

# MODERN GREEN HOMES Sanctuary

**INSIDE ISSUE 16** 80+ Green products & design tips; Thermal bridges & how to avoid them;  
Open plans brought under control; Design workshop: free advice on your home plans

## TOWARDS 10-STAR HOMES THAT RAISE THE BAR

LED lights demystified

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Pocket Neighbourhoods

Tiny Houses: Big Ideas



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# MODERN GREEN HOMES Sanctuary

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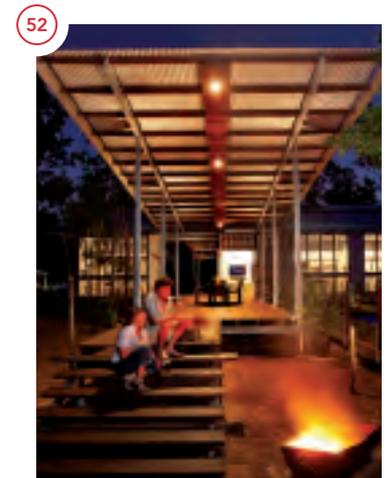
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# Quiet Achiever

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Protected from coastal winds and with great sea views, this modest South Australian holiday house couples design simplicity with passive thermal performance.

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WORDS Anna Cumming  
PHOTOGRAPHY Sam Noonan



An angular wall panel of corrugated iron gives a dramatic aesthetic to the structure, and protects it from the western sun. The deep eave on the north shades the windows in summer.



**EIGHT YEARS AGO, SEAN AND BRONWYN BOUGHT A**

four hectare block in rolling hills just inland from the beaches of Cape Jervis, an hour and a half south of Adelaide. Tied to the city for their work in academia, the couple had always planned to complement their small city base – deliberately within easy walking or biking distance of their jobs – with a place out of town for weekends and holidays. As marine ecologists, it was important to both of them that they set up near the sea.

Part of a farm subdivision, the land had been grazed for years and was bare except for a handful of scattered paddock trees. The couple set about revegetating with native trees and tussock grasses straight away, sometimes spending weekends in a caravan on the block with their young son Zac.

When they were eventually ready to build several years later, Bronwyn describes the brief they gave architect Max Pritchard: “We wanted a house that was liveable, light and airy, without extra rooms that would rarely be used.” The finished home achieves this with a simple rectangular floorplan.

“Maximising the panoramic sea and rural views to the north, and providing protection from strong southerly winds, determined the house’s form,” explains Max. “The simple arrangement of rooms provides a model for sensible economical housing.”

Nestled into a gentle north-facing slope, the house is built on a cantilevered concrete slab with a slanted roof jutting out to provide a wide shading eave on the north. Half of the 93 square metre house is an open living and dining room with a compact kitchen along the southern wall; the other half consists of two bedrooms and a single combined bathroom and laundry. “Most of the time it’s just the three of us, so it’s all we need,” explains Bronwyn. The main bedroom is large enough to accommodate a mattress on the floor for their son when they do have guests, and for really big gatherings there are four bunk beds in the shed. An open-air cold-water shower and toilet next to the shed eliminate any need for an ensuite or second bathroom inside, and the shower is handy for rinsing off after beach trips.



# Light & liveable

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This family home underwent a considerable design reconfiguration to greatly improve functionality.

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WORDS Sandra Langdon  
PHOTOGRAPHY Andrew Wuttke





**WITH TWO TEENAGERS AND AN ACTIVE CHILD CRAMMED INTO** their home in Melbourne's Ascot Vale, Kim and Paul Lewis knew they needed more useable space but didn't want to build up or move out. "We really struggled," Kim says. "It was an original Californian bungalow with poky rooms and no built-in robes and it was a nightmare."

Paul was against building up, especially as the house is on a street corner. "We were really conscious of not having a huge mansion. We wanted to use the space that we had a bit more wisely," Kim says. Eventually they found Brunswick architect Jeremy McLeod of Breathe Architecture. "They didn't want a parents' retreat," Jeremy says: "It was a one-line brief: 'There is enough room, it just doesn't work. Make it work.'"

