MODERN GREEN HOMES

Sanctuary

ISSUE 50

SUSTAINABLE DESIGN TRENDS SPECIAL

Classic houses revisited; designing to nurture nature; Passive House treechange; get your home EV ready

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Sanctuary celebrates 50 issues of Australian design

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Inside issue 50

HOUSE PROFILES

28 CLASSIC HOUSES REVISITED

Over the fifteen years since the first issue, more than 380 sustainable homes have featured in *Sanctuary*'s house profile pages. To celebrate our 50th issue, we revisited three of our favourite houses from the early days to see how they have stood the test of time.

IDEAS & ADVICE

REGULARS

Suburban beach house

LOCATION Wright, ACT
WORDS Sophie Weiner
PHOTOGRAPHY Ben Wrigley

At a glance

- Modular design approach
- Excellent thermal performance with standard construction and materials
- Energy efficient and airtight: 8.2 Stars and 3.2 air changes per hour
- Great design for a narrow site with north to the street

With standard materials, a modular design approach and careful attention to detail, this Canberra couple have created a high-performing family home that's a haven in the suburbs.

Five years ago, Jenny Edwards and her partner David Dufty set out to build a home that would serve as an oasis for their family in the middle of a new high-density suburb in Canberra's south-west. At the time, both were living in underwhelming and unhealthy rentals, and felt they could do better for their blooming partnership.

Jenny, a building scientist and the founder and managing director of ACT design outfit Light House Architecture and Science, was uniquely qualified to execute this vision. Her company specialises in homes that are designed and built to exacting standards, make the most of their surrounds and keep energy use to a minimum.

With her own home, built on what she describes as a "tricky" narrow block with the street to the north, Jenny wanted to demonstrate that not only can good design create a comfortable and energy-

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Making the most of a tricky narrow site with the street to the north, the house's kitchen and dining area opens to a generous deck with a shady pergola. The well-insulated house is clad with Weathertex and standard clay bricks.

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Pictured in lusher times, the newly constructed Bridge House in South Australia featured on the cover of issue 8. Image: Sam Noonan

Back to the future

Classic *Sanctuary* houses revisited

Over the fifteen years since the first issue, more than 380 sustainable homes have featured in *Sanctuary*'s house profile pages. Dipping into the early issues, it's easy to spot things that have changed. Back then, efficient lighting meant compact fluorescent. Solar PV systems were generally just a single kilowatt or so and were eye-wateringly expensive, and low-VOC paints and finishes were niche products, hard to find. And yet, the fundamentals that characterise a *Sanctuary*-worthy home have not changed much at all. Passive solar design, good orientation, sustainable materials, attention to energy efficiency and, perhaps most importantly, pleasant, comfortable spaces for humans to live in with a minimal eco footprint. To celebrate our 50th issue, we revisited three of our favourite houses from the early days to see how they have stood the test of time.

Bridge over peaceful waters

Known as the Bridge House for obvious reasons, the modest home on the cover of *Sanctuary* 8 is made spectacular by its novel location spanning a gully among magnificent gum trees in Ashbourne, south of Adelaide. Designed by architect Max Pritchard and completed in 2008, the innovative, lightweight structure touches the ground at just four points, minimising disruption to the creek bed below. Two steel trusses support an insulated, suspended concrete slab on which is built the Colorbond-clad, double-glazed home.

"I have always admired elegant bridge structures, devoid of ornament but beautiful," says Max. "One of my first design projects was my own house, designed as a bridge suspended up to eight metres above the ground and with an expressed steel frame. Twenty years later I was presented with this opportunity to design a similar structure, this time with the added romantic notion of living over running water."

Long and narrow, the house was designed to make the most of views to both north and south. Summer cooling was by way of cross ventilation, shading and ceiling fans, and winter comfort was ensured by solar gain onto the thermal mass of the slab plus a small combustion heater. A 1 kilowatt solar PV system (which cost a whopping $20,000 at the time) and solar thermal hot water reduced the all-electric home's grid energy needs.

The original owners of the house having passed away, it's been home to John Sexton and his partner Micarla since 2018. John has a building background and was very impressed with the structural design of the house and the quality of the build. "It's weathered beautifully. When we moved in I cleaned the outside with a high pressure cleaner, and it didn't reveal any issues or damage."

