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KZNIA

ARCHITECTURE — LANDSCAPE INTERFACE

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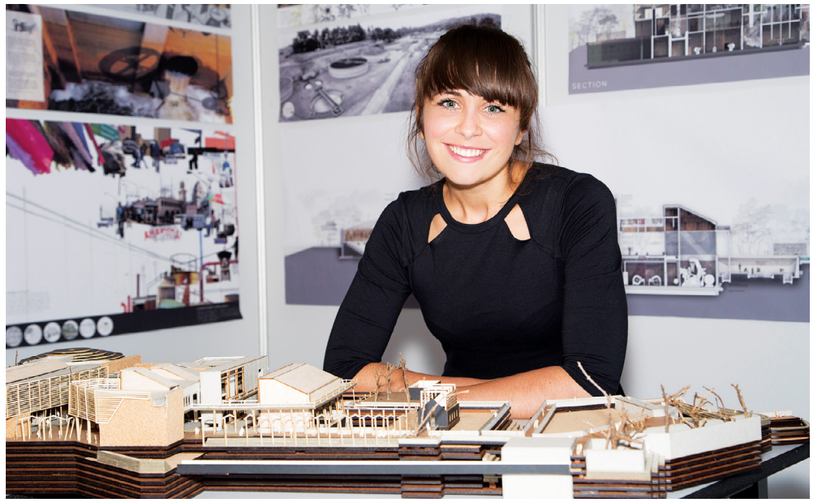
KZNIA



27th *Corobrik* Architectural Student of the Year, Heidi van Eeden, pictured with the model of her winning entry entitled Machinarium.

■ *Corobrik* Student of 2013

Corobrik Architectural Student of the Year Awards were created to promote design quality and to acknowledge talent among architectural students 27 years ago.

At this year's prestigious event held at The Maslow, Sandton, on 9th April 2014, University of Pretoria student, Heidi van Eeden, was declared *Corobrik* Architectural Student of the Year 2013 for her design thesis Machinarium: Architecture as a living machine, a 21st century textile mill. The prize of R50 000 was in addition to the R8 000 prize she had already earned on winning the regional final in September last year.

The thesis investigated the potential of industry as an urban catalyst and focused on the re-structuring of the textile industry based in an urban wasteland at Daspoort, Tshwane.

"The reinterpretation of architecture as a living machine; reconnecting a community with its history and with the nearby river as well as re-looking at the idea of waste as a resource; and achieving a well-considered urban design resolution" were issues lauded by jurors Ruben Reddy of Durban, Amanda Katz of Cape Town and president of the South African Institute of Architects, Sindile Ngonyama, of East London.

■ Letters to the Editor

1/2014 Everywhere Otherwhere to Somewhere, UIA Special Edition

What an outstanding issue this latest one is. Stunning photography, clever red rings, beautiful poetry...it evokes Durban to perfection.
Hazel Bond, Somerset West

It's terrific – congratulations to all responsible!
Alex Robertson, Cape Town

All competitors for the coveted title with the sponsors: Peter Kidger of *Corobrik*, Heidi van Eeden University of Pretoria, winner of the 27th *Corobrik* Architect Student of the Year Award, *Corobrik* Chairman Peter du Trevou, Tarryn Michael of the University of Witwatersrand, Talia Orli Gild of the University of Cape Town, Mongezi Ncube University of KwaZulu-Natal, Dylan Watkins of the University of Johannesburg, Thilo Sidambaram of *Corobrik* , Wynand Viljoen of the University of the Free State, Marco du Plessis of Tshwane University of Technology, Mientjie van Niekerk of Nelson Mandela Metropolitan University, and *Corobrik* MD Dirk Meyer.

Cover:
Evening sets at the New Operations Centre — eThekwini Electricity in Westville. See page 8.

Photography:
Angela Shaw

■ UIA Young Architects and Students Committee

Sikhumbuzo (Skura) Mtembu, principal of Striation Architects, Durban, and a KZNIA regional committee member, has been appointed a representative of Region 5 (Africa) on the Union of International Architects (UIA) Young Architects and Students Committee.

■ SACAP President 2014-18

Having appointed the members of the Council of the South African Council for the Architectural Profession (SACAP) for its 4th term, 2014-18, the Minister of Public Works oversaw the election of office bearers. In this process Durban architect and academic Yashaen Luckan was elected President.

Yashaen (b. 1972) who hails from Tongaat, cut his teeth in Architecture at ZAI Inc and ARK@TEK Studio before joining the staff of the Department of Architectural Technology at what is now Durban University of Technology in 2003. On graduating with an M.Arch degree from UKZN in 2008, Yashaen served as head of Department 2009-13.

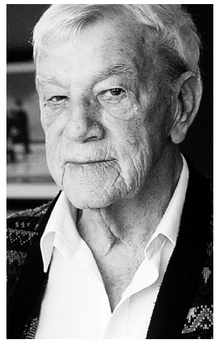
The last KZ-N architect appointed to this high position in the predecessor body, SA Council for Architects (SACA), was Mike Taylor who served 1980-83, almost three-and-a-half decades ago. –*Editor*

Above: Yashaen Luckan

■ Obituary: Reg Buck (1927–2014)

In 1954 Reginald Charles Buck and Bernard Whitehead formed the practice Buck & Whitehead, which left its imprint most forcibly on the uppermost end of North Beach with Bel-Aire apartment block (1956), characterised by its façeted plan and mosaic bands inspired by Zulu beadwork, and Blue Waters Hotel (1969). Later followed, both in collaboration, Edgewood Teachers' Training College (1960s), now UKZN Edgewood campus, and the Westville Prison (1970s).

Reg was an exact contemporary of Gordon Small (1927-1995) with whom he studied, and besides practice, was a soccer player and a coach of note, as well as a ballroom dancer. Like Gordon, he was a 'larger than life' character, remembered by many.
Neil Hayes-Hill



■ Obituary: Peter McCaffery (1954–2014)

Peter George McCaffery, born in Mauritius on 04 April 1954, passed away in Hong Kong on 29 July, 2014, after a long and courageous fight with cancer. He leaves behind his beloved wife and friend, Mara, and a legion of very good friends.

Small in stature, large in life, he was a most courteous man with impeccable manners and a droll sense of humour. He stood out immediately as someone who carried himself along his chosen path with integrity, dignity, modesty and a singular passion for doing things thoroughly: for example, using his love of yachting as an example, he would always keep the boat shipshape, i.e. in credit, for the time when a crisis arose such as a withdrawal. That was a motto for him. 'Make it happen' was another – he lived by them and they served him well.

He followed his profession with accuracy, directness and vigour, graduating with distinction in 1978 and formed the practice, McCaffery Wilkinson & Little, together with Pete Wilkinson and Ian Little in 1990.

Rather than run through the many achievements of his professional life, one period stands out for me. On a last visit to Hong Kong, with Peter Wilkinson, to see 'Mac' while he was receiving treatment, (he had moved there after leaving SA in 2001), I discovered that since I had last seen him in 2006 he had grown a small practice, specializing in retail planning, into a 450 strong fully-fledged architectural firm, and had become MD to boot, all in the space of 4 or 5 years. Maybe that's what happens when you live next door to China, India and the Asian Tigers!

My abiding memory of him, however, and for many of his friends too, nothwithstanding his many professional achievements, will always be 'Mac', standing behind the wheel of his 'Roxanne', with a crooked grin and a steely eye, watching the sails, ordering a tweak here and a shift there, calling the odd play, the exemplar of what a skipper should be: calm, decisive and competitive.

May he rest in peace.
Miles Pennington

■ Obituary: John Frost (1937–2014)

Following the sudden diagnosis of a tumour in the brain in October 2013, John Frost died peacefully in his adopted city of Perth on 7th June, having "conducted himself with dignity and courage and love throughout his illness", wrote Moira, his wife of many years.

On graduating in Architecture at Natal in 1961, John Anthony Frost gained experience in London and with Hallen & Dibb in Durban, before commencing private practice in 1966 and teaming up with Rags Sommerville in 1971 as Interarc. Subsequent partners were Richard Dobson and Roly Muller.