Breathe Architecture's solution involved making sense of the floor plan by grouping the wet areas to the west, converting the original lounge into a bedroom and reconfiguring the kitchen and dining area a little. "Importantly, we changed the way you enter the house," says Jeremy. "We made a new double-height entry on the east, in the centre of the floor plan – so guests don't have to walk past all the bedrooms to get to the living areas."

The house's overall footprint hardly changed, although the eastern wall of the living area was moved to the boundary to provide a little extra space. Money was spent opening up the north side, and sun angles were calculated to make simple passive solar gains. Argon-filled double glazed sashless windows can slide up or down to direct the airflow on hot days, and a big, rusted steel screen can be pulled across the north-facing window to the dining room. "It has two purposes," Jeremy says. "Active sun control – you can slide the screen across or let the sun in anytime. And protection for the occupants once hockey practice starts in the back yard." Kim says the screen is "just fantastic, although I still freak when balls hit it!"

The back yard is divided into three spaces: the synthetic hockey pitch,

a deck and a paved entertaining area. At the rear of the yard, a red brick studio with big retractable doors functions as a games room and bedroom for 19-year-old Nicholas. Four 3200 litre slim rainwater tanks line the western boundary and are plumbed in to flush the toilets and water the garden. Running along the west side of the house is a narrow Colorbond steel shelter, which conveniently tucks away the family's bikes. "The more accessible they are, the more you are going to use them," says Kim.

The renovation made use of salvaged materials including Tasmanian oak floorboards, grey ironbark for exterior timberwork, and recycled bricks to match the studio. Jeremy says the flooring was straightforward, the recycled bricks were harder to source and finding recycled ironbark was tough. As a result, a lot of the decking and cladding is new, with the recycled timber used for feature pieces.

"The standard solution for laying floorboards is directly over particle board flooring, using adhesive and secret-nailing them," Jeremy says. "This means the floor can never be pulled up again; also, the adhesive can release VOCs and its embodied energy is high." For these reasons they opted instead for top-nailed recycled floorboards, which came with unique characteristics such as old nail holes and marks. "The downside is sometimes squeaky floorboards – it is an imperfect solution. But it looks great and is environmentally responsible." Kim loves the floors to bits. "They stay really clean, the dark parts are much richer and the old marks and blemishes scattered around the house look beautiful."

Hydronic heating was installed in all rooms. With two children suffering from allergies, Kim feels hydronic is far superior to ducted heating. "Ducted heating collects dust and dust mites in the ducts while it is idle and then blows them around the house. Installing hydronic heating wasn't a lot more expensive than our quote to have the ducted heating extended," Kim says. "It's much more efficient to run and it's peaceful."



➔ "I love the whole factory industrial look," says Kim. It's evident in the very practical roller doors converting this space from a study to an indoor exercise area for Kim's personal training business.



# RN OTTS



The marks and irregular colouring of recycled Tasmanian Oak floorboards add interest and warmth to the kitchen and living areas.

# From McMacro to Micro

Small, tiny, micro – many ways to describe a movement which is becoming too big to ignore.

WORDS Verity Campbell

Several issues ago, in *Sanctuary* 9, we looked at the US-based Small House Movement. Born from an increasing desire to radically shift the way we live, Jay Shafer and Gregory Paul Johnson trail blazed a movement designed to give people the tools and support they need to replace “trophy” houses with homes that better suit their needs, improving quality of life and freeing up time and money. According to the Small House Society, “It’s not a movement about people claiming to be ‘tinier than thou’ but rather people making their own choices towards simpler and smaller living, however they feel best fits their lives”.

Small homes use fewer resources and are filled with less stuff. Small homes increase urban density. Small homes are more affordable. Small homes make paring down a necessity. After reading in *Collaborative Consumption* (reviewed on p10) that the average drill is used “somewhere between six and 13 minutes in its entire lifetime”, I began to look around my home: camping and ski gear, juicer, dust-gathering books, two drills! So many things that are rarely used. Creative online distribution models such as the Sharehood ([www.thesharehood.org](http://www.thesharehood.org)) make these items available as a shared community resource, while websites like Ziilch ([au.ziilch.com](http://au.ziilch.com)) and Freecycle ([www.freecycle.org](http://www.freecycle.org)) facilitate passing on unwanted items.

