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November/December 2016 No. 73  
R60-00



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The King's Grand Hall. See article on page 8.





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ISSN 1817-4715

# IN SEARCH OF THE SILVER LINING, AND MORE RAIN CLOUDS!



There doesn't seem to be much good news doing the rounds these days, faced as we are with a horrendous heat wave, inadequate rain, dodgy politics and a floundering economy. As I write this ed's comment though, there is a chance that the charges against the finance minister will be dropped. If this happens, maybe the silver lining is starting to shine through?

In a press release dated 20 October 2016, the South African Weather Service stated that most local and international forecasting systems were indicating that our summer rainfall areas can expect wetter conditions during the early and mid-summer periods (November, December, January, February). The forecasting system showed enhanced chances for above normal rainfall conditions for the coming season. My spirits lifted! It went on to say however, that the uncertainty of these forecasts remained a concern, since factors such as the possible development of La Nina have not yet strongly manifested. My spirits dropped! (Just to clarify – El Nino is a weather phenomenon causing the warming of sea surface temperatures, and La Nina is the cooling of them. Drought conditions are linked to the El Nino weather pattern).

The most frustrating thing is that all these unfortunate circumstances are beyond our control. What is within our control though is the careful use of water, something most South Africans don't see as a priority. Personally, I think that the water restrictions should have been implemented long ago, and in a much more forceful way.

At the same time, municipalities have to pull their weight too. The ageing infrastructure in Joburg means ongoing burst pipes, spewing out millions of litres of precious water into the air and down the streets. What are they doing to improve their response times to phone calls reporting these leaks? And just think of the opportunities for job creation if they trained more people as plumbers and artisans!

By the time readers see this editorial, news of the charges against Pravin Gordhan and his two co-accused being dropped will no longer be news. I think most South Africans knew that they were trumped up and politically motivated anyway, so let's move onward and upward, hoping for more rain clouds and their silver linings!

Best wishes for the festive season and a better 2017.

  
Karyn Richards  
Editor

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Above and below: The geometry of the ramp is bold and the intersecting stepping stones appear to “float” on the surface of the water

# THE SKYCATCHER



## Project Team

**Client:** Aria Property Group

**Project Managers:** Nest Living

**Architects:** Boogertman + Partners

**Landscape Architects:** Square One

**Landscape Contractors:** Servest Landscaping

**Structural Engineers:** Eckon

**Quantity Surveyors:** DTP

*The Skycatcher is situated in Northgate Business Park, Cape Town. Landscape architect Mark Saint Pôl of Square One submitted the winning entry in a design competition that re-imagined an existing car park ramp as a multi-purpose meeting, recreation and event space as part of a broader building refurbishment.*





Articulated beds create gathering spaces within the curved walls, while carefully detailed decking platforms turn the sloped ramp into a series of garden rooms



A range of indoor and outdoor plants was chosen to thrive in the highly varied light conditions



The creepers have nearly grown to the extent shown in this early rendering



*Trachyspermum jasminoides* adds its scent to the sensorial experience of the park



The mirrored surface of the pond reflects the ever-changing sky into the space

Ilan Kaplan of Aria Property Group commissioned Square One to transform the ramp into a unique amenity that would attract dynamic new tenants to the development. This spiral ramp structure was to form the core of the long, four storey building which is located in a district of large, low-rise commercial and industrial buildings and flanked by the N1 highway.

Saint Pôl's multi-disciplinary design process is *Driven by Landscape*, encompassing social, economic and environmental dimensions. This strives to achieve a balance between the built and the natural components of each of these dimensions, with landscape being the primary informant and tool used in the realisation of his ultimate objective, namely urban place-making.

### Building and planting

Until recently, this district had been largely devoid of sheltered, human scale green open space. The intervention at Northgate

was the perfect opportunity to counter this and in addition, to use the site as an example of innovative open space creation within the city. It was this landscape of horizontal features that gave form to the Skycatcher concept – a consolidated façade of vertical greenery where draping climbers and hanging plants wrapping the ramp structure create an eye-catching cylinder of green. A variety of species was used to maximise the variation of colour and textural interest throughout the year. These include *Clerodendrum speciosum*, *Dipogon lignosus*, *Distictis buccinatoria*, *Pandorea jasminoides*, *Parthenocissus tricuspidata*, *Passiflora edulis*, *Pyrostegia venusta*, *Thunbergia alata* 'Fire Red' and *Trachyspermum jasminoides*.

External and roof planting comprises mainly wind and drought tolerant fynbos species that will provide dense planting beds and seasonal colour, while minimising the excessive maintenance for the building management team.





The green walls create a type of ambulatory with selected views into the amphitheatre

The building was designed to bring the outside in and to draw the inside out, thereby creating spaces rich in sensory experience. It balances built and natural elements to create a valuable and unique urban place.

### Pool and amphitheatre

A carefully engineered slice through a concrete ramp allows sunlight to stream down onto a large reflecting pool at the base of the structure, while an amphitheatre provides opportunities for gatherings alongside the reflecting pool. For those wanting to take a break from their office environment, seating areas along the ramp offer breakaway spaces for them to relax and have lunch. Planted screens create 'green rooms' for gathering or informal meetings and the harbour-like ramp functions as an ambulatory or open air gallery which opens up to reveal the sky above and panoramic views of Table Mountain and Devil's Peak.

The reflection pool, although not part of the brief, was nevertheless a central component of the Skycatcher proposal. Its rim flow design reflects the changing sky above the open parking garage ramp and to bring the tranquil sound of falling water into the space. A cut through the northern side of the ramp allows more light in, and the pond reflects this into the space. The stage platform in the pond is the focal point for the amphitheatre and ramp as a whole. One of the main entry points into the space takes people beneath the bridge and across a series of 'floating' steps which provide an invigorating sensorial experience as they move through the core of the Skycatcher.

### Landscape installation

This was undertaken by Servest Landscaping, under the direction of Redewaan Isaacs and area manager Luthando Renque. Their scope of work included soft landscaping, irrigation installation, supply and installation of imported potting soil and installation of Isover Saint Gobain hydroboard sheets.

Renque says the revamping of the old existing car ramp was labour intensive and they had to carry over 100m<sup>3</sup> of material (potting soil, sand and mulch) in bags onto the site, co-ordinating closely with the other contractors. "Being the last contractor on the project, we had to protect the work of other contractors by not placing soil on the deck and thereby causing stains. Another challenge was ensuring that material brought to site met the weight restriction specifications."

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**By cutting through the ramp, the northern aspect was opened up to allow light into the park**



**The northern entrance cuts across the pond, affording visitors an exhilarating sequence of experiences**

Ground preparation comprised mainly filling of built planters and the installation of bidum geo-fabric as the first layer, glueing it onto the walls and then placing drainage sand. A second layer of geo-fabric was also glued, followed by a layer of the above-mentioned hydroboard. After a third layer of geo-fabric was placed, a specially prepared potting mix consisting of 40% bark, 50% sifted compost, 8% phillip sand, 1% vermiculite and 1% polystyrene, was used.

Soft landscaping comprised a variety of exotic and indigenous plants, mostly creepers and semi-shade material, in order to shade the urban space while providing flowers in different seasons.

The irrigation system installed comprises Netafim pressure compensating dripper lines, specifically designed to reduce water wastage and spraying on the walkways.

Maintenance being undertaken by Servest includes weeding, disease control, pruning, litter removal and shaping and training of creepers to climb the cables. **lsa**

***Text and photos supplied by Mark Saint Pôl, Square One Landscape Architects***





The water feature is a focal aspect of the site

# THE KING'S GRAND HALL

## Project Team

**Client:** Ministry of Public Works, Swaziland

**Architects:** Ramashka Architects

**Landscape Architects:** Seas of Green

**Landscape Contractors:** Bidvest Landscaping

**Main Contractor:** AG Thomas

*The King's Grand Hall (Mandvulo Hall) is situated in Lozitha, Swaziland, and forms part of the royal palaces of King Mswati III of Swaziland, head of the Swazi Royal Family. The stylised, colonial building was developed to host the 36<sup>th</sup> SADC summit which took place at the end of August 2016 in Swaziland. King Mswati is the current SADC chairperson.*

The project was a design/build undertaking and was project-managed by Jonathan Ferguson of Bidvest Landscaping, working closely with landscape architect Paul Smit of Seas of Green. Ferguson says the landscaping component fell within the broader civils contract due to the budget, scale and size of the project.

## Landscape design

The concept architect, Elena Dlamini, undertook the initial hard landscape design comprising a formal garden on the upper terrace portion of the site, on the approach to the Grand Hall. In this area, the focal point is a large, bowl-type water feature (designed by the architect), with gazebos on either side of it. The design of the gazebos, water feature and numerous colonnades emphasises the formal, neo-colonial style of the project as a whole.