Among the landmarks of the practice are Glenridge Gardens, 61 Mazisi Kunene (South Ridge) Rd (1971); Old Mutual Industrial Centre, Prospecton, which landed an ISAA Natal Award of Merit (1985); Conservation Awards each for Kings House, Cottam Grove and 219 Florida Rd (1991); an Award for the building known as 136 Victoria Embankment on Margaret Mncadi Ave cnr Salmon Grove (1995); and Old Mutual Centre on Farewell Square (1996) with Stauch Vorster.

But, practice was only one pursuit. John was active in the affairs of the Institute; he headed up the conservation committee, served as NPIA President 1988-89, and was later instrumental in D'Urban Changes Forum. He was a regular Comrades Marathon runner, skilled as a diplomat, and played a pivotal role in the acquisition 160 Bulwer Rd as the home of KZNIA since 1993. Rightly, John was presented with a KZNIA scroll of honour in recognition of his services to the profession over many years.

When he decided on relocating to Perth in 2000, John insisted that I avoid the term 'farewell' in the entry in this *Journal* (2/2000) and rather use *au revoir*, literally 'until we meet again'. While this happened regularly at year ends when together with Moira he would visit Durban, now I have no choice.

Farewell friend, colleague and gentleman; KZNIA members gratefully remember your dedication and integrity, and wish Moira special strength for the stretch ahead.
Walter Peters

Elated partners Carina Strauss and Mark Horner (second from left and right respectively), accepted the Award for Excellence certificate and plaque for Dash Apartments on behalf of designworkshop:sa. Also in the photograph are SAIA-President Sindile Ngonyama (left), Obert Chakarisa, SAIA-Chief Executive Officer (centre); and Peter du Trevou, Chairman: *Corobrik* (right).

Corobrik SAIA Awards of Merit and Excellence

KZNIA entries did not go unrewarded at the gala dinner held in the Albert Luthuli Durban International Convention Centre on Friday, 1st August.

Corobrik – South African Institute of Architects' Awards of Merit went to **Dunkirk Beach Clubhouse** at Salt Rock by designworkshop:SA as well as to **Hopeville Visitors Centre** at Port Elizabeth by Koop Design (see *Architecture SA*, May/June 2014).

But, with **Dash Apartments** (Dunkirk all-suite Hotel) on Dunkirk Estate, Salt Rock, designworkshop:SA landed its 5th Award for Excellence, following on from Electric Ladyland at Kloof and Singita Lebombo Lodge in the Kruger National Park (2002), the Constitutional Court, Johannesburg (2006), and Igoda View House, East London (2008). *What a collection! Editor.*

Jurors were SAIA-President Sindile Ngonyama, *Visi* magazine deputy editor Annemarie Meintjes, Cape Town architect and former SACAP-President Malcolm Campbell, Prof Paul Kotze, Director: Architecture Programme, University of the Witwatersrand, and Peter Kidger who represented the sponsors, *Corobrik*.

Above: Dash Apartments (Dunkirk all-suite Hotel)
Below: Dunkirk Beach Clubhouse.

A beaming Richard Stretton (left) received an Award of Merit for Hopewell Visitors Centre, Port Elizabeth, by Koop Design.

A relaxed KZNIA-President Kevin Bingham and his wife, Lynne.

UIA Appreciation

At the same function, Patricia (Trish) Emmett was honoured for her many years of service to the Union of International Architects (UIA). She was handed a copy of the 2014 SAIA Merit Award-winning book by Jon Noble, *African Identity in Post-apartheid public architecture*, as a token in recognition and appreciation of her dedication. *For the record, Trish served on the UIA Council 2003-8; as UIA Vice-President Region V and UIA 2nd Vice-President 2008-11; and treasurer 2011-14. The only other South African to have served as a UIA councillor is Hans Hallen, elected in Venice, 1975, and re-elected in Katowice, 1981-87 (see KZNIAJ 1/2001). –Editor*

Presidential Certificates

To everyone's surprise yet very well deserved, SAIA Presidential Certificates of Meritorious Service were awarded to Hassan Asmal (second from left), President of the UIA 2014 Durban National Organising Committee; Nina Saunders (third from right), Local Government Liaison and President of the UIA 2014 Durban Local Organising Committee; and Amira Osman (at right), UIA 2014 Durban General Reporter. Also in the picture are SAIA-President, Sindile Ngonyama (left); SAIA-Chief Executive Officer, Obert Chakarisa (third from left); and SAIA Vice-President, Simmy Peerutin (2nd from right).

Presidential Certificates were conferred on these three members "for having delivered extra-ordinary services ... which advanced the standing and stature of the Institute, the profession and practice of architecture both nationally and internationally" and the citation on each certificate continues by articulating the particular contribution of the recipient towards the hosting of the UIA 25th world congress of architecture held in Durban, 3-7 August.

KZNIA member, Nina Saunders', specific citation reads: "As the representative for the City, Nina [Saunders] has been the vital link between eThekwini City Architecture and the Organisation Committee. Working tirelessly to secure both financial and organisational support, Nina's commitment and vision, is immeasurable". *Well done, Nina! –Editor*

ARCHITECTURE – LANDSCAPE INTERFACE

Louis du Plessis, Guest Editor

While practising with Lees & Short Associated Architects in Durban since 2008, Louis held a contract appointment at UKZN teaching History of Architecture and in the Design studio. However, he has now decided to focus on an academic career and joined DUT as a lecturer in August 2014. –Editor

IN SETTING OUT to compile this edition of the KZNIA Journal, the opportunity was grasped to further investigate recent thoughts relating to architectural practice and inhabiting the urban realm and our professional interface that have preoccupied me. This is rather a broad spectrum of contemplation therefore some focus was required for the publication. Numerous avenues have led to the theme presented, being the interface and opportunities for the architectural practice that exist in integrating landscaping.

Ever since the inception of the modern iterations of the 'allied disciplines' within the built environment, starting off with the events and people surrounding the construction of the first ever arch cast iron bridge, the Coalbrookdale Bridge in Shropshire, England, our profession's circle of influence has become more specialised. What has been gained in applied expertise tends to shift the focus from that of the broader environment. The personal concern is that broader opportunities for integrated design are not enjoying the attention they should.

This contemplation of professional existence has been combined with a fascination with the overall urban beauty and character of the neighbourhoods of central Durban, sadly a quality that is lacking in many subsequently developed areas of the city. One needs only to drive through the new developer-driven Tuscan styled housing estates springing up around the city. In previous research, I came across a 1950s publication highlighting the fact that Durban was referred to as the 'garden city' of South Africa. This notion fortunately seems to be re-embraced by city authorities in some small measure with the recent landscaping and urban upgrades across Durban Central.

This is comparable with an approach experienced in Bolivia. Though significantly less resourced than South Africa, the appreciation of the landscaped urban realm was admired. This is spoken of in the Travel Diary.

Added to this, a comment in conversation made by Peter Buchanan during his visit to present at the 2013 KZNIA New Paradigms conference that the trees in the city link and unify a conglomeration of the built environment, reinforced the desire to research this aspect more. This recently dovetailed well with certain projects that came into being in practice. These selected projects were guided by a very distinctive integration between architecture and landscaping, the current pinnacle of which is the site planning for the new Depot for eThekwini Water and Sanitation in Prospection, featured in this publication.

Recent hard and soft landscaping upgrades at Old Fort complex of eThekwini municipality. Rear entrance (top); and along KE Masinga (Old Fort) Rd (middle and bottom).

With all the preceding aspects mentioned, the theme for the publication became quite evident. Numerous articles in this journal focus on exploiting the opportunities to interface between the architect and landscaping. Clearly, landscaping is not only about 'pretty plants and paving', but if treated as integral to the design process, the resultant design exploits numerous possibilities, particularly in regards to recent changes in national and local compliance regulations.

