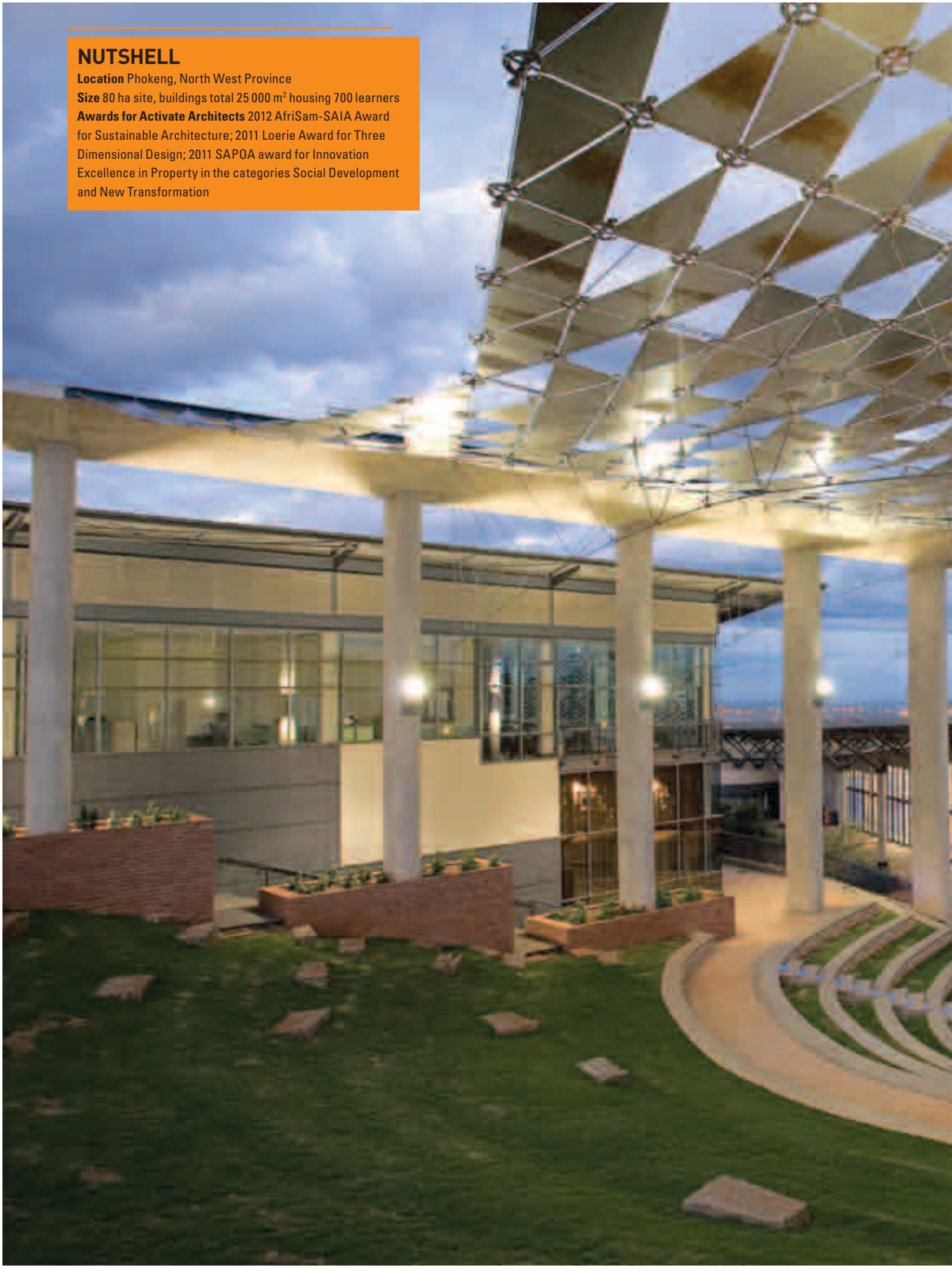
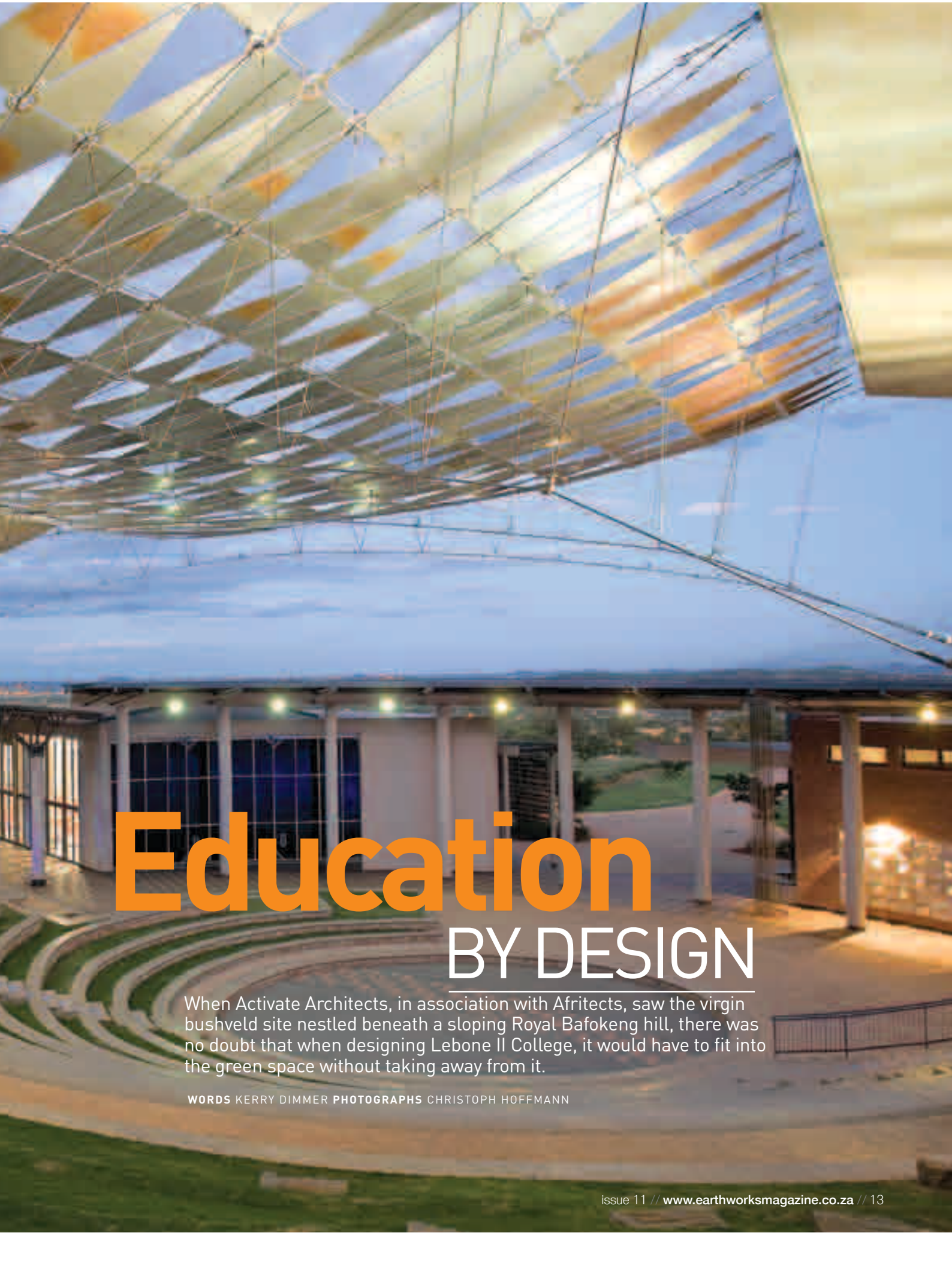


