

HOUSE SPECIFICATIONS

HOT WATER

- AquaMax 20 instantaneous gas hot water system using bottled gas, for energy resilience and to avoid oversized off-grid solar and battery system

RENEWABLE ENERGY

- 8kW off-grid solar PV system with Risen Solar panels, from Gold Coast Solar Power Solutions
- 26kWh LG Chem battery storage with SMA Sunny Island inverters

WATER SAVING

- Rainwater tanks totalling 65,000L plumbed to entire house; no mains water
- Ozzi Clean RPIO sewage treatment system

PASSIVE DESIGN, HEATING & COOLING

- Pavilions designed to be one room deep for cross ventilation, each with a different orientation to capture different views and light
- Double-stud construction to west wall of new pavilion, with air cavity and vented ridge to roof to expel summer heat
- Polished concrete floors and concrete block feature wall to central living space for thermal mass

ACTIVE HEATING & COOLING

- Aranbe 160 freestanding wood heater
- Brilliant 52-inch ceiling fans in new pavilion

BUILDING MATERIALS

- Timber-framed wall construction with recycled hardwood, fibre cement sheet and Colorbond custom orb cladding
- Roof: Colorbond and galvanised custom orb
- Polished concrete slab floors
- Stage 1 insulation: R6 batts to walls and R2.5 batts to ceiling
- Stage 2 insulation: Anticon 50mm reflective foil blanket to roof and R2.5 batts to ceiling; R2 batts to walls
- Extensive use of recycled materials for stage 1:
 - Mixed hardwood for trusses, wall lining, light fixtures, benchtops and cabinetry from Kennedy's Timber, Narangbar
 - 350mm posts salvaged from the old Maclean railway bridge
 - Salvaged corrugated steel for eaves, ceilings and external wall cladding
 - Doors salvaged from the Southport Yacht Club
 - Reclaimed sash windows for kitchen

WINDOWS & GLAZING

- Stage 1: reclaimed timber-framed windows and glazed doors
- Stage 2: aluminium-framed windows with low-e glazing

LIGHTING

- LED lighting throughout

DESIGNERS

John Wilson, Dust Temple (concept design and stage 1); ptma Architecture (stage 2)

BUILDERS

Treby Build & Joel Allen, Crown and Bole

PROJECT TYPE

Staged new build

LOCATION

Currumbin Valley, QLD

SIZE

Stage 1 93m² plus carport 27m²
Stage 2 147m²
Land 4.45ha

ENERGY RATING

6.6 Stars (see Insights)

ENERGY ASSESSOR

Energy Rating Consulting

BUSHFIRE ATTACK LEVEL

BAL-12.5

INSIGHTS

"The design was originally assessed using a 'deemed to satisfy' method as it was built in stages. However, we had a full energy assessment done on final completion - it came back at 6.6 Stars for the whole house, including those sections completed some years ago. Note that this does not include any of the 'bonus' Stars available in Queensland for solar PV, outdoor living areas and so on."

Peter McArdle, architect



→ Set in bushland above Queensland's Currumbin Valley, the house is off-grid.

HOUSE PROFILE

Squarely sustainable

LOCATION Kensington, WA • WORDS Sasha Shtargot • PHOTOGRAPHY Roger D'Souza Photography



At a glance

- Passive solar extension designed to be visually distinct from yet complement historic cottage
- Roof terrace for views and extra garden space
- Extensive shading and cross ventilation

A cube-shaped extension with a roof garden and a cut-out for summer shading sits respectfully behind this century-old Perth cottage, updating it for modern living.

It was obvious to Emily and Peter Evans when they bought their weatherboard cottage in the Perth suburb of Kensington that it needed a serious makeover and more room. "It was rundown, almost unliveable. You could see the ground through the floorboards in the bathroom. We always needed an extension," Peter says.

But the 1920s four-room house with an enclosed verandah sleepout, typical of working-class Perth homes of the time, had character. The couple dreamed of combining the charm of the old with the clean lines and environmental values of the new through an addition that would connect gracefully with the old cottage.

In 2019, after engaging architect Philip Stejskal and 12 months of building, their two-storey extension was finished. A timber-framed and fibre cement-clad cube, it links to the original cottage through a brick-paved walkway with a small outdoor courtyard on either

side. The brick note continues into the extension with a fireplace and adjacent seating area built with reused bricks from the demolished chimney in the original house.