Smit designed the rest of the landscaping, comprising a lawned terrace, an amphitheatre seating 50 000 people, pockets of soft planting, screening hedges, flowering shrubs and trees. "I designed the gardens around the

concept architect's initial plans and although my design philosophy took cues from the hall's neo-colonial architecture, the outlying areas are much more informal, with veldgrass, trees and shrubs merging into the surrounding Swazi landscape," he explains. The amphitheatre makes efficient use of the huge open spaces on the site, and accommodates outdoor events and functions.

Flower beds are framed by topiarised hedges to give permanent structure, and are in-filled with annuals and perennials for colour. Smit says these areas are symmetrical, following the formal guidelines of classical gardens. "The opulence of a particular European era was necessary to complement the neo-colonial architecture," he says.

## Installation aspects

Bidvest Landscaping was responsible for construction of the amphitheatre, stepped terraces and plant installation.

Ferguson states that with all the many aspects of the installation, the main challenge was the fact that although the architect supplied designs, dimensions and renderings, these were conceptual and not accompanied by detailed construction drawings. "Building the amphitheatre and grassed terraces was a challenging technical exercise, especially as the site slopes back towards the highway. Another was the deployment of a 35 tonne crane, brought to site in order to lift the massive central bowl of the water feature into position. In all aspects of this project, we used what little information we had, worked to very tight timelines, improvised where we needed to and worked things out as we went along, working as a close-knit team."

Bidvest maintained the site until the end of October 2016.

## Water feature

This was installed by Brad Straw of Waterscapes and is a focal aspect on the site. He says the project was very different in that he and his team were responsible for the entire co-ordination and installation of various pre-cast elements which were installed in phases until completion. His scope of work included the following:





Above and below: The water feature lit up at night



- design, construct, supply and install all aspects associated with the water features' hydrodynamics and reticulation;
- design, supply and installation of electrical panels for the water features;
- staffing, training, health and safety management;
- weekly planning and programming with the landscape contractor;
- co-ordinating the construction and installation of the structural requirements for finishing effects;





Hard landscaping aspects of the site show the neo-colonial style of the project

- waterproofing and finishing effects of concrete items; and
- final installation and commissioning.

The overall project included the following elements:

- the tribune – an area where dignitaries and others meet on arrival;
- the alcoves - circular elements with strong focal points in the landscaping;
- the colonnades – strong, curved columns creating a flank to the water feature;
- a small water feature with columns similar to the colonnade, creating an individual element complete with spouts of water from a steel manifold above and a ring below;
- the main water feature, which is a large, scallop-shaped bowl that has rows of various spouts culminating in the centre column. The bowl also has a rim flow effect of water falling back into the main pond.

Straw says the project required a lot of co-ordination to get the levels and angles correct to ensure that the permanent shuttering would fit correctly. Heavy, unexpected rains occurred after the foundation excavations were completed and persisted for two weeks, widening and deepening the foundations. These then had to be poured but once the project was back on track, all elements were installed in a sequence; this ensured that the construction would dry, allowing enough structural strength before installing the next piece. After final installation, all elements were patched and painted with a cementitious “white” finishing coat.

Local contractors were used for the roofing and Straw says that this was challenging as they work differently to the sub-contractors he was used to. However they achieved the same finish with the same quality. “As far as possible we only used local labour and supported local businesses for all the basic building material and supplies.”

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Above and right: Hard landscaping aspects of the site show the neo-colonial style of the project

Above left: The central bowl portion of the water feature being lifted into position by crane

### Logistics

Ferguson explains that the project's logistics were tricky, with complex border crossings, but nevertheless manageable. Everything from plants, trees, bricks, garden furniture, paving and machinery had to be brought in from South Africa.

"It was an unusual project, and one where we were, in a sense, masters of our own destiny" he concludes. **lsa**

### Concrete structures

Claudio Del Gallo of Gallo Precast was appointed to manufacture and supply the vast amounts of precast elements for the site, namely the tribune, main fountain, smaller fountain, alcoves, colonnades, entrance lions and curved borders for the alcoves and colonnades.

Some of the items were made from glass reinforced concrete to assist with installation as weight was a factor. Other items such as the main fountain were made of reinforced concrete. Materials used varied as all items were custom-made for the project. Copings on the alcoves were made to form a permanent shutter as there is a beam cast on top of them. New moulds were required for the project.

All precast items were transported to site by Gallo Precast, who assisted Waterscapes with the installation.

### Irrigation

This was designed by Gareth Manson of Controlled Irrigation, who worked with the design supplied by Seas of Green. The irrigation system is a state-of-the-art RainBird decoder system, allowing great flexibility for projects where there are many areas that need to be worked on all at once.

The system is fed via a pumping station several hundred metres down in the valley, and water is pumped up to a reservoir at the highest point above the site. It is then gravity-fed into the irrigation system. With nearly 3 000m of mainline pipe network through the site and several hundred metres of elevation variants, there were pressure concerns at certain points on the site, but these were overcome by using inline pressure reducing valves. There are 130 solenoid valves in total, controlled by two RainBird ESPLXD decoder controllers.

The system covers all the landscaped areas and a wide variety of irrigation heads have been used to cope with the different landscape types. Drip irrigation is used around the water features and rotary van nozzles for the seating area of the amphitheatre. "The King's Hall is a great example of the 'intelligent use of water' that a well-designed and installed irrigation system offers," says Manson.

Photos courtesy of Jonathan Ferguson, Bidvest Landscaping







The back section of the house

# BIRDLIFE SOUTH AFRICA



Egyptian goose chicks in the wetland

## Project Team

**Client:** BirdLife South Africa

**Landscape Architects:** Landmark Studios

**Landscape Contractors:** Servest Landscaping

**Wetland Construction:** Hard Landscape Enterprises

**Ecologist:** Tania Anderson

*Isdell House in Dunkeld, Johannesburg, is the new head office of BirdLife South Africa, a partner of BirdLife International. This is a global partnership of conservation organisations that strives to conserve birds, their habitats and their biodiversity. Isdell House is named in honour of Pamela and Neville Isdell in recognition of their major contribution to the project.*



Bird sculptures in the arid succulent and aloe habitat area







The lower wetland pond



Redevelopment of the house and its garden began in January 2015 and the criteria for this were that the building should be energy efficient, with water use kept to a minimum. The garden had to be indigenous, water wise and showcase the different habitats that encourage bird variety to the site.

Landscape architects Glenn Wagner, Mark Young and Stephanie Nel designed a contemporary landscape that was strictly indigenous in order to attract birdlife and ensure a natural environment. The main design element is a green trellis at the front of the house, which will eventually form a “type of green cage structure”, according to Wagner. Nel adds that this creates the threshold to the front door of the house. “It was originally the architects’ concept, and we then designed it further.” The look is structured, in strong contrast to the rest of the site and Nel comments that the front portion of the site is the “people space, the rest is the bird space”. The primary focus of the space is for bird habitat, but permitting controlled human movement.

Keith Nevin of Hard Landscape Enterprises was briefed to design and construct a bird friendly water feature and as the area allocated for this was sloping, he created a top pond, stream section and a base pond. The shell was constructed with Ferro cement and was designed to be more of a wetland, round and shallow, into which birds can wade. The shell was waterproofed, and rocks packed throughout the feature creating planting pockets.

In the stream section, Nevin created a water rapid with the rocks and then a 300mm waterfall to aerate the feature. The filtration system comprises a swimming pool pump, sand filter and UV light, resulting in clean, clear water.

The water feature is placed on either side of a brick walkway, and natural sleepers connect the two sections in the form of a bridge, which also allows for wheelchair access. Water flows underneath the sleeper bridge from the top pond to the bottom one.

Different depths of water were nevertheless important and the bottom pond is one metre deep, with a tree stump forming an island on which birds can perch. Edge conditions around the ponds have shorter grasses and rocks – the latter were on site during the clearing process and retained for re-use.

A lawn platform for functions was a requirement from Mark Anderson, CEO of BirdLife South Africa. He was inspired by a similar feature at the office premises of Landmark Studios, together with a series of steps and hedges leading up to the lawn and main entrance in alternating bands. The garden design is formal in front of the house and more relaxed at the back. Changes in levels have created platforms which add interest to the landscape.

Nel explains that an analysis was done to determine the hotter, cooler and shadier parts of the site, so for example placing the forest biome in the shadier areas to respond to the microclimates. “It is a model garden to display all the biomes, although the emphasis in terms of biome size is on the grassland and wetland sections”.

In her initial design, Nel looked at the creation of different storeys and different levels of planting so that everything was relevant to biomes or habitats.

### Sustainable green building

The criteria for re-developing the new premises were that the building and landscaping should be energy-efficient, with water use kept to a minimum, and for plants and other building materials to be retained and re-used wherever possible. Servest Landscaping stripped and cleared the site, salvaging plants and clay brick paving from the previous walkways. The old pool was filled in and now forms the deck, and although the roof of the house had to be replaced, the shell of the building was re-used.



The Savanna area on the site







Planted trellis and steps at the front of the house. Pots contain *Strelizia reginae*.



Upper wetland pond



Brick and sleeper pathway across the wetland feature. The water runs underneath the bridge from the upper to the lower pond.



