

Suburban treehouse

A lightweight treetop extension gives a young Sydney family a little extra space and a more comfortable lifestyle.

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PHOTOGRAPHY Adrian Boddy Photography





↑ This pavilion-style treetop extension sits at the rear of a family home on a steep east-west oriented site in the Sydney suburb of Hornsby. The pavilion shields the existing house from hot westerly summer sun and is also a warm living space in winter.



BRETT AND JOANNE GREEN COULDN'T HAVE BEEN HAPPIER

when they bought their house in Sydney's northern suburb of Hornsby. "It was set amongst other houses but because it was surrounded by trees it really didn't feel hemmed in," says Brett. However, when their first child Lara came along, the couple realised their little oasis could do with some help. "It was a totally standard 1970s house with all the rooms facing into a central living area. It was noisy, and after Lara was born we got pretty tired with tip-toeing around after 7:30 at night," says Brett.

Noise wasn't the only problem. The small living room and poky kitchen of the three-bedroom, 100-square-metre house felt increasingly inadequate for their changing needs. The uninsulated living and kitchen area, where the family spent most of their time, was uncomfortable year-round. In summer an external wall exposed to the fierce westerly sun saw the living area heat up quickly and in winter uninsulated walls required them to push their ducted gas heating into overdrive.

In addition to making their home more comfortable, Brett and Joanne were keen to expand it with as small an environmental footprint as possible. They wanted a second living space that maximised the available sun but also blended into the surrounding bush. "I'd been reading about passive solar and energy consumption so I had a fairly clear idea that was

the path we wanted to go down. The problem was we knew that getting there was going to be tricky," says Brett. The house's location on a steep slope rising to the east gave the couple their sense of bushy seclusion but the ridge of the hill overshadowed the house. An extension, they realised, would require attentive design to maximise solar access.

In response to Brett and Joanne's brief, Sydney architect Ben Giles suggested a pavilion or 'living pod' extension to the back of their house. A combined kitchen, dining and outdoor area, the resulting pavilion is a light and airy second living space that connects to the existing house through an enclosed breezeway. A large deck skirts the breezeway and joins the old and new parts of the house, providing a spacious and semi-shaded outdoor living area.

"A major challenge was to design the building to suit the existing site falls and bush views to the west," says Ben. "This contradicted conventional passive solar design planning, which orients buildings to face north, with a long east-west axis. The result, with the long axis running north-south, required careful window design to maximise daylight but control the amount of direct summer sun."

The pod needed to capture the sun at the right times and have effective cross-ventilation. "The high east-facing



This treetop extension's lightweight timber-framed construction and raised platform floor minimised disturbance to the bush below during the build process. The roof form mirrors that of the existing house and is pitched to capture morning sun over the high ridge of the hill to the east on a steep block.



A major challenge of the project for architect Ben Giles was to design the building to suit the existing site falls and maintain bush views to the west. To retain these views and limit hot afternoon sun entering the pavilion, Ben lowered the head of these full-height windows and ensured they were shaded by the roof's 900-millimetre eave overhang.



louvred windows enable light and heat to enter the building on winter mornings due to the low angle of the eastern sun in the morning," explains Ben. In summer, the new extension shades the main house from the worst of the hot westerly sun. Meanwhile, its windows are shaded from hot summer sun by the roof's eave overhang. The windows also help to regulate the temperature in both the extension and the main house by enabling hot air to escape and drawing cooler air up from the valley below.

In the winter, the family spend most of their time in the new pod. "We put a gas fire in the new extension," says Brett. "It keeps the living area warm in the winter and the rest of the house pretty comfortable. The ducted gas heating is on timers now and we've halved our reliance on it."

Brett and Joanne's keenness to cut their energy consumption also extended to the building process itself. They chose lightweight timber construction for the extension because of its lower embodied energy than traditional masonry or steel construction. This construction approach came with other benefits too. The pavilion's steel support structure was prefabricated off-site and the builders brought the materials onto the site by hand, minimising disruption to the steep, leafy valley. "The whole point of the renovation

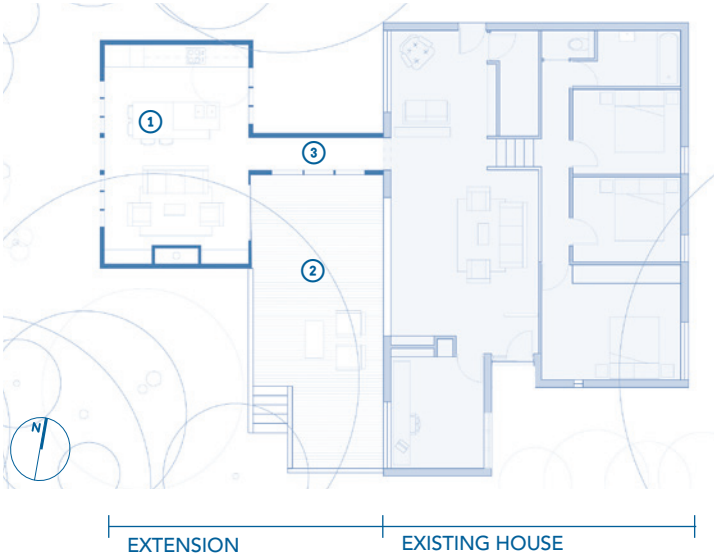
was to have something that really enhanced the sense of living in the bush. It just didn't make sense to then go and cut down trees for truck access and trample over what we've got," says Brett.

