



SARON WASTEWATER TREATMENT WORKS

WASTEWATER TREATMENT

ENGINEERING PERSPECTIVE

Wastewater treatment is mostly thought of to meet effluent standards only. However, beyond regulation, treatment plants must become factories for the recovery of resources. Depending on the scale of operations and the local needs, economic benefit could be derived from:

- Treated effluent as water for re-use
- Nutrients and compost for food production
- Energy reduction through process optimisation
- Bio-gas and bio-solids for generation of renewable energy

Existing infrastructure and old process units are important resources to be reconfigured and upgraded to achieve these goals.

PROFESSIONAL SERVICES

Our process engineers and technologists are experts in the planning, design, construction monitoring and hands-on commissioning of treatment plants, ranging from cutting edge international best practice to the most appropriate local technologies, including:

- Biological nutrient removal activated sludge
- Membrane biological reactors and mechanical sludge dewatering
- Extended aeration, oxidation ditches, racetrack treatment systems and sludge composting
- Biological trickling filters for nitrogen removal and bio-gas production via anaerobic digestion
- Low technology systems like anaerobic ponds, oxidation ponds and constructed wetlands
- Selection from a wide range of packaged plants

We use dynamic simulation platforms, checked against our customised spreadsheets, based on the mass balances defined by Activated Sludge Models and Trickling Filter Modules, published by the International Water Association and the South African Water Research Commission. Virtual Consulting Engineers offer a three-day masterclass on Municipal Wastewater treatment worth 2 ECSA CPD credits.¹

¹ Data analysis, flow characterization, model calibration and simulation for wastewater treatment works process design, control and optimization, based on WRC (1984) Theory, design and operation of nutrient removal activated sludge processes, Report no. TT 16/84.



PROJECTS



Saron Municipal Wastewater Treatment Works (2017)

Drakenstein Local Municipality

New 1.5Mℓ/d treatment plant to meet special limit standards for phosphate and nitrogen, in the sensitive Berg River catchment, through flow balancing in unaerated zones of a Modified UCT process configuration, constructed around an existing clarifier. Waste activated sludge selection improves settleability and phosphate is recovered in an aerobic/anoxic sludge stabilisation reactor.



Madadeni Wastewater Treatment Works (2018)

Newcastle Local Municipality

Upgrade of old extended aeration from 20Mℓ/d to 35Mℓ/d, including biological nutrient removal in a Johannesburg process configuration with return activated sludge to a side-stream anoxic reactor. The plant was upgraded with new inlet works, new clarifier and waste activated sludge thickening, and will include gas chlorination and fine bubble aeration.



Ncome, Matatshe and Waterval Prisons (2018)

Department of Public Works

Repair and upgrade of wastewater treatment plants for a nominal capacity of 1Mℓ/d at rural prisons, including biological trickling filter, with primary sludge withdrawal and anaerobic digestion (Waterval, KZN), and orbital reactors with new paddle aeration and anoxic zones in the Modified Ludzack-Ettinger configuration (Ncome, KZN and Matatshe, Limpopo).



Waterval Wastewater Care Works (2019)

Ekurhuleni Water Care Company

Upgrading of Module 2 and 3 at the Waterval WWCW (1,485m AMSL), from 70Mℓ/d to 110Mℓ/d combined capacity, with biological nutrient removal in a Modified UCT/Three Stage Bardenpho activated sludge process configuration. Replacement of old blowers reduced specific energy demand and improved effluent quality, allowing direct reclamation for drinking water production.



SANAE IV Wastewater Treatment (2019)

Department of Public Works

Replacement, installation, commissioning and maintenance of the new wastewater treatment plant on Antarctica, with a membrane bioreactor and waste activated sludge centrifuge. The toilets were replaced with a vacuum system to reduce water consumption, because water is produced through an energy intensive ice melting process.



Refengkgotso Wastewater Treatment Works (2024)

Metsimaholo Local Municipality / Department of Water and Sanitation

The new 6Mℓ/d biological nutrient removal activated sludge plant was designed as a Johannesburg process configuration. Nutrient removal is achieved through a primary anoxic zone, receiving clarifier underflow and a small portion of raw wastewater, then an anaerobic zone, a secondary anoxic zone, which receives A-recycle, and finally tapered aeration with increasing oxygen concentrations, for special limit effluent standards.