

SAFE SANITATION

New sanitation technology brings dignity to Gauteng school

The provision of safe sanitation in all South African schools remains a critical government priority. Tsholetsega Primary School, in Krugersdorp, has become the first recipient of an innovative, next generation sanitation technology implemented through the South African Sanitation Technology Enterprise Programme (SASTEP). Article compiled by Lani van Vuuren.



The containerised treatment unit treats wastewater on site for reuse. The treated water is recirculated for flushing.

SASTEP, a programme developed by the Water Research Commission (WRC) in partnership with the Bill and Melinda Gates Foundation and Department of Science and Innovation, seeks to enable the development of suitable sanitation technologies in South Africa towards the creation of a viable sanitation market. The programme does this by fast-tracking the adoption of innovative and emerging sanitation technologies in South Africa through fostering local manufacturing and commercialisation. The core strategy of the programme is to support and empower sanitation innovators (technology partners) and sanitation entrepreneurs (commercial partners).

This is undertaken in support of government initiatives such as

SAFE (Sanitation Appropriate for Education), aimed at replacing pit latrines and other unsafe forms of sanitation at schools with more appropriate and sustainable technologies. The SAFE Programme was launched by President Cyril Ramaphosa in 2018, after a nationwide survey indicated that 3 898 South African schools still had inadequate access to sanitation facilities. Most of these schools are located in the Eastern Cape, Kwazulu-Natal and Limpopo provinces.

SASTEP Programme Manager, Akin Akinsete, noted that the successful introduction of new sanitation technologies was aimed at introducing more sustainable toilet solutions to places such as schools, while reducing the cost per seat. In addition, the



WRC Executive Manager, Valerie Naidoo, with one of the new toilets.

incorporation of a robust operations and maintenance strategy would also prolong the lifespan of these systems.

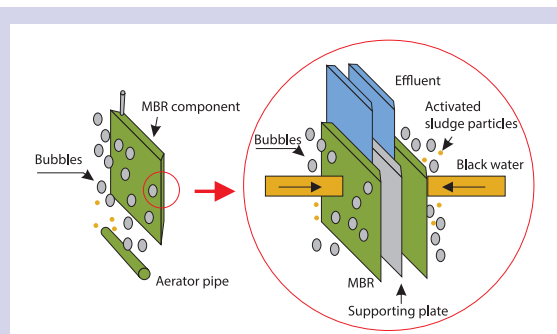
Since the launch of the SAFE Programme, 577 schools have had their sanitation facilities upgraded, while sanitation is in various phases of planning and/or construction at a further 1 957 schools. According to SAFE Programme Manager, Nompumelelo Nyembe, government aims to provide safe sanitation at all the remaining schools by September 2021.

The technology selected for Tsholetsega Primary School is the Clear recirculating toilet. The toilet system was originally developed by Clear, a Chinese company, but will be manufactured locally by South African firm, Enviroloo.

The system collects waste from flush-type toilets, which is then treated by a closed system on-site. Water is recovered, treated and reused for flushing purposes. The system allows for off-grid set-up, while also allowing for waterborne sanitation in areas with little water supply. Since most of the system is containerised, this negates the need for expensive on-site civil construction.

Two models are currently being tested the school, namely the TT-5 containerised four toilet seat front and backend treatment plant ablation facility, with a total daily maximum capacity of 600 flushes. In turn, the TT-6 backend treatment plant is connected to an existing 25-seat (inclusive of male urinals), with a total max capacity of 4 000 flushes. The installed toilets use between 3L and 5L of water per flush. Wash basins for handwashing using potable water have also been provided. The system is currently plugged into the municipal electricity system, but can operate using solar power. Water samples are regularly tested offsite, and, in the case of an emergency, sewage can be redirected into the municipal sewer line, reducing the risk of spills.

“The system installed at the Tsholetsega Primary School is performing excellently, and preliminary results are very encouraging,” noted Enviroloo COO, Mark la Trobe. “We believe that the technology has the potential to transform the landscape of the South African Sanitation industry... The push for the commercialisation and industrialisation of appropriate sanitation technologies in the country is a positive step and has the potential to transform South Africa into a hub of sanitation manufacturing excellence on the African continent.”



The waste stream from the toilet is initially stored in a black water collection tank. The tank provides residence time for the wastewater to equalise. The tank inventory is then pumped to the treatment section of the system where it is first treated to remove suspended solids and before undergoing aerobic and anoxic biological treatment. The treated stream is then passed through a membrane biological reactor (MBR). The MBR membranes serve as microbial barriers that can capture most of the biomass for recirculation inside the bioreactor. This produces water that can either be reused for toilet flushing or discharged into downstream sewer directly or be reused as irrigation water.



The outside of the new ablution block. Wastewater is gravity-fed to holding tanks before being treated in the on-site treatment system.



The Clear TT-5 containerised four toilet seat front and backend treatment plant abluion facility.

Speaking at the official launch of the toilets on World Toilet Day, 19 November, WRC CEO, Dhesigen Naidoo, said that the implementation of the solution at Tsholetsega Primary School offered the opportunity to test a solution in demonstrator format while adding value to the SAFE programme. "The Covid-19 pandemic has reminded us of the importance of access to safe and dignified sanitation. If we want our people to be healthy and safe enough to contribute meaningfully to the development of their society then these are the base investments that we simply have to make," he told delegates during the event.

His sentiments were shared by keynote speaker, Dr Olive Shisana, from the Office of the Presidency. "In a water scarce country, such as South Africa, we need to embrace newer technologies that do not depend on the availability of water in large quantities. The time has come for us to change the sanitation engineering and management model."



The Clear TT-5 containerised four toilet seat front and backend treatment plant abluion facility.