would certainly be less administratively burdensome.

It must be noted that the devil lies in the detail. Drilling in an urban setting can be hazardous because of buried water and sewer pipes and other buried services such as electrical cables. Both the property owner and the contractor must be aware of the location of these hazards before drilling commences. Also, the quality and contamination status of the groundwater must be ascertained before the groundwater is used, irrespective of the intended use. This is only common sense. As highlighted earlier, some municipalities require that their permission be sought before drilling. Requirements differ, so it is best to check with the local municipality before drilling.

Water use authorisation

Some recent reports have misrepresented aspects of water use authorisation. There are no numerical limits associated with Schedule 1 water use. Water use is authorised under Schedule 1 if used for reasonable domestic use, domestic gardening not for commercial gain, animal watering, firefighting, and recreational use. If groundwater use exceeds 10 000 L/d then this must

be registered with the Department of Water and Sanitation (DWS) or the relevant Catchment Management Agency (CMA), where they exist.

Water use is not considered to be Schedule I use may be generally authorized. This means that water can be used without a license, but if more than 10 000 L/d has to be registered with DWS. General Authorisation is dependent on the abstraction limit of the catchment in which the use will take place and the size of the property, up to a maximum of 40 000 L/d. It is improbable that any groundwater use within urban limits will be authorised within this mechanism because erven are just too small. Accepting a General Authorisation of 75 000 L/ha/for most of Johannesburg and making a few reasonable assumptions, the volume of groundwater use permitted on an average erf amounts to just 20 L/d. A small holding of 1 ha would be permitted to abstract 205 L/d.

Any water use that falls outside of the provisions of Schedule 1 and General Authorisation is subject to a water use license. The drafters of the NWA recognized the need to only issue water use license in those instances where such water use could be detrimental to the resource and those dependent on it, including the environment. Unfortunately, in practice,





Given these realities, the question arises: Is the time, effort, and cost associated with protecting and managing groundwater resources justified? Rather than a simple "no," the answer must consider the context. During the Cape Town drought, concerns were raised that the proliferation of domestic boreholes would negatively impact underlying aquifer. However, detailed groundwater level monitoring across Cape Town indicated that neither the drought nor the increased borehole use had significantly impacted the aquifer (See DM 19/04/2022). While the situation in Johannesburg requires further investigation, decisions regarding groundwater management should always be grounded in measurement, monitoring, and analysis, rather than speculation and misinformation.

There is a large knowledgeable and experienced groundwater community that can provide guidance on these matters. Registration of hydrogeologists and drillers is imperfect and, as in all things, you get the good and the bad. But the fact checking process can start with the Ground Water Division (of the Geological Society of South Africa) and the Borehole Water Association of Southern Africa. Both organisations have useful information on their websites, including a list of registered groundwater specialists. Asking the right people the right questions at the right time would be a good start. ●

the conservative implementation of the NWA results in most water use being subject to a license.

Despite President Ramaphosa requiring water use licenses be processed within 90 days, the reality remains that it takes years for some water use licenses to be administered. During the Cape Town drought of 2015 to 2019 it took an average of 792 days to obtain licenses for 56 groundwater schemes implemented to keep critical facilities (mostly hospitals and clinics) functional in the Day Zero scenario. One license remained outstanding for 1 256 days

i.e., 3.5 years. And this was despite most of the water use being small (thus having insignificant impact, if any), having made special provisions with the authorities to fast-track the applications and the impending arrival of Day Zero.

I am told that the water use license application process has been improved. During 2023 to 2024 new applications were resolved within an average of 130 days. While this is still higher than the intended 90-day target and older applications remain unresolved, it suggests some progress in streamlining the process.





A UNITED APPROACH TO FIXING SOUTH AFRICA'S WATER SUPPLY AND SANITATION

Last year, the Association of Water and Sanitation Institutions in South Africa (AWSISA) was formed to promote better collaboration with entities that play a role in Integrated Water Resources Management (IWRM).

Dr Ndweleni Mphphu, Director at AWSISA, discusses this partnership within the water sector.

Comprising seven water boards, various catchment management agencies, the Water Research Commission (WRC) and the Trans Caledon Tunnel Authority (TCTA), AWSISA was formed to support the mandate of the Department of Water and Sanitation (DWS) while pursuing the common interests of its members along the water and sanitation value chain.

Challenges

"This is a structure that will promote better collaboration among waterboards. For example, collectively, water boards are owed over R25 billion by municipalities. It is far easier to ask for intervention from the Treasury as a unified voice, than

it is to individually deal with outstanding payments," says Mphphu.

Non-revenue water is a reason for the rising levels of municipal debt. The No Drop Report found that national non-revenue water rose from 37% in 2014 to 47% in 2023, surpassing the international average of 30%. This is caused by lack of maintenance, theft and vandalism. "The lack of maintenance results in municipalities being reactive and spending more time and money repairing burst pipes than preventative maintenance. Then there are illegal water connections, but this is often a result of a municipality's failure to provide water in that area. There is also the water tanker mafia, who deliberately sabotage water systems to attract business from municipalities," he adds.

Alarmingly, many municipalities do not have adequate data to even understand their water demand. This makes it nearly impossible to implement water conservation and water demand management programmes.

Another issue is declining water quality. The 2023 Blue Drop Report revealed that 46% of South Africa's water supply systems are microbiologically unsafe for consumption, indicating a significant decline in drinking water quality since 2014.

There is also escalating pollution of water sources that is mostly caused by the discharge of untreated or partially treated effluent by wastewater treatment plants that are failing. The most recent Green Drop Progress Assessment Report found that 64% of wastewater treatment works are at high or critical risk of discharging partially treated or untreated effluent into the environment, posing serious environmental and public health risks.

