



# Oostenberg integrated waste management facility

THE CITY OF Cape Town is developing the first integrated waste management facility in South Africa, comprising a refuse transfer station, a compaction hall, container handling operations, garden refuse chipping facilities, materials recovery facility, workshop, wash bay, diesel storage, domestic recycling centre and a public drop-off, security building, entrance building, weigh bridges, with provision for a future 'resource park' and accommodation for future 'alternative technologies'.

Jeffares & Green, in joint venture with GJA Consulting Engineers, has been appointed to undertake the civil, mechanical and electrical design and implementation of the proposed Oostenberg Refuse Transfer Station and Materials Recovery Facility (ORTS and MRF).

The site is located in Kraaifontein, in the Cape Metropole, just off the N1 national road, and is approximately 15 ha with the ORTS portion of the site being approximately 3,5 ha, the balance being

► Oostenberg site map on page 38

## PROJECT TEAM

Jeffares & Green (Pty) Ltd  
G Johardien & Associates  
in association with  
DPE Consulting Engineers  
DV CAPE  
Cook Lipschitz Partnership

reserved for the future facilities.

The layout of the facility has been planned for a containerised bi-modal transport system (i.e. road and/or rail), although initially the transfer of containers will be done by road only. The rail infrastructure will be provided at a later date.

The design capacity currently allows for a 100 tonnes/day MRF (or 200 tonnes/day for a double 8-hour working shift) and a 1 000 tonnes/day refuse transfer station. It is not expected that these volumes will arrive at ORTS from the outset, as a host of factors come into play, for example the extent to which the City of Cape Town can manage the waste collections (i.e. routing/beats, vehicles, private contracts, and minimisation strategies) to take advantage of this facility. Tariffs and by-laws will also need to be examined and amended to promote the diversion of recyclable wastes.

The City of Cape Town's Solid Waste Department will be the owner of the facility and it is currently envisaged that the function of the RTS and secondary facilities (workshop, wash bay, diesel tank, office block, control room/entrance building, security) will be operated by the City of Cape Town, whilst the MRF and drop-off will be operated by a private contractor.

Over and above the extensive engineering input into the design of this facility, the design team is spending time on 'green engineering' opportunities for

this development, such as:

- rainwater harvesting, due to the extensive roof area
- supplementary supply of water harvesting by borehole or usage of clean storm water runoff from the site and/or from the existing municipal storm water pond across the road.
- low-energy lighting
- solar energy
- water-wise indigenous greening of the area
- specially designed oil traps
- site-specific litter traps and silt traps (a design that will be used by the City of Cape Town for research)
- maximising of natural ventilation opportunities
- maximising of natural lighting opportunities