This issue will hopefully spur a greater engagement in the dialogue surrounding the architect's responsibility towards 'the edge' on a smaller scale than urban planning in a developer-driven environment. *–Louis du Plessis*

INDUSTRIAL OASIS

eTHEKWINI WATER & SANITATION, JEFFLES RD DEPOT

The industrial oasis in the making in the robust industrial area of Prospecton promises to be an innovative success.

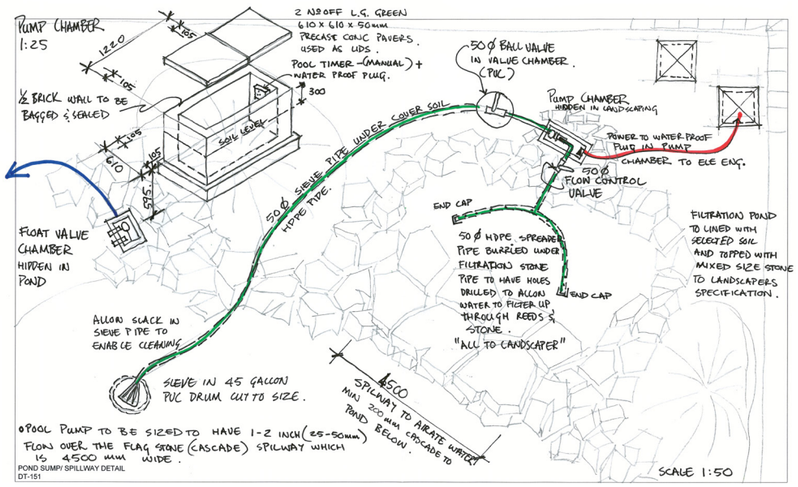
Top: View across 'NDM bakkie parking area' and 'Wetland One'. Bottom: The naturally high groundwater level was incorporated into the wetland design.

IN PROSPECTON, DURBAN, the new depot for eThekwini Water and Sanitation is an experimental oasis in the making in a rather robust industrial area. Surrounded by factories and warehouses, this facility's functions are very much like those of its surroundings. What is different is its unique approach to landscaping, ecology and biodiversity. Though the success of the approach of the integration of wetland ponds into the overall site planning needs to be gauged over time, it currently promises to be an innovative success.

BRIEF

Once a wetland, the reclaimed area of Prospecton is now overwhelmingly industrial. Though a few reed-inhabited culverts and sporadic trees are to be found, the local ecology has been entirely disrupted. The site itself was initially owned by Transnet, and used as a storage lot before the city took over ownership. The site was subsequently ceded to eThekwini Water and Sanitation (EWS), which has now elected to construct one of its regional depots there.

The depot consists of an administration building, ablutions, mechanical and electrical workshop, stores and parking facilities for the numerous departments, and private employee and contractor vehicles associated with the depot. Because of the nature of the facility and the type of materials stored on site, security was a high priority.



OPPORTUNITY

Due to the overwhelming number of vehicles associated with the site, the standard design approach would have resulted in a veritable asphalt covered lot. The architectural team from eThekwini Architects soon realised the opportunity to implement a more ecologically sensitive approach to the overall site planning. Recent changes to local regulations required that stormwater be attenuated on site. One of the past general hindrances to the application of alternative servicing is the increased construction cost associated with it. As these construction costs were to increase as a result of the new wastewater disposal requirements, the architects seized the opportunity to utilise their funds differently to achieve the required performance.

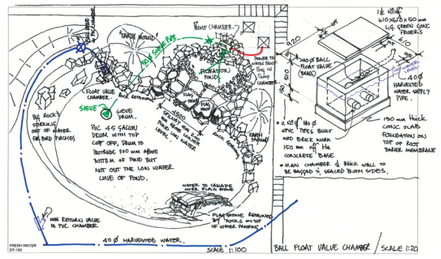
STORMWATER TREATMENT

As an alternative to the use of standard attenuation tanks, stormwater is treated in two separate processes. The surface water run-off from asphalt, due to the anticipated high level of oil, is filtered and then attenuated in a specialised system of planted wetland ponds. Stormwater run-off from roofs is harvested and filtered for use in the ablution block in an entirely separate system.

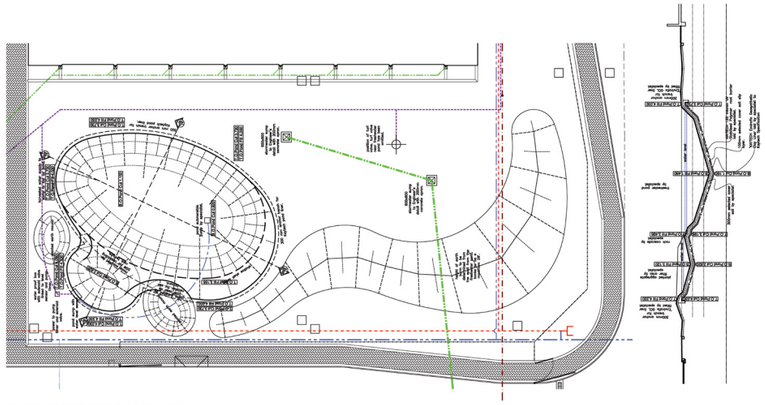
The asphalt run-off initially gets collected along the perimeter of the respective parking areas, with permeable kerbing allowing water to be channelled into a course sand filled surface channel. This channel cleans the water of most of the impurities, such as the motor vehicle oil. The sand is anticipated to be cleaned out every 5 to 10 years, either by replacement, or the preferred method is to process the sand and remove the oil and then reuse it. Once the water goes through this initial sand filtration, it is then released into a series of linked wetland ponds. The construction and planting of the ponds was quite specific, all of which are clay lined to hold water for longer periods to maintain the wetland planting. The bottom surface includes varying elevations to allow for 'wet' and 'dry' sections. The water will either slowly percolate back into the natural water table, having been cleaned in the wetland ponds, or evaporate. Only during peak rain season will limited overflow enter into the municipal stormwater system.

A fairly complex system of harvesting and reticulation is used in the ablution block. Water is harvested from the main roofs in the complex as the surface run-off was deemed to be too contaminated to be used. The water is then collected in two large 38 kilolitre tanks and filtered for use in the ablution block for flushing of toilets, washing vehicles and irrigating landscaping. This harvesting system can easily be extended to allow for the water to be used for showering with the addition of a filtration unit.

The construction and planting of the ponds was quite specific, all of which are clay lined to hold water for longer periods to maintain the wetland planting.



Above left and right: Freshwater pond construction details issued to site.
Below: Dedicated service yard at rear of ablutions block.



FRESHWATER POND AND BURM - Setting Out Plan

FRESHWATER POND - Section A

During the construction process, all wetland plants that self-seeded during the procurement time were relocated to an area that would not hinder progress on site.

Clockwise from top left: Landscaping details being finalised on site with project team; Plan and section of freshwater pond adjacent Administration building; Detail of some of the exclusively indigenous landscaping used on site.

LOCAL ECOLOGY

This particular approach to stormwater management has allowed for a concerted effort being made to reintroduce some of the previous bio-diversity into the area while still enabling the 'industrial' processes of the client to be undertaken without disruption. During the construction process, all wetland plants that self-seeded during the procurement time were relocated to an area that would not hinder progress on site. This allowed the various indigenous wetland species to multiply and be used when the first of the ponds was completed. When subsequent ponds became ready, the plants in the initial pond had again multiplied and could be divided into these ponds. The overall view of the design was that wetlands and landscaped areas be self-sustaining and low maintenance once the system is properly established. Plants are all endemic species occurring within a 50 km radius and specifically selected to be suited to the immediate environment in which they are to be placed.

INTERDISCIPLINARY COLLABORATION

The overall success of the servicing strategy is due to the collaboration between the Architects, Environmental Consultant, Civil Engineer and Landscape sub-contractor. A system that deviated from the norm required additional research and flexibility of notions of standard responses. The civil engineer embraced the new approach and assisted wherever possible. Additional expertise was brought on board with the addition of Richard Winn as an Environmental Consultant. His expertise of rehabilitation of landfill sites for eThekwini Solid Waste was most useful. Once on site, regular meetings between the environmentalist, the architectural team and landscaper allowed for the necessary adaptations of variations to expected site conditions and availability of planting. This particular design approach requires an extended landscaping maintenance period be included in the construction contract to ensure proper establishment of the planted system.

