

Friedrich Naumann
STIFTUNG

FÜR DIE FREIHEIT



Best Practice Projects in Local Government
Meulwater Water Treatment Works

Meulwater Water Treatment Works

An innovative project of the Drakenstein Municipality



THE MEULWATER WATER TREATMENT WORKS AT A GLANCE

Water sources	Nantes Dam & Bethel Dams
Plant size	8MI/d, upgradable to 15MI/d
Commission date	July 2012
Location	Paarl, Western Cape
Consulting engineer	Aurecon
pH correction	Lime dosing
Coagulation	Alum and polymer blend
Filtration	Rapid gravity sand filters
Disinfection	Chlorine gas
Stabilisation	Lime addition

Source: www.wateronline.co.za

The Meulwater Water Treatment Works is situated on the Paarl Mountain, alongside the majestic Paarl Mountain Nature Reserve. In designing this project the sensitive environment needed to be given proper consideration.

The Drakenstein Municipality and its consulting engineers designed and built Meulwater in a way that integrated the new facility into its surrounding environment. The water treatment works features state-of-the-art technology and is providing superior quality water to the residents of Paarl at the foot of the mountain.

QUICK GLANCE

Drakenstein
Municipality



MAJOR TOWNS
Paarl, Wellington, Gouda,
Saron



AREA
1 538km²



POPULATION
255 000 people & 61 000
households

THE WATER TREATMENT WORKS ON THE MOUNTAIN

Up until recently almost 95% of Paarl's water came from the City of Cape Town. The decision to build a water treatment works on Paarl Mountain was made to secure a new water source for the town, thus reducing reliance on water purchases from elsewhere.

Paarl Mountain has traditionally been an important source of water for the town at its foot. Farmers and residents have been using the water from streams on the mountain since the first days of settlement in the valley. More recently the water sources on the mountain had been delivering very little of the water required to meet the town's needs so it made sense to develop the source.

Studies showed that when compared to purchasing water from other municipalities, it would be cost-effective to build and operate a new water treatment works. The Bethel and Nantes Dams had previously been constructed on the mountain so it made sense to treat this water. The proposed location for the water treatment works, at a site on Paarl Mountain above the Meulwater Reservoir, was however a highly sensitive one.

After an extensive environmental impact assessment the Department of Environmental Affairs agreed with the municipality that the best

site for the proposed water treatment works was indeed above the Meulwater Reservoir, as it allowed for the most effective integration with the existing distribution infrastructure.

Through a collaborative effort of many professionals including botanists, engineers, landscape architects and construction specialists a unique design was born. The Minister of Local Government, Environment and Development Planning in the Western Cape, Anton Bredell, acknowledged the work of these professionals when he opened the completed Meulwater Water Treatment Works.

"The design team had to overcome significant challenges in providing a solution for the water needs of the Drakenstein Municipality in a highly sensitive environmental area," he said.



GOVERNING PARTY
Democratic Alliance



MAYOR
Adv. Gesie van Deventer



VISION OF DRAKENSTEIN MUNICIPALITY
A Place of Excellence

"The Meulwater Water Treatment Works is an example of a project that has been conceived and developed to blend in completely with the natural environment that we are all so proud of and seek to protect."

Mr Anton Bredell,
Western Cape Minister of Local Government, Environment & Development Planning



WATER DEMAND MANAGEMENT

Water losses in the Drakenstein Municipality were an unacceptable 34% in 1999. A lack of effective infrastructure maintenance contributed to this problem, although consumers were also using water without regard to its status as a scarce resource. Through a coordinated programme of action the municipality reduced the water losses to 12.1% by 2013. Compared to the national average of 36.2% for water losses, this achievement is remarkable and worthy of replication. Considering the scarcity of water resources in South Africa today, municipalities can ill-afford not to reduce water losses, which are in most cases entirely preventable.

Ways to Reduce Water Loss

Municipalities around South Africa can learn from the Drakenstein Municipality. Among other things the municipality took the following actions:

- Using pressure management it reduced losses through leaks at certain times of the day.
- Metering of all un-metered water connections.
- Detection of leaks, with subsequent repairs of pipes, or refurbishment where necessary.
- Increased public awareness on ways to reduce loss.