## PROJECT STATUS

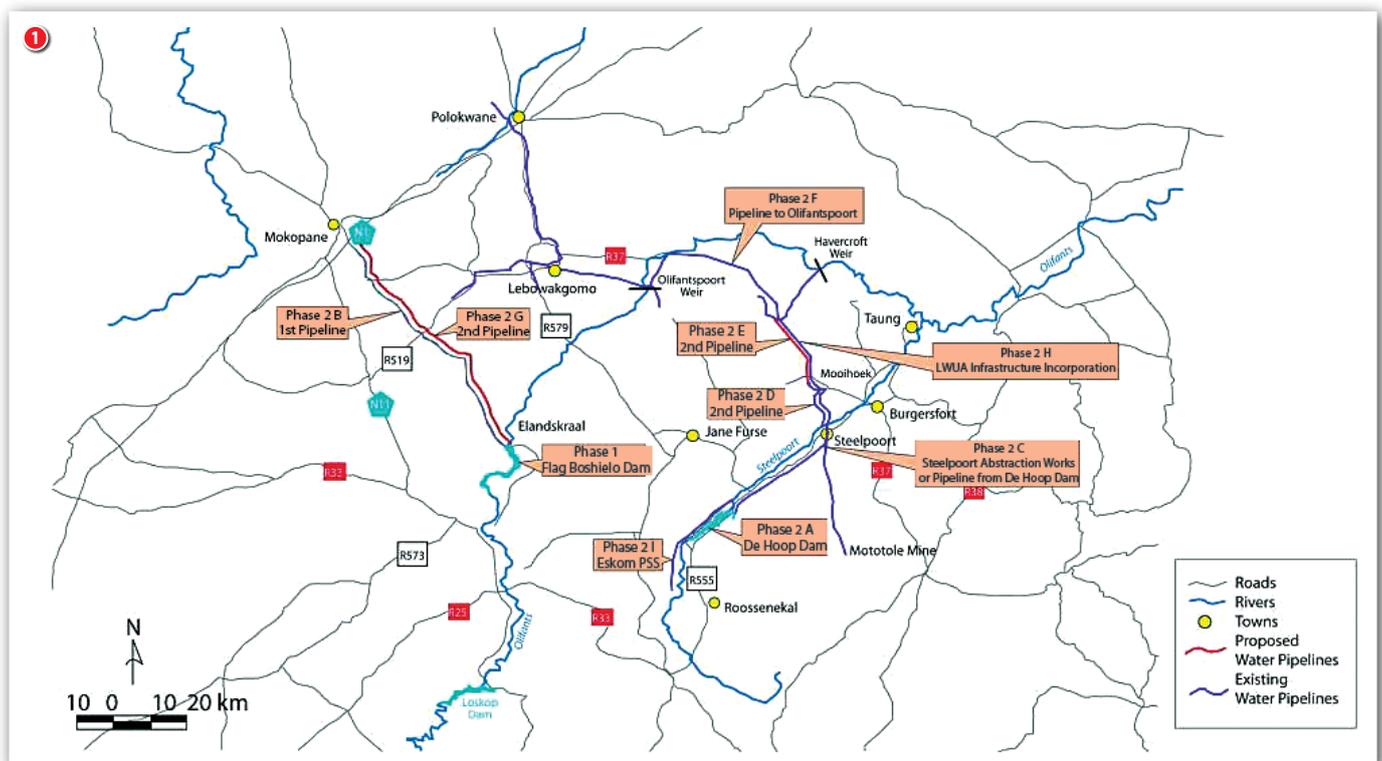
Currently the estimated R160 million project is in the detailed design phase, preparing for the tendering stage. The team is aiming to be out to tender in August 2008 and to have the facility completed by early 2010.

## CONTACT DETAILS

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# De Hoop Dam brings hope



Dam construction engineering technology is harnessed to ameliorate the socio-economic conditions of a people, while their natural and cultural heritage is respected through the implementation of best practice environmental principles

THE DE HOOP DAM is situated in the Limpopo Province, between the towns of Roosenekal and Steelpoort on the Steelpoort River, a tributary of the Olifants River which runs through the

Kruger National Park on its way to the Masinger Dam in Mozambique. The construction of the De Hoop Dam not only brings hope of jobs and economic upliftment to the people of Sekhukhuneland and Limpopo, but also the prospect of permanent water supply to a dry land.

A screening exercise was done to investigate and identify the most suitable alternatives (dam and non-dam) for further development of the middle Olifants River catchment water resource. The dam alternative examined the potential social impacts in detail, and the non-dam alternative considered aspects such as water conservation, water demand management, ground water options and trading water allocations. The as-

**1** The ORWRDP area and proposed infrastructure assessment of both the dam and non-dam alternatives contributed to a proposed project to facilitate greater water resource availability and stability in an area where the water demand surpasses the available water resources.

After the conceptual design and feasibility studies had been done it was concluded that the most feasible option from a technical, environmental and economical perspective would be the construction of a dam on the Steelpoort River, at the farm De Hoop, and associated infrastructure for bulk water distribution. The latter would include pipelines from a proposed abstraction weir near Steelpoort

and from the Flag Boshielo Dam.

On 9 June 2004 Cabinet granted the Department of Water Affairs and Forestry (DWAF) approval for project implementation, subject to obtaining the necessary environmental authorisations. The National Water Act (Act 36 of 1998) states that in each area in the country there will be a number of possible solutions to balance water requirements with water availability.

