SIMPLE pleasures

A bold yet unobtrusive house in the Simbithi Eco-Estate in KwaZulu-Natal makes a strong statement in sustainable living from practical and philosophical perspectives.

WORDS GEORGIE CHENNELLS **PHOTOGRAPHS** DENNIS GUICHARD

The house was designed to fit seamlessly into its environment.

Playing the role of both architect and client, Suren Indhul of i3 Lab had the rare opportunity of actualising his vision for a recyclable building that was sensitive to the environment. The house in which he and his wife now live received a KwaZulu-Natal Institute for Architecture Award. These are awarded every two years and recognise recently-completed examples of excellence in architecture. The jury commended among others "the appropriateness of the typology of the pavilion" and "the consistency in following through the design principles".

Essentially one long rectangular pavilion approximately 24 m by 7.5 m, the main dwelling is positioned along the contour of a north-south slope with a south-facing veranda and monopitched roof open to the north. Concrete stub foundations direct loads to concentrated points of connection between the steel frame of the building and the indigenous garden below. A paved driveway and monopitched garage building on the north are separated from the main house by a pergola-covered courtyard and a shallow reeded rill.

The building is characterised by interconnected open spaces that flow from interior to exterior. Natural light penetrates throughout and a series of manually adjustable screens allow for permutations of openness and intimacy, while helping to manage light and heat levels. Cleverly designed to be low-tech but high performance, the house is a harmonious system synchronised with nature.

Influencing concepts

Indhul's approach to sustainable design was not only based on practical solutions, but also informed by the practice of biomimicry and the principles of Vastu, an ancient Vedic philosophy especially concerned with the building plan and spatial elements.

Biomimicry, which involves the examination of models, systems and processes of nature in order to solve human problems, was a useful tool architecturally. Using simple models of controlling air, temperature and water flow which were borrowed from nature, meant that the expense and wastage relating to HVAC systems, electricity and water was avoided.

Vastu philosophy is more concerned with the building as a whole and takes into consideration the orientation with respect to living spaces, airflow and circulation. An influential aspect of the Vastu home is the connection between the healthy building and healthy mind free from excess: uncluttered spaces with easy flow of air and light are prioritised and the

entire building - from furniture to fenestration - is treated with this in mind.

This minimalism and interconnectedness ensure that spaces are unrestricted in their use and can be adapted for future needs. The idea that no space should be wasted at any stage is a universal principle of sustainable space-planning.

ESTATE CHALLENGES

A major challenge faced was approval by the estate's building controls committee. While Indhul admired the lifestyle and freedom that came with estate living his design did not quite match the prevalent modern farmhouse aesthetic.

What could have been a major hurdle in the approval process was avoided by going back to the basics and looking to the guiding principles of the estate instead of their cosmetic expressions. These included "an emphasis on pared down simple forms that are combined in an appropriate and poetic manner", "an uncluttered architecture that is true to form and function" as well as emphasis on the roof as a continuous climatically-responsive element, transparency of walls and sensitive junction of site and building. The design was duly approved.

SITING AND LANDSCAPING

An enthusiast of Glen Murcutt's mantra of "touching the earth lightly", Indhul feels strongly about the relationship of a building to its site. He notes that the generally-accepted practice of placing buildings into excavated sites where the ground is disturbed, should be reconsidered. For him, the landscape is an integral part of the building and needs to be treated with the same sensitivity when designing.

Indhul's building sits snugly in its environment, sited along the contour and allowing for planted growth underneath as well as around its raised footprint. A concrete ground beam connecting a series of piles secures the two buildings on the

NUTSHELL

Location Simbithi Eco Estate, KwaZulu-Natal
Size 1 200 m²
Cost R2.5 million
Start and end construction 2009
Dwelling components 3 bedrooms, 3 bathrooms, kitchen/ scullery, entertainment area (includes entertainment kitchen, lounge and dining areas), 2 decks, yard, garage.

The main pavilion is elevated from the ground which limited excavations.

01.

02.

04.

03.