The only change the couple has made so far is to put in new efficient ceiling fans, "which are really quiet and move the air around beautifully," says John. The original solar PV system is still going strong, and will soon be upgraded to a 10 kilowatt system; John and Micarla are considering getting batteries and going off-grid for electricity in the future. They are also in the process of installing a sprinkler system in case of bushfires.

John reports that the house is lovely to live in. "There's a real sense of elevation. We're basically within the treetops, with nature around us: blue wrens, possums – it's great for nature lovers like us."

Read the original house profile, 'Treetop vantage', in *Sanctuary* 8.

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Today, the Bridge House is home to Micarla and John Sexton and their dogs Jessie and Luna. "The original owners had done a lot of work with native replanting and encouraging wildlife such as ringtail possums," says John. "There were strict guidelines for the sale – they wanted it to go to people who were suited to the property and would keep up the revegetation work." Image: Christine Sexton

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Built 20 years earlier, architect Max Pritchard's own home in Adelaide was an early testing ground for the structural design used in the Bridge House. Image: Sam Noonan

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Suspended among the trees, the Bridge House provided a sense of peace and connection with nature from day one. Large north windows and a concrete slab floor were designed for passive solar performance, and ceiling fans and cross ventilation were (and remain) the only cooling. Image: Sam Noonan

Naturally lovely

LOCATION Witchcliffe, WA • **WORDS** Rachael Bernstone • **PHOTOGRAPHY** Ange Wall

At a glance

- Natural materials for a healthy indoor environment
- Built from breathable, renewable, vermin-resistant hempcrete
- Small footprint, passive solar design for thermal performance
- Designed for accessibility

Built with a focus on natural materials including hempcrete, this small home near Margaret River will provide a Perth couple with a comfortable, healthy, low-bills retirement.

Perth residents Andrea Beck and Holger Butenschon wanted a small, sustainable and healthy home for their upcoming retirement and found an ideal 3800-square-metre block in Witchcliffe, six kilometres south of Margaret River. Formerly farmland, it abuts remnant forest, offering an appealing sense of privacy and seclusion.

They engaged a friend – James Shaw of Ecotect Architects – to design their new house. "We've known James for 25 years; our kids went to playgroup together," Andrea says. "He's super passionate about passive solar design and when we told him we'd bought the block, it turned out he'd already looked at the block next door, so he designed the house on a napkin.

"James said: 'It needs to be small; to offer protection from the wind coming from the south-west and south; to have high windows to the north for winter sun, and you should consider windows to the south and west for breezeways'," Andrea recalls. "Initially we wanted three bedrooms but we couldn't afford that, so we built two bedrooms and two bathrooms, one of which has an integrated laundry."

All of the major elements from James's initial sketch were realised: the only big departure was the use of hempcrete, which was suggested by the couple's adult daughter. She sang the praises of the termite- and vermin-resistant, breathable, renewable material, which also provides good thermal mass.

"We looked at the first hempcrete house being built at Margaret River, and Holger was worried that it wasn't a proven technology and didn't have official R-ratings; he's an engineer and wanted to understand the numbers," Andrea says. "But we visited that house during construction when it had a roof and walls but no windows. It was a wet and windy September day, and it was three or four degrees warmer inside than outside – and the scent from the hempcrete was beautiful."

Further research via books and Irish hempcrete expert Steve Allin convinced

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Holger and Andrea chose hempcrete for their retirement home, and couldn't be more pleased with the result.

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Modest in size, the house consists of just two bedrooms and a single open plan living space with views to the neighbouring bushland. Cross ventilation and ceiling fans provide the only cooling needed.

Local support

LOCATION Kangaroo Valley, NSW • **WORDS** Rebecca Gross • **PHOTOGRAPHY** Tom Roe

At a glance

- Use of local materials, skills and knowledge for community sustainability
- Small-scale family home with valley views
- Highly insulated with shade screens and cross ventilation for energy-efficient thermal comfort
- Built to BAL-29 requirements, higher than the site's rating

A small, energy-efficient family home perched above NSW's Kangaroo Valley prioritised the use of local materials and skills, contributing to community sustainability.