### ORWRDP

The De Hoop Dam will enable new allocation of water to meet the current and future water needs of the area, especially for the benefit of the mining sectors within the middle Olifants catchment, as well as part of the Mogalakwena and Sand catchments. DWAF commissioned the Olifants River Water Resources Development Project (ORWRDP), which comprises two phases:

- Phase 1 involved the raising of the Flag Boshielo Dam by 5 metres. This phase has been completed.
- Phase 2 involves the development of additional water resource infrastructure within the middle part of the Olifants Water Management Area. Phase 2A entails the construction of the De Hoop Dam and the realignment of the provincial road between Steelpoort and Stoffberg (the R555), whilst Phase 2B-2I involves the construction of pipelines and associated pumping stations and balancing dams.

Globally speaking, mitigating the detrimental ecological impacts of dams have by and large met with only a degree of success, as these impacts mostly are difficult or impossible to mitigate. For example, there is no realistic means of preventing the build-up of sediments in an impoundment of these dimensions, and nothing can be done about the riverine habitats that will become inundated. However, in an effort to ensure that the De Hoop Dam environment is protected and preserved as best possible, the environmental authorisation process was followed. Where applicable and appropriate, the requirements of the Environmental Conservation Act (Act 73 of 1989), the National Environmental Management Act (Act 107 of 1998), the National Heritage Resources Act (Act 25 of 1999), the Minerals and Petroleum Resources Development Act (Act 28 of 2002), the Forestry Act and the National Water Act

(Act 36 of 1998) were adhered to.

An Environmental Impact Assessment (EIA) was undertaken to establish the potential impacts of the project on the socio-economic and biophysical aspects. The EIA comprised four phases, namely:

- Scoping
- Impact Assessment
- Environmental Impact Report
- Decision Making

International agreements were also considered, including Agenda 21, the Convention of Biological Diversity, the Kyoto Protocol, Helsinki Rules, and the SADC Protocol on Shared Waters. The UNEP Document on Dams and Development (Relevant Practices for Improved Decision Making), refers to the ORWRDP as an example of a large dam project where internationally agreed development goals are pursued in an effort to reduce poverty through environmentally and socially sustainable development of water resources. This is being done within the framework of DWAF's sixteen principles of the guidelines for public participation, including consultation with stakeholders such as NGOs and interest groups, and stakeholder communication via an issues-and-response report and feedback process.

During scoping, as part of the EIA, six key issues were identified which needed to be further assessed and clarified, namely:

- impact on quantity and quality of river flows
- aquatic and terrestrial ecology
- long-term sustainability and water demand management
- capacity of the receiving environment
- minimising construction-related impacts
- land acquisition and compensation

It was also broadly agreed that a seventh issue, cooperative governance, needed consideration for future planning and implementation of Phase 2.

The De Hoop Dam study area is an ecologically sensitive region and required extensive environmental investigations before a Record of Decision (ROD) was issued by the Department of Environmental Affairs and Tourism on 21 November 2005. This was followed by five appeals against the decision which had to be investigated and responded to by DWAF, before the Minister of the Department of Environmental Affairs and Tourism on 16 October 2006 made a final decision in terms of Section 35

of the Environmental Conservation Act (Act 73 of 1989) – that is, the revised Record of Decision – in support of the project, but incorporating more stringent environmental requirements.

This revised ROD has many conditions of authorisation which DWAF has to comply with to minimise the potential impacts as anticipated by the appeals, including a suite of Environmental Management Plans (EMPs) to be prepared, namely:

- Pre-construction EMP
- Construction EMPs (7 different EMPs)
- Post-construction EMP
- Operational EMP

In compliance with the requirements of the revised ROD, the ACC (Authorities Coordinating Committee) and the EMC (Environmental Monitoring Committee) have been established. There is also a full-time Environmental Control Officer (ECO) on site, as required by the ROD.

On 19 March 2007, during a sod-turning event, the project was launched at Maseven. Prior to the commencement of construction, the De Hoop Dam Charter was also signed, containing the social and economic development and procurement targets of Government. The 347 million m<sup>3</sup> of water will be impounded by an 88 m high roller-compacted concrete wall.

