

Sanctuary

MODERN GREEN HOMES

ISSUE 48 | SUSTAINABLE HOUSE DAY SPECIAL

Find a green builder; hempcrete home with heart; playspaces; budget house from repurposed pods

Prefab & Passive House

WIN

A TCK Solar sponsored Tesla Powerwall 2 valued up to \$15,000

Offer open to Australian and New Zealand residents. Details page 43

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Paying it forward

LOCATION Myrtle Bank, SA • WORDS Rachael Bernstone • PHOTOGRAPHY Shane Harris



At a glance

- 8.1 Star high-performing home for a large family
- Attention to airtightness and insulation gives a very comfortable home without the need for mechanical ventilation
- Flexible design to accommodate changing requirements over time
- Plenty of storage

Having learned from the shortcomings of their first home build, the Whittall family engaged TS4 Living to design and build a high-performing sustainable home that would work for them for the long term.

Bridget and Ben Whittall built their first family home when their first child was a baby 10 years ago, and subsequently had three more children. It became apparent that their newly built home didn't perform very well spatially for a family of six, or in terms of comfort and liveability.

"It was horribly hot in summer and quite cold in winter," Ben recalls of their first build. "We didn't really know any better, but we had assumed that it would perform better than it did. So I did a lot of research and we carried out a lot of retrofitting – adding shading outside and more insulation – and those things helped, but it still wasn't great."

Increasing power bills became a significant issue, but the family was more concerned about a lack of thermal comfort. "We just didn't like the feeling of living in air conditioning for most of the

summer," Ben recalls.

He began attending Sustainable House Days and reading articles in *Sanctuary*, *Renew* and elsewhere, and the family decided to look for land within walking distance of the children's school. They found a 1930s worker's cottage in Myrtle Bank, south-east of Adelaide's city centre, which Ben said looked cute from the front but retained few original features inside.

They bought the property and engaged Paul Henty of TS4 Living to undertake a major renovation, after meeting him at several Sustainable House Day home openings over the years. "We quickly ascertained that the existing cottage would require a substantial extension, and the cost per square metre of that new extension versus knocking the cottage down and starting again was markedly different," Ben says. "Also, the bank advised that we'd probably be overcapitalising if we decided to extend, while building from new would get us exactly what we wanted. There are still limits in terms of what you can achieve when renovating."

Their new home ticks many boxes, and the family is so pleased with the outcome that they intend to stay put for



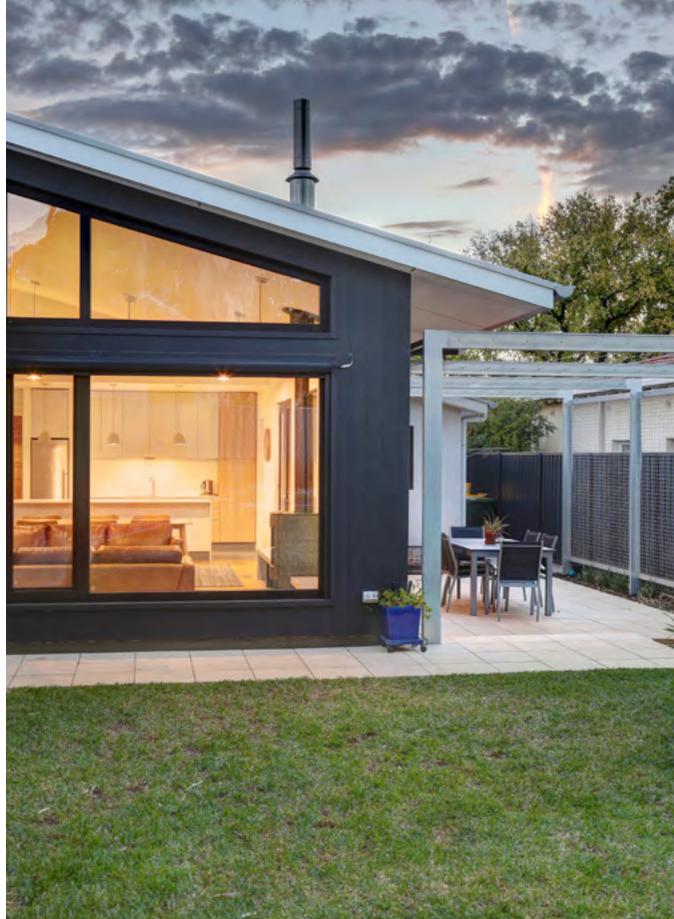
Opening for
Sustainable House Day
Sunday 15 September 2019

For more information visit
sustainablehouseday.com and
search for 'Myrtle House'



The bedroom wing and the main living area both face north for maximum solar gain. "The way we build houses in Australia is often unsuitable for the climate, although that's slowly changing and people are getting interested in sustainable design," says homeowner Ben Whittall.