Based in the small regional community of Kangaroo Valley in NSW, architect Wesley Hindmarch's ethos for his practice is to make maximum use of local materials, skills and knowledge (even its name – Local Architect South Coast – reflects it). He and his wife Gabrielle moved to the area in 2018, wanting to raise their son in a rural environment. For their own home, Wesley designed a house that respects and reflects its environment and, true to his values, engaged local tradespeople and sourced local materials for the build. "This is the best contribution you can make to a regional community's economic, social and environmental sustainability," he says.

Wesley and Gabrielle wanted an energy-efficient home that took in the dramatic valley and escarpment views to the north and west that their site enjoys. Wesley designed a lightweight, highly insulated house to provide thermal comfort through Kangaroo Valley's cold winters and hot summers. He sourced timber from a sawmill in southern NSW and worked with a family-run construction business for the build: "It was important for us to have a builder from the area," Wesley says.

The house is built on a steep slope and is exposed to strong wind, western sun and the threat of bushfires. The compact, two-storey form responds to these elements, with glazing protected by sliding timber screens and deep eaves. The thick insulated walls – using two 90-millimetre timber frames – plus additional roof insulation and high-performance windows keep internal temperatures comfortable. The construction exceeds the requirements for the site's Bushfire Attack Level of BAL-19, meeting the more stringent BAL-29 to allow the family to grow some vegetation around the site. There are two bedrooms, a bathroom and a cupboard laundry on the lower level, and living, dining, kitchen, flexible study/extra bedroom and deck on the upper floor which has a beautiful view over the

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Gabrielle and Wesley's compact home is sited to make the most of sweeping views to the west and north.

Nurturing nature

Designing a home with biodiversity in mind

WORDS Sarah Bekessy, Georgia Garrard, Sarrah Hurley, Casey Visintin, Freya Thomas & Holly Kirk

There's a lot you can do to promote biodiversity when you're designing a new home or renovation, with clear benefits for you and your family as well as for the natural environment. Ecologist Sarah Bekessy and her colleagues explain what's possible.

While sustainability is becoming a mainstream concern for those embarking on building or renovating a house, the impacts and opportunities for biodiversity are rarely considered. In Australia, many of our most threatened species and ecosystems rely on habitat near where people live and work, and urban development is considered one of the most destructive processes for nature. House construction and renovation can pose many serious threats to wildlife, through the clearing of land for housing, construction materials that damage habitat and biodiversity in their production, and architectural features that create environments that are hostile to biodiversity.

But it doesn't have to be this way! There are many opportunities to design a home to protect the existing biodiversity on a house site, or even to bring back species that may have used the site in the past. Our team at RMIT's Interdisciplinary Conservation Science group developed Biodiversity-Sensitive Urban Design (BSUD) as an alternative approach that aims to generate buildings (and whole suburbs) that have a positive effect on their local biodiversity. Let's have a look at how you can incorporate BSUD in your project, whether you live in the city, on a suburban block or on rural acreage.

STEP 1: INVESTIGATE YOUR SITE

A key reason why renovation and construction can be damaging for biodiversity is that it is rarely considered during the design and planning stage – so get started early. An important first step for BSUD is understanding the current biodiversity values of your site. It's a good idea to engage an ecologist to help identify rare or interesting plants and animals or to find historical information about species that once lived in the area. Many of these species, especially interesting local plants, can be reintroduced easily onto house sites. Alternatively, talk with your closest Landcare group (start here:

landcareaustralia.org.au/landcare-get-involved/findagroup), 'friends' group for your local creek or reserve, or your council to obtain information about local plants and animals.

STEP 2: IDENTIFY YOUR GOALS

Armed with this information about your site, the next step is to decide on your biodiversity goals. We recommend choosing a set of species on which to focus your design attention. These might be:

- Charismatic species that you would enjoy having around the house (e.g. fairy wrens or chocolate lilies)
- Culturally significant species (e.g. Bogong moths or Indigenous food plants such as murrnong)
- Species that provide a key ecosystem service (e.g. microbats that eat pest insects, or native bees to boost pollination)
- Species that act as an 'umbrella' for other species (e.g. providing habitat for growling grass frogs will likely benefit other frog species).

Goals might also include identifying invasive species to discourage from the site, such as blackbirds, Indian mynas or high-threat weeds. Providing a range of food and shelter resources and considering their spatial arrangement on your site can not only attract the target species you have in mind, but also direct less desirable creatures away from your living spaces, for example directing snakes to wilder areas of the garden.