On the ground floor there is a generous open-plan kitchen, dining and living area with limewashed ply bench seating under the windows. The eye-catching kitchen benchtop and splashback are of Paperock, a tactile, durable product made from layers of recycled paper and zero-VOC resin treated with heat and pressure. Upstairs there are two bedrooms and a bathroom, with the floor made of jarrah remilled from the floorboards of the old cottage. There's a surprise on this level - a wooden staircase with a glazed hatch leads to a roof terrace with garden. Peter and Emily were keen on the terrace to take advantage of views to the Perth CBD. "It's lovely up there in summer in the evening, watching the sunset," Emily says.

Energy efficiency, passive solar principles, connection with garden and responsiveness to the warm climate of the area were key to the design of the extension. "We wanted to minimise the need for additional heating and cooling and to have a small footprint to maximise garden space," Peter explains. A double-



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 "We wanted the extension to be modern, energy efficient and to have a minimal footprint to allow us to have as much garden as we could," explains homeowner Peter of the double-storey addition behind their renovated cottage. A roof terrace provides extra outdoor space and views to the Perth CBD in the distance.

height void was designed into the form of the extension on the northern corner, shielding the building from the sun's rays in summer and allowing them to penetrate in winter. A line of adjustable timber fins and a batten roof add extra sun protection and privacy to the garden area in this cut-out space, which will eventually be surrounded by deciduous climbing plants on trellises.

Philip says providing shade from the scorching heat of Perth's summers was integral to the design: "The idea was to incorporate cover into the form of the building, rather than just tacking on a pergola at the end." To reduce the need for air conditioning, louvre windows were fitted throughout the extension to take advantage of cross breezes, and the stairwell to the roof terrace – working with windows on lower levels – creates further ventilation through a stack effect.

Attention is paid to thermal mass in the exposed concrete slab on the ground floor, while under the roof a Permastop building blanket and high-density glasswool batts achieve a creditable insulation rating. There are also R2.7 acoustic batts in the walls.

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 Bricks salvaged from the original house's chimney were used in the new addition. Two landscaped courtyards sit between the old and the new sections of the house, which are connected by a glazed link.



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 "A passive solar strategy was instrumental in shaping the form of the extension," says architect Philip. The two-storey cube has a volume cut out on the north corner and extensive shading for summer cool.

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 Paperrock, a durable and eco-friendly material made from recycled paper, was used for both benchtops and splashback in the kitchen.

Peter and Emily were not content to let the extension be the entire focus of their new home project. While the builders worked out the back, they sweated restoring the weatherboard cottage. They replaced the floorboards, restored walls which had been taken out some time ago, installed wall and ceiling insulation, reglazed and re-putted the old windows and repainted inside and out. "We put a lot of physical labour into the cottage and so it was very nice not to have to lift a finger on the extension," Emily laughs.

Thanks to its environmental design and features, there is a noticeable thermal difference walking from the cottage into the extension, according to Peter and Emily. It's "very comfortable" on baking hot days when the original house is struggling to stay cool. Opening the back sliding doors and louvred windows on summer evenings allows cooling breezes to penetrate deeply. The couple are also beginning to harness the climate-tempering power of plants:



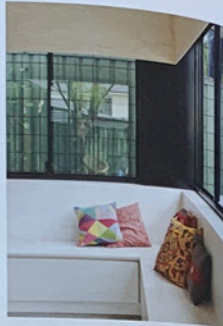
a vigorous passionfruit vine is growing in the void-space garden and Emily has planted numerous plants including a tree fern and lemon myrtle in one of the side courtyards.

The couple are delighted with the end result of the project but there were one or two initial design concerns: "The vertical fins were a challenge for us and the builder," Emily says. "We were worried that they would revolve in the wind, but they are actually quite stable."

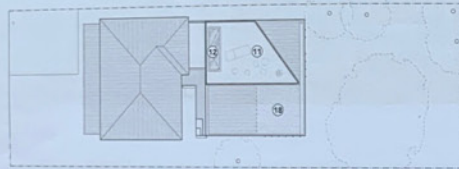
Whether it's enjoying the view on a pleasant evening with a glass of wine on the roof terrace or reading a book by the

cosy warmth of the brick fireplace, there's a satisfying feeling about the extension and how it connects with the cottage. "It's very comfortable – it's a very easy place to be," Peter says. ●

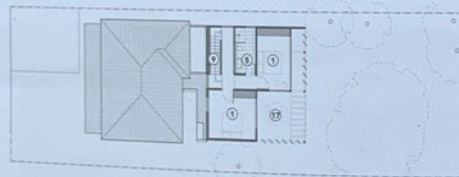
→ Limewashed FSC-certified hoop pine ply was used for much of the interior joinery, including the built-in bench seat in the dining area.