The Small House Movement continues to grow. Encouragingly, we recently heard from *Sanctuary* readers Christopher and Natalie, who have created a Facebook page, Tiny Aussie Homes, to help share experiences of building tiny homes in Australia. The couple are building their own off-the-grid tiny house and will post their experiences and progress on the page.

On the following pages we profile two interesting international projects. We’d love to hear about your tiny and small house projects too, so please email [sanctuary@ata.org.au](mailto:sanctuary@ata.org.au).

## FOR MORE:

[www.tinyhouseblog.com](http://www.tinyhouseblog.com); [www.tinyhousetalk.com](http://www.tinyhousetalk.com);

[www.tumbleweedhouses.com](http://www.tumbleweedhouses.com); [www.resourcesforlife.com/small-house-society](http://www.resourcesforlife.com/small-house-society)

The original article published in *Sanctuary* 9, *Small Houses: America’s Small House Movement dreams big, builds small* is available at

[www.sanctuarymagazine.org.au](http://www.sanctuarymagazine.org.au)



↑  
Tiny houses are literally tiny. This design of Jay Shafer’s, the Epu, has a floorplan of eight square metres. Photo © Tumbleweed Tiny House Company

↓  
Derek “Deek” Diedricksen’s largest prototype, the “Gypsy Junker”, sleeps one comfortably on a bunk bed. Photo by Bruce Bettis



## Micro home prototypes

Derek “Deek” Diedricksen had been obsessed with tiny homes for a long time, but it wasn’t until he moved to a new home with a spacious yard near Boston that he had both time and space to indulge his passion. To his neighbours’ delight (and occasional frustration), from his yard sprouted first one, then two, three and finally four micro shelters, built almost entirely from found materials. The four prototypes appeared in everything from *The New York Times* to *Make Magazine*, and Deek has just finished a sold out workshop about hands-on tiny house/shelter buildings with guest speakers, visiting mobile cabins, authors and demonstrators.

Deek’s largest prototype is the semi-transportable “Gypsy Junker”. Gypsy because it borrows the aesthetic of a caravan, and junker because it’s made out of junk, or “crap” as Deek puts it. Apart from the corrugated roofing, the junker is made from materials scavenged from hard rubbish – in this case, timber pallets. A neighbour’s cast-off kitchen cabinets became doors, while the side of a washing machine forms an outdoor table under the window. Inside, a bunk bed sleeps one person comfortably, with room for two more on the

floor (at a squash). The shelter has a homemade heater made from aluminium ducting, tin cans and an old frying pan. According to Deek, this clever contraption heats the cabin to toasty on little more than a small jarful of used vegetable oil.

Deek isn’t suggesting we live in micro dwellings like these permanently – after all, there are no kitchen or bathroom facilities; he has built them as “prototypes and functionally experimental designs” to show how semi-viable housing and shelter can be made using junk. Each shelter costs on average less than \$200 to build.

“*Humble Homes, Simple Shacks, Cozy Cottages, Ramshackle Retreats, Funky Forts, and Whatever the Heck Else We Could Squeeze in Here*”, self published by Deek, is a graphic novel-style instruction book with sketches outlining his projects and the ideas behind them. Deek also hosts, directs and produces the “how-to” series “Tiny Yellow House” on YouTube, with videographer Steven Sherrick. Well worth watching.

[www.youtube.com/watch?v=LmR3kx660gw](http://www.youtube.com/watch?v=LmR3kx660gw)

[www.relaxshacks.com](http://www.relaxshacks.com)



Deek with his four micro shelters in his backyard near Boston. Photo by Bruce Bettis



# Against the wind

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Building a sustainable home on a remote island off the US coast needed more than a touch of ingenuity.