SECURITY ENHANCEMENTS

As noted before, security was a high priority for the client. The overall site is planned into distinctive zones, with access being limited to each. The strategic placement of certain ponds in conjunction with fencing creates a more secure perimeter to zones while the barriers do not appear overbearing or excessively authoritarian. These barriers were augmented with the planting of specific indigenous thorny species.

PLANNED VIEWS

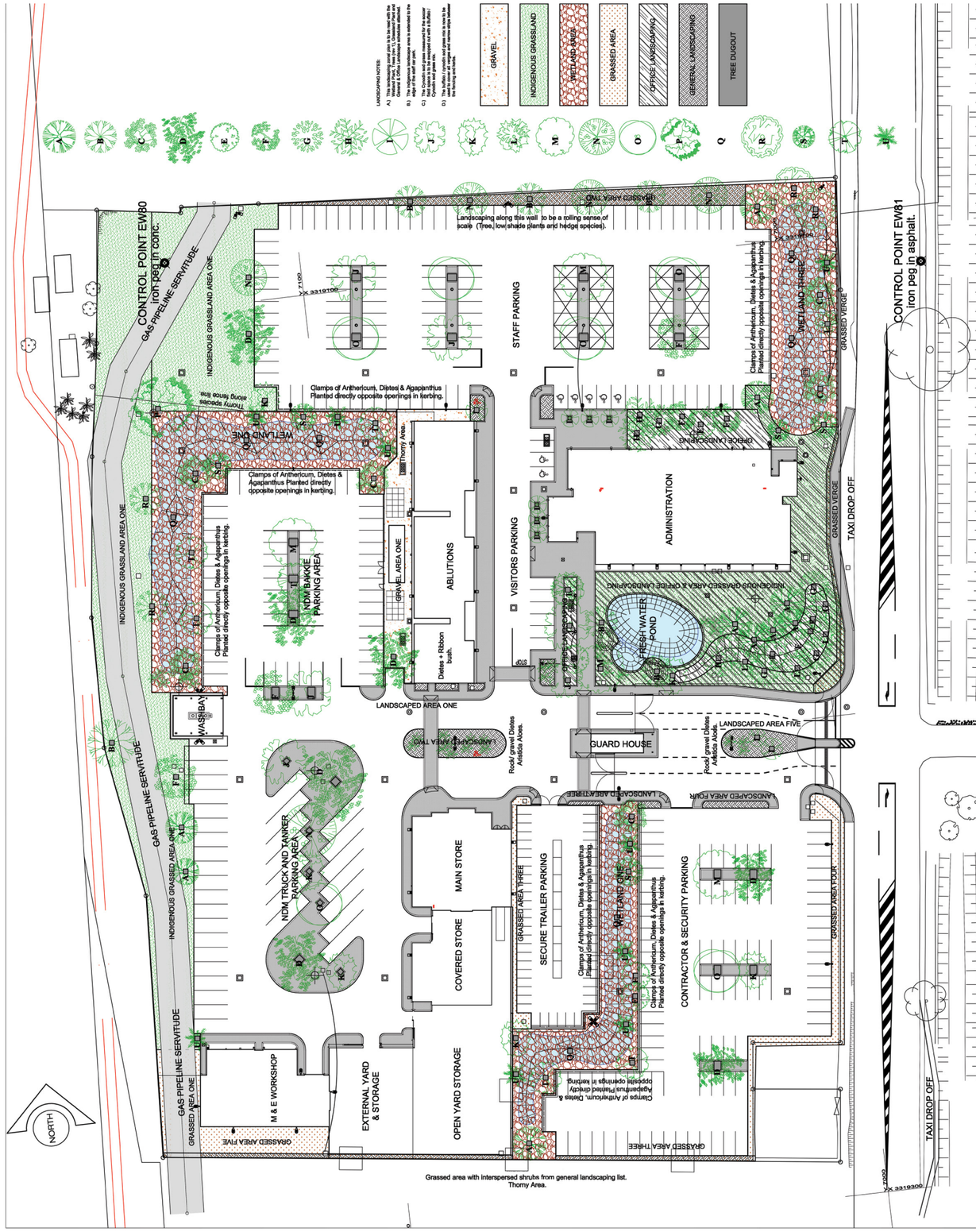
The client always planned to have some form of freshwater pond incorporating harvested water at the entrance to the site to demonstrate their commitment to conserving water through harvesting. The general planning of the administration block and main entrance allowed for prominent views of one of the wetland ponds to be exploited, with the pond being located between the two. This results in prime views of the pond for both people entering the site and for the staff working in the open plan area of the administration building. This idea of demonstrating water conservation, however, has now expanded into a broader commitment to a holistic approach to environmental conservation with the system of wetland ponds and overall landscaping being designed and implemented.

CONCLUSION

By developing the site to accommodate the client's requirements, new local and national regulations and seizing on the opportunity to incorporate a more ecologically sensitive approach to the site, the new depot for eThekwini Water and Sanitation in Prospecton is both wholly functional and progressive. The particular servicing approach, driven by the architectural team, has resulted in a restoration of some of the previous natural ecology while at the same time not compromising the somewhat industrial requirements of the client. Not only is the client demonstrating their intention of being serious about conserving the scarce resource of water, but this has been extended to allow for a much greater positive impact on the bio-diversity of the area.

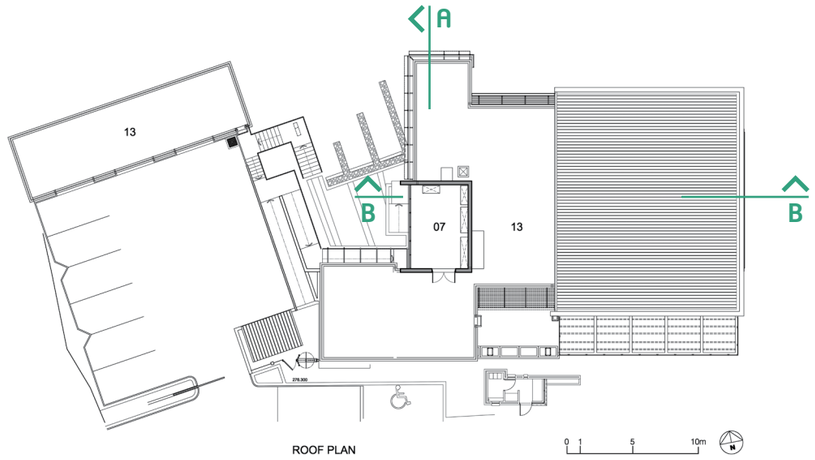
Louis du Plessis

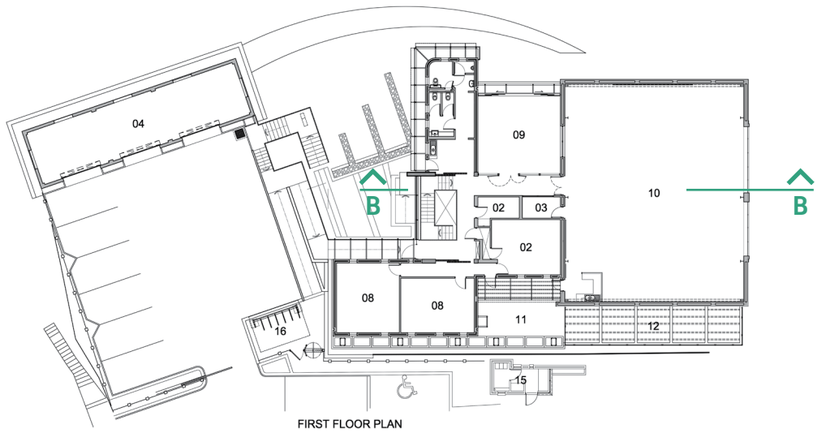
Client: ***eThekwini Water and Sanitation***
Architects: ***eThekwini City Architects (Consultants: Robert Johnson, Gary Short, Dave Barrow)***
Environmental planning, rehabilitation & landscaping consultant: ***Richard Winn***
Engineers: ***LSC Brunette (Sada Naidoo)***
Landscaping contractor: ***Alex Leitch (Leitch Landscaping)***