A strategically placed branch serves as an island for birds in the lower pond

In the interests of long-term sustainability and greening of the building, the following are some of the measures taken into account to accomplish this:

- a large pergola/trellis (mentioned above) was constructed to form a green buffer to reduce heat on the west facing walls of the house, keeping the building cooler in summer so that air conditioning usage is reduced. It also provides a sheltered habitat for nesting birds and a cool, shaded deck for visitors;
- the roof is cool because of its dove-grey colour which provides a solar reflective surface that absorbs less heat;
- large windows ensure that the offices are naturally lit, thereby reducing the use of electrical lighting. The window glass is thicker and provides better insulation against climate change and sound, improving indoor comfort and staff productivity;
- solar panels will be fitted on top of the carports in the near future, providing renewable energy to the building and reducing electricity wastage;
- water saving is crucial, especially in terms of the current drought situation and JoJo tanks have been installed to harvest rainwater from the roofs. This water is used to top up the wetland and irrigate the garden. Drip irrigation has been installed in a few sections where more regular watering is required. The drip irrigation system is computer controlled and the computer is connected to a rain sensor that switches off the irrigation when rain is detected. Other areas are watered by hand only when necessary and once mature, will rely on summer rainfall;
- waste is another aspect of the site's sustainability and separation bins are located in the kitchen for collecting paper, plastic, glass, metal, general and organic waste. The latter is placed into a bin to create compost for the garden.

### Indigenous garden

Ecologist Tania Anderson was responsible for the plant species selection and planting plan, and the garden is intended to specifically promote biodiversity and a bird-friendly ecosystem. Its layout was planned with biomes as the central theme and various habitats for birds within these biomes, which comprise Highveld grassland, savanna, dry and mesic bushveld thickets, forest woodland, arid and aloe habitat, a scrubby exclusion zone and shady low shrub habitat. At the back of the house, an exclusion zone of thicket bushveld has been created for "shy or secretive" birds.

"It is a fairly unconventional approach, with planning for ecological systems as the starting point", she explains.



The lawned area is used as a function space

Indigenous plants used are water wise and xeriscaping is practised, emphasising water conservation by growing plants that are appropriate to the local climate. Mulch in the form of shredded sticks, recycled organic material, bark chips and nut shells helps retain moisture in the soil.

Anderson positioned the plants and the various biomes move naturally into each other without clear dividing lines. She says plant material in each biome, as well as the biome, itself, is intended to mimic the natural ecosystems we find around us. Although some pruning of grasses, trees and shrubs takes place, for the most part they are left unmanicured.

Approximately 220 plant species were used on the site, and the grassland habitat, being the largest area, contains the following: *Cussonia paniculata*, *Gardenia volkensii*, *Erythrina* sp., *Merrillia* sp., *Bulbine* sp., *Eucomis* and *Asparagus*. Grasses include *Melinis nerviglumis*, *Themeda triandra*, *Aristida junciformis*, *Panicum maximum*, *Gladiolus crassifolius* and a variety of daisy bushes such as *Felicia*. Grassland aloes include *Aloe greatheadii* and *A. cooperi*.

The wetland habitat was specifically important and contains *Buddleja salicifolia*, a variety of sedges, *Typha capensis*, *Berula erecta*, *Nymphaea* sp., *Aponogeton distachys*, *Ornithogalum juncifolia*, *Kniphofia* sp., *Aristea ecklonis*, *Tetradenia riparia*, *Crinum* sp., *Dietes*, *Crocosmia* and *Kyllinga alba*.

### Landscape installation

This was undertaken by Servest Landscaping under the supervision of Elton Fohren. Site preparation included fine grading, soil improvement and installation of the irrigation system. Approximately half the site is under drip irrigation and the lawn area has four inch pop-ups. The rest of the site is not irrigated. **Isa**

Photos by Mark Anderson, Tania Anderson and Karyn Richards

# WASTE-CON 2016: DIVERSIFYING WASTE TOWARDS A ZERO WASTE ECONOMY

By Jason McNeil, Sales and Marketing Director at Interwaste

**Recently, Africa's largest and most prestigious waste management conference, Waste-Con, took place in October 2016, seeing leading waste management business, Interwaste, along with key players in the waste management sector and government, come together. The aim was to discuss industry issues, as well as important aspects around the local waste management sector, in a bid to improve waste management on the African continent and use waste as an opportunity within other areas.**

This year, the conference covered topics such as recycling, waste management and landfill engineering, with a special focus on municipal waste management, recycling and finding alternatives to landfill. If we consider that Africa's waste economy has been in the spotlight substantially in recent months, with majority of South Africa's audited landfill sites not being compliant with the minimum requirements as set out by the Department of Environmental Affairs, then there is no doubt that this conference – and the focus that was placed on key issues – came at exactly the right time.

In a recent report by the Green Biz Forum I, it was stated that South Africa will have no landfill space by 2024 as a result of overflow of waste. Given this, there is an enormous amount of pressure on consumers and businesses to meet governments objectives– meaning that waste generators and management companies need to find ways in which they can take heed of the role they play in creating a circular waste economy and driving solutions to better managing waste to landfill.

Key innovations demonstrated by Interwaste included:

- Refuse Derived Fuel (RDF) - in February this year the company launched South Africa's first Refuse Derived Fuel plant (RDF), to reduce the waste to landfill and directly contribute towards



government's efforts to reduce the country's carbon footprint. Taking on average 12 000 tonnes of general, industrial and municipal waste, which is then converted to alternative fuel, this plant offers a more substantial and economic alternative to traditional fuel.

- Interwaste strongly believes that it's not just up to government to drive change where responsible waste management is concerned, but that corporates too play a fundamental role in supporting the government in realising its objectives of the Waste Act (Act 59 of 2008), which demonstrates their intentions to improve and expand waste and management through expanding the legal framework of regulating waste management in South Africa, as well as increase the compliance requirements for waste generators, transporters and waste managers. This type of collaboration is crucial in the waste management environment.
- Waste derived fuels (WDF) – Blending platform, Interwaste partnered with Lafarge to develop a blending platform, deriving energy from waste at a relatively low cost and providing an environmentally sound solution for managing combustible waste products, that are banned from landfill. Such waste is not only expensive to dispose of but toxic if not managed correctly.
- In addition, through the same partnership, Interwaste Pharmaceuticals offers the safe disposal of Pharmaceutical waste by using the alternative fossil fuels created from waste, during the manufacturing of cement. These and other initiatives have shown a 748% increase in the diversion of hazardous waste from landfill from 2014 - 2015.
- The Klinkerstene Waste Park - In line with Interwaste's global best practice methodology and approach to market, they recently developed their newest market leading landfill innovation and waste park – The Klinkerstene Waste Park, situated at the company's newest property in Delmas. Through this project, Interwaste has demonstrated leading landfill operations by developing a floating cover made of high-density polyethylene (HDPE) – a market first and leading innovation in managing changing waste management requirements.

This new landfill site, set to become the company's flagship operation, is a result of Interwaste's continuous investment in innovative solutions for environmentally sound waste management opportunities.

Although the idea is to move away from landfill, the reality is that it will be around for some time to come so while Interwaste is always at the forefront of waste innovation, it supports those items that can't yet be diverted and ensures that there is a best practice and compliant landfill site available when needed. **isa**

For further information visit [www.interwaste.co.za](http://www.interwaste.co.za).



# 2016 ILASA CONFERENCE: RE-INTERPRETING LANDSCAPE

*The above conference took place in September 2016 at the CSIR Conference Centre in Pretoria. The paper below was presented by Carina Malherbe, Director: Environmental Sector Advocacy and Co-ordination, Department of Environmental Affairs. Further presentations will be featured in future issues of Landscape SA.*

## **Effective Environmental Improvement Intervention System: Recognition of Improvements in the Environment**

It is common cause that humanity is using more than what the earth can provide. According to the United Nations (UN), we are using 25% more resources than what our planet can sustain. Humanity exceeds planetary limits and ecological assets are becoming more critical. When ecological footprints are bigger than the biological capacity, ecological deficits are created. In a study conducted on the ecological deficits in South Africa, Cole *et al* (2014) used the Stockholm Research Centre's "safe operating space for humanity" concept to establish and illustrate possible ecological deficits in South Africa. As shown in Figure 1, South Africa has already exceeded the safe operating space for humanity in climate change by 2%; freshwater use by 34%; marine harvesting by 45% and biodiversity loss by 37%. Arable land use, phosphorous loading and air pollution are within 10% of reaching and exceeding their boundaries.

The National Development Plan 2030 (NDP) affirms that market and policy failures resulted in the global economy entering into a period of

ecological deficit as natural capital is degraded, destroyed or depleted faster than it can be replenished. To address the situation, the NDP gives direction in saying that "...developments that have serious environmental or social effects need to be compensated / balanced through improvements in related areas..."