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Homeowner Ben describes the main living space as a big, light-filled central hub. High-level openable windows allow cross ventilation and night purging of warm air in summer and large east-facing windows offer a good visual connection to the backyard.

the foreseeable future, potentially 20 to 30 years, Ben says. That’s possible because they discussed their current and future needs with Paul, who produced a design that would stand the test of time.

“We didn’t want a huge footprint,” Ben explains. “We wanted a house that would be comfortable and liveable; that would retain winter heat, and be space efficient for our four children as they grow up. We wanted it to be elegant but not ostentatious, and very functional, because we lead busy lives and have demanding jobs.”

Paul sited the house so the open-plan living area faces north, where it is partly shaded by a large existing gum tree as well as new deciduous vines over the patio. The children’s bedrooms share the same orientation in a separate wing. The house boasts a thermal mass wall, uPVC double-glazed windows and a series of

high windows in the main living area, for passive thermal performance and night time purging of heat in summer.

Paul designs airtight homes which can achieve and maintain stable indoor temperatures during the hottest and coldest seasons and, on this project, he achieved an air leakage rate (measured in air changes per hour at 50 Pascals, using a blower door test) of 5.2 ACH50. “That’s somewhat higher than we normally achieve – the house has a large build envelope with a lot of exposed wall area, and a dog flap – but it’s much lower than most typical new homes, including the family’s previous house,” Paul says. “Many new homes are built with an air leakage rate in excess of 15 ACH50.”

“It was great to work with Steve Jones from Aria Homes because he was really committed to building sustainably,” Ben says. “His quality control regarding fitting

insulation properly and sealing the place up was great. A few times I could see him working hard to educate his tradespeople about the importance of not cutting corners.”

Achieving such high performance standards may take more effort and investment in design and construction, but results in tangible benefits during both hot and cold extremes, Ben says.

“In summer, the house resists heat very well and on nights when the temperature drops down enough, we open up those high windows and the whole house cools down very quickly,” he explains. “This year we experienced a hot January, peaking when Adelaide hit a record high temperature of 47 degrees Celsius, and the house performed very well through that period. We used the air conditioning for much shorter bursts – the house would hold the cool – and we didn’t

need to leave it on overnight at all. We are also finding our first winter is much more comfortable.”

Their new home also performs better for daily living, Ben says. “Our lives are really straightforward now, because we have a lot more storage and it’s in the right place,” he says. “The kitchen is a bit bigger and much better laid out; the living area is a central hub which is big and light-filled, and the house is very quiet, which is great! It’s just a nice place to come home to.”

Having built two family homes – one that performed very poorly and one that works incredibly well – Ben is keen to share his lessons learned with others. “We benefitted from going to several Sustainable House Days, and now we are opening our home to share our knowledge.”

This year will be Paul’s eighth Sustainable House Day over the past 10 years, and he’s noticed increased demand and changing demographics for his architectural services over that time. “Seven years ago, our client base was mostly older people who had lived in northern Europe or were widely travelled, and were grassroots environmentalists,” Paul says. “There are more younger people now – aged in their 20s and 30s – who



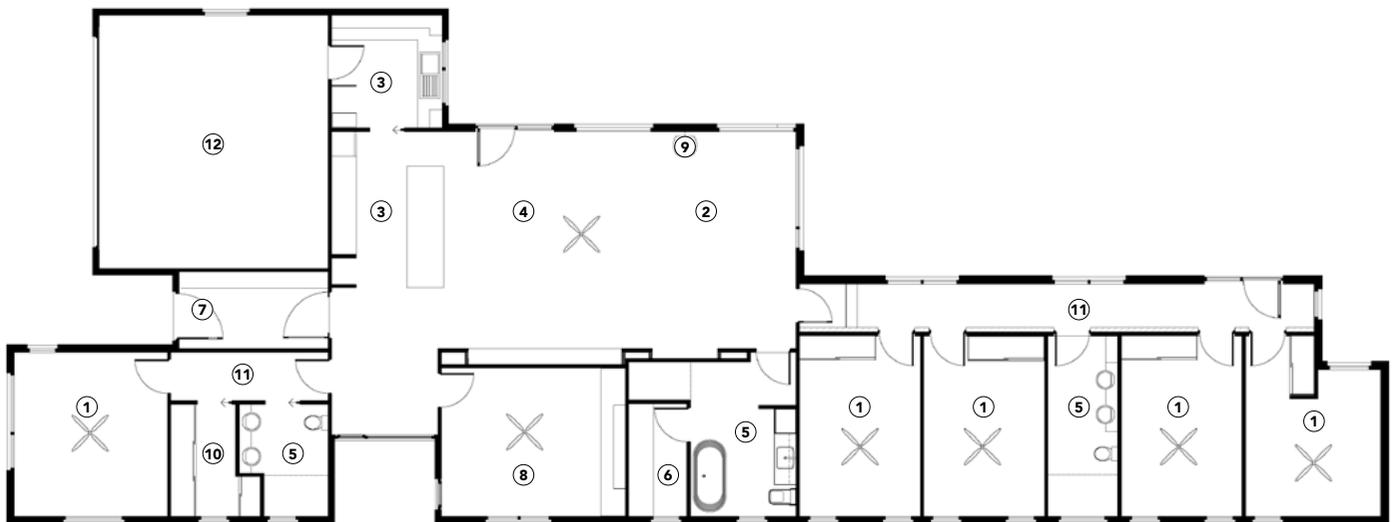
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Deciduous vines will eventually cover this pergola, providing shade to the patio and north-facing living room in summer.