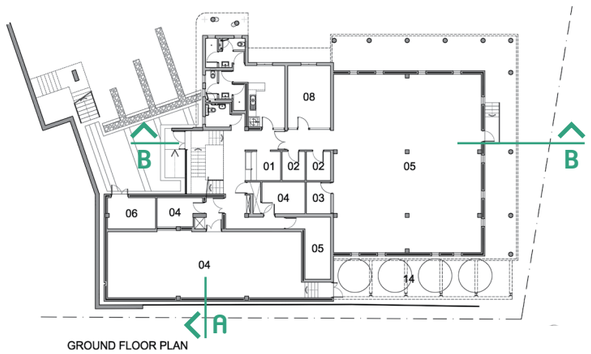


NEW OPERATIONS CENTRE

eTHEKWINI ELECTRICITY, WESTVILLE







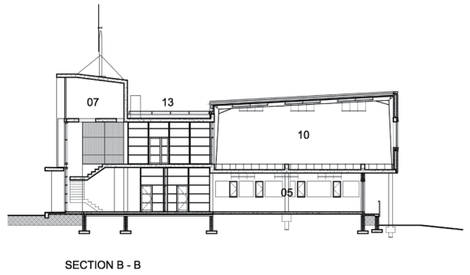
01 Reception
02 Store
03 Printing Room
04 Service Room
05 Open Plan Office
06 Waste Sorting Room
07 Plant Room
08 Office
09 Boardroom
10 Control Workroom
11 Exterior Terrace
12 Service Deck
13 Planted Roof
14 Rainwater Tanks
15 Guardhouse
16 Bicycle Shelter

eTHEKWINI MUNICIPALITY'S growth from a population of 2,5 million in 2000 to 3,5 million in 2014 has placed a strain on service delivery rendered by the municipality to citizens, especially in the urban periphery, a region historically lacking amenities. The ability to roll-out equitable services has therefore been made more critical to the city's goal of developing the 'most caring and liveable city in Africa' by 2030. The provision of power, with its social and economic spin offs, is key to achieving liveability. eThekwini Electricity's brief was for the development of a new operational facility, central to the metro area serviced, to enable improved pro-active and reactive service requirements.

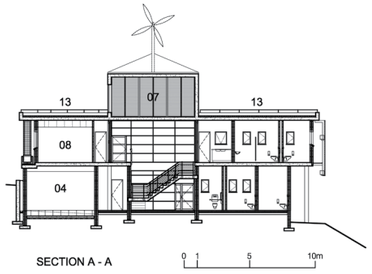
The Client supported an early decision to adopt a sustainable design approach with the new centre. The planning was dictated by the footprint of an existing building on the site, an obsolete sub-station, so as to retain and salvage as much of its material as possible. This sensitivity was also extended to respond to existing levels and ecology.

In the execution of the planning, the conceptual process was 'form follows function', and the internal spaces depicted by materiality externally. The forms are also sensitive to the residential context in which the building finds itself while communicating a civic scale to its public mandate.

Materiality was an important design process, and the same consideration undertaken for context would need to be followed for materials. Four aspects were tested in the selection and application of building materials: durability, recyclability, manageability and disassembly, with focus on the embodied potential of a material. A palette of masonry, concrete, steel and glass was selected as these performed well when tested, but in addition, landscaping features as an important contribution embracing the building to temper the crispness and harshness of the complementing materials.



SECTION B - B



SECTION A - A

Clockwise from top right: View of main internal staircase. Materials were chosen to be hard wearing; View of planted vertical screen from main entrance ramp; View of east facade as seen from road. Particular attention was paid to brick detailing.

In the execution of the planning, the conceptual process was 'form follows function', and the internal spaces depicted by materiality externally.

Planted building surfaces reduce internal heat loads and lessen consumption to cool the spaces, very important in Durban's sub-tropical climate.

Top left: View from planted main roof with polycarbonate clad air-conditioning plant room at right.
Bottom left: View of detail of entry portal to upper floor along access ramp.

Site ecology is not limited to the ground surface, but also to the vertical planted surfaces and roof gardens allowing all planes of the building and its energy to connect to and resonate with the surrounding natural ecology. Planted building surfaces reduce internal heat loads and lessen consumption to cool the spaces, very important in Durban's sub-tropical climate. Peak energy demand is reduced through solar panels and wind turbines which exploit the natural energy opportunities of the location. The site ecology is also utilised to reduce the stormwater discharge to the municipal system and acts as attenuation.

The site provided the facility with the opportunity to connect to the rest of the city through non-motorised and public transport modes with its proximity to the King Cetshwayo (Jan Smuts) Highway. Bicycle racks and shelters reduce private car parking; with associated shower and change-room facilities ensuring non-motorised transport was supported.

The primary success of the facility is in its function of meeting the brief for providing centralised operations for a power supplier with a growing customer base. Secondary successes are around the building, prompting more sustainable building practice not just by eThekwini Municipality's Architecture Department, but also by citizens getting a first-hand look at a more caring and liveable built environment.

Andile Ncapai, eThekwini City Architects

Client: ***eThekwini Municipality, Electricity Department***
Architects: ***eThekwini City Architects in association with Lees & Short Associate Architects***
Landscape Architects: ***eThekwini City Architects***
Sustainability Consultants: ***Mahesh Khoosal Associates in association with Arup***
Quantity Surveyors: ***Dick Hathorn Associates***
Structural Engineers: ***eThekwini City Architects***
Electrical Engineers: ***eThekwini City Architects in association with Sydney Naidoo Associates***
Mechanical Engineers: ***Mahesh Khoosal Associates***
Photographer: ***Angela Shaw***

DUBE HOUSE

DUBE TRADE PORT, KING SHAKA AIRPORT, DURBAN

DUBE HOUSE (aka 29 degrees south), located adjacent to the new King Shaka airport, was commissioned as the first building in the new Dube City environs. It houses the head office for the Dube Trade Port with commercial tenants as well as limited retail on the ground floor, and an attractive new public square, Dube Square.

The client's brief was to create a landmark Green building, in line with international standards, whilst respecting its African context and culture. Together with the other professionals, the architects endeavoured to create a building that meets with the Green Building Council of South Africa's minimum certification requirements. The primary challenge was to design a responsible and low-energy building in Durban's sub-tropical coastal climate, with hot summers, extensive cloud cover and high humidity. Some of the key design drivers were:

ORIENTATION

After extensive solar and thermal modelling at sketch plan stage, it was ascertained that the optimum orientation for this building was north-east. This also aligned well with the prescribed urban grid and should benefit future construction in the precinct. Being the first building in a new precinct, the design also needed to take into account the new Dube Square that was to be constructed simultaneously with the building. This forced the original 'atrium' design (most efficient footprint due to reduced perimeter area), to a 'Z' formation, to enclose the square which, together with narrow building widths, has resulted in good daylighting and external views to over 95% of the internal usable areas.

PLAN FORM

All services and lobbies are located in the core area where the two elongated masses meet. This minimizes wasted space and reduces infrastructural requirements. The building is designed to accommodate sub-tenancy on all levels with a minimum of 250 m².