The need for collaboration

Mphphu believes that better collaboration can help address these challenges. "Water boards successfully supplying SANS 241-compliant water hold little value if many municipalities struggle to reticulate that water effectively to communities. We are not pointing fingers, we believe that water boards and municipalities should work together. Water boards have the skills and experience to provide assistance. The primary goal of AWSISA is to ensure that all communities, no matter where they are located, receive water. We want to help municipalities improve their No Drop, Green Drop and Blue Drop scores that will ultimately improve water provision to communities.



Dr Ndweleni Mphphu, director at AWSISA

AWSISA can provide an advisory role to the sector on all matters from an IWRM perspective and support municipalities in water services provision.”

Planning ahead

AWSISA has developed seven work streams to assist with various the challenges:

- Technical
- Finance – AWSISA can be involved in leveraging project financing through structures such as TCTA and the water board’s strong balance sheets.
- Innovation, research and development – AWSISA membership can lead innovation, research and development projects through structures such as WRC and share knowledge with WSAs
- Legal and risk management
- Human resources and labour relations
- Partnerships – fosters intra and global partnerships among AWSISA members
- Water resource management

They are also hosting a conference from the 9th November to 13th November at Emperors Palace, Gauteng, that will address critical

water and sanitation challenges while showcasing Africa-focused solutions and innovations.

AWSISA also approves of the draft National Water Amendment Bill that aims to strengthen accountability for water service providers and encourage transparency by introducing an operator’s licencing system. “There may be municipalities that do not qualify

for a license – the private sector and waterboards may then be called upon to provide such services. Existing water boards with a reputation for quality and competence are well placed to move into this space as they are familiar with the highly regulated water sector,” says Mphephu.

Water Day Message

DWS Minister Pemmy Majodina recently stated that water has been identified as priority number one as parts of the country continue to battle with supply. She went on to say that there is no substitute for water and that attention needs to be placed in terms of its provision. “AWSISA whole heartedly agree with this. For us, it is no mistake that World Water Day is celebrated a day after South Africa’s Human Rights Day. People have a right to water, and they have a right to clean water. With collaboration between waterboards, national government and municipalities and even other African countries, we can ensure that all people have water and dignity in terms of sanitation,” concludes Mphephu. ●



Water boards successfully supplying SANS 241-compliant water hold little value if many municipalities struggle to reticulate that water effectively to communities. We are not pointing fingers, we believe that water boards and municipalities should work together. Water boards have the skills and experience to provide assistance.”



JOHANNESBURG WATER'S PRV PROGRAMME: MANAGING PRESSURE, REDUCING LOSSES

Pressure reducing valves aid in the fight against water losses

To effectively manage water demand and minimise losses while ensuring a reliable and sustainable water supply, one of Johannesburg Water's key initiatives is the Pressure Reducing Valve (PRV) Programme.



A demonstration of the valves and how they work at Johannesburg Water

This programme, part of Johannesburg Water's ongoing Water Conservation and Water Demand Management Programme (WCWDM), is designed to alleviate strain on the city's water supply networks. A critical component of this effort is the maintenance and management of PRVs.

This initiative focuses on reinstating and refurbishing conventional pressure reducing valves that are currently non-operational due to vandalism and technical faults.

"Additionally, the organisation plans to install smart pressure controllers on key network zonal PRVs. These controllers will help manage pressure more effectively, reducing the incidence of bursts and leaks. Together, these interventions aim to lower high pressures in the system, decreasing minimum night flows and water losses," explains Logan Munsamy, senior manager for WCWDM and Technical Metering.

The WCWDM Programme also addresses other issues, such as leaking reservoirs,

on-property customer leaks, and the ageing infrastructure that contributes to water loss. Johannesburg Water aims to reduce water demand by 37,123 million litres per annum through these technical interventions, complemented by its water conservation initiatives.

"PRVs are essential components of the water supply system. Installed inline within pipelines, they regulate downstream pressure to ensure a consistent water supply over long distances, even pipes of varying diameters. Proper pressure management not only ensures efficient distribution, but also helps reduce physical losses, especially in older infrastructure. Therefore, maintaining PRVs is a critical focus area."

Each region in Johannesburg Water's Networks Department conducts PRV maintenance with a dedicated special services team, led by an operations manager and skilled artisan fitters, responsible for both reactive and preventative maintenance of PRVs.

Given the valuable materials used in PRVs, such as brass and copper, securing these components is vital to prevent theft and vandalism.

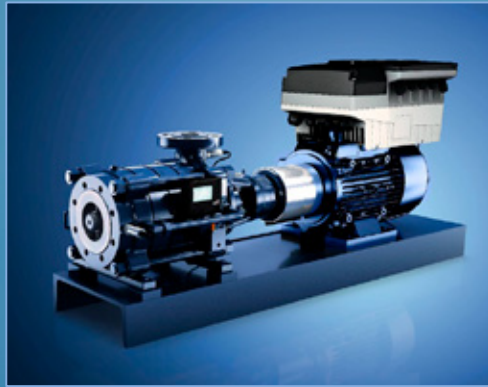
Johannesburg Water currently operates a total of 730 PRVs within the network. However, some of these valves are bypassed due to vandalism or require some maintenance and repairs. To address this, the company has established a framework contract to procure spare parts, enabling its teams to repair and reinstate PRVs more efficiently. In addition, the entity is implementing a project to install smart controllers in high consumption PRV zones. In the 2023/24 Financial Year, 15 units were installed, with plans underway to install an additional 12 units in the current fiscal year.

Through its PRV Programme and other initiatives, Johannesburg Water is dedicated to enhancing water management, minimising losses, and providing a reliable water supply for all residents. ●

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