On 26 May 2008 a Memorandum of Agreement (MOA) was signed between the Minister of Water Affairs and Forestry, Mrs Lindiwe Hendricks, twenty-three individual mining houses, and the Joint Water Forum (JWF), a representative body of associated mines involved in exploiting the mineral resources of the Eastern Bushveld Complex in the southern part of the Limpopo Province. This MOA paved the way for R7,4 billion of water supply to Limpopo. It essentially encapsulates the principles to be distilled in the individual off-take agreements with the mines and is the founding agreement for the implementation of the ORWRDP for the needs of the mining users located in the project area.

The Trans-Caledon Tunnel Authority (TCTA) was requested to develop a financing proposal for the project, subject to the approval of DWAF and the National Treasury. It has been Government policy since 1997 that all commercially viable projects have to be funded off-budget by making use of private sector funds with loan repayments from the revenue of the

water tariffs. The off-take agreements with the mines will provide the necessary channel for private sector funding required for project implementation.

As there are two main end users in the project – the mines and the social users – DWAF, in consultation with the TCTA, negotiated the MOA with various mining institutions represented by the JWF, in terms of which the mines commit to taking all their future water requirements, specific to the project area, from the project. The MOA also enables the mines to continue with their mining license applications.

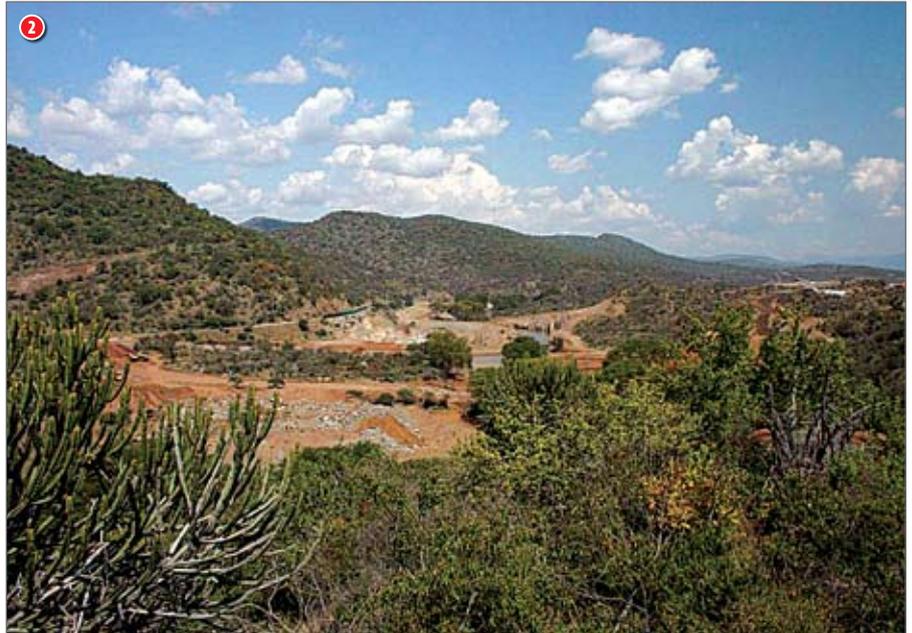
In terms of the MOA, Government will fund the social users' portion of the infrastructure, which will be recorded in off-take agreements with the relevant municipalities. The tariff structure will vary for the two end users in that the commercial users will pay a Capital Unit Charge (CUC) whereas the municipalities will pay a Return on Asset (ROA) charge on the capital investment.

Other users include ESKOM (for their proposed pumped storage scheme) and a host of water supply authorities who will be responsible for the treatment and distribution of water to the domestic sector.

In an effort to keep to the social and economic upliftment objectives of the project, the Charter requires that the contractors recruit 60% of the labour locally. This labour may be recruited from three local areas in prescribed percentages, and preference is given to women and people with disabilities. The contractors should also provide generic and entrepreneurial training so as to leave behind a workforce with enhanced skills.