DAYLIGHT AND EXTERNAL VIEWS

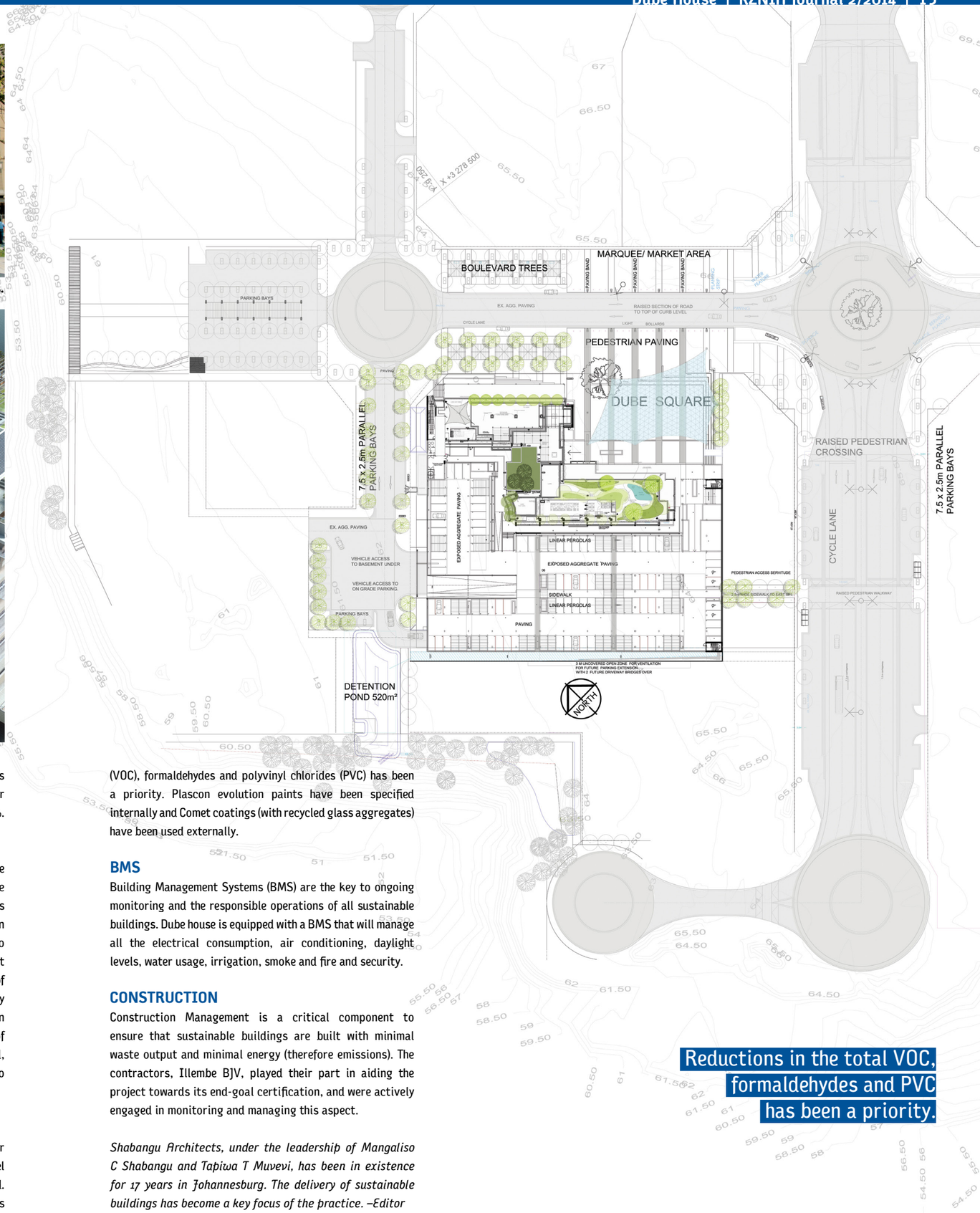
The narrow floor-plate (12.5 m) maximizes daylight from both sides of the building and allows external views throughout. Careful consideration of glare potential and solar screening has allowed for a high percentage of glass on the external envelope. Daylight sensors will monitor and adjust internal levels in response to daylight conditions.

SOLAR SHADING

Ongoing thermal and solar modelling during the design process enabled the design team to reduce direct solar penetration into the entire building for over 90% of a workday, in both summer and winter. This should significantly reduce glare and energy requirements due to solar heat gain, and improve human comfort. All façades were analysed independently and solutions generated accordingly. The north/north-east façades have predominantly horizontal steel and aluminium screening, which extends beyond the corners to provide additional shading, as well as planted vertical 'living walls' to provide additional shading near the core.

The east and west façades are treated with solid mass (with service rooms as additional thermal buffers) and/or large 'floating' aluminium screens that eliminate direct

Above: Canopy to Dube Square by Henry Fagan & Partners, structural engineers.



A highlight of the design is the green roof...designed as an active 'park' where tenants can relax or hold functions.

sun. These architectural elements are intended to create 'inter-climates' and have generated spaces such as balconies and sky gardens, that will ameliorate the harsh effects of low-angle east and west sun but still allow maximum glazing to the office perimeter walls. The south façade consists of extended structural fins and protruding structural planters that help to eliminate the unwanted south-westerly sun.

WATER

Water use reduction and savings have been a primary focus of the design team. All taps, showers and water outlets have saving features and each water-use zone in the building is monitored and metered. Waterless urinals have been installed throughout. This will save approximately 1.5 million litres of water per year. That equates to 45 million litres of potable water saved on urinal water use for this building alone, over an assumed 30 year lifespan of the building!

Extensive water harvesting is provided with about 150 m³ of storage space in the basement. This will be used to flush toilets and meet the entire irrigation requirement for the landscaping. Extensive water retention facilities have also been provided around the building, including reed retention ponds and indigenous (practically endemic) species of plants only. The overall anticipated water savings for Dube House, compared with another conventional building, should be as high as 70 – 80%.

ENERGY

Energy reduction has been considered at all levels of the design from efficient HVAC systems to motion and daylight sensors, to building envelope and materials selection, to 'regenerative' lifts and photovoltaics for the water features of Dube Square. The overall anticipated energy savings for Dube House, again, compared with another conventional building, should be as high as 45 – 50%.

GREEN OR 'LIVING ROOF'

A highlight of the design is the green roof. The roofspace is designed as an active 'park' where tenants can relax or hold functions. Large parts of the roof are planted with grass and trees on undulating soils, and a pond has been provided to further enhance this new urban ecosystem. A fire-pit is also present. The primary intent of the green roof is to reduce the future heat-island effect of Dube City and achieve a minimum 30% landscape coverage on the site after completion of construction. Parts of the lower balconies are also vegetated areas and, together, these elements contribute significantly to reducing stormwater discharge from the site.

MATERIALS

The materials selected for the building are wherever possible, locally sourced and supplied. Recycled steel and reduced cement content have been speicified. Reductions in the total volatile organic compounds (VOC), formaldehydes and polyvinyl chlorides (PVC) has been a priority. Plascon evolution paints have been specified internally and Comet coatings (with recycled glass aggregates) have been used externally.

BMS

Building Management Systems (BMS) are the key to ongoing monitoring and the responsible operations of all sustainable buildings. Dube house is equipped with a BMS that will manage all the electrical consumption, air conditioning, daylight levels, water usage, irrigation, smoke and fire and security.

CONSTRUCTION

Construction Management is a critical component to ensure that sustainable buildings are built with minimal waste output and minimal energy (therefore emissions). The contractors, Illembe BJV, played their part in aiding the project towards its end-goal certification, and were actively engaged in monitoring and managing this aspect.

Shabangu Architects, under the leadership of Mangaliso C Shabangu and Tapiwa T Muvevi, has been in existence for 17 years in Johannesburg. The delivery of sustainable buildings has become a key focus of the practice. –Editor

Reductions in the total VOC, formaldehydes and PVC has been a priority.

THE ARCHITECTURAL IMPLICATIONS OF LANDSCAPING INCLUSION

Soft landscaping and roof plan, New Operations Centre, eThekwini Electricity, Westville. *See pp8-10.*

Top: Ridgeside sub-station planted roof after regular maintenance.
Bottom: Direct roof planting on the New Operations Centre building during the establishment phase.

eTHEKWINI MUNICIPALITY has over the last few years, been investing in the incorporation of planted elements into the built environment. Most architects, especially those who venture deeper into the machinery of the central City Engineer's building, will be familiar with the 'Green Roof Pilot Project', with the test site easily visible from the upper floor exterior walkways of the building.

