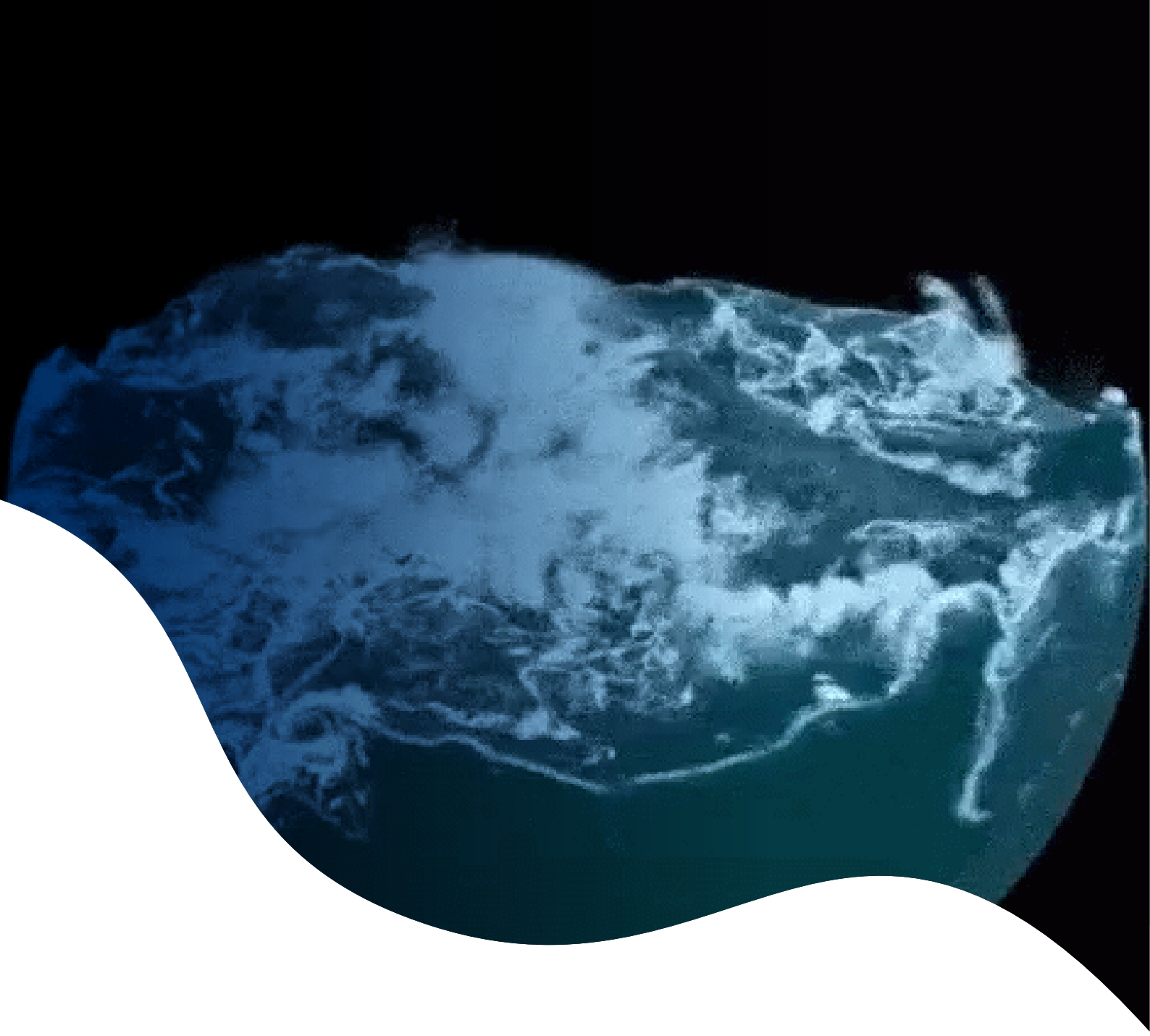
CSIR WATER RESEARCH CENTRE

WATER AND WASTEWATER INFRASTRUCTURE

CSIR

Touching lives through innovation



The CSIR Water Research Centre contributes to the provision of reliable, efficient and functional water and wastewater service delivery, in the interest of economic development, through the development and refinement of smart water use and infrastructure technologies for the public and private sectors.

The centre addresses shortcomings in water planning and accountability; infrastructure operation and maintenance; water treatment technologies and critical domain skills. It also focuses on dwindling water resources, deteriorating water quality, emerging water pollutants and lack of access to alternative water resource. The diverse team of experts are also able to provide advisory and engineering services that focus on both water and wastewater management issues.

