MODERN GREEN HOMES

Sanctuary

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WIN

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SUSTAINABLE STRATA

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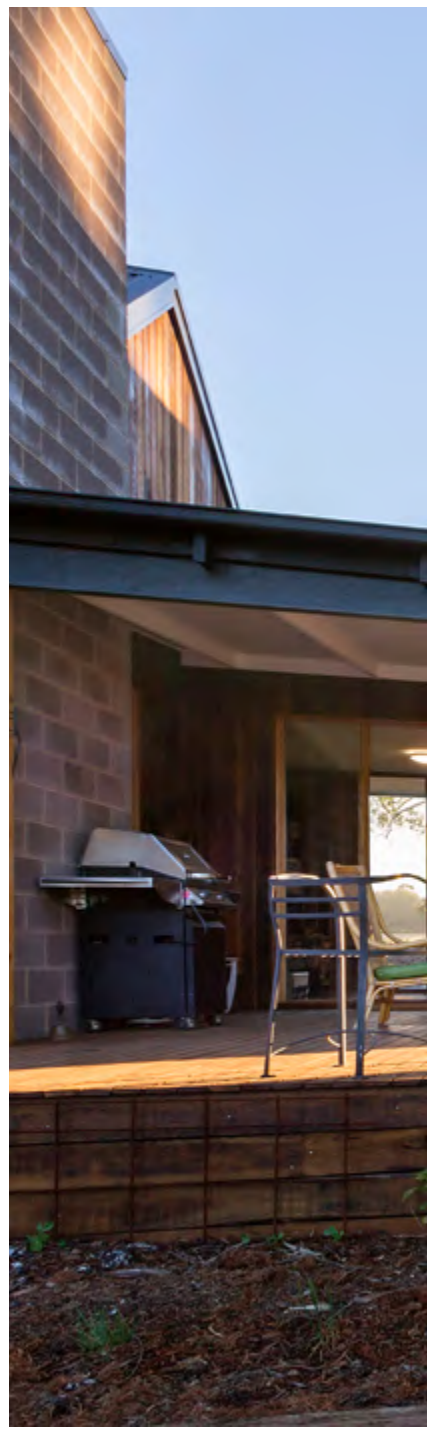
Tranquillity base

The owners of the Culvert House, on a rural block in country Victoria, didn't just want a sustainable and peaceful home for their retirement; they wanted to enjoy the journey.



WORDS Anna Cumming
PHOTOGRAPHY Chris Neylon

IAN AND PAM CORNTHWAITE ARE NOT new to house building, nor to sustainable homes: they designed and managed the build of a mud brick holiday house in Apollo Bay, and also spent five years living in the eco-friendly community development of Westwyck in Melbourne. So when it came to planning their retirement home, they had plenty of ideas. "We didn't just want a house; it was a project for us," says Pam. Ian agrees: "We had a lot of pretty strong opinions on what we wanted and didn't want. Mike Hill [co-founder of Westwyck] was an inspirational man, and living at Westwyck was a wonderful experience. We couldn't leave there and not try to build something as sustainable as possible."

Wanting to move out of the city but still be within easy reach to encourage visits from family and friends, the couple "drew a circle about an hour from Melbourne" and looked for a long time before finding the ideal block. They found it on the corner of a farmland subdivision just out of the small town of Trentham, 75km north-west of the city. With views to the north and west through mature gum trees and over the dam and paddocks of the remaining farm, it was possible to design a passive solar house that turns its back on the rest of the subdivision and feels remarkably 'off in the bush'. A disused railway line runs past the corner of the block, and a beautifully crafted old brick culvert was the inspiration for the house's name.

Ian and Pam found sustainable architects Maxa Design through *Sanctuary*. "We wanted to enjoy the journey, and part of that was working with like-minded, nice people," says Ian. "The team at Maxa were genuine, personable and enthusiastic, and we liked their work – we didn't even go to meet anyone else." Sven Maxa recalls that the couple had a very clear idea of the style they wanted: "They weren't prescriptive about anything aesthetic, but they knew how they wanted it to feel. We came out of the initial design meeting pretty much knowing exactly how the floor plan had to be, based on how the house needed to function and feel."

Maxa's design features two buildings with an entryway in between that Sven describes as "a hinge or a knuckle – a connecting joint between the two

A large grey ironbark deck tucked in the angle between pavilions provides a peaceful shady spot to lounge, without blocking winter sun to any of the living spaces. The house is clad with rough-sawn spotted gum, which will fade to grey as it weathers.

The house is orientated to look out through trees to farmland views to the north, ensuring privacy. "It was important that the house was elegant, rural, contextual," says designer Sven Maxa. "It had to fit with the site, look like it belonged."

The benchtops are Paperock, an Australian product made from layers of recycled paper bonded with phenolic resin and compressed. Ian and Pam chose it for its sustainability credentials, and are delighted with the look and feel. "It's so much warmer than stone. It doesn't mark easily, it's heat resistant and after 18 months the benchtops still look great and are easy to clean."