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WORDS Sasha Shtargot  
PHOTOGRAPHY Eirik Johnson





**LIKE OTHER SMALL ISLANDS SURROUNDED BY OCEAN, CRIEHAVEN** gets a fair dose of buffeting on bad days. Winds can howl in at 160 kilometres per hour off the open Atlantic, driving salty air that corrodes and weathers.

There are plenty of headaches for anyone wanting to build a sustainable house on this most distant of east-coast USA's inhabited islands, 32 kilometres off the Maine coastline. Aside from the elements, there is the problem of getting material on and off the island, which is accessible only by private boat or plane. Oh, and there's no electricity grid, no mains water and no roads.

Alex Scott Porter knew she had a challenge when she took on the job of designing her family's retreat home at the eastern end of Criehaven (also known as Ragged Island). Some of the best advice on sustainability came from a local lobster fisherman who had been living off-grid for years.

The construction had to be planned meticulously, virtually to the last nail, because of the difficulty in transporting goods. All the materials came out at the same time on a Vietnam-era amphibious US Army landing craft that pulled up on the beach within reach of the house site. Building started in late summer and lasted five months before the harsh winter set in, with the crew returning the following spring to finish the interior.

The final product is a compact 51 square metre home of unfinished native timber, encased in a green aluminium shell that blends with the nearby pine woods and provides protection from the elements. Three large sliding doors close the house and keep it fortress-tight when unoccupied in winter.

Alex wanted to employ sustainable materials with design and construction simplicity. "We decided early on to conserve materials by not having an interior finish and to expose all the framing, so it needed to follow a simple rhythm, otherwise the interior would feel chaotic." All the wood framing elements for the house – wall studs, floor joists and roof rafters – are placed according to a grid measuring 60 centimetres.

The grid system simplified the calculations for all the materials, which was an important consideration as everything had to be ordered before construction. Another imperative for the grid was that the builder, Josh Howell, was on his own with little contact with Alex while she attended to her architectural design business in New York. "The design needed to have an internal logic that we both implicitly understood," Alex says. She hopes to sell the elegant and simple plans in the future.

Inside the Criehaven home, local beach stones are used in the base of the small fireplace, the benchtops are concrete and the cabinets are made

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Some of the best advice on sustainability came from a local lobster fisherman who had been living off-grid for years.

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# Tropical Heat

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This award-winning home demonstrates design for a comfortable lifestyle in the tropics – without air conditioning.

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WORDS David Bridgman  
PHOTOGRAPHY Peter Eve

## **SITTING COMFORTABLY ON A STRINGYBARK BUSHLAND**

block south of Darwin, the airy steel-framed home of Geraldine Lee and Kristian Mortlock demonstrates just what is possible when architect and owner-builder share a common vision for passive design in the tropics. Small by today's standards at only 75 square metres plus a verandah, the house is a study in appropriate design for this region, with the emphasis firmly on passive cooling rather than the ubiquitous air conditioner. Indeed, this was part of the brief to the architect, Greg McNamara of Troppo Architects. "We were adamant we didn't want air conditioning in the house," Geraldine says. "We were looking for a naturally cooled house where we could live comfortably in the tropical environment."

Keeping cool in the tropics is no easy task. Like the rest of the tropical north the region has two distinct seasons: a cool, pleasant, dry season from April to September; and a hotter wet season from October to March characterised by storms, monsoonal rainfall and the ever-present threat of tropical cyclones. To handle the climate, every opportunity has been taken to promote natural cooling in the house. The interior spaces soar to an impressive five metres above the floor, and shutters located at the peak of the raked ceilings can easily vent rising hot air.





The house's unusual cruciform plan was presented by their architect at an early meeting. "It was different from any of our sketches," says Kristian, "but Geraldine and I were instantly drawn to the idea and we knew that this was the house for us." The house is raised above the ground on short piers, creating minimal disturbance to the landscape – an important consideration that saw the house designed around a mature Ironbark tree and several rare cycads. A long verandah cuts through the house forming the main circulation spine. At 85 square metres, it more than doubles the home's living space and teams with the many louvred windows to allow natural light and ventilation to permeate the building.