Of more recent and broader public knowledge is the Priority Zone rooftop garden that incorporates indigenous and general planting and urban agriculture, see *KZNIAJ* 3/2011 and 1/2012. This initiative run by Drake & Scull FM, has now implemented roadside vegetable gardens in the inner city. eThekwini City Architects, through their own in-house landscaping division, has also implemented landscaping elements into some of its architectural projects.

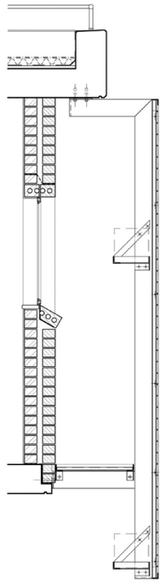
This article deals with a synthesis of a number of projects located throughout the city, and the professional experience of two of the landscapers involved therein. One of the projects, the New Operations Centre in Westville, is featured in this issue. The other projects specifically referred to are the proprietary green wall system and the simple planted vertical screen at the City Architects' building in Old Fort Place, and two sub-station roofs that have been converted to be planted, one in Umhlanga and one at Isipingo Beach.

PLANTING SYSTEMS

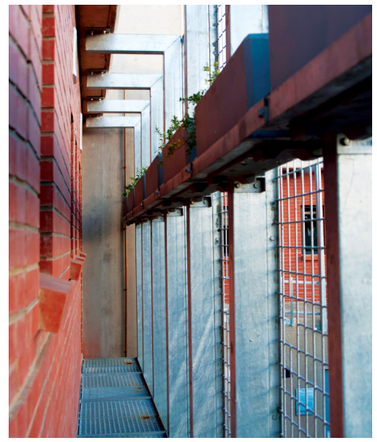
Capital costs and maintenance seem to be the biggest factors in determining an appropriate system to use. Proprietary systems, though quite convenient due to their all-inclusive nature, typically incur three times the cost of direct planting. Only the planted wall at City Architects uses a proprietary system, while the container planting used at the New Operations Centre consists of custom made glass reinforced plastic containers. All three of the green roofs are direct green roofs where the medium is laid in-situ onto the structure.

CONTAINER PLANTING

The New Operations Centre project incorporates both direct and container planting. Planting in containers has distinct advantages for initial installation. Containers can be pre-planted and hardened on or off site prior to installation, although the containers in this project were not. Pre-planting allows for the building program time allocated to this item to be greatly reduced. The distinctive drawback is that there is increased long term maintenance and that container plants are particularly susceptible to environmental factors. The far smaller volume of soil available for plants to root, results in most nutrients being consumed in a short period, undesirable soil temperature fluctuation, and the tendency for planters to become water and root-logged. This has been factored into the maintenance cycle at the building.



Far left: Vertical screen in background and planted proprietary wall system in the foreground at City Architect's building.
Left and below: Detailed section through the vertical planted screen at the New Operations Centre incorporating maintenance catwalk.



DIRECT VERSUS CONTAINER

Landscapers prefer the direct method as it allows for greater cross-population of micro-organisms in the soil and results in greater and more homogenous soil health throughout the planted area. The two major drawbacks associated with this method are the process of remedying potential leaks into the building and the increased establishment time of the roof. However, the increase in skill of construction of green roofs and their associated structures and material development in waterproofing systems, have reduced the potential for leaks. The vital component is ensuring a sufficiently installed root barrier, as this is the most common cause of waterproofing failure. Other technologies, such as waterproofing additives to concrete and flexible fibreglass waterproofing membranes, with superior performance over standard membranes, are becoming more commonplace in the local construction industry.

EXPOSURE

The need for exposure to natural elements plays a key role in the determination of planting, especially in vertical layout. Beyond the need for sunlight, exposure to rain is also important. At City Architect's building, the two systems clearly illustrate the influence of sunlight on the planted elements.

The screen in the background shows considerable growth on the east facing aspect while on the south side it is noticeably reduced. The choice of creeper clearly favours direct sunlight for part of the day. The proprietary system in the foreground is located in more shade, but due to the choice of planting, and the controlled distribution of nutrient enriched water, the growth is lusher in comparison.

The aspect of direct rain also needs to be considered, particularly in areas of high air pollution. The particles collecting on the leaves will build up over time and compromise the photosynthesis process in addition to dramatically increasing the risk of disease attacking the plant. With drip irrigation, there is no means of artificially washing the leaves, so exposure to the occasional rainfall or 'hosing down' is required. The landscapers recommend that overhangs be limited to vertical planting elements.

MAINTENANCE

Even though the planted landscaping elements are planned to be 'zero-scape', regular maintenance is essential, particularly in the Durban coastal climate. It is anticipated that once the initial establishment phase is over, maintenance at each of the three sites should only occur once a month for a few hours at a time, and consist overwhelmingly of weeding. This cycle may be increased at the Ridgeside substation as the surrounding land-use is still fallow, resulting in considerably higher seed banks for weeds being present.

There is some concern over the invasive nature of the creepers at City Architect's vertical screen with this element being quite close to pipework. These concerns have been addressed to some extent at the New Operations Centre where the vertical screen is distanced from the building with the inclusion of a maintenance catwalk. The catwalk surface itself consists of tiles of mentis grating that can easily be removed to allow access to the planters beneath, and planters above are positioned within reach. Added to this, larger openings within the vertical screen elements have been placed at particular intervals to allow for hands to reach through for clipping exterior facing growth.

ADDITIONAL NOTES

Planted architectural elements have enormous potential and offsets. Much of this is outlined in the rather comprehensive yet accessible 58 page report on the eThekwini Municipality's *Green Roof Pilot Project*[1]. The potential for an offset in required energy performance is extensive, with green roofs typically having an R-value in excess of 10 times the current insulation requirements laid down in SANS 10400. The Local Authority requirement of stormwater attenuation is also adhered to. At the New Operations Centre sufficient unplanted roof space was assured to supply the required run-off collection for the harvested water system, though run-off from the planted roofs was also channelled into the system. Clearly, planted architectural elements, such as green roofs or screens can be seen as a tool in the design process.

Louis du Plessis

Thanks to Craig Hardman and François Hattingh (currently) and Fourie Pieterse (formerly) of the landscaping division of City Architects.

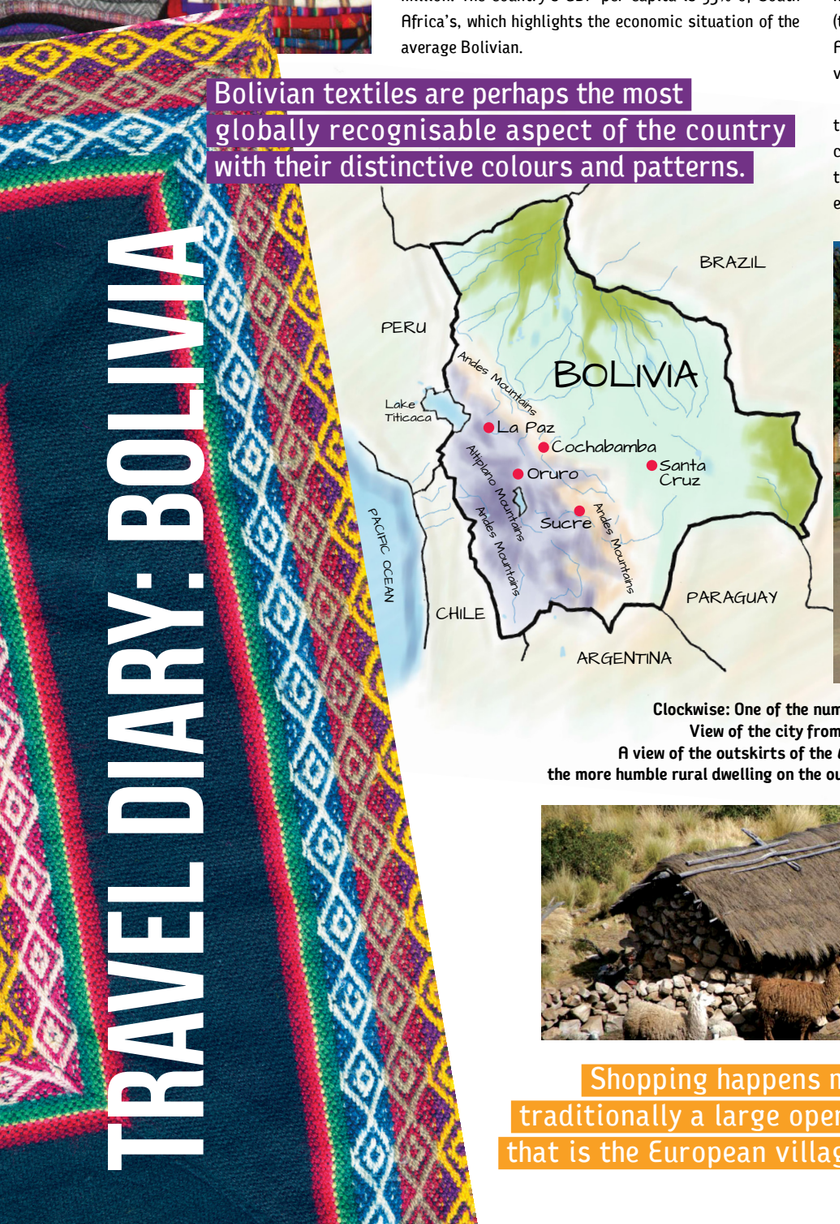
[1] Van Niekerk, M et.al. (2011) *Creating Space for Biodiversity in Durban: Guideline for Designing Green Roof Habitats*, eThekwini Municipality Environmental Planning & Climate Protection Department.