Reducing the Environmental Impact

In order to reduce any negative visual impact the building sits up to 5.5m underground in some places. Much of the granite that was displaced through the construction was used for other purposes, including for the cladding of the buildings. The cladding helped to create a 'natural' look for the buildings. In addition the roofs are covered with fynbos gardens, and trees were placed at certain locations around the building allowing it to blend in further.

Direct Filtration

According to Aurecon the direct filtration process of this 8Ml/d facility allows for a minimised footprint. Direct filtration is still a relatively new process in South Africa. Aurecon describes the uniqueness of the process as follows:

"The chemical dosing requirements and flocculation process [of Meulwater Water Treatment Works] are different to conventional

systems where heavy and large settleable flocs are sought. The design at Meulwater Water Treatment Works facilitates a penetrating depth filtration of sturdier and smaller flocs, resulting in full utilisation of the solids storage capacity within the filter bed."

Backwash

The filter cleaning process at Meulwater Water Treatment Works is also particularly unique to South Africa. The backwash process is enhanced through the combined air scour and sub-fluidisation velocity backwashing. Aurecon notes that when the right combination of air and water are used a "collapse-pulsing mechanism occurs in the bed" which among other things loosens accumulated and adhering solids. Used backwash water is recycled to the head of the works to ensure minimal water is lost to wastage. Since the commissioning of the water treatment works in July 2012 the average water losses have been in the region of only 2.5%. This compares very favourably to the 15% of water losses encountered in traditional treatment processes.

Remote control

Telemetry links allow for the surveillance of the water treatment works from offsite locations. This means that the works do not need to be constantly overseen.



MACHINE ROOM



INLETWORKS



CHEMICAL DOSING ROOM

Cost

Meulwater Water Treatment Works cost R34.7m to construct. Of this, R29.8 was funded through a Municipal Infrastructure Grant, while the municipality funded the remaining R4.9m. The civil works on the project cost R15.2m and the mechanical works cost R12.7m.

The new plant is proving to be a worthwhile investment. Estimates from the municipality are that treatment costs at the new plant are approximately R2.11/kl. This is significantly cheaper than the R3.42/kl that the City of Cape Town charges for water sales to Drakenstein Municipality. Meulwater Water Treatment Works has the potential to treat between 1650MI and 2900MI per year, which translates to between 15% and 26% of Paarl's annual water needs.

Conclusion

The Meulwater Water Treatment Works combines innovative technology and processes with a low-impact design for superb integration in the highly sensitive surrounding environment. Advocate Gesie van Deventer, the Mayor of Drakenstein Municipality, was correct when she noted at the opening of the facility, that *"it is indeed an honour to have a world class facility like this in Paarl as part of Drakenstein Municipality."*

Sources:

- Bredell, A (2012), "Speech at the opening of Meulwater Treatment Works,"
See <http://www.westerncape.gov.za/speech/opening-meulwater-treatment-works>
- Drakenstein Municipality (2012), "Most sophisticated water treatment works in the country is now fully operational in Paarl,"
See: <http://www.drakenstein.gov.za/News/Documents/Jan%2020212%20June%2020212/Meulwater%20Official%20Opening%202012.pdf>
- Theunissen, B. (2012), "Securing a reliable water source for Paarl' increasing water demands,"
See: <http://www.aurecongroup.com/en/thinking/current%20articles/securing-a-reliable-water-source-for-paarls-increasing-demands.aspx>



"An emerging issue for all WSAs, including Drakenstein Municipality, is the response of the water sector to climate change. According to the NWRS2 "there is a need to build the water sector's climate response capability and commitment to timeous action to be able to avoid inappropriate responses, and to ensure that the sector is able to manage water in a context of high levels of uncertainty."

