



Rim of the immense reservoir.

# Water focus; a priority

South Africa's water infrastructure is overloaded, owing mainly to the flood of people migrating to urban areas. Deteriorating municipal water treatment infrastructure is also a concern, brought about largely by a lack of coordination between government departments.

By Kim Kemp\*

According to Consulting Engineers South Africa's (CESA) *Bi-annual Economic and Capacity Survey* (BECS), water infrastructure spend has been prioritised, not only to deal with the effects of the current drought, but also to lessen the effects going forward. "Water is our second-biggest sector in the engineering industry," the CEO of Industry Insights, Elsie Snyman, outlined in her presentation of the CESA report.

Water constitutes 20% of government budget spend, she points out and adds, "Since 2011, we are starting to see an increase in water becoming a bigger priority ... water is almost more important than nuclear at this stage," she stresses.

She outlines how the 2016 water budget was revised up for the 2017 budget, to include bulk infrastructure, as well as smaller maintenance and sanitation type projects. "Water is certainly a bigger priority in terms of government spending," she says.

The custodians of this crucial resource, therefore, are under constant pressure to build high-quality infrastructure quickly and efficiently.

## Water infrastructure comes to Katlehong

Such a project was undertaken by Ekurhuleni Metropolitan Municipality in Katlehong, which, together with Thokoza and Vosloorus, is the second-

largest township in Gauteng, after Soweto.

The municipality is delivering a new reservoir that will bring much-needed relief to this high-density area. Consulting engineer TLS Engineers & Project Managers, as well as civil engineering contractors Civcon and QC4 Civils are collaborating on the project.

QC4 Civils' contracts manager, Ettiene Coetzee, says this is the largest reinforced, post-tensioned ground reservoir to be built by the company.

Constructed with six 16.15m by 4.2m buttresses for post-tension anchors, the 35 mega-litre reservoir has an internal diameter of 54.4m, as well as wall height of 16.15m and wall



Precast concrete elements being positioned.

thickness of 450mm. The structure features a 700mm diameter inlet pipe, two 800mm diameter outlet pipes, a 600mm diameter scour pipe, and 800mm diameter reservoir overflow pipe.

From the outset, it was decided that the roof of the structure would be constructed with precast concrete elements to save time on the construction programme, in keeping with the urgency of water infrastructure being built.

The project cut eight months off the construction programme, allowing the reservoir to be delivered in 11 months.

The reservoir roof comprises more than 2 300m<sup>2</sup> of slabs, each up to 250mm thick. They are supported by 16 columns and 18 beams, weighing 12.3 tons and 7.5 tons, respectively. These were manufactured by Corestruc and stored before delivery to site, ahead of installation in February, which commenced when 80% of the walls had been cast.

The construction of the reservoir wall alone was an impressive achievement, fast-tracked with a new climbing system designed and supplied by Form-Scaff, the civil engineering

contractors. In as little as two weeks, 747m<sup>2</sup> per section could be erected, as opposed to the initial plan of 200m<sup>2</sup> per section.

Construction of the wall and installation of the post-tensioning system followed the installation of the internal pipes, pouring of the reinforced concrete foundation, installation of load-bearing pads for the wall, and completion of the subsurface drainage system. This programme was divided into three sections and four lifts. The floor slab had also been cast, while the bases and plinths were ready to receive the columns.

Equipped with a state-of-the-art theodolite, Corestruc's team lifted and fastened the components into place, achieving tolerances of about 20mm at heights of 15 metres.

A total of 2 000m<sup>2</sup> of precast items were installed in eight working days — a feat Corestruc's Willie de Jager attributes to the extensive upfront planning.

Once Corestruc had completed its operations, the civil engineering contractor's team started installing water proofing and covering it with a stone layer. They installed the tendons and commenced tensioning, followed by grouting. A lightning protection system was installed, and the reservoir cleaned and inside surfaces chlorinated before filling the structure and undertaking waterproof testing.

An added benefit of Corestruc's technology is the high durability of the roof, with all the elements manufactured from a 55MPa concrete — far exceeding the 40MPa specification of the in situ material. This contributes to the overall performance of the asset, reducing maintenance requirements of the structure and costly rebuilds. ♦

\*Contributors: CESA, Corestruc, and QC4 Civils.

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Elsie Snyman, presenting the CESA report.