Double-glazed sliding doors open from the living space onto a narrow deck to the north, and a western window looks across the main covered deck to views of established gum trees on the neighbouring farm. The room has a generous volume enhanced by the Victorian ash-lined cathedral ceiling. Found at a local second-hand dealer, the pendant lights were rescued from the renovation of the historic Port Melbourne courthouse and date from the 1920s. Ian and Pam had them rewired and fitted with LED globes.

pavilions". The pavilions are offset to allow for views to the west from the living area and a generous covered deck tucked into the angle, where it doesn't block winter sun to any north windows.

The main part of the house contains the master bedroom with ensuite, a small second bedroom currently designated as the grandchildren's room, a study spot in the wide passage, and a generous open plan living room, dining and kitchen with timber-lined cathedral ceilings. It's long and narrow on an east-west axis, with plenty of northern glazing providing solar gain to all rooms in winter. The eave is appropriately designed to block the sun in summer when it's not wanted. Windows to the south were kept small for privacy, but are carefully located for cross ventilation. "Trentham's climate is particularly problematic for achieving a high star rating," explains Sven. "It can get very hot and dry in summer, and also gets very cold – it even snows. Especially when the budget is a bit tight, it's really important to honour basic passive design principles to get a good result."

Across the entryway is the studio – used variously for sewing and accommodating guests. Adjoining is a laundry and second bathroom. The layout makes it easy to close off parts of the house to reduce heating and cooling needs. "We would have liked in-slab hydronic heating, but it was cost-prohibitive," says Ian. "Instead we went with efficient Daikin split systems in the living room, main bedroom and studio, but we hardly need them. We find that the lower ceilings in the bedrooms and the sun coming in the windows works well for heating." They also have a wood heater in the living room.

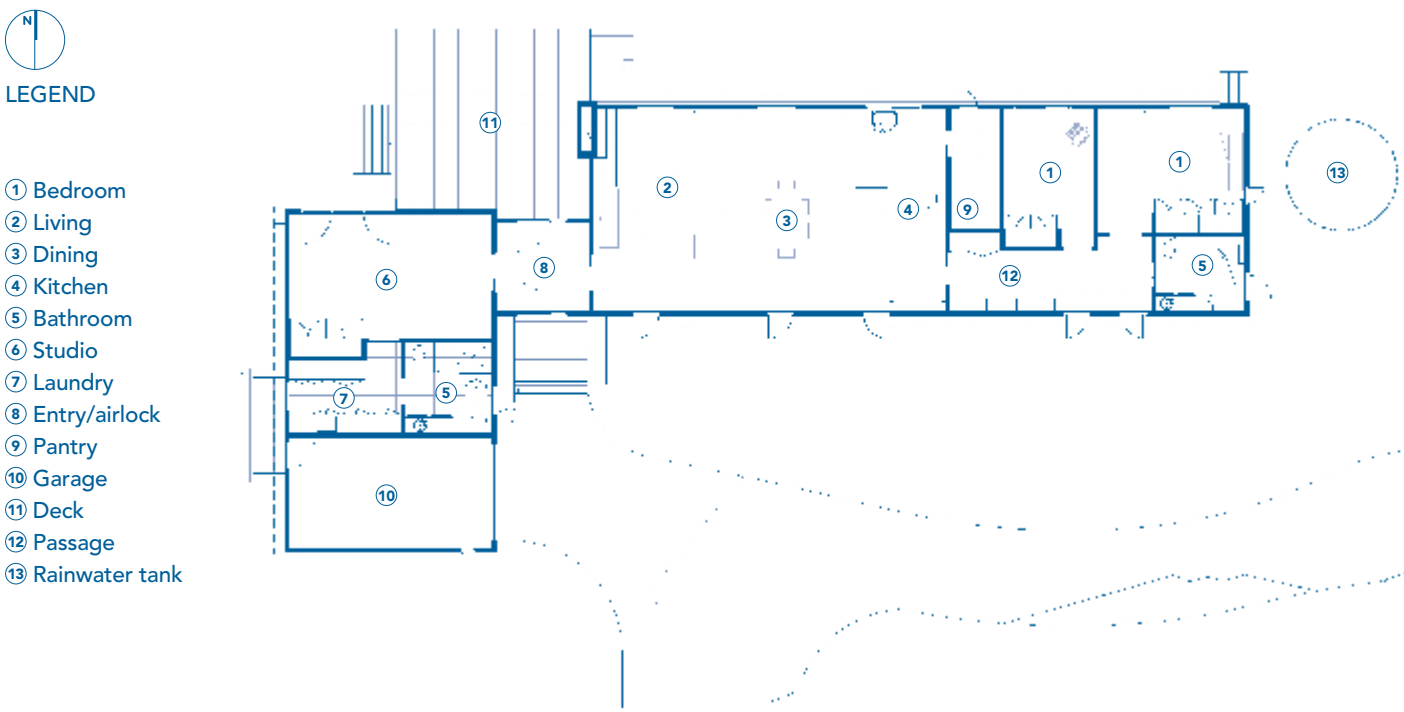
The house has a polished concrete floor throughout, and the walls are well-insulated timber frame with rough-sawn spotted gum shiplap cladding. "It will weather and fade to grey over time, and shouldn't need maintenance," says Ian. Other surfaces and colours have been carefully considered to be matte and muted, which when combined with the quiet setting, give the house a certain tranquillity. "At this stage of our lives, we're enjoying stillness and not having to be too busy," says Pam.