The Sustainable Development Goals were adopted by members of the United Nations in September 2015 to end poverty, protect the planet and ensure prosperity for all. Goals 6 - ensure availability and sustainable management of water and sanitation for all, and 15 - protect, restore and promote sustainable use of terrestrial ecosystems, sustainably managed forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss—make specific reference to:

- the restoration of water-related ecosystems;
- terrestrial and inland freshwater ecosystems and their services;
- the restoration of forests, wetlands, mountains, drylands, degraded land and soil and land affected by desertification, drought and floods; and
- the strive to achieve a land degradation-neutral world.

## **Progressive, not reactive**

The Department of Environmental Affairs (DEA) is implementing a new progressive system called "Effective Environmental Improvement Interventions" (2E2I). This system responds to the direction given in the NDP 2030 and the SDGs on environmental improvement and restoration of degraded environments to restore ecological infrastructure in the three basic resources for human life—air, water and earth.

The objectives of the 2E2I system are that:



Above: Lake Fundudzi headwaters rehabilitation  
Below: Fundudzi eight years later



Above: Wakkerstroom gully before  
Below: Effective environmental improvement of the Wakkerstroom gully



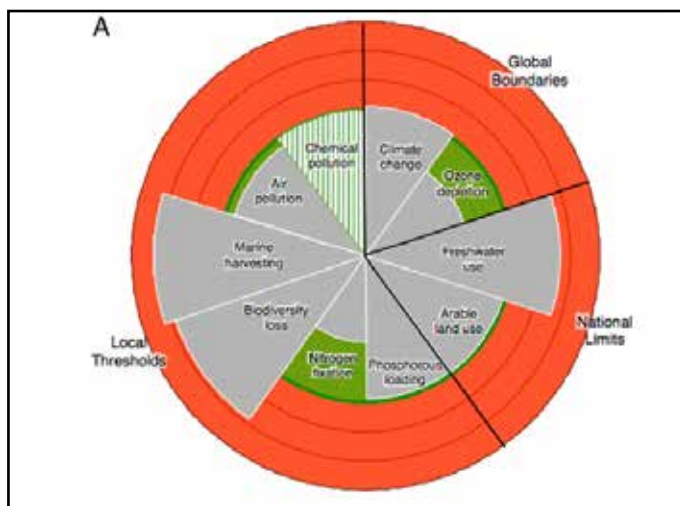


Figure 1. South African ecological deficits as determined by Cole et al.

- (i) good, effective, sustainable, efficient and properly informed restoration projects are recognised as environmental improvement projects; and
- (ii) the value associated with 2E2I recognition accelerates, incentivises, promotes, supports, highlights and generally increases the large-scale rollout of effective environmental improvement interventions.

### Supportive, not regulatory

The submission of application to be registered as a 2E2I project is completely voluntary. The purpose of the 2E2I system is to award recognition to effective environmental improvement interventions in South Africa, to stimulate rehabilitation and restoration interventions and provide for a central platform for information-sharing on “good” environmental improvements in South Africa. It is therefore not underpinned by national legislation, but rather based on principles agreed to in the NDP and the SDGs. The success of the 2E2I system is dependent on the number of projects that are registered and

recognised. The strategy to maximise project registration is by building the value of 2E2I recognition through the on-going provision of ever-improving recognition benefits.

Initially, the 2E2I recognition benefits will be derived mainly through profiling interventions such as award ceremonies, departmental press releases, project profiling by the Minister and senior officials at high-profile events, recognition as good practise case studies, advertorials and media coverage. This will contribute to the improved status of 2E2I intervention designers, implementers, funders and custodians. Further benefits of 2E2I status includes published and quotable recognition by the DEA, a recognised contribution to research, third party evaluation, a recognised contribution to national and global environmental improvement efforts and the attainment of the Sustainable Development Goals, and potentially improved public, private sector, national and international interest, support and funding opportunities. However, the 2E2I Unit will continuously engage with the environmental improvement community in exploring and implementing new ways of increasing and/or improving the benefits of 2E2I recognition.

### Scientific, but not academic

An Effective Environmental Improvement Intervention is defined as a discrete, intentional and recognised intervention that has the measurable and sustained improvement of degraded natural environments or environmental media as its principle objective. All project information will be made available on the DEA's website. This will include project descriptions, project implementation reports, spatial information and sustained project reports for 25 years. This wealth of information will be accumulated and can be explored by researchers to further ecological restoration science. **Isa**

For further information contact Carina Malherbe on 012 399 9742 or [cmalherbe@environment.gov.za](mailto:cmalherbe@environment.gov.za).

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# GREENED UP

## NOVEMBER RELEASES FROM BALLSTRAATHOF

*Petunia 'Night Sky'* is the result of a breeding breakthrough, with a starry, speckled pattern on its blooms. White speckles stand out against a deep purple-blue backing recreating a clear night sky, and each bloom has its own distinct pattern. The plants are suitable for containers, hanging baskets and in the garden. Grow in full sun and allow the soil to almost dry out between watering.

*Celosia cristata 'Dracula'* is a dramatic looking plant worthy of its name, with an unusually shaped dark purple flower on dark foliage. It is a good mid-high border plant or novelty container plant, growing in full sun and well drained, fertile soil. As an indoor plant, the flower is red and the foliage green, but the colours take on a more purple tone when planted in the garden. It flowers from spring to late summer.

*Zinnia Zahara Double Salmon Rose* is a disease-resistant Zinnia with extra large flowers that provide long lasting colour in the garden, especially in sunny, hot and dry conditions. It makes a good colour filler for the middle of a border. Grow in full sun for a good flowering performance in summer.

*Begonia benariensis 'Big Green Leaf Pink'* is a showy landscape begonia that grows into a substantial plant with upright, arching growth, glossy leaves and large flowers that fall off cleanly when old. This interspecies hybrid tolerates full sun as well as partial shade and does best in moist soil that drains well. Fertilise once a month and use in tropical gardens, as a filler, in mass plantings, mixed borders, as an edging or in large containers and hanging baskets.



**For further information contact BallStraathof on 011 794 2316**

***Petunia 'Night Sky'***



***Zinnia Zahara  
'Double Salmon  
Rose'***



***Begonia 'Big Green  
Leaf Pink'***



***Celosia 'Dracula'***

## COROBRIK PROVIDES HANDS-ON LEARNING EXPERIENCE

Since 2013, landscape technology students at the Cape Peninsula University of Technology (CPUT) have benefitted from a 'construction week' sponsored by Corobrik, providing an opportunity for the students to participate in a landscape design and construction project. This year the students constructed a paved pathway through a medicinal plant garden that will be used to grow a variety of plants researched by the Medicinal Plant Research Group within the Faculty of Applied Sciences.

The range of students working collaboratively on a single construction project provided a vital opportunity for peer learning and skills transfer. Corobrik donated 100m<sup>2</sup> of clay pavers to enable the practical learning, and has done so since the event's inception in 2013. Each student is instructed to install his/her own square metre of paving after a training session conducted by Ishmael Rothman, Corobrik's bricklayer training school co-ordinator.

The paving donated this year included the Corobrik clay pavers - Meadow and Constantia - known for their durability. The yellow



**A section of the completed pathway constructed by CPUT landscape technology students**



colouring of the Meadow paver alongside the red of the Constantia made for an attractive and colourful design, clearly evident in the finished project.

Christie van Niekerk, Corobrik Western Cape Manager, said that the event establishes a professional bond between the students and Corobrik.

**For further information contact Christie van Niekerk on 021 888 2300**

## WESBANK FNB CAMPUS BANKS ON SOLAR

The large campus shared by WesBank and FNB in Fairland, Johannesburg, will soon earn a five star rating from the Green Building Council of South Africa (GBCSA). Next year, the campus will supplement its electricity supply using a large scale solar panel installation.

The campus has 978 outdoor parking bays and over the next 11 months the ageing car ports will be replaced by new structures that use 7019 photovoltaic (PV) panels. Along with providing shade for vehicles, this installation will be capable of providing 1 806 kilowatt hours of energy to the building, with a total expected supply of 3 000 000 kilowatt hours per annum. This would be enough to power the average South African household for nearly 800 years.

The project forms part of existing measures to reduce electricity consumption at the campus and will be rolled out in two phases. By Arbor Week 2017 the campus will switch on its solar grid – a move that will save around R3.9 million in electricity costs during the first year of operation.

Chris de Kock, CEO of WesBank, says it is their social and environmental duty to reduce their carbon footprint wherever possible and with this solar installation they will usher in the era of sustainable energy for business. He adds that the work is a sign of the bank's commitment to environmental sustainability.

The Fairland campus already has a four star rating and the building has a significant focus on sustainability, employing a number of measures to minimise its impact on the environment. Offices are equipped with population density sensors that power off lights when no human activity is detected. A separate solar panel installation is also used to heat water for ablution facilities. Sun screens on the exterior of the building provide insulation, aiding the efficiency of the heating and cooling systems.

In addition, extensive water saving measures are in place; the air conditioning system is able to harvest condensation, allowing for 30 000 to 60 000 litres of water to be collected and used for irrigation purposes. An on-site pond is also used to collect storm water and serves as a safety mechanism to assist in preventing soil erosion on the banks of the nearby

Klein Jukskei river.