NUTSHELL

Location Phokeng, North West Province
Size 80 ha site, buildings total 25 000 m^2 housing 700 learners
Awards for Activate Architects 2012 AfriSam-SAIA Award for Sustainable Architecture; 2011 Loerie Award for Three Dimensional Design; 2011 SAPOA award for Innovation Excellence in Property in the categories Social Development and New Transformation



Education BY DESIGN

When Activate Architects, in association with Afritects, saw the virgin bushveld site nestled beneath a sloping Royal Bafokeng hill, there was no doubt that when designing Lebone II College, it would have to fit into the green space without taking away from it.

WORDS KERRY DIMMER **PHOTOGRAPHS** CHRISTOPH HOFFMANN

How do you impress a client who has a university degree in architecture and planning from the Natal University, and who also happens to be King Kgosi Leruo Tshekedi Molotlegi of the Royal Bafokeng Nation? Intimidating though that sounds, not only did Activate Architects capture the essence of what was required, their design made enough of an impact to share top honours in the Afrisam-SAIA Awards for Sustainable Architecture.

The competition, introduced to recognise and promote projects in the South African architectural arena, aims to identify those who have effectively shifted paradigms with buildings that are ecologically sustainable while also uplifting communities. Lebone II College, which opened in 2010, epitomises those criteria and also represents one of the most inspirational journeys within the sustainable built environment in South Africa.

The first and biggest hurdle for Activate was to beat four rivals in designing Lebone II College in a "by invitation only" competition. The Royal Bafokeng Administration had identified an 80 hectare site, and in 2007 started with five companies in what Activate Architects' Reon van der Wiel describes as a fairly comprehensive briefing, client appraisal and design process.