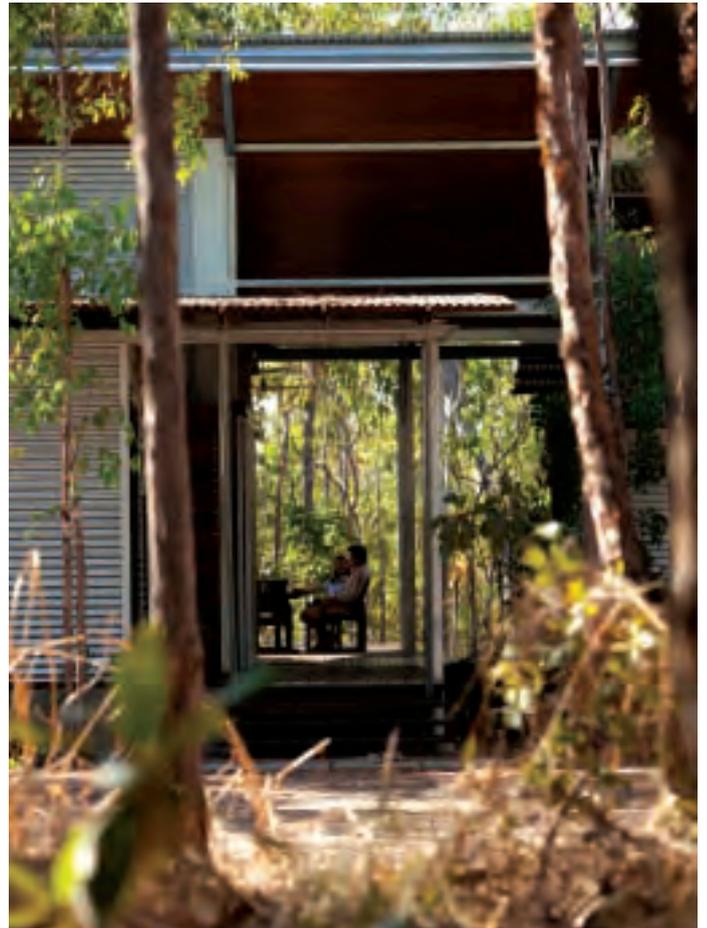
The western arm of the house contains space for two bedrooms and a compact kitchen and living area. To the south and east across the verandah are the main bedroom, bathroom and a clever mezzanine providing a quiet retreat for the parents. Quirky details such as slicing off the end of the house at an oblique angle enhance views out to the landscape. "Our place is very similar to the house I grew up in," Geraldine says. "Modernised, of course, but the basic elements are all there." Historical precedent is a compelling design tool for the tropics, where the fundamental elements of an appropriate architecture have been shaped over decades.

Construction techniques were tuned to the skill set of the owner-builder: Kristian, a sheet metal worker specialising in stainless steel fabrication, undertook much of the construction work himself. As a consequence steel is ever-present, from the main structure and external cladding to the interior finishes, where it's used for bench tops and the large sliding doors that open up the living space.

One of the advantages of being an owner-builder is having the time to review the design as the house progresses. A telling example was the decision to omit a row of vertical louvres along the verandah designed to block the setting sun. "We were willing to sacrifice a couple of hours in the afternoon to have a clear, unimpeded view of nature while seated on the verandah," says Geraldine.

Solar energy is harnessed to provide hot water and also electricity, with the excess fed back into the local grid. The inclusion of grey and black water recycling was considered but costs proved prohibitive, so the house is connected to a standard septic system, with funds directed towards water tanks instead. Geraldine and Kristian chose energy- and water-efficient fixtures and fittings wherever possible, and a desire to reduce embodied energy guided many material choices: a difficult task in a region far removed from manufacturing bases.

Indeed, one of the more frustrating aspects of building was dealing with local suppliers. "Anything non-standard had to be ordered at our risk," says Kristian. "We also had difficulty finding information on sustainable practices," notes Geraldine. "For example, in selecting timber flooring there was very little information on what we should use, and Darwin is not ideally positioned to access recycled timbers, as there is next to nothing available locally. We looked into flying down south to inspect and purchase, then transport back, and this proved to be non-viable." After much research, Spotted Gum from sustainable forests in Australia was selected for interiors and decking, while Ironwood salvaged from clear felling of native forests on Melville Island (to make way for plantations of fast-growing trees) was used for structural elements wherever possible.



