

Linden Vleihuis: Reintroducing Biodiversity into Urban Living

In September 2018, Solid Green demonstrated sector leadership when the Vleihuis Development in Linden, Johannesburg, achieved Net Zero Certifications from the GBCSA for Carbon, Water and Ecology. The project was also awarded Runner Up: Net Zero Innovative Project Award in the Green Building Council Leadership Awards 2018.

Owned and designed by Marc Sherratt Sustainability Architects, the development comprises five residential units on a 2500sqm, long, narrow brownfield site close to Linden's 4th Avenue 'high street', day care, schools and various leisure amenities.

The Landscape as Client

The design brief required that the project should demonstrate innovation in terms of sustainability and biomimicry, while being contextually relevant. "The area was once dominated by grassland, wetland and koppie," says Marc Sherratt. "Restoring the indigenous ecology of the site became the starting point and controlling device for the architectural design. We approached the landscape first rather than the buildings, to determine what life we could keep, and which landscape might increase the area's biodiversity. We decided to treat the landscape as a client.

"We underwent an extensive research process into the indigenous landscape of Johannesburg, and consulted with a wetland specialist and an ecologist. Through this process, we decided to re-create a wetland on the site and to develop buildings that would sit sensitively in the landscape. The overarching design concept was informed by a bird's nest – from how the structures touch the ground and the use of local materials, to the building's response to climate and ideas around camouflage."

Wetlands provide evaporative cooling of around 2 degrees, thus giving the building resilience and future-proofing. Wetlands are also nature's way of filtering and purifying water. This type of ecosystem facilitates large volumes of water being stored and recycled on site, which addresses one of the biggest challenges under a Net Zero certification for water by negating the need for large water storage tanks.

The wetland therefore has several uses. It acts as a storage facility; provides a wildlife sanctuary for indigenous wetland species, many of which are threatened; and offers a unique aesthetic value to the development. Water is filtered slowly and naturally using the slight slope of the site, ultimately resulting in potable water for residential use. Marc explains that, when the cost of the system is shared between five units, it will be amortized relatively quickly.

Solid Green Sustainability Consultant on the project, Annelide Sherratt says, "Rainwater that falls onto the wetland and runoff from the roof is harvested and stored in the wetland. The total collection area on site including the roof and wetland surface area is approximately 960sqm. The average annual rainfall that is predicted to be harvested is estimated to be 655,600 litres. The predicted consumption of the development is 643,100 litres, so the project is expected to achieve a surplus of 12,500 litres of harvested water per year.

“The project will have a 3-step filtration system, which catches leaves and plant materials, filters water down to 10 microns through a micron screen filter, and then purifies it to drinkable quality. The storage tanks of filtered water will have more than 5 days of water available for use at all times.”

In addition, the architect’s research revealed that wetlands in nature are a major source of fresh food for communities providing, among others, fish and fresh water mussels. Marc explains, “Unit owners will be offered the option of an aquaculture system, which, together with the option of an urban farm on the roof, will allow them to produce their own food. This challenges the Western concept of sustainability and proposes a more African approach that embraces practical benefits to the community.”

Touching the Earth Lightly

The building itself sits lightly on the earth, touching the ground at two points only, with the rest of the structure floating above the wetland. Each of the five units has its own private view and the primary spaces are north-facing, with open plan kitchen and living areas on the ground floor and bedrooms on the first floor. The roof areas have been designed to accommodate residents’ individual needs such as children’s play areas, urban farming, or outdoor entertainment areas.

“The premise behind this development is that the way we consume is as important as the way in which we build,” Marc says. “To protect the integrity of the site, we are developing strict parameters with regards to how the development will be operated, a process that will be managed by a body corporate. The residents of this development will become stewards who understand that urban growth can help protect threatened biodiversity, in a symbiotic relationship that acts to the benefit of both.”

In addition to passive design principles with lightweight, low Portland cement concrete construction providing good thermal mass, each unit will be fitted with Energy Star appliances, a gas stove, a solar hot water heating element and a 3kW solar PV system with 15kWh of storage.

The ground floor spaces have double glazed stacking door systems, allowing seamless integration of interior and exterior spaces; while the upstairs rooms have sliding glass doors with timber screens to minimise solar gain. Skylights bring in additional natural light and illuminate the internal natural textures.

Finishes are as natural as possible, without painting or applied floor finishes which would increase the building’s embodied energy. The intention is to offer clients three options for internal wall cladding, using a system that allows the cladding to be changed or adapted over time – reeds that are commonly used in the African subcontinent, which could potentially be grown on site; recycled timber; or Rhino Wood, which is more expensive but has longevity.

The project is not currently targeting the Net Zero - Waste category, as this option is not open to projects in the design phase, but the developers hope to target this category in the as-built and operational phase of the project.

An Ambitious Vision

“Net-zero represents the beginning of the first true response to climate change from the building industry,” Chilufya Lombe, Sustainability Consultant and Director at Solid Green observes. “Whilst it is evident that we cannot stop the development of new buildings as cities grow, it is possible to ensure that impact on the environment as a result of development is negated. This represents a significant departure from the last 10 years of green buildings in South Africa where the target has been 'having less impact' – or, specifically, targeting 30% lower than this benchmark or using 30% less than a normal project. Achieving net-zero in any category is quite a difficult task. Triple net-zero represents the pinnacle in environmental design by building a structure that has zero impact on resources.”

The Linden Vleihuis embodies an ambitious vision for integrating true sustainability and reintroducing endemic biodiversity into an existing urban context. As such, it raises the bar for residential developments that seek to address the impacts of climate change.

ENDS

(1140 words)

PROFESSIONAL TEAM:

Architect and Project Manager:

Marc Sherratt Sustainability Architects

Ecologist:

Ecology International

Wetland Specialist:

Emifula Riverine Consultants & Associates

Mechanical Consultant:

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Wet Services:

Green Planet Engineering Services

Quantity Surveyors:

Russell Irons & Associates

Sustainable Building Consultant:

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About Solid Green Consulting

Solid Green Consulting has tailored its services offerings to meet the needs of its clients, taking into account best building practices, the long-term financial and operational benefits of going green, and the increasing demand for systems that benefit occupant health and productivity. Ideally starting from initiation and design, these service offerings extend right through to construction, operation and maintenance of the project.

Solid Green is specialised and experienced in both Green Star SA and LEED green building certification, offering certification for offices, residential projects, retail centres, existing buildings, interiors, and public and education (PEB) buildings. All team members are Green Star SA Accredited Professionals (GSSAAP), with key team members also holding LEED AP, EDGE AP and WELL AP accreditations.

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