**For further  
information contact  
Rudolf Mahoney on  
083 282 1246**

**The WesBank FNB  
campus in Fairland**





**Above and opposite page:**  
The vertical green wall

# NETCARE PINEHAVEN VERTICAL GREEN WALL

Project Team

Client: Netcare Hospitals

Wall Design: Seas of Green

Wall Installation: Bidvest Landscaping

Wall System Manufacturer: Modiwall

***Bidvest Landscaping received a SALI gold award in the 2016 SALI Awards of Excellence for their installation of a vertical green wall at Netcare Pinehaven in Krugersdorp. The project was entered in the category of Specialised Landscape Construction.***

Charl Baker and Paul Smit are partners in Modiwall and together designed and manufactured the Modiwall system, with the emphasis on introducing it

to the green industry. The system is patented to Modiwall and is manufactured in Cape Town.

Netcare approached Bidvest with a brief to install the wall just beyond the reception area. It was required to create a soothing backdrop in this space using different leaf textures and shades of green. Colour was specifically avoided.

## Wall technology

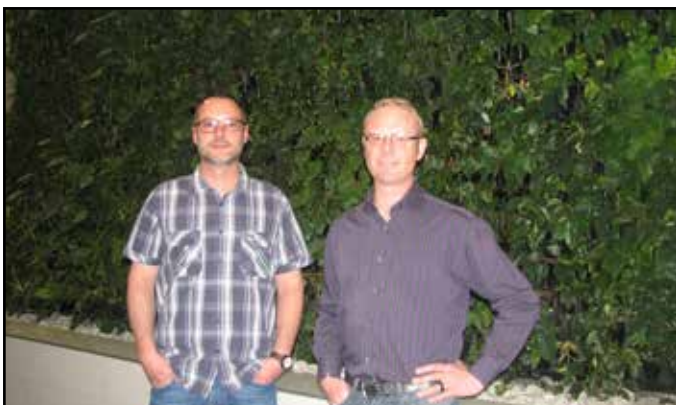
The wall is made from recycled, moulded plastic which is UV resistant and comprises four units slotted into each other to make a one square metre vertical garden. The units can be fastened to any support wall or hang from a support beam. The fact that the system is modular allows for easy installation of units which slot together to form a wall of any size.

The modular units consist of three main components – a wall panel, grid panel and the pots. The latter clip easily onto the grid panel and are designed to allow for optimal moisture by means of capillary action. They can be easily swapped for maintenance or a change in planting theme.

The walls can be pre-grown off site for an instant effect at installation and there is adequate root space for optimal growth in the soil.

## Irrigation

The irrigation system is built into the wall, operating by means of a pump and pipes located underneath the reservoir (in this instance covered by attractive white pebbles). Water is recycled and irrigation occurs three times daily for 10 -15 minutes. There is very little evaporation and the plants draw the water they need from the panels. The detachable front panel has a support matrix of clip-on, self-irrigating planting trays and the reservoir feeds a ring main, supplying water to the top of the panels. Water trickles down uniformly



**Paul Smit (left) and Charl Baker, partners in Modiwall**





inside the panels to irrigate the plants in the individual pots.

A liquid-based fertiliser, Nitrosol, is fed to the plants through the pipes.

### Installation

This was undertaken by Bidvest Landscaping under the supervision of Jonathan Ferguson and Gugu Msezane. The installation took place over a period of seven days, and plant material was prepared off site at the nursery, taking four months to grow. Five species were used and the wall consists of approximately 4 800 plants. The vertical garden is eight metres tall (including the reservoir), 6.5 metres wide and 65 square metres in total.

Msezane says the wall was assembled on site, with batons acting as its main structure. The batons are spaced out accordingly so that the panels can be mounted correctly. It took three days to mount the panels and one day for the irrigation to be installed. The irrigation is set on a timer according to the needs of the plants.

The system was waterproofed by the main contractor and plants were installed in three days, transporting them from the nursery to the site and clipping them into place. Coverage on the wall was instant and plant growth was rapid, according to Msezane, who says that maintenance is not complicated but needs to be done efficiently and regularly.

### Lighting

Long narrow lighting tubes have been suspended from the ceiling in front of the wall to supplement the light conditions, as the natural light available nearby the wall is diffused through the windows behind it.

### Benefits of the Modiwall system

- The wall is modular, allowing for fast and simple installation;
- detachable components allow for easy swapping or replacing of plants;
- walls can be pre-grown off site for an instant effect at installation;



- there is swivel action for curved walls and bends;
- the optimal moisture supplied by capillary action minimises water waste;
- there is adequate root space for optimal growth in the growing medium;
- it is a simple, non-hydroponic system for reduced technical requirements;
- the recycled, UV-resistant plastic used for the wall ensures indoor and outdoor longevity.

### Public interest

According to Safiyya Mohamed, Client Liaison Officer at the hospital, the green wall has been well received by patients and people visiting the hospital. "They have shown positive interest in it and curiosity as to how it actually works, walking up to it to take a closer look," she states. **lsa**

**Photos courtesy of Charl Baker, Operations Director of Modiwall.**



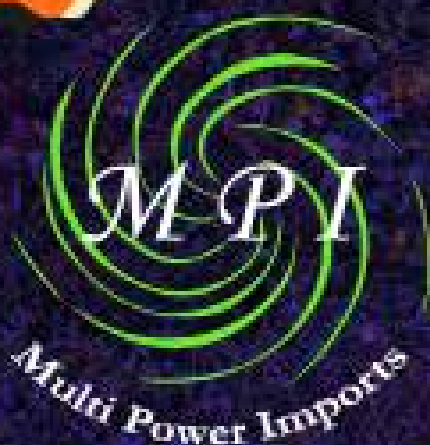
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# EVERGREEN TURF OPEN DAY

The Evergreen Turf Open Day took place in August 2016 in Eikenhoff. Below are photos of some of the exhibitors.









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## Grassnyer Kliniek

The Grasshopper Company is a privately held corporation dedicated to the design and production of commercial and large-acreage mowing and grounds maintenance equipment. Grasshopper introduced the first zero-turn radius mower with dual swing-out levers in 1969, and other industry firsts include the first liquid-cooled, diesel-powered zero-turn radius mower in 1983 and the first electric-actuated fold-up mower deck in 2004. Based in Kansas, USA, the company distributes its products worldwide and is committed to clean manufacturing processes that reduce impact on the environment.

Grasshopper was introduced in South Africa 23 years ago. Tandem Lawn Industries, the largest manufacturer of lawnmowers in South Africa, obtained the agency in 2013, supported by a committed group of specialist dealers.

The range in South Africa includes midmount models with cutting deck sizes ranging from 48" to 72". The most popular model in the range, the 126V-52 maintains the same professional quality craftsmanship as all other Grasshopper mowers, with features that include a fully hydraulic, integrated pump and wheel motor transmission, 26 hp commercial turf engine, 52 inch wide cutting deck with foot pedal and drop pin height adjustment, large turf style drive tyres and a fully cushioned Cordura covered seat with padded armrests.

The model 126V-52 is well-suited to large properties, contractors, schools, farmers and estate lifestyle who want to maintain lawn areas around their homesteads. It provides the agility of a zero-turn mower with a compact size, able to manoeuvre in tight spaces and allowing for easy storage in garages or small outbuildings. Combined with a 300 hour transmission fluid change interval, this model is designed for less maintenance, low cost of operation, extended service life and long term value.

Grassnyer Kliniek Pretoria has been servicing the landscape, governmental, corporate and retail markets for the past 38 years, providing new, top brand machinery, parts and back-up service.

**For further information email [rudi@lawnmowerclinic.co.za](mailto:rudi@lawnmowerclinic.co.za)**



**Grasshopper 126V-52**

## Professional Performance without Petrol

The Husqvarna battery series comprises a comprehensive range of battery-operated equipment including chainsaws, top handle saws, brushcutters, hedge trimmers, pole pruners and leaf blowers. These offer the power of petrol performance but with the benefits of battery technology and the convenience of cordless. Some of the advantages of the battery technology are:

- lasting power, where the Li-ion 36V batteries provide long-lasting power and are equipped with a cooling system which extends the battery cells' lifetime;
- simple operation – the battery machines are operated using an interactive keypad. The machines are started and stopped easily by pushing a button;



- no emissions – quiet, exhaust-free operation means that battery units are ideal for working indoors;
- longer operating time – the SavE mode on the intuitive keypad can be used for maximised runtime with great results;
- convenience – the battery pack is designed for demanding, long lasting use and fits all Husqvarna machines, allowing quick switching of the same battery between equipment;
- consistent torque – advanced brushless motor is 25 % more efficient than a standard brush motor, meaning that it provides high and consistent torque for maximum performance;
- low maintenance – no refilling of fuel, less parts to service and an electronically controlled drive system means less downtime and low operation costs;
- comfortable use – Husqvarna's battery machines have a compact design, excellent product balance, comfortable handle grips and intuitive controls allowing comfortable working in all situations. The machine has low noise levels, enabling longer working hours and the ability to work in noise sensitive areas such as schools, office parks and hospitals;
- two-way rotation – trimmer head on battery trimmers can rotate in both directions so grass clippings can be directed away from walkways, giving a tidy result and eliminating the need for sweeping;
- cost effectiveness – the battery machine is offset by the saving in operational costs;
- unique battery features means that they can be recharged at any time.