01. The house was designed in such a way that limited its impact on its environment.

02. The roof is made of recyclable aluminium.

03. The veranda is south-facing and receives ample morning light.

04. With no gutters or downpipes, water runs along furrows to the garden and excess is channelled under stonework to a water tank.

site with minimal excavations and damage to the surrounding landscape. The absence of retaining walls means that the site conditions of soils and planting have been left intact as much as possible.

The elevation of the main pavilion from the ground below serves a vital purpose in the functioning of the house. Services have been designed to fit below the building as much as possible, allowing maximum

OVER 50 PLANS WERE ISSUED FOR THE BUILDING, AND EVERY SHOWER TILE, PLUG POINT AND BOLT WAS DETAILED.

The kitchen is uncluttered following Vastu philosophy

The interior is minimal and interconnected, allowing for easy adaptation for future purposes.

use of space on the living level above and easy access to the services from below. Services housed in the basement include electrical conduits, heat pump, plumbing and gas.

The treatment of rainwater has been thoughtfully considered too. There is a distinct lack of gutters and downpipes connected to the roofing elements, causing rainwater to fall directly to a series of agricultural drains. Here the concept of ant furrows has been borrowed from nature: stormwater is channelled along the furrows into the garden to where it is needed. Any excess is channelled under the decorative stonework to a water tank under the house.

MINIMALIST STRUCTURE

Indhul worked closely with engineer Rob Young of Young and Satharia on the steel frame for the building, designing a lightweight, wide-spanning structure. The steel was expressed as a feature of the building and treated with a duplex paint system for galvanic protection against the coastal humidity.

A drawcard to using structural bolted steel was the recyclability of the material: structural steel has the benefit of a cradle-to-cradle lifespan where it may be easily disassembled and re-used elsewhere, or re-formed into new parts. According to Young, between 40% and 80% of new steel is made from recycled scrap steel worldwide.

The building's I-beam portal frame supports a suspended ring beam with concrete slab over polystyrene blocks for insulation. These are covered with an innovative flooring system where birch strip flooring panels are secured using Elastilon, an elastic mat which eliminates the need for nails and adhesives. This product allows the timber to remain intact and be easily disassembled for re-use.

Higher up, the steel structure supports a recyclable aluminium roof with 150 mm of rock wool insulation between ceiling boards. The ceiling itself is a single element running the entire length of the house and separated from the lower structure by glass on all sides.

Between floor and ceiling levels the spaces are open and airy. Tight service spaces for bathrooms are centralised on either end of the living space, of which the dimensions are then modified through the use of timber screens.

INDHUL'S APPROACH TO SUSTAINABLE DESIGN WAS BASED, NOT ONLY ON PRACTICAL SOLUTIONS, BUT WAS ALSO INFORMED BY THE PRACTICE OF BIOMIMICRY AND THE PRINCIPLES OF VASTU, AN ANCIENT VEDIC PHILOSOPHY ESPECIALLY CONCERNED WITH THE BUILDING PLAN AND SPATIAL ELEMENTS.

BIOMIMICRY: ADJUSTABLE LAYERS AND TERMITE MOUNDS

The building relies on passive heating and cooling techniques, conceptualised through biomimicry. Passive ventilation also plays a large role in the house's adjustable microclimate and Indhul uses the concept of the termite mound, with its vents on the uppermost edge of the structure, to allow hot air to escape and cool air to take its place.

Throughout the house there is a series of screens which are manually adjustable to control climatic conditions. Indhul explains the several layers of these skins which can be adjusted just as an animal sheds its coat in summer and grows a thicker one in winter.

The first skin is an external high aluminium screen which cuts out the glare and allows the north light to permeate the building. These lightweight louvered panels also break down the visual scale of the building, further settling it into the natural surroundings.

The second skin is Solarvue glazing, specified throughout the house for its favourable control of solar heat, UV rays and light transmission. This particular glazing eliminates more than 90% of the damaging UV radiation and allows minimal solar heat gain while allowing maximum light through to the interior. At the highest point of the ceiling, there are adjustable centre-pivot clerestory windows which stimulate air movement through allowing hot air out and drawing cool air in from below.