STEP 3: DESIGN FOR YOUR CHOSEN SPECIES

Once you've picked your biodiversity goals, you can identify the key resources your chosen species need and any local threats to them (see box on p85 for some examples). The next step is generating design options to meet those requirements. This is partly about spatial planning – for example, positioning the house or extension to encourage interaction with nature or to help the site act as a wildlife 'corridor'. It's also about including specific architectural and landscape design features that link to your biodiversity objectives.

Mitigating threats

Some design features aim to mitigate threats to biodiversity, such as predation by cats or foxes, collision with cars or windows, and light pollution. Some suggestions include:

Protection from predators: Cats allowed to roam outdoors cause an enormous amount of damage to wildlife. Instead, you can design your house so that your cat will be content inside by providing strategic window ledges, sunny indoor spaces and secure outdoor cat courtyards or runs [Ed note: see 'Purr-fect design' in *Sanctuary* 41 for more]. Gardens can also be designed to provide shelter for wildlife from other outdoor predators like foxes, for example placing bird baths up high and planting low prickly shrubs for wildlife to hide in.

Bird-friendly windows: Angling windows downward by 20 to 40 degrees can help avoid bird collisions, as they will see the ground reflected rather than trees and sky. Alternatively, you can install bird-friendly glass, which has cross-hatching visible to birds but not humans. You can also retrofit

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Designed by Weinstein Vaadia Architects, the visitor centre at the Jerusalem Bird Observatory incorporates a green roof with wildflower planting for habitat, and the external stone walls are designed with in-built cavity nest boxes for local birds. Every surface of the building envelope is utilised to provide amenity to local plant and animal species. Images: Amir Balaban, The Society for the Protection of Nature in Israel, The Nili & David Jerusalem Bird Observatory

MODERN GREEN HOMES:

A short history of energy-efficient housing in Australia

WORDS Anthony Wright

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In 2010, working with industry partners, CSIRO designed and built Australia's first zero-emission demonstration house in Doreen, Victoria: the Australian Zero Emission House (AusZEH) built by Henley Homes. The home rated 8 Stars and incorporated low energy appliances and a 6 kilowatt PV array. Image: Henley Homes

As we celebrate 50 issues of *Sanctuary*, it's timely to look back at how far the 'modern green homes' of our tagline have come in the magazine's lifetime. CSIRO building researcher Anthony Wright looks at the development of energy efficiency regulations, how we're building, and where to next for achieving a truly sustainable built environment.

Climate responsive design is nothing new, but it does sometimes seem like it must be rediscovered over and over. About 2500 years ago Xenophon recorded Socrates describing "beautiful and good" houses in ways that, adjusting for his northern hemisphere perspective, will be familiar to *Sanctuary* readers:

"Now in houses with a south aspect, the sun's rays penetrate into the porticoes in winter, but in summer the path of the sun is right over our heads and above the roof, so that there is shade. If, then, this is the best arrangement, we should build the south side loftier to get the winter sun and the north side lower to keep out the cold winds. To put it shortly, the house in

BIBLIO-TECH:
Libraries leading sustainable design

WORDS Jessamie Yule

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Libraries are going green, in more ways than one. Architects BVN's design for the new Woollahra Library at Double Bay in Sydney was inspired by its previous location in the lush Blackburn Gardens, and features vertical gardens and organic-shaped voids lined with hanging plants. Image: John Gollings AM

Far from disappearing into obscurity as the world goes digital, libraries around the world are being reinvented as vibrant community hubs. The best examples demonstrate environmental sustainability in their design as well as contributing to the social sustainability of their communities.

The old stereotype of dusty shelves and the dread of being shushed by the librarian has no place in modern library spaces. In Australia, library attendance is on the rise every year, as the community does more than borrow books. Libraries have made themselves a partner in people's lives by responding to an ever-changing social brief, meeting current community needs and anticipating those of the future, in a variety of fields from art to health, civic engagement, education and technological literacy.

Increasingly, physical book and journal collections are being digitised, freeing up essential space. The integration of garden and landscaping blurs the line between indoor and outdoor spaces, and building systems that monitor and maintain thermal comfort and air quality encourage longer visits. Flexible, multifunctional spaces can serve as meeting rooms, technology hubs and classrooms for learning programs that educate and support. Libraries are acting as places that encourage debate, places to gather and share important information and fact-check. And as the effects of climate change are increasingly felt, they are also anticipating the need to function as community havens during and after emergencies, as happened in the 2009 Victorian bushfires and the 2011 Queensland floods.