**For further information visit [www.husqvarna.co.za](http://www.husqvarna.co.za)**

## Husqvarna cleans up streets

Following heavy rains in KZN, Husqvarna dealer Hendre Lottering from Powerworld and Pumps in Amanzimtoti initiated a clean-up of the streets in his neighbourhood using the Husqvarna P525 front mower with broom attachment. The machine also enables landscapers to tackle cutting tasks with powerful front rotary action and a low cutting profile. The high capacity, diesel-powered mower offers excellent manoeuvrability and productivity in narrow areas and large open spaces. The front-mounted, low profile deck offers an excellent overview of the working area, resulting in precise, close-up trimming and good accessibility under fences, bushes and park benches. The machine also has a low centre of gravity and high performance AWD system, guaranteeing excellent slope stability. A wide range of attachments is available.

**For further information visit [www.husqvarna.co.za](http://www.husqvarna.co.za)**





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## Kubota U30 Mini-Excavator

The Kubota U30 mini excavator distributed in South Africa by Smith Power Equipment, is small and compact but has a good power to size ratio. It digs and closes trenches with a dozer blade like a machine three times its size. The machine is fuel and cost-efficient.

Pioneering advanced features include Auto Idle and LCD panel with self-diagnosis function. The machine's auto idle system helps save up to 10% fuel and when the control levers are in neutral for more than four seconds, the engine idles automatically. When any control lever is moved, the engine immediately engages and this feature reduces noise, exhaust emissions and running costs.

The digital LCD panel and Kubota Intelligent Control System help reduce downtime and save on repair and technician costs by providing accurate and timely diagnostic readings and routine maintenance alerts. Service technicians are easily notified of the operational history of the machine through the AutoSave function which automatically displays error history. This shortens inspection and repair time, which also helps reduce costs.

**For further information contact Smith Power Equipment on 011 284 2000**



**Kubota U30 mini excavator**

## Saving Rhinos with Outdoor Power Products

A rhino-dehorning campaign, using Husqvarna outdoor power products, is proving highly successful in South Africa. In KZN, the practice is gaining momentum, with increasing numbers of private game reserves voting for this option in a bid to save their rhinos from poachers. When rhinos are dehorned professionally, the horn is taken above the growth

layer of the skin, however poachers brutally uproot the entire horn from its base under the skin.

Dr Mike Toft of Kifaru Wildlife Vet Services in Zululand is spearheading a campaign to dehorn all rhino in private reserves and with the help of equipment from Husqvarna, he has so far dehorned about 200 of them. Zululand Rhino Reserve was the first to come on board, and since then the process has been carried out at almost all of the private rhino-owning reserves in the province.

Husqvarna approached Toft suggesting he add a Husqvarna battery-powered chainsaw to his tool kit as well as a battery blower to keep the rhino cool during the process. Battery products are fuel free and thus produce no harmful emissions. They are also much quieter than their petrol equivalents and lower noise levels results in less anxiety for the sedated animal. Toft uses both a Husqvarna battery chainsaw and a petrol one – the petrol saw for the initial cutting and the battery saw for the finer trimming. He said the Husqvarna blower played a vital role in keeping the rhino's core body temperature down, which was important during the dehorning procedure, especially during very hot weather. In winter it is not needed quite as often. Toft says between 12 and 16 animals a day could be dehorned, depending on the ambient temperatures.

He believes poaching can be reduced by up to 80% by dehorning. Husqvarna South Africa's marketing manager, Jacqui Cochran, says they are committed to this project and are thrilled that their range of equipment is being used for a cause as worthwhile as saving the rhino. **lsa**

**For further information visit [www.husqvarna.co.za](http://www.husqvarna.co.za)**



**Above and below: Rhino dehorning with Husqvarna equipment**





Search and rescue, Wittekleibosch to Dieprivier, new Eskom powerline upgrade

# SEARCH AND RESCUE OPERATIONS

*Lesley Lynch of Myezo Landscape Concepts has undertaken search and rescue operations on various projects, most recently with her involvement on the National English Literacy Museum project, featured in the previous issue of Landscape SA. This article gives information on some of her other search and rescue work, and methods used.*

## Plant identification, flora and fauna search and rescue: General standards

The plant rescue and revegetation management plan addresses the need to mitigate all impacts leading to disturbed vegetation, loss of species and/or agricultural potential, disturbed soil surfaces and bare soils prone to erosion and further degradation on proposed routes. The method statement covers search, rescue and rehabilitation in conjunction with successful rehabilitation in accordance with an Environmental Management Plan.

The objective of this method statement is to establish:

- protocols for the removal, temporary storage and replanting of plant species of conservation concern;
- protocols for the rehabilitation of vegetative cover across the project area;
- tools for planning the rehabilitation works and maintenance of nursery sites.

The objective of rescuing plants, rehabilitation and revegetation on the project area is to:

- prevent the loss of species either directly or through future extinction and minimise impacts of development on the population dynamics of species of special concern;
- preserve the natural configuration of habitats as part of the ecosystem,

thus ensuring a diverse but stable hydrology, substrate and general environment for species to be able to establish and persist;

- preserve or re-create the structural integrity of the natural plant communities;
- actively aid the improvement of indigenous biodiversity according to a desirable end state, according to a previously recorded reference state. This reference state, if healthy, will be dynamic and able to recover after occasional disturbances without returning to a degraded state;
- improve the ecosystem function of the natural landscape and its associated vegetation.

All relevant permits need to be in place before any activities commence on site.

## Removal of species of conservation concern

Species of conservation concern are declining either due to exploitation, or their range of occupancy is limited and further infringed on by development. Most plant populations require a certain minimum number of individuals within a population or meta-population to allow for sufficient genetic transfer between individuals. This prevents genetic erosion and hence weakening of the ability of the individuals to persist in their environments. Similarly, where the distance between meta-populations is significantly increased due to fragmentation and the resultant loss of some populations, these may suffer genetic decline due to restricted movement of pollen. Therefore the aim of this search and rescue action is to always maintain as many individuals of the plant population in as close proximity to the original habitat as possible, in order to minimise the loss of individuals and fragmentation of populations to prevent future extinction.

## Goals

Successful plant search can only be achieved when the following steps are taken:





***Aloe broomii* was rescued and relocated – Eskom powerline to the Amakhala Emoyeni Wind Farm**



**Combing the area for protected species, Wittekleibosch to Dieprivier, new Eskom powerline upgrade**



***Euphorbia meloformis***

- species are removed from their original habitat with minimal damage to the plant, especially the roots. Therefore great care must be taken when removing plants;
- all plants removed need to be stored safely and treated according to their specific requirements. Soil from the area of the plants' origin must be used in the replanting/bagging up process, and only organic fertilisers and pesticides should be used. Over or under watering needs to be monitored.
- plants should be relocated to a suitable habitat and protected from further disturbance and damage in order to ensure their successful re-establishment;
- more successful relocation and removal of species occurs at the onset of the growing season, generally the beginning of September.

## Workforce

Generally the staff is divided into two teams – the bush team and the site nursery team. The number of staff members used depends on the scale of the project and its completion requirements, and includes a skilled supervisor and area manager who has 15 years nursery and landscaping experience. Workers are recruited from the local community as a skills development and community upliftment program and continuous training is provided on site, in the field and at the nursery/holding area. This number is increased as required.

The area is 'swept' in a loosely formed line and care is taken to stay within the target area. The team uses hand tools to gently remove plants from the soil and smaller ones are placed into woven bags and stored in a cool place (under a tree or bush) along the route. More sensitive (delicate) plants are packed into crates to avoid being bruised and at the end of the day the bags and crates are collected and taken to the holding nursery if required according to the permit issued. Otherwise they are donated to local communities or relocated to areas suitable for re-establishment.

Just under two hundred plant species are sometimes collected, most of them being small succulent plants and geophytes (bulbs). The area covered daily depends on the type of vegetation or the level of disturbance in degraded areas. These sweeps net between 400 – 1000 plants per day; however, this is also dependent on vegetation type, size and level of disturbance. The team works ahead of the main contractor's clearing team and at the end of each day, a certificate is issued to allow the main contractor access to clear.

When required and depending on the scope of work, there are generally three people at the site nursery to bag, identify, count and sort the rescued plants into piles. Diseased or badly damaged plants are either discarded, placed into a healing situation or bagged up in the shade house. Some are

replanted directly into the ground if they are tougher and more resistant to transplanting and disturbance. Other plant species are bagged up using local soil into size specific bags or pots, and placed under the shade house for recovery and maintenance. They are counted again after planting - careful record keeping of each search and rescue campaign is standard practice.

Suitable, preferably organic, fertilisers / herbicides / insecticides are used. Any undesirable insects are picked off by hand and destroyed or sprayed if necessary. Fertilising of plants is essential and organic fertiliser such as Bounce Back is used, or chicken manure pellets. A dedicated maintenance staff member is on site daily to ensure that weeds are removed and that watering is done when necessary.