It's refreshing to hear how much Ian and Pam did enjoy the journey of creating the Culvert House. "As well as the great team at Maxa, we were lucky to have an excellent builder who, while not necessarily 'eco' as such, was very happy to do things the way we wanted them," says Pam. "Nothing at all went wrong with the build process."

"We had trusting relationships with the farmer whose land we bought, with our designers, and with our builder," adds Ian. "I don't think we'll build again, because we'd be lucky to have such a satisfying experience a second time!"

In its category, the Culvert House won Best Residential Design and a commendation for Best Environmentally Sustainable Design: Residential at the Building Designers Association of Victoria (BDAV) 2016 Awards, and also took out the award for Best Residential Design at the National Association of Building Designers (NABD) 2016 Awards.

FLOOR PLAN



Culvert House

—Specifications

Credits

DESIGNER
Maxa Design

BUILDER
Massina Building

PROJECT TYPE
New build

PROJECT LOCATION
Trentham, Victoria

COST
$500,000

SIZE
House 197 m²;
Land 9022 m²

BUILDING STAR RATING
6.3 Stars

Sustainable Features

HOT WATER
– Thermann evacuated tube solar hot water system with electric boost, 315L storage tank.

RENEWABLE ENERGY
– 3kW grid-connected photovoltaic array from EnviroShop; 12 Yingli solar panels; 12 Enphase Energy microinverters (average daily energy production 10.8kWh).

WATER SAVING
– 22,500L Tankworld steel tank and Davey RainBank with surface pump to supply house with all water needs. House is connected to mains town water (mandatory) and will automatically switch if necessary. NB: ATA's Tankulator (tankulator.ata.org.au) calculations predicted that a 10,000L tank would be suitable for complete self-sufficiency, but owners have oversized to account for dry periods
– WELS 4-star Swedia Klara stainless steel mixer taps for bathroom basins, laundry and kitchen
– Caroma Titan stainless steel range rated WELS 5- and 6-star used for bath and shower, supplied by Reece
– WELS 4-star Porcher toilet.

PASSIVE DESIGN / HEATING & COOLING
– House uses passive solar design principles, with a narrow north-south footprint to aid winter solar penetration and cross ventilation for this region; the long east-west footprint ensures all rooms benefit from this
– A covered deck is positioned to ensure the living areas are not shaded during winter
– Entry airlock minimises any heat losses and separates the studio from the main dwelling to minimise any heating/cooling requirements
– Northern eaves exclude summer sun but allow maximum north facing winter sun to enter home.

ACTIVE HEATING & COOLING
– 3 x Daikin Zena and L-Series split systems in the main bedroom, studio and living room, with a COP of 3.6 to 4.5
– Quadra Voyageur Grand Insert wood heater: 63% efficient, 2.0g/kg emissions, maximum average heat output burning hardwood 9.3kW
– Airfusion 142cm stainless steel ceiling fan used in conjunction with split system 'fan mode'.

BUILDING MATERIALS
– External cladding is rough-sawn spotted gum shiplap profile; decking is grey ironbark decking; internal ceiling lining is Victorian ash, from Kennedy's sustainable timber supply
– Insulation: Fletcher pink batts used for external and internal walls R2.5 and flat ceilings R6.0. Raked ceilings use 2 layers of R2.0 high performance Bradford gold ceiling batts and Anticon 55 foil backed blanket R1.3
– Polished concrete floors throughout (with exception of the tiled bathrooms).

WINDOWS & GLAZING
– Double-glazed FSC-certified hardwood window and sliding door frames with low-E glass supplied by Valley Windows, supplied with matching hardwood-framed aluminium mesh fly screens. BAL 19 compliant, U-value average 2.6, SHGC average 0.64.

LIGHTING
– Living room and studio pendant lights recycled from the former Port Melbourne courthouse (circa 1920), fitted with LED globes
– All other light fittings (internal & external) are LED in various fixtures supplied by Beacon Lighting.

PAINTS, FINISHES & FLOOR COVERINGS
– Cladding and decking finish: Quantum Quantec exterior wood preservative
– Haymes low-VOC paints used throughout the interior
– Victorian ash ceiling lining stained with Quantum Timbre Plus (in walnut).

KITCHEN AND BATHROOM
– High performance appliances including Miele induction cooktop and Schweigan rangehood (with externally mounted exhaust fan) from Evolve Appliances
– Paperock benchtops throughout
– Bamboo hand basins in all bathrooms
– Vented refrigerator cavity to maximise fridge efficiency (estimated 20% improvement).

OTHER ESD FEATURES
– Designed for an off-grid future, much consideration was given to the energy and thermal performance of this home, with the combination of wood heating and efficient electric appliances.