The third skin, a series of timber shutters, can be adjusted to allow for varying climatic conditions to control heat and light. They can be moved into position in winter to decrease room sizes and to insulate, and conversely adjusted to open the space to breezes and light in summer.

All these adjustable devices contribute to the thermal and lighting efficiency of the house. Indhul goes as far as using frosted glass screens inside the house to separate bedroom and bathroom, sharing light between spaces or "borrowing the light", as he calls it. The house is further sparing in its use of electric light and all interior fitted lighting runs off different circuits for more control and less wastage.

There are no conventional doors and windows: only sliding screens, all suspended from the same height. This, coupled with the fact that no one solid wall reaches the ceiling, makes for a harmonious interior and allows natural light to diffuse evenly throughout.

Exterior lighting is all solar: a series of ground-level lights, each the size of a cobble, illuminate the garden paths at night and then absorb more solar energy during the day.

CONSTRUCTION

Realising his vision of a minimal and finely-tuned building was not as easy as it may appear. "It's deceptively simple: to construct it was very difficult!" says Indhul.

The design required thorough detailing and documentation and the architectural team also spent a lot of time on site supervising. The inclusion of various pre-assembled parts such as the steel, glazing and a drop-in plumbing system meant that the drawing resolution required the snugness of a jigsaw. Over 50 plans were issued for the building, and every shower tile, plug point and bolt was detailed.

Indhul is meticulous when it comes to details and notes their importance in achieving overall balance and harmony in the space.

SUSTAINABILITY FEATURES

- Minimal site impact through raising the dwelling
- Rainwater harvesting
- Indigenous garden
- Recyclable materials used during construction:
  - Framework of structural steel with bolted joints
  - Aluminium roof
  - Elastilon-attached floor panels
- Passive design
- Various "skins" for sunlight control: screens and Solarvue glazing
- Sloped ceiling and clerestory windows for ventilation stack effect
- Adjustable timber screens for thermal control and multiple uses of spaces
- Sustainable technologies employed domestically:
  - Heat pumps
  - Gas supply for cooking
  - Solar-powered outdoor lights

A further practice employed in pursuit of precision was the gradual supply of drawings to the construction team instead of a full set handed over at once. These drawings were issued in stages, from the ground up, in order for the construction team to concentrate on one element of the project at a time. For example, when the concrete for the floor was being applied, the builders were given drawings that took into account stepless shower levels in the bathrooms, but without the wall-mounted counter details irrelevant to the floor.

A SIMPLE CONCEPT

With such fervour for the details, Indhul is relaxed about the overall aesthetic and enjoys the experience of living in the space. A simple, but incredibly tight concept followed through on every level has translated into a low-maintenance and easy living environment. Consideration for the environment on many levels has its benefits too, and according to Indhul, "any house that fits into the landscape, fits into the natural environment, is going to look great".

SOURCEBOOK

Architect i3 Lab Suren Indhul 031 566 3820 info@i3lab.co.za
Structural engineer Young and Satharia Consulting Structural Engineers Rob Young 031 207 7252 www.yands.co.za
Contractor Silverline Construction Silver Padayachee 083 354 5703 spdayachee@webmail.co.za
Project manager i3 Lab Suren Indhul info@i3lab.co.za
Quantity surveyor LDM Consulting 013 752 5228 www.ldm.co.za
Environmental Izwe Lethu Environmental Solutions Warren Manning iswe@wol.co.za
Landscaping Burgess Landscapes Wayne Burgess 031 709 1780 www.burgesslandscapes.co.za
Glazing Façade Solutions Clint Peters 031 569 5024 www.facadesolutions.co.za
Timber Afsan Joiners Dave Dipoa 031 507 2456 www.afsan.co.za
Flooring Floors Direct www.floorsdirect.co.za
Roof Ogilvie Steel Allan Olive 083 700 2212
Lighting Cobin Lighting Guy Mets 031 312 146 www.cobinlight.com