Once an area is cleared of species of concern, the contractor may remove the topsoil and stockpile it in demarcated areas for future use in the area. This topsoil should be swept for bulbous species, succulents and shrubs which can be transplanted or bagged up at the holding nursery as it also contains a lucrative seed bank. It should be re-used in areas close to its source in order to restore the natural biodiversity in specific areas.

It is expected that soil seed banks of indigenous vegetation will be present to initiate initial vegetation cover, but it may not be sufficient to establish an acceptable cover of desirable species. Seed should ideally be collected from the site or an environmentally matched site and the collection should be done throughout the year, as the seed ripens. It can however be restricted to summer, and seeds can be stored in paper or canvas bags dusted with insecticides and sown at the onset of the rainy season, for best results.

Slower-growing perennials are raised from seed or cuttings in the nursery and community members are employed to maintain the nursery; skills transfer and development is introduced to the local community members involved.

## Search and rescue of the new Eskom Powerline to the Amakhala Emoyeni Wind Farm

This was another project undertaken by Myezo Landscape Concepts, beginning at the Poseidon substation in the Eastern Cape. The team comprised Lynch, site manager Stephen Stacey and six general staff. A few community workers were employed as the project took the form of a community development training programme.

In total, approximately 1 619 plants were relocated, all of which were protected species. Certain endangered *Mesembryanthemum* species (on the Red Data list) were relocated to an adjacent area which was found to be of similar soil and environmental conditions.

*Aloe tenuior* was another protected species relocated. It is a rambling Aloe which occurs naturally in dry thickets of the Eastern Cape and KZN. A





Combing the area for protected species



Variegated aloe from a borrow pit in Cradock

Left and right: *Colchicum* 'Longpipes' found during the search and rescue operation at N61 Hard Rock Quarry, between Tarkastad and Cradock



useful landscape plant, it forms large clumps topped with masses of delicate yellow or red flowers.

The team also found and relocated 250 *Euphorbia globosa* and *E. gatbergensis* plants, endangered species on the Red Data list, as well as 35 *Euphorbia meloformis* species. These plants in the wild differ from one population to another, and also from one plant to another.

Other plants found and relocated were:

- *Trichodiadema bulbosum* (African bonsai), which is listed in CITES;
- *Crassula capitella thyrsoiflora*, a perennial succulent;
- *Euphorbia tirucalli*, abundant in southern Africa and seeding freely across its distribution range. They are succulent trees which resemble cactus plants and occur in various habitats such as grassy hills, rocky outcrops, river courses, bushveld and open savanna. They are particularly abundant in KZN and produce yellow flowers that attract insects;
- *Aloe broomii*, found on rocky slopes of the central interior of southern Africa.

### Search and rescue at the Eskom Wittekleibosch Dieprivier Powerline

In this search and rescue operation, also conducted as a community development training programme, approximately 500 plants were relocated.

The area was thoroughly combed for protected species, some of which included *Bobartia orientalis*, *Brunia nodiflora*, *Brunsvigia gregaria*, *Erica gracilis*, *Leucadendron salignum*, *Lcuneiforme* and *Haemanthus* spp.

### Hard Rock Quarry Phase I

This search and rescue project on the R61, Section 3 from Cradock to Tarkastad, was undertaken in July and August 2015, in accordance with the conditions issued by the Department of Environmental Affairs. The relocation permit was issued by the Eastern Cape Department of Economic Development, Environmental Affairs and Tourism.

Species found and relocated included *Crassula lanuginosa*, *Pelleae* spp., *Colchicum* 'Longpipes', *Boophane disticha*, *Ledebouria* spp., *Euphorbia mauritanica*, *Aloe ferox* and *Gladiolus* spp.

Other projects completed include:

- Tombo to Majola Tee R61, Section 8 Upgrade;
- Kudu to Melkhout Eskom powerline upgrade, rehabilitation after construction included;
- Wittekleibosch to Melkhout Eskom powerline upgrade, rehabilitation included. **Isa**

Further information may be obtained from Lesley Lynch on [lesleylynch2008@gmail.com](mailto:lesleylynch2008@gmail.com)





Sorting team



Sampling

# THE CHANGING FACE OF WASTE MANAGEMENT

*The 23<sup>rd</sup> Wastecon Conference took place in Johannesburg in October 2016 and was held under the auspices of the Institute for Waste Management of South Africa. Its aim is to educate members of this organisation, the private sector and government on proper waste management practices. The paper below, Considerations when Conducting a Waste Characterisation Study, was presented by Suzan Oelofse, Natural Resources and the Environment, CSIR.*

Changing the face of waste management in South Africa includes waste diversion from landfill to alternative management options. There are a number of interventions to consider which may vary from very low tech, labour intensive solutions to extremely high tech, capital intensive technology options. Making an informed decision about the preferred technology choice will require a certain level of knowledge of the composition of the waste stream at hand. The level of detail that is required from the waste characterisation study will be determined by site specific conditions and the level of change that is to be achieved. If the envisaged change includes high tech, capital intensive solutions, it will be necessary to have a high level of confidence in the characteristics and volumes of waste that will be diverted to the particular solution in question. This paper unpacks the considerations to take into account when conducting or evaluating a waste characterisation study in support of changed waste management in South Africa.

Waste composition information has widespread applications. It can be used for solid waste planning, designing of waste management facilities and establishing a reference waste composition for use as a baseline to monitor progress towards diversion and recycling targets, or to inform collection systems and choice of alternative waste treatment technology (AWTT) options (ASTM, 2008; Dahlen and Lagerkvist, 2008). Shortage of landfill airspace in some municipalities, stricter standards for landfill design combined with national government priorities to divert waste from landfills, have resulted in a number of municipalities engaging in feasibility studies to divert waste away from landfill. Recent studies and studies that are underway investigating waste diversion from landfill include the City of Johannesburg, City of Tshwane, Ekurhuleni, Rustenburg, uMgungundlovu, uMhlathuze,



Interesting finds

Mbombela, Emfuleni, and Mangaung, amongst others. The ultimate decision on waste diversion strategies will have to be informed by the volumes and composition of the municipal waste in these municipalities and therefore waste characterisation studies will have to be done.

A number of interventions previously introduced in South African municipalities failed due to inadequate information on waste volumes and composition, which resulted in inappropriate equipment and technology choices. Examples of such failures include a materials recovery facility constructed at a landfill in Mangaung that was never commissioned and the imported equipment at another material recovery facility that was not suited to the material received for processing. Luckily, the imported equipment could be modified but at a great cost (Personal Communication, WastePlan, 2015). There are also similar examples globally, where a proven technology was introduced in a different location.

Waste composition and volume by waste stream and geographic area are therefore at the core of decisions around interventions to divert municipal solid waste from landfill. Yet there is no national or international standard methodology for waste characterisation studies (Dahlen and Lagerkvist, 2008).

In the absence of a South African national standard methodology for waste characterisation studies, there is no benchmark against which to evaluate proposals for or findings from municipal waste characterisation studies. Waste characterisation studies performed in neighbouring municipalities are not necessarily comparable, thereby limiting the potential for neighbouring municipalities to compare and possibly work together towards meeting economies of scale. Gauteng is a case in point where all three metropolitan municipalities are investigating AWTT options, whereas a joint effort might have resulted in a more sustainable and financially viable solution benefiting all three metropolitan municipalities.

In the case of Ekurhuleni, the waste characterisation study undertaken in 2014/15 had to be repeated due to questionable sampling methods, un-representative sampling, inadequate compositional analysis and generally unreliable waste composition results. This situation could have resulted in substantial wasteful expenditure if the incorrect data from this study was used to inform infrastructure investments. If waste characterisation and quantification of waste flows were performed

and interpreted consistently, comparisons of different treatment technologies, collection systems and cause/effect discussions would be facilitated (Dahlen et al., 2007).

### Comparing South African characterisation studies

Available waste characterisation studies done in South African municipalities to date are limited. As at 2012, a total of 23 studies were undertaken in 17 of the 284 South African municipalities (DEA, 2012). The following shortcomings relating to these studies were identified (DEA, 2012): ● sampling and sorting methods used are not standard; ● waste categories vary between studies and are not comparable; ● low numbers of samples renders the study unrepresentative; ● sampling methods do not cater for seasonal variation (the majority was done in winter); and ● variability in sorting accuracy.

Waste generation rates are influenced by income group and the composition of the waste also differs between income groups. Some of the mentioned waste characterisation studies lump income groups together and report a single figure (DEADP, 2007a, DEADP, 2007b, DEADP, 2007c). This inconsistency in reporting style between municipalities makes it virtually impossible to compare data and to reach informed decisions (DEA, 2012).