ABOUT CSIR WASTE WATER AND INFRASTRUCTURE

The CSIR's research group for water and wastewater infrastructure focuses on research, development and innovation (RDI) that deliver solutions to the prevailing national challenges within the water and wastewater infrastructure space. In doing so, it collaborates with various tiers of government, higher education institutions, industries and other independent research institutions. The group comprises multifaceted teams to deliver applied research in sector water efficiency programmes and implementable smart technologies in the domestic, mining, and industrial space. For purposes of streamlining and alignment, the group delivers on RDI, design and optimisation, whereas construction and fabrication is primarily outsourced. The group provides a sound platform for testing and demonstrating water and wastewater infrastructure-related technologies.

OFFERINGS

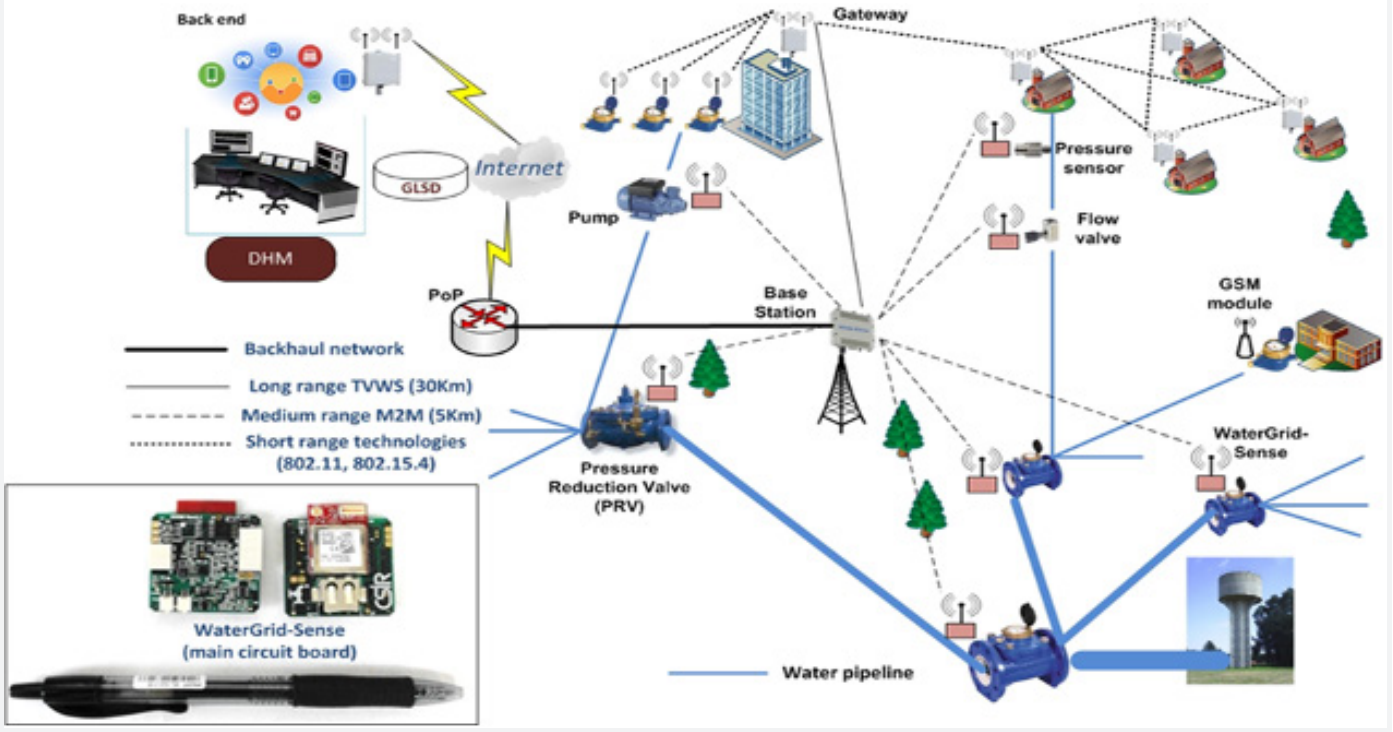
Validation and verification of infrastructure assets

- Infrastructure technical audit
- Infrastructure life cycle assessment
- Infrastructure mapping
- Blue Drop and Green Drop implementation
- Process and compliance audits

Designing of smart water infrastructure

- Improvement of the operation and maintenance of water infrastructure.
- Deployment of Internet of Things and fourth industrial revolution (4IR) technologies for water infrastructure.