FIND OUT MORE

The following resources may be useful for anyone who wishes to find out more about water management in Drakenstein Municipality in particular, and South Africa in general. Various policies and plans for Drakenstein Municipality can be found at www.drakenstein.gov.za, including:

- Water Services Development Plan, 2011/2012
- Integrated Development Plan, 2012 – 2017
- Water Losses Policy
- Tariff Policy, 2013

Some relevant national documents that may be of interest include:

- 2012 Blue Drop Report
See: www.dwa.gov.za/Documents/RSP.aspx
- National Water Resource Strategy, 2013
See: www.dwaf.gov.za/nwrs/NWRS2013.aspx

Mr André Kowalewski, the Engineer: Water Services at Drakenstein Municipality, is a renowned trainer and sharer of best practice models in the water sector in South Africa. To find out more about the Meulwater Water Treatment Works and water management in Drakenstein Municipality contact him on:

Email: andrek@drakenstein.gov.za
Tel: 0 21 807 4705

WHAT ARE THE FUNCTIONS OF THE DRAKENSTEIN MUNICIPALITY AS A WATER SERVICES AUTHORITY?

According to the National Water Resources Strategy (NWRS2), "Water Services Authorities are municipalities that in terms of Section 12 of the Municipal Systems Act have the constitutional responsibility for planning, ensuring access, and regulating provision of water services within their area of jurisdiction." Drakenstein Municipality is a Water Services Authority (WSA).

WSAs have the right to use water for any of the uses defined in Section 21 of the National Water Act, subject to the conditions that may be set by the relevant authority, usually the Department of Water, including the provision of water services to its constituents.

With regards to water management, Drakenstein Municipality has developed an enviable reputation in South Africa for sound planning and implementation. While many municipalities in South Africa lack the necessary human resources required to manage and maintain water infrastructure and processes, Drakenstein Municipality has a capable and experienced team of water officials. A number of policies and plans have been formulated by Drakenstein Municipality to assist it in carrying out its responsibilities as a WSA effectively and efficiently.



blue drop
CERTIFICATION

drinking water quality
REGULATION

Drakenstein Municipality achieved a Blue Drop score of 96.29% for the 2012 assessment. This highly commendable score was the 15th highest in South Africa and 6th highest in the Western Cape.

THE BLUE DROP STATUS OF DRAKENSTEIN MUNICIPALITY

The Blue Drop Certification Programme is an innovative incentive-based regulation programme of the Department of Water. The target for excellence is a score of 95%. Water Services Authorities that achieve this score or a higher one are awarded Blue Drop certification.

Importantly, the scoring for this programme does not just take into account drinking water quality. Scoring also includes asset management, safety planning, process management, accountability and local regulation. Attaining Blue Drop status means that a Water Services Authority has complied excellently with national standards throughout the relevant reporting period.

In 2012 a total of 931 water systems across 153 municipalities were assessed for Blue Drop certification. In Drakenstein Municipality 5 water systems were assessed: the Gouda, Saron, Bainskloof, Drakenstein, and Hermon systems. The Meulwater Water Treatment Works will form part of future assessments as it was commissioned after the last Blue Drop Report need to be constantly overseen.

AWARDS FOR MEULWATER WATER TREATMENT WORKS

The innovative Meulwater Water Treatment Works has won several awards. The Institute of Municipal Engineering of Southern Africa (IMESA) and Consulting Engineers South Africa (CESA) presented the Excellence Award in the Environmental Category to Drakenstein Municipality for Meulwater at the 2012 Project Excellence Awards competition.

An Engineering Excellence Award was also bestowed on the municipality for this project by CESA in the category for projects that cost less than R50 million.

It was no surprise, considering the efforts of the project managers to minimise the environmental impact of the Meulwater Water Treatment Works, that the project also received a Certificate of Merit from the Drakenstein Heritage Foundation.

In late 2013 the Drakenstein Municipality also won an Impumelelo Gold Award for the Meulwater Water Treatment Works. This award, bestowed by the Impumelelo Social Innovations Centre, recognised the Meulwater Project as being innovative and worthy of replication elsewhere.



Mayor of Drakenstein Municipality, Gesie van Deventer (centre), flanked by water officials André Kowalewski (left) and Sifiso Nkonyane (right), celebrates the awards for water management in the municipality.



Best Practice Projects in Local Governments is a series produced by the Friedrich Naumann Foundation for Freedom. The series focuses on projects that have an environmental focus, particularly ones that have a bearing on the response to climate change in South Africa.

Friedrich Naumann Foundation for Freedom: Travel House 3rd Floor, 4-6 Hood Avenue, Rosebank. Tel: 011 880 8851