The most comprehensive waste characterisation study in South Africa to date was done under the leadership of the CSIR for the City of Johannesburg in 2014/15 (COJ, 2015). This study covered three seasons, three socio-economic groups and reported waste composition in 15 main categories and 54 sub-categories. The sample covered 40%, 54% and 20% of collection routes during the spring, summer and winter sampling periods respectively. The project therefore covered at least 128 out of 136 round collection routes and sorted 23 tonnes of household solid waste over the study period (CoJ, 2015). This characterisation study followed the same sampling methodology as was used in 2001 in the City of Johannesburg (Jarrod Ball and Associates, 2001), but introduced more detailed waste categories during sorting. The results of the 2001 and 2014/15 studies are comparable due to the level of detail captured in the write-up of the methodology in 2001.

### International best practice

There are several methods for solid waste component analysis described in literature in different levels of detail (Dahlen and Lagerkvist, 2008; ASTM, 2008) but there is no international or even European standard for waste characterisation studies (European Commission 2004; Dahlen and Lagerkvist, 2008). A review by Dahlen and Lagerskvist (2008) lists twenty different methods and they conclude that the most crucial choices in household waste composition studies are: ● to divide the investigation into relevant number and types of strata; ● to decide the required sample size and number of samples; ● to choose the sampling location, i.e., sampling at household level or sampling from loads of waste collection vehicles; and ● to choose the types and number of waste component categories to be investigated.

Most methods suggest a limited number of primary waste categories into which the waste must be sorted. A larger number of secondary and even tertiary categories can enrich the data for more applications. The level of detail required depends on the purpose of the study (Dahlen and Lagerskvist, 2008). For example, to assess the potential for energy from waste, one category of glass would suffice, but to determine the glass recycling potential of the waste, the categories of clear glass, green glass, brown glass and flat glass will be of interest (Dahlen and Lagerskvist, 2008).

In general, it is accepted that local seasonal variation in waste generation should be considered and each sample should cover at least one full week's worth of waste generation since waste generation over weekends differ from week days (Dahlen and Lagerskvist, 2008). However, there is no definite conclusion about the appropriate sample size and number of sub-samples. Dahlen and Lagerskvist, (2008) suggest, as a

general rule of thumb based on practical experiences, that the minimum number of samples for a waste characterisation is ten, if the sample size is 100kg or larger. Always using the same primary components for sorting and classification will facilitate comparisons both over time and between regions/countries (Dahlen and Lagerskvist, 2008).

### Sampling

It is a challenge to perform a correct solid waste sampling procedure (Dahlen and Lagerskvist, 2008). Features for waste composition studies reviewed by Dahlen and Lagerskvist (2008) are summarised below in Table 1.

Table 1: Features for Waste Composition Studies

Base of size of sample	Stratification i.e. base for sample location	Sub-sampling method	Sorting process
Bulk samples			
Mass	Selection of vehicle arriving at specific site Geographic urban/rural climatic, demographic, socio-economic Collection variables	Coning and quartering Randomised grab procedure Grid over flattened load	Manual Combined manual and stepwise screening
No of households	Geographic Single/multi-family Collection variables	Coning and quartering Grid over flattened load	Manual Combined manual and stepwise screening
Percentage of population	Single/multi-family Collection variables	Grid over flattened load	Manual
Individual household samples			
Number of households	Socio-economic Single/multi-family Community type Collection variables	No sub-sampling	Manual Combined manual with conveyor belt, drum sieve, magnets, vibrator, cyclone
Volume of waste bins	Residential structure Collection variables Other	No sub-sampling	Combined manual and screening

Sampling and sub-sampling should be done to eliminate sampling errors as far as possible, while capturing the full variation of the waste in any specific stratum. Logistical challenges are a given and the interpretation of data and analysis thereof should take these into account.

### Conclusions

There is no standard waste characterisation methodology that can be applied to all waste characterisation studies. The choice of methodology should be appropriate to the objectives of the study. Accurate and detailed recording of the sampling methodology will allow for comparative studies to be done in future.

The most crucial choices to be made are: ● the number and types of strata based on the objectives of the study; ● sampling location, i.e. at households or sampling loads from ordinary collection vehicles; ● sample size and number of samples; ● type and number of waste components to be investigated.

Other important considerations include seasonal variations such as special events and holidays that could impact the validity of the sample and each sample should cover at least one full week. As a general rule, a minimum number of 10 samples for a characterisation campaign are required, if the sample size is 100kg or more (Dahlen and Lagerskvist, 2008). **isa**

**References have been omitted due to space limitations but may be obtained from Ms Oelofse on soelofse@csir.co.za. Photos courtesy of Suzan Oelofse.**





Above and below right: An award winning maintenance site



Above and left: Agapanthus at the main entrance to the building





Life Landscapes staff constructed this walkway with small, leftover dumprock from the site, improving access to it as well as its overall appearance



Gravel pathway around the water feature, lined with *Diets bicolor*

## MAINTENANCE AT SPOOR AND FISHER

*In the 2016 SALI Awards of Excellence, Life Landscapes received a Gold Award for their maintenance of the Spoor and Fischer offices in Pretoria.*

Maintenance area manager Tania Ahlers says they started maintaining the site in November 2014, with one full time staff member, Siyabonga Msiya, and one part time employee, Malani Kaskombe, working three times per week. Both workers perform the same tasks.

Maintenance involves litter control, weed control in gardens and on hard surfaces, sweeping of paved surfaces, filling up empty spaces with cuttings or splits, removal of dead leaves, flowers and general plant material, pruning of *Trachelospermum jasminoides* and trimming of *Abelia* hedges. Refuse is removed daily as there is no storage area for this on site. Crownlifting of trees is done on a regular basis as there are a lot of *Podocarpus*, *Combretum* and *Acer* trees. *Nandina domestica 'Pygmaea'* was replanted to form better groupings and a more flowing pattern. There is no irrigation system on the site and hand watering takes place on a regular basis. Maintenance of the water feature was not included in Life Landscape's contract.

Ahlers says that Onion weed (*Nothoscordum borbonicum*) was a "huge problem" when they started on the site but that Msiya had managed to eradicate it with regular removal and applications of pre-emergent weed killer.

She says the maintenance budget is also very small and all upgrades and improvements were undertaken without additional cost to the

client using splits and cuttings harvested from other sites.

### Initial neglect

Ahlers explains that when Life Landscapes first took over the site maintenance, it was in a totally neglected condition and the garden was completely overgrown with weeds and seedling trees. Planters in front of the main entrance were completely infected with Onion weed.

A large amount of old *Diets bicolor* in the garden was split up and replanted to get rid of old plant material. There were also many empty areas in the garden that were planted up with splits from existing plants on site and cuttings that the area supervisor, Victor Sithole, had obtained from some of his other maintenance sites.

Initially there was no proper access to the back garden and the workers and security guards had to walk through the garden on the western side of the building. Taking the initiative, they constructed a walkway with small leftover dump rock from the site and this was a huge improvement to the overall look and feel of the garden.

### Site inspections

The client conducts his own site inspections on a monthly basis and passes on instructions to Life Landscapes if there is anything specific that needs to be addressed. **lsa**

**Information and photos supplied by Tania Ahlers, Maintenance Area Manager, Life Landscapes**



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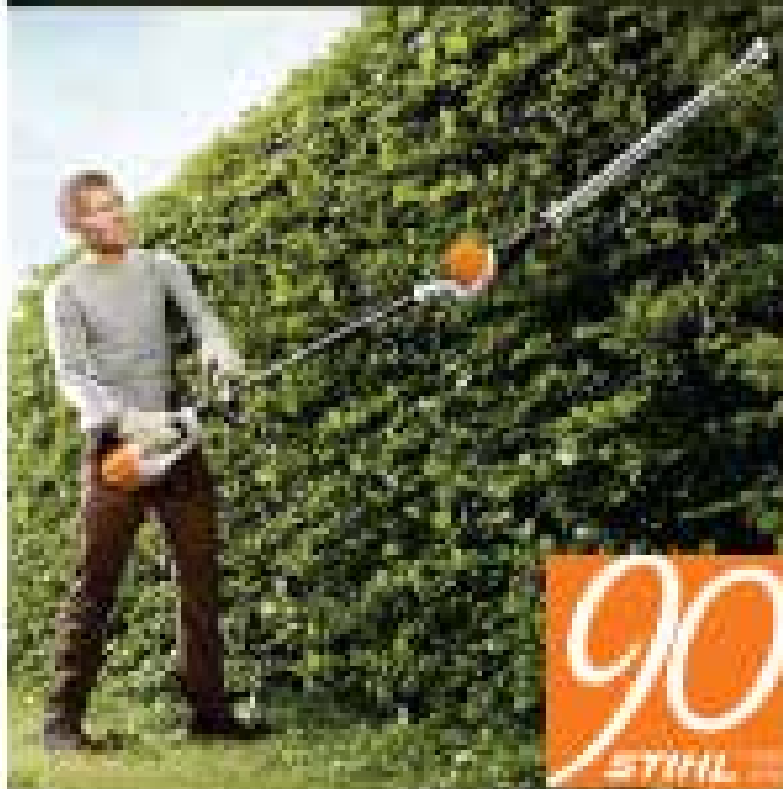
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