Construction on the project started in June 2007.

The geology of the area includes the mineral-rich Bushveld Igneous Complex. Mining activity is rapidly expanding, requiring water and power. At the same time, approximately 800 000 people are residing in the near vicinity, without recourse to a safe and reliable water supply. Government hence views the early completion of the dam as of major importance.



2 A view towards the dam wall construction area

3 *Boscia Albitrunca* (Shepherd's Tree) being transplanted during landscaping

4 Archaeological excavation next to the R555 road diversion

## NATIONAL CONSERVATION FOREST

According to the specialist vegetation study reports on the project area, 295 plant species were recorded in the proposed dam basin, of which nineteen are highly sought after and widely used in the Steelpoort Valley as medicine, for food and firewood, and in traditional customs. Of these species, four are in such high demand that they are now considered endemic or near-endemic by the Sekhukhune Centre of Plant Endemism (SCPE), and one is a Red Data species.

Measures were introduced to ensure the protection of the fauna and flora in the project area for future generations. Accordingly, before the commencement of construction work SANBI (South African National Biodiversity Institute) carried out the identification and removal of endangered plants in the prioritised areas. The flora was moved to the National Botanical Gardens in Pretoria, and some unique seeds were sent to the Millennium Bank in Kew Gardens, London. The SCPE plants were used in the landscaping of the De Hoop Dam Information Centre, and the *Boscia Albitrunca* (Shepherd's Tree) was transplanted from the dam basin area to the garden of the Information Centre. The Information Centre will provide the community and visitors with information on dam development activities and water resource management, as well as on the cultural (archaeological) and natural heritage aspects of the project area.

The project area was approved as an off-site mitigation area, and was consequently declared a National Conservation Forest. It was gazetted as such on 6 July

2007 under the National Forest Act. This land is now protected under state law, and no wood harvesting, or any other type of harvesting, is allowed. The protection of plant species (near-endemic, endemic and common) benefits not only Sekhukhuneland and its inhabitants, but also the greater region, as it preserves a unique floristic area for future generations. The sustainability of these initiatives will greatly depend on the cooperation of locals and visitors.

## ARCHAEOLOGICAL SITES

During the Heritage Impact Assessment, the presence of a large number of iron-age sites was recorded. One of the requirements of the ROD was that these archaeological sites would be researched and recorded before construction work could advance. This work is well advanced under the leadership of Professor Johnny van Schalkwyk, with the research team painstakingly digging, trowels and brushes at hand, uncovering secrets of the past. A substantial number of graves had to be relocated – 118 of the 209 on the register were relocated after consultation with the affected families.

## PROGRESS

The housing and site services contracts, as well as the P169-1 road realignment, are continuing and some contracts are nearing completion. The pouring of concrete for the dam has already started, while work on the right flank of the excavation is progressing.

The design of phase 2B, 2C, 2D, 2H and 2I (the bulk distribution system) will commence off-budget via the funding

obtained by the TCTA from the private sector. However, the scale and scope of construction will depend on the number of off-take agreements signed. Discussions with the JWE, ESKOM and the Water Services Authorities will continue in all earnest in order to conclude the above-mentioned off-take agreements.

DWAF is committed to appropriate international best practice and, in line with this aim, external review panels were appointed to both the technical and the environmental suite relating to the dam. As the ECO is also monitoring and reporting on the social and environmental impacts of the project, a holistic assessment of both negative and positive impacts on society and the natural environment will take place by ensuring this process continues after project completion. These study results will shape the project's future operation and maintenance plan to minimise any possible negative impacts.

## Acknowledgement

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### THE ORWRDP PROJECT TEAM

**Clients** DWAF

**Consultants** DHDC (Dam)  
VELA VKE MMA JV (Road)  
Africon (Infrastructure)

**Contractors** DWAF (Dam)  
HLE (Road)  
Several BEE contractors (Infrastructure)

Source:

[http://www.saice.org.za/downloads/monthly\\_publications/2008/CivilAug08/#/0](http://www.saice.org.za/downloads/monthly_publications/2008/CivilAug08/#/0)