↑  
No front door!

# “Fonzie Flat”

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Building this stylish self-contained studio behind a Sydney house actually increased the size of the backyard, as Rachael Bernstone discovered.

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WORDS Rachael Bernstone  
PHOTOGRAPHY Andy Baker

## WHEN THE OWNER OF THIS HOUSE IN SYDNEY’S INNER

west approached architect Ben Giles, she wasn’t quite sure how to deal with the ad hoc outbuildings in her backyard. “I wanted to be rid of the eyesore which was the ramshackle collection of outhouses, and create something which would be fabulous to look at from the main house back balcony,” she said, “as well as something useful – a living space.”

Initially, Ben investigated keeping some of the buildings on the rear boundary, but the presence of asbestos and their poor quality ruled out that option. As he began exploring solutions that involved demolishing and rebuilding, the introduction of “granny flat” legislation – making it easier to erect secondary dwellings in NSW backyards – was a welcome bonus.

Under the new regulations, granny flats or self-contained secondary dwellings should be no more than 60 square metres, a limitation that dictated the footprint for the new studio.

“We wanted to create as small a footprint as possible to maximise the amount of landscaping and garden,” Ben says, “so I opted for a building that would take up the block’s full width, but be just one room wide, with a loft-style bedroom on the second floor. The extra height makes it feel more spacious.”





↳ The facade facing the street is articulated into visually separate panels, which are modulated and banded by the cladding ribs running either horizontally or vertically.



↑  
The studio is clad in pre-finished and profiled metal cladding. This is quick to construct, lightweight, and requires no painting.

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**“You can deliver a lot of amenity in a small space using simple materials and traditional construction methods”**

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The two-storey section – which occupies the northern part of the block to minimise shading over a neighbour’s property – plays a functional role too. According to Ben: “The two-storey form creates a thermal stack effect, so that heat travels upwards and can be ventilated out via louvred windows on both sides at the highest point”. Combined with the concrete slab main floor, insulated timber-framed walls and roof, and adjustable external blinds, the studio is packed with inexpensive passive solar design features.

The decision to use just one material to clad the walls and roof (Lysaght Spandek made from Colorbond Steel, which was chosen for its durability and to keep costs down) makes the studio appear a discrete entity that contrasts well with the main house, a Californian bungalow. “Because this is a small building,” Ben explains, “we wanted to keep the materials the same, to create an elegant object rather than an articulated building which might have competed with the original dwelling”.

Inside, Ben used clever design to maximise the sense of space. “The kitchen is recessed into a wall, the bathroom is located behind it and all of the spaces are connected with the bedroom upstairs. The client has everything you need in a house, in just 60 square metres.”

She agrees, adding that her “little house” is like a piece of art nestled in the revamped backyard. “I often sit in it just to admire the sense of space. When friends come to stay – and more do now – they love being in it. It’s

comfortable, cool, quiet and has everything anyone could need without a sense of being cluttered.”

“It just goes to show that you can deliver a lot of amenity in a small space, using simple materials and traditional construction methods to create good architecture,” Ben says.

And thanks to the new planning laws, it doesn’t need to be a long or drawn-out process. “The whole project took less than 12 months from the day the client first called me to the day I took the final photos. That was partly because she was driven and partly because of the new regulations that made it easier to get planning permission.”

For Ben, this project is a lighthouse for sustainable development because the studio can be used by visitors or rented out to tenants to provide permanent accommodation. “Creating this sort of alternative and small housing is the way of the future for Australian cities. This has always been an interest of mine: how can we develop new ways of living and working with suburban housing blocks? They can be very inefficient in their layout, but offer potential for great improvements.”

Ben has already completed his second granny flat project, and has had many enquiries from potential clients keen to replicate the success of this contemporary and comfortable studio. In NSW at least, the options for making the most of your block have become a whole lot more interesting.