Brett's concern to protect the bush is evident elsewhere in the building. Joists from the existing deck were salvaged and reused, while spotted gum was used for the new deck and flooring. "We kept saying to ourselves: 'Merbau is murder'! When it came to wood, I really wanted to go with an Australian option." [Ed note: According to Greenpeace's *Good Wood Guide*, merbau is a primary target for illegal logging in Indonesia and Papua New Guinea.]

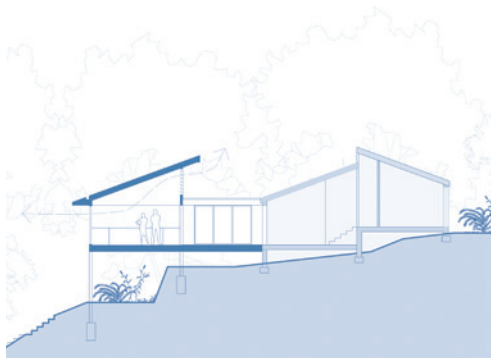
The result of their choices is an extension that looks and feels at home in the bushy valley. The hardwood decking is acquiring a beautiful patina that blends with the surrounding bush while dark tones on the walls and roof complete the feel of a treehouse receding into the leaves.

For Brett, Joanne and Lara, the extension is a comfortable and well-insulated living space that also assists with climate control in the main house. And it demonstrates what can be achieved on a less-than-perfect suburban site: a stylish extension that significantly reduces this family's ongoing energy use. 5

FLOOR PLAN



SECTION



LEGEND

- ① New kitchen/living pavilion
- ② New deck
- ③ Breezeway



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A breezeway connects the open plan pavilion to the main house.

Hornsby house

—Specifications

Credits

DESIGN

Ben Giles Architect

BUILDER

Coolibah Building & Design

PROJECT TYPE

New pavilion extension

PROJECT LOCATION

Hornsby, NSW

COST

Approx. \$220,000

SIZE

Original house 100 sqm, extension 45 sqm, new deck 40 sqm

Sustainable Features

HOT WATER

- Reused existing instantaneous gas unit.

WATER SAVING

- Restricted flow tapware.

PASSIVE HEATING & COOLING

- High level windows on the extension's eastern side capture morning sun and encourage natural ventilation, enabling warm air inside the house to escape
- Lower window head height and 900mm eave overhangs over tall west-facing windows cut out low angle afternoon summer sun but retain views
- Narrow plan enhances cross ventilation
- Low level and high level louvres enhance cross ventilation and natural cooling.

ACTIVE HEATING & COOLING

- Jetmaster Heat & Glo 550 gas fireplace chosen as an efficient and attractive form of heating.

BUILDING MATERIALS

- Lysaght Spandek trapezoidal steel wall and roof cladding with Colorbond Monument finish on timber framing and plasterboard lining.
- Architect Ben Giles says this was chosen for its affordability, quick and easy installation and because it's non-combustible in bushfire-prone land.
- Blackbutt hardwood timber decking (specified as FSC)
 - Repurposed timber was used under the deck and a step from the old verandah was turned into the mantle above the fireplace
 - Finger-jointed plantation pine skirting fixed to wall.

INSULATION

- R1.3 Bradford Anticon 55 with R2.5 Bradford Gold Ceiling Batts achieves a total R3 roof insulation value
- Bradford Enviroseal Wall Wrap and R1.5 Gold wall batts achieve minimum R1.7 wall insulation value
- R1.5 Standard 10 Foilboard Insulation Panel rigid insulation is fixed to the underside of the floor structure.

WINDOWS & GLAZING

- Capral Narrowline 400 and Capral 125 louvre frame aluminium framing
- Grade A safety and toughened glass installed to meet the site's bushfire requirements.

PAINTS, FINISHES & FLOOR COVERINGS

- Spotted gum tongue and groove timber flooring with secret nail fixing
- Organoil Pure Tung oil finish.

OTHER ESD FEATURES

- Small building footprint sited to retain significant site trees and maximise bush outlooks from the extension and existing house
- A raised platform floor maintains existing ground conditions
- Lightweight construction – a timber stud frame with cladding on the outside and lining on the inside
- Minimal demolition required

“The sustainable benefits of lightweight construction are less embodied energy in the materials, quicker building time, less impact and mess on the site, and no wet trades,” explains architect Ben. “When it's properly insulated lightweight construction performs as well as, if not better than, standard or heavy construction.”

- Views and natural ventilation of existing house maintained with new extension
- Windows located to maximise privacy from adjoining and overlooking neighbours.