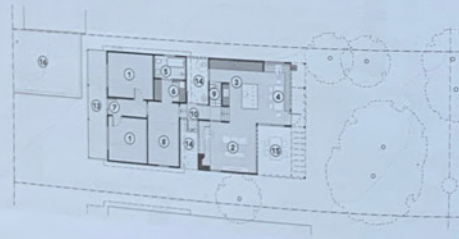
ROOF TERRACE PLAN



FIRST FLOOR PLAN



GROUND FLOOR PLAN



LEGEND

- ① Bedroom
- ② Living
- ③ Kitchen
- ④ Dining
- ⑤ Bathroom
- ⑥ Laundry
- ⑦ Entry
- ⑧ Study
- ⑨ Stairs
- ⑩ Link
- ⑪ Roof terrace
- ⑫ Roof access hatch
- ⑬ Porch
- ⑭ Courtyard
- ⑮ Outdoor living
- ⑯ Car space
- ⑰ Void
- ⑱ Polycarbonate roof

HOUSE SPECIFICATIONS

HOT WATER

- EcoHeat Evo270 heat pump hot water system

RENEWABLE ENERGY

- Provision for a future 8-panel solar PV system

WATER SAVING

- Water-efficient fixtures
- GreyFlow PS greywater diversion system with automatic filtration

PASSIVE DESIGN, HEATING & COOLING

- Orientation: a double-height volume carved out of the northern corner of the extension gives internal spaces shade in summer yet direct sun in winter
- Natural ventilation: windows placed for cross ventilation, and stairwell leading to roof terrace encourages ventilation by creating a stack effect
- Thermal mass: exposed ground floor slab stores the heat of the winter sun
- Shading: all openings are shaded to minimise solar heat gain in summer

ACTIVE HEATING & COOLING

- Hunter Pacific Eco2 ceiling fans to living areas, bedrooms and outdoor covered living space
- Daikin 10kW ducted reverse-cycle air conditioner
- Chiminees Philippe Radiante 873 2V SR slow combustion fire

BUILDING MATERIALS

- Timber framed structure
- Exterior cladding: James Hardie EasyLap fibre cement panels

- Burnished concrete slab floor on ground level and salvaged jarrah floorboards upstairs
- Recycled brick link flooring, fireplace and seating using bricks from original chimney
- Zincalume roof with Solasafe Opal polycarbonate roofing to double-height exterior living space
- Insulation: Permatop building blanket to roof (R1.3), Pink Batts high density glasswool insulation to ceilings (R2.5) and Pink SonoBatts Premium acoustic insulation to walls (R2.7) in extension; batts to ceiling (R4) and walls (R2.5) in original cottage
- Interior joinery: limewashed FSC-certified B-grade hoop pine ply from Austral Plywoods
- Paperrock benchtops and splashbacks to kitchen and bathrooms
- Jarrah decking to roof terrace

WINDOWS & GLAZING

- Aluminium-framed low-e windows and sliding doors from Nu-Look
- Breezway Altair louvre windows with aluminium frames
- Gorter mechanically-operated double-glazed aluminium-framed roof hatch to roof terrace

LIGHTING

- LED lighting throughout

PAINTS, FINISHES & FLOOR COVERINGS

- Burnished concrete floor to extension
- Salvaged jarrah floorboards finished with Bona Traffic (water-based)
- Limewash to interior plywood
- Dulux Wash&Wear low-VOC paints

DESIGNER

Philip Stejskal
Architecture

BUILDER

Assemble Building Co

PROJECT TYPE

Renovation & extension

LOCATION

Kensington, WA

COST

\$585,000

SIZE

Existing house 66m²
Extension 121m²
Roof terrace 27m²
Land 519m²

INSIGHTS

"The design includes a double-height timber frame to the north-east and north-west facades which is intended to be engulfed by vegetation over time, merging building with landscape and affording the climatic benefits of doing so by providing shading, cooling and a green outlook in summer."

Philip Stejskal, architect

→ "It's lovely up there in summer in the evening, watching the sunset," homeowner Emily says of the rooftop terrace.