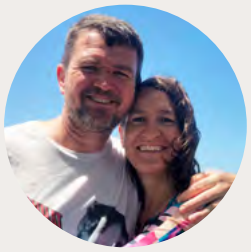
Libraries are relieving transport congestion by supporting telecommuters and encouraging the sharing of resources by providing access to items like audio equipment and sewing machines. By consulting with people who aren't currently using their facilities, they are devising strategies for getting more local involvement. For instance, some libraries are including creative technology hubs offering virtual reality equipment, robotics, laser cutters and 3D printers as well as assorted courses in their use, designed to support transitioning workforces and younger students not following traditional pathways.

At some libraries, extended opening hours accommodate shifts in the working week – the West Gippsland library in Victoria recently introduced 24-hour access to its Foster branch for members – and as the political climate creates instability for our most vulnerable people, libraries have become a welcoming place for refugees and asylum seekers.

SHAPING *SANCTUARY*

Editors in profile

DONNA LUCKMAN
Issues 1-5



MICHAEL DAY & VERITY CAMPBELL
Issues 6-17

Over the years since its launch in 2005, *Sanctuary* has flourished under the leadership of a formidable lineup of editors. Each of them had a unique perspective on sustainability and design, and each brought that to the magazine in their own way. On the occasion of our 50th issue, we spoke to our past editors about their memories of the magazine, their thoughts on the triumphs and challenges of the sustainable design sector and what they hope to see in the future.

The idea to launch *Sanctuary* was the result of a tipping point in conversations about climate change, Donna says. "Al Gore's film *An Inconvenient Truth* came out, and there was the 'climate change election' in Australia. We were in the middle of the millennium drought," she recalls. "We knew people were going to be more interested in sustainability and energy in housing, and there was nothing actually filling that niche in the market."

Renew, *Sanctuary*'s publisher, received a federal grant as part of the government's *Your Home Technical Manual* program to launch the magazine. It was initially intended to be published twice a year. "It was hard to source houses to profile," Donna says. "Nearly every house that qualified to be featured in the magazine made it into our first issue."

For Donna, one of the most exciting things about starting the magazine was the instant community it created. "We got to talk to all the leading designers and architects across the country who were doing work in sustainability." Many of those experts are still contributing today.

Donna marvels at how far sustainable design in Australia has come since that first issue. Back then, "people thought you needed new materials and techniques [to achieve thermal efficiency], but it comes down to good design. That's become more entrenched in building practices today."

As for the future, she believes the next frontier is apartments and strata. "It's exciting to see the big builders launching new projects for medium-scale strata, but sustainability is still not totally embedded in apartment buildings. We need to put the regulations and incentives in place."

After handing over the *Sanctuary* editorship, Donna continued at Renew as Communications Manager and then CEO for six years, stepping down in late 2019.

Michael and Verity applied to be the editors of *Sanctuary* as a couple and got the job together. It was a novel arrangement, but sharing the position was a joy, they say. "I loved working with Michael, we were really grateful for that opportunity," Verity says.

Taking over from *Sanctuary* founder Donna, Michael says he appreciated her willingness to let them guide the magazine in a new direction. "Donna wasn't possessive over *Sanctuary*, she just handed it over to us and gave us her full support for anything we wanted to do."

Michael and Verity oversaw the magazine's transition to focusing on the practical side of sustainable design. "We placed a lot more emphasis on 'how to' and doing," Michael says. "We pulled back on the narrative side of the articles and emphasised the specifications, the materials, the products."

The couple are also proud of chronicling the beginnings of the Tiny House movement in Australia and responding to the Black Saturday bushfires in 2009.

After their departure, Verity became a consultant for architects trying to publicise their work. And last year, she helped found Architects Declare, the movement that led hundreds of Australian architects and designers to declare a climate emergency (see *Sanctuary* 49).

She hopes that sustainable design practices will become common sense for everyone in the industry. "*Sanctuary* was always leading the conversation and there will always be a space for that," Verity says. "My hope would be that every person – not just architects and designers – understands the basic principles of sustainable design because then we're more likely to build the houses we need in this country."

WIN

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