TRAVEL DIARY: BOLIVIA

A TRIP OF GREAT CONTRASTS, yet also in some sense comforting similarity, awaited me in 2005 as I set out to travel the Americas after completing my 'gap year' between two architectural degrees. I initially spent two weeks travelling around Florida, USA, with two friends with whom I had studied at university, after which I travelled down to Bolivia in South America to spend 6 weeks with relatives based there at the time. Going from the opulence of North America to the poorest of South American countries certainly highlighted the dramatic contrasts that exist in the world.

Having grown up in small towns in northern KwaZulu-Natal, the simplicity of life that I experienced on my arrival in Bolivia was strangely familiar, but the major difference was that I was now in Cochabamba, the fourth largest city in Bolivia with a current population of 1.9 million. The country's GDP per capita is 35% of South Africa's, which highlights the economic situation of the average Bolivian.

Bolivian textiles are perhaps the most globally recognisable aspect of the country with their distinctive colours and patterns.



AT A GLANCE

The country is the birthplace of Simon Bolivar, the father of the independence movement in South America, though most people are far more acquainted with Che Guevara. Like the vast majority of South America, Bolivia was colonised by the Spanish from the 16th to the 19th centuries, and their cities still clearly echo Spanish colonial influences. Geographically, the country is quite varied, with Amazonian rainforest flats occurring to the east along the border with Brazil, the great salt flats to the south, and the high mountainous regions of the Central Andes to the north and west.

Of particular interest is that Bolivia is one of the few land locked countries that boast an operational navy! Primarily formed as a political instrument to protest the loss of access to the coastline of Chile in 1879, the navy was formed in 1963 and is based on Lake Titicaca (the world's highest navigable lake and largest in South America) and consists of one dated patrol boat and various other minor patrol craft.

Unfortunately, a week long bout of illness, common to foreign travellers to the country, meant a cross-country tour of the regional highlights (the salt flats, the Altiplano, Sucre and La Paz) was curtailed, so my experience is overwhelmingly of Cochabamba.

Clockwise: One of the numerous inner city plazas; View of the city from the adjacent mountain; A view of the outskirts of the *Cancha* (Market); One of the more humble rural dwelling on the outlying areas of the city.

Shopping happens mainly in the *Cancha*, traditionally a large open area within the city that is the European village square equivalent.

La Plaza de las Banderas (The flag Plaza) is one of the more significant traffic circles in the city of Cochabamba

THE CITY

Cochabamba is based within a fairly narrow, linear valley within the southern fringe of the Altiplano. One of the most prominent features is the 40.44 m high *Cristo de la Concordia* (Christ of Peace) statue overlooking the city, very much like Rio's 38 m tall *Christ the Redeemer*. The city centre is typical of the neo-classical Spanish colonial tradition – the judicial and administrative buildings and the cathedral are clustered around the central plaza.

The formality and openness of this area quickly makes way for a matrix of collector streets lined with small shops, not unlike Durban's CBD. The rampant corporate culture of 'the west' has not yet taken a real hold on the country, though even here, one can find a Unilever factory prominently located on a primary access road to the city.

The city had just opened the second branch of the only large hypermarket style store (local family owned, naturally), and there was a cinema complex with two or three theatres. Shopping happens mainly in the *Cancha*, traditionally a large open area within the city that is the European village square equivalent, just on a much larger scale and far more colourful. The vast majority of the population does their shopping here, much like the quaint French ideal, but far less sophisticated. Warwick markets spring to mind as a similarity though the apparent chaos and informality belies a well refined system that is at the cornerstone of the city economy. These markets do, however, have a much broader selection of wares, and do not only carry 'grey-market' goods, but premium brands. Our local CAD suppliers would also undoubtedly be most distressed by the ease of availability of their software at rock bottom prices!

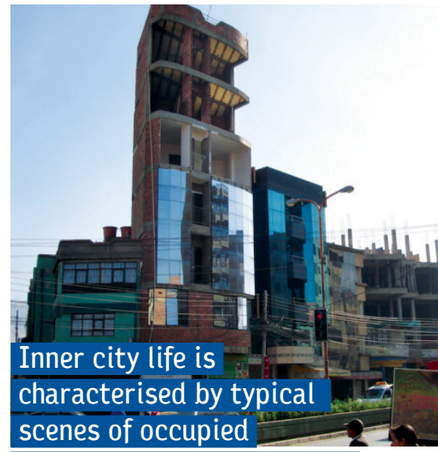
One of the most prominent features is the 40.44 m high statue *Cristo de la Concordia* (Christ of Peace) overlooking the city, very much like Rio's 38m tall *Christ the Redeemer*.

What was striking was the prominence placed on public spaces, which are frequent and scattered throughout the city. Major traffic circles feature sculptures, often incorporating monuments of military engagements (that they have never been victorious in). The middle class neighbourhood where I stayed with my relatives has a large open park with a working fountain in the centre. This is a sign of the commitment the city authorities have to public open spaces, in contrast to our own situation, where it is rare to see any public fountain operational, such as the fountain in Medwood Gardens in central Durban (We shall conveniently disregard Cochabamba's challenges in other service provision when beating this particular drum, such as reliable water provision. All neighbourhoods only get pumped water two to three times a week, and each house has to have their own elevated storage tank).

SUBURBAN ENTERPRISE

As with the small scale economic enterprises of the city centre, all suburbs have numerous small operations running from family homes. This has a profound impact on the architectural fabric of the suburbs. Houses tend to be multi-storied, with part or all of the ground floor given over to the family business. These home-businesses are wide ranging; I even had the opportunity to play racquet ball (very similar to squash) in one.

A prominent feature of the city landscape, both urban and suburban, is the unfinished but occupied building. These usually feature the ground floor with small enterprise, the first and second floors in various stages of completeness where the families would reside, and the third floor of merely a concrete frame of slender ratios that would make an architect envious and an engineer flee in horror! Apartment buildings are rare. Most residences accommodate extended families on plots growing in size the further one moves away from the city centre. This compound approach to living mirrors the rural established vernacular of the hacienda approach.



Inner city life is characterised by typical scenes of occupied buildings in various stages of construction.

There is a fairly robust density and prominence of the public that characterises the city where a simpler way of life and an integration of the economic activity prevails throughout. Clearly, wealth is not in abundance in the city, but having recently dared to travel through the new housing neighbourhoods where complexes are being built for the 'wealthy elite' in Umhlanga, I dare say that the less affluent of Cochabamba experience a far richer and charming urbanity.

Louis du Plessis