Illustrative smart water network (SWN) based on the WaterGrid-Sense nodes



3.5 kL/hr dissolved air flotation (DAF) pilot plant at the CSIR

A 2.5 kL/hr high-rate clarification and filtration rig at the CSIR

Designing fit-for-purpose infrastructure for access to non-conventional water resources

- Spring water protection, access and treatment.
- Low-cost and viable acid mine water reclamation.
- Energy-efficient desalination processes.
- Decentralised/packaged water and wastewater treatment infrastructure for micro-grids.

Resource recovery from waste

- Valorisation of acid mine water.
- Valorisation of domestic wastewater.
- Domestic sludge beneficiation.

Capabilities

- Process engineering and design.
- Process modelling and simulations.
- Smart process integration.
- Water infrastructure mapping.
- Bulk water and water distribution network assessment and design.
- Hydraulic modelling of water networks.
- Water balance modelling.
- Process and compliance audits.
- Water and wastewater quality management.
- Blue Drop and Green Drop implementation.

INFRASTRUCTURE:

TECHNOLOGY OR INFRASTRUCTURE	POTENTIAL USE OR VALUE
Domestic sludge beneficiation pilot plant (Biogas)	Beneficiation of domestic wastewater sludge for biogas production, struvite synthesis and potable water recovery.
Acid mine water treatment demonstration plant	Treatment of acid mine water.
Valorisation of acid mine water technology – MASRO	Reclamation of drinking water and production of valuable minerals that have a myriad of industrial applications.
Gypsum to sulphur and limestone (Gypslim) technology	Treatment of gypsum to recover sulphur and calcium carbonate.
Chemical-free and energy-conservative water purification technology	Purification system for the decentralised water treatment and supply of safe water in rural and peri-urban areas.
Corrective action request and response system	Incident management system for municipal services.
Dynamic hydraulic model technology	Smart water distribution networks design, with improved operation and maintenance and non-revenue water reduction.
Dissolved air flotation unit	Treatment of high-strength industrial wastewater.
Point of use water purification technology	Household-based water treatment and safe storage system.
Advanced oxidation processes – photocatalysis and catalytic wet air oxidation	Treatment of refractory organic and inorganic compounds. Also, treatment of wastewater containing both organic compounds and heavy metals simultaneously, without the generation of sludge and toxic gaseous emissions.

Field of science: Water Resources Management, Environmental Science, Civil Engineering, Process Engineering

RELATED PROJECTS:

PROJECT TITLE	DETAILS	CLIENT/PARTNER/ FUNDER
CARRS technology	An innovative system that helps communities engage municipal authorities and ensures an improvement in water supply services through the proper operation and timely maintenance of municipal infrastructure.	Department of Science and Innovation
Biogas generation	Beneficiation of domestic sludge for biogas production and resource recovery.	Johannesburg Water
Spring protection	Infrastructure is erected and commissioned in the vicinity of springs to harvest, treat and store spring water for use by rural and remote communities with no access to reticulated drinking water.	Department of Rural Development and Land Reform
Demonstration of Magnesite-Softening-Reverse Osmosis (MASRO) technology	Recovering drinking water and minerals from acid mine drainage.	Exxaro Resources
WRC Decolouration Project	Investigations into the use of magnesite to remove pollutants from industrial wastewater.	Water Research Commission

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RELATED PROJECTS:

PROJECT TITLE	DETAILS	CLIENT/PARTNER/ FUNDER
Demonstration of Dynamic Hydraulic Modelling (DHM) technology	DHM is a software tool for pressure management and leak detection on water distribution networks.	City of Tshwane
		Magalies Water
Development of a pilot plant for the treatment of acid mine drainage (AMD)	The pilot plant demonstrates the CSIR's Alkali-Barium-Calcium (ABC) desalination process for AMD neutralisation and the removal of total dissolved solids.	University of Johannesburgr
Decentralised treatment and supply of potable water	Application of an advanced oxidation process (Safewater Africa technology) to treat river water to potable quality.	European Union
CSIR Green Drop solutions for five wastewater treatment works in the City of uMhlathuze for a three year period	Provide services aligned with meeting the require-ments of the Green Drop programme.	City of uMhlathuze
Water and wastewater quality monitoring - Blue Drop and Green Drop	Provide water and wastewater quality monitoring aligned with requirements of the Blue Drop and Green Drop programmes.	Capricorn District Municipality
Blue Drop improvement project for sites in KwaZulu Natal (KZN)	Provide services aligned with improving and meeting the requirements of the Blue Drop programme.	National Department of Public Works
Spill basin wastewater and borehole wastewater monitoring in KZN sites	Monitoring of wastewater compliance according to permit requirements.	Transnet

CONTACT DETAILS

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