"When we went to site for the first time," says Van der Wiel, "we realised just how truly amazing the invitation was for a designer to engage in such a context. Virgin bushveld, indigenous trees and afro-alpine vegetation, all nestled at the foot of the Tshufi Hill, with stunning viewpoints over the town of Phokeng and local platinum mines. It gives you a perspective of the world we are living in, and we were determined to respond in a way that would celebrate this."

The only scar was a quarry, but ultimately even that had advantages that would up the ante for Activate. One further challenge lay with the quarry having disrupted a watercourse which, during heavy rain, morphed into a small stream. Activate was to use this to the aesthetic benefit of the project.

The brief was heavily biased towards creating a flagship school of world-class standards: ultimately to enhance the lives of learners from Grade R to matric, their families, and the community at large. It had to embody and symbolise the fact that Bafokeng people have a vision of transforming their communities through education. By developing an inspirational and innovative facility, they intend to provide opportunities to teach in new and progressive styles

in order to promote a sustainable future.

Research into educational environments proved that optimal learning is achieved in environments that provide a sense of belonging and emotional security, provided that such locations are flexible, physically open and transparent, and can provide physical comfort with balanced nutrition.

"Such criteria resulted in a radical shift from the current spatial norms of a school, to the ideas we explored in designing Lebone II College," says Van der Wiel. "Our interpretation was to move away from the standard institutionalised built fabric of large classroom wings, passages and orthogonal layouts and look to the core of the school as a set of building blocks that would present as individual learning clusters. And of course, we were intensely focused on as much of a sustainable build as possible."

The required facilities utilise a gross floor area of 25 000 m^2, and include 37 learning classrooms, four laboratories, a library, an IT centre, drama and art spaces, an auditorium, multi-purpose hall, a refectory and catering kitchen, a staff room, head's offices, administration offices, a clinic, two boarding houses, seven teachers' homes, an edible gardening centre, waste management depot; sports fields and courts, and retention dams, wetland and conservation areas.

The first and most demanding stage required critical decisions that would position the campus on the site. Comprehensive rehabilitation of the quarry and surroundings required the removal of alien vegetation and the reinstatement of the stormwater stream, which when completed became a water feature. By recycling effluent water through a black water treatment system consisting of eight tanks, as well as via the reed beds of a specially-created wetland, the college realises a 100% fresh water savings on the irrigation of its sports fields and gardens.

More than 80% of the rainwater that collects on roofs and hard surfaces of the buildings is channelled to newly-created dams, aiding in the recycling process, while 90% of water heating is provided by 17 solar heating panels. Other than in the boarding houses and teachers' accommodation, only cold water is available in the toilet facilities.

The sports fields have been sited to utilise most of the eight-hectare quarry, with buildings lying on the outskirts. Only indigenous vegetation was used, including the grass for the play and sports areas. Around 25 000 m^3 of top soil that was unearthed during construction was also redirected for landscape use.

The contouring lines of the quarry site fortuitously provided an almost natural amphitheatre, eliminating the need to create, from scratch, the tiered layers required for a drama space of this nature. Adding to the aesthetics, and also embedded across the landscape are a number of granite features that represent an almost-lost civilisation's art forms.

Van der Wiel elaborates: "In one of our meetings, the King firmly suggested that we make use of discarded waste from granite quarries in the area. On seeing these amazing piles, rather like giant Lego blocks, we conceptualised them being used in clusters as staircases and under trees as benches. Not only do they contribute to the natural beauty of the environment, but also provide comfortable, accommodating areas that are ideal for study, contemplation, or social gatherings."

Activate responded sensitively to the sloping terrain of the site to create a multi-tiered campus that Van der Wiel describes as "a sense of one moving on the landscape". During the exercise of creating the platforms, stone collected during excavation was used in gabion walls, paving infill, and stonewall cladding which, together with the granite, totals some 150 m^3.

The tiering of the college was also important in the preservation of the established indigenous trees, many of which cannot be cultivated in nurseries, like the *Burkia africana* tree. Sensitive consideration was also given to the alien bluegums that have historical significance to the Bafokeng people. Such trees, along with plantings of *Combretun spp.* and *Celtis africana,* are used as natural facades to shade the windows.

In terms of the existing vegetation and neighbouring nature reserve, Activate were guided

THE SCHOOL HAD TO EMBODY AND SYMBOLISE THE FACT THAT THE BAFOKENG PEOPLE HAVE A VISION OF TRANSFORMING THEIR COMMUNITIES THROUGH EDUCATION.

by a comprehensive ecological study of the site by Insite Landscape Architects. "Our research encompassed the identification of Red Data species, inclusive of medicinal plants," says Insite's Fritz Coetzee. "Further, graves and stone mounds with cultural heritage value were present. Our master plan was to create a rich planting palette to ensure indigenous species, even insects and birds, maintain the biodiversity of the area."