understand the need for sustainable design and appreciate that they can’t necessarily achieve what they’d like to on their own, so they are willing to engage the right expertise.”

And as the audience has expanded, the focus of discussions has shifted too, with much more emphasis now on health

and comfort levels, and energy efficiency. Sustainable housing appears to be gaining mainstream acceptance, and Ben and Paul are both happy to be part of the movement towards a more sustainable future. ⑤

FLOOR PLAN



LEGEND

- | | | |
|-----------|------------|----------------|
| ① Bedroom | ⑤ Bathroom | ⑨ Fireplace |
| ② Living | ⑥ Laundry | ⑩ Walk-in robe |
| ③ Kitchen | ⑦ Entry | ⑪ Hallway |
| ④ Dining | ⑧ Study | ⑫ Garage |

HOUSE SPECIFICATIONS

HOT WATER

- Sanden 315L heat pump

RENEWABLE ENERGY

- 6.4kW solar PV system: 20 x REC TwinPeak 2 320W Mono panels, 6.6kW Fronius inverter with monitoring

WATER SAVING

- 22,500L Polymaster rainwater tank plumbed to toilets and garden irrigation
- Stormwater management: surge tank combined with main rainwater storage tank designed to 'slow release' water to stormwater during heavy downpours
- Low flow showerheads and taps

PASSIVE DESIGN, HEATING & COOLING

- Passive solar design with living areas facing north for maximum solar gain in winter
- Deciduous vines on pergola on north facade to block summer sun
- Temporary shade cloth awning to front entertaining area until vines mature
- Stone wall for thermal mass
- Design for good cross ventilation
- Well-sealed building envelope gives an air change per hour (ACH50) rate of 5.2, much more airtight than the typical Australian home and yet not requiring a mechanical ventilation system

ACTIVE HEATING & COOLING

- Daikin split-system air conditioners: integrated ceiling ducted unit for the living area and main bedroom, and wall units in the bedrooms

- Nectre N60 convection wood heater
- Ceiling fans: Fanco Origin DC 56" in living room, Infinity-I Quiet DC 54" in main bedroom and study, and Fanco Eco Silent DC 48" in other bedrooms

BUILDING MATERIALS

- High performance multi-layered construction: timber frame with microporous breathable building wrap, reflective non-combustible DCTech polyisocyanurate (PIR) rigid insulation board, and CSR bulk insulation products
- Colorbond roofing
- Concrete slab with recycled aggregate
- Insulation: foil-faced insulation blanket R1.35 to roof; CSR glasswool batts R6.4 to ceiling; batts and rigid, high performance non-combustible insulation R5.6 to external walls; glasswool batts R2.4 to internal walls

WINDOWS & GLAZING

- Rehau 70 Series uPVC Tilt and Turn windows supplied by DoubleGlazed.com, Lonsdale SA

LIGHTING

- Australian-designed high efficiency surface mount LED light fittings by UNIOS, supplied by LEDOutdoor

PAINTS, FINISHES & FLOOR COVERINGS

- Dulux low-VOC paints and sealers

OTHER ESD FEATURES

- No gas connection
- Efficient appliances
- Native, water-wise garden

DESIGNER

TS4 Living

BUILDER

Aria Homes

PROJECT TYPE

New build

LOCATION

Myrtle Bank, SA

COST

\$625,000

SIZE

House 240m²
excluding garage
Land 705m²

ENERGY RATING

8.1 Stars

INSIGHTS

"We benefitted from going to several Sustainable House Days, and now we are opening our home to share our knowledge."

Ben Whittall
Homeowner



←
Storage is tucked in everywhere, including under these window seats.