One of the most practically pleasing aspects of the main classroom design is the incorporation of courtyards that provide good natural cross ventilation, thereby mitigating the need for air-conditioning in almost all the buildings. "Three sides of the classrooms have sliding doors that open up completely, but the major advantage is that we have been able to use the full spectrum of natural light. It is a physiological fact that people perform better in naturally lit spaces, let alone aiding in reducing the carbon footprint and expenses that artificial lighting incurs," says van der Wiel.

A further light-enhancing technique on the main buildings, such as the art classroom, library, staffroom and head's offices was the installation of mechanical screens. "In wanting to take advantage of the view facing the east, but still eliminate the heat gain through windows, we developed with architect Lewis Levin, easily-operated sunscreens based on very clever, but simple, mechanics that require little to no maintenance," explains van der Wiel.

"We also had to consider the language of the sunscreens, given their prominence on the buildings. We were very excited about the idea of weaving and tapestry but only in an abstract and contemporary manner, given that the material used in making the screens is aluminium, which is usually used in the manufacture of aircraft. So it was a great opportunity to create a machine that referred back to traditional techniques of making things."

This was achieved by designing a lozenge-shaped screen with a novel weave effect that translates into a lattice-overlapping structure allowing for optimal light and temperature control. "It became," says van der Wiel, "one of those ideas that functions on both a technical and conceptual level. The final resolution was choosing the four colours - two tones of grey, light blue, and white – that alternate the weave across the extent of the building. They are unpretentious in that, while they don't especially blend into the landscape, they aren't loud, but rather more subtle and sophisticated with a playful nuance."

The development of a food garden, sited slightly away from the school space, has a number of advantages in that it provides a teaching space for a separate community programme that serves to educate locals about food gardening, and also provides food. This feature includes a potting shed that doubles as a classroom, two hot houses and a one-acre planting field. An additional food garden is attached to the dining hall to provide fresh herbs, which, according to van der Wiel, has produced lots of excitement from the catering staff.

When asked if the Lebone II College design is one that should be replicated as an ideal South African architectural concept, Van der Wiel answered "I think that for this, and dozens of other projects, it's more about applying our minds to the challenge in hand, which is to be creative and responsible about the solutions we provide ... Every project is unique, but if Lebone does contribute, in any way, to the *zeitgeist* of South African design, then I hope that at that level it is more about synthesising the language of design than say, just a particular element."

SOURCEBOOK

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WORDS KERRY DIMMER **PHOTOGRAPHS** JASON BUCH

ADDING FUNCTION TO FORM

Eastgate 20 was once a showroom; today it is a 4-Star Green Star rated office building.

The Paragon Group is gaining a reputation for achieving Green Star SA ratings. Apart from its first for the Eastgate 20 retrofit in Sandton Johannesburg, it has recently achieved a 4-star Green Star rating for its latest from-scratch design, the Alexander Forbes building in the same vicinity. At a total of 100 000 m^2, with rentable space of 38 000 m^2, this is one of the largest buildings to be completed in South Africa this year.

As has been proven with Eastgate 20, and also Paragon's first Sandton eco-friendly building (15 Alice Lane), the emphasis on sustainable buildings that respond to the climate is becoming the norm. "As mindsets change, albeit slowly, clients and tenants are realising the need to embark on this process and are accepting the additional costs involved," says Paragon Group's Hugh Fraser.

"The developers are also demanding that there are no surprises between the blueprint and the final construction; between estimated costs and final calculations; as well as the imperative to meet deadlines throughout the project timeline." This is achieved through the use of software such as REVIT and similar, which Fraser says produces a final build that is close to 100% as designed across the project.

Eastgate 20 is typical of that process. Reworked to become a signature building in the neighbourhood, it was a somewhat expensive retrofit for a small building, but the client, Tiber Projects, anticipated prospective tenants to demand green and sustainable aspects.

The most dramatic alteration to Eastgate 20 was in elevating it by two storeys so it no longer rests in the shadow of the adjacent highway vehicular flyover. This necessitated the introduction of glare-reducing solutions such as incorporating louvres and high performance glass to offer sunscreen protection, while still taking full advantage of natural light to save 64% on artificial lighting.

Other green measures included: occupancy sensitive internal lighting; mechanical ventilation offering 15 litres per second per person of fresh air; the use of low-VOC paints, adhesives and sealants; recycling of waste; and a vehicular environment that encourages the use of electric/alternative transport.

The largest green concentration was on water systems with the inclusion of solar geysers; set toilet water pressure; storm water cleaning; and meters on incoming mains, showers and irrigation supplies that are designed to save 35% on normal usage.

At a cost of R40-million for the retrofit, Eastgate 20 offers 4 500m^2 of lettable green space.

** The full feature appeared on p76 in the August – September 2012 issue.*

SOURCEBOOK

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