HOUSE PROFILE
Spotswood, VIC

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Fresh start

Inner-west Melbourne's first Passive House was the result of one family's desire for a healthy home that would stand the test of time.





AT A GLANCE

- *Comfortable, quiet, healthy city living for a family with respiratory issues*
- *Certified Passive House with airtightness of 0.41ACH*
- *All-electric, energy efficient and thermally high performing*
- *Existing house relocated for a new life*





When smoke from the Black Summer bushfires sent the particulate count on their air quality monitors through the roof in late 2019, Erin and her husband Martin started to wonder whether renovating and extending their period home as they'd planned was going to be the most future-proof option. "The events of that summer were huge, and really made us question what makes for a healthy home that suits the climate we might experience in the future," explains Erin.

The family already understood the impact of air quality on their health, living next to the Westgate Freeway in Melbourne's west with an asthmatic child. "When that bushfire smoke came through the city, it was shocking to see just how porous our old weatherboard house was," Erin says. The draughtiness also had an impact on the home's thermal performance; Erin describes it as "freezing when it needed to be warm and boiling hot when it needed to be cool".

Faced with budget unknowns once they started pulling apart the house for renovation, and concerns that they would be able to get only to a certain point of energy efficiency and comfort, Martin and Erin and their building designer James Goodlet from Altereco Design started exploring options for a new home on the tight block instead. James had just completed Passive House training at the time; fast forward a couple of years and the hundred-year-old dwelling has now been replaced by a modern four-bedroom home, certified to the exacting Passive House standard, and designed and built by the original team assembled for the renovation.

Rather than demolish the original house, it was sold and relocated to Ballarat on the back of a truck, "where it's having a new life," says Erin. This reuse helped justify the decision to build new. "Building from scratch means that we're using mostly new materials and resources, but to compensate, Erin and Martin were clearly focused on the longevity of what they built and creating a legacy," says James.

The new house is so airtight that it achieved just 0.41 air changes per hour (ACH) on its blower door test, well under the 0.6ACH upper limit for a Passive House. The couple's asthmatic child has had no respiratory issues since living in the home, nor have they turned on a heater, even in the depths of their first winter last year. "We would step outside and find we were inadequately dressed," says Erin.

Builder Matthew Carland says that water management and ensuring everything was fully sealed and tested were important in the build. "Honestly, it was the easiest build I've ever done," he says, reeling off several Passive House





projects completed or contracted since. "We had been playing around with a lot of the principles in other high-performance houses, so we were aware of all the breathable wraps needed for thermal efficiency and airtightness, the mechanical ventilation system requirements, and how it all comes together."

The 167-square-metre floor plan emphasises liveability rather than size. "We just wanted things to be well designed, with inbuilt storage and a thoughtfulness that means it's a comfortable house for our family of four, without needing to be a big McMansion," says Erin. Starting afresh meant the house could be designed for better solar access on its 12-metre-wide block, with the rear living area set close to the long southern boundary to maximise north sun and make room for a north-facing native garden. It's based on the 'Possum' from

Above "We've designed a family home that's not very big, but prioritises sustainability at its core," says designer James. The 167-square-metre home is based on the 'Possum' from the designers' AlterecO2 range of pre-designed Passive Houses.





Left and below Windows and doors are very high performing triple-glazed units in uPVC frames. A mechanical ventilation system with heat recovery keeps fresh air flowing throughout the house, even when they are closed.

the designers' AlterecO2 range of pre-designed Passive Houses, an offering that aims to reduce some of the design costs associated with custom architecture and, importantly, streamline and shorten the design and build process.

"I don't understand why we have to champion Passive House. I think it should just be standard." – Matthew, builder

While a new heritage overlay in the area prevents others from sending their period homes to the countryside like Erin and Martin did, they feel that their new home adds to the neighbourhood character – and their neighbours' feedback has been good too. "I think James did such a beautiful job, with the modern interpretation of the original gabled weatherboard frontage," says Erin.

The family is learning how to use the house, with some features like the mechanical ventilation system largely silent and forgotten until it's time to clean the filters every three months. "You should see what comes out," says Erin, mentioning the major road tunnel under construction nearby. The house doesn't have to stay locked up, though. "When a cool change comes through, we can crack our tilt-and-turn windows open. The house hasn't been getting hot so far, but we do it for a bit of breeze."

The benefits of building from scratch – and to a high standard – show in the family's lived experience, says James. "The evidence is in the big improvements in those scenarios that we talked about during the planning stages, such as the traffic noise, pollution, energy use and comfort." The modestly sized solar PV system generates more electricity than the home needs.

For Erin, the most surprising thing is the quiet inside the house. "We hadn't really thought about the sound benefits of having triple glazing and all the insulation. The house feels really peaceful. We sleep a lot better because we're not interrupted by incidental noise from outside. That hum of the freeway that we used to hear when the wind blows in our direction – we don't hear it at all anymore," she says. "If you are going down the custom design and build path, I find it hard to understand why you wouldn't try to get the best environmental performance that you could, whether that's a certified Passive House or not." S

LEGEND

1. Entry
2. Bedroom
3. Living
4. Kitchen
5. Dining
6. Bathroom
7. Laundry
8. Toilet
9. Multipurpose room
10. Study
11. Pantry
12. Walk-in robe
13. Porch
14. Deck
15. Carport
16. Bike parking

SPECIFICATIONS

DESIGNER
Altereco Design

BUILDER
Carland Constructions

PROJECT TYPE
New build

LOCATION
Spotswood, VIC
(Boon wurrung Country)

COST
$964,000

SIZE
House 167m^2
Land 388m^2

ENERGY RATING
Certified Passive House

PASSIVE HOUSE CERTIFIER
Detail Green

FLOOR PLAN



HOT WATER
- Reclaim 315L CO2 heat pump hot water system

RENEWABLE ENERGY
- 6.66kW solar PV system (18 x 370W SunPower Performance 3 BLK panels with Fronius Symo inverter)
- Wiring in place for future battery storage and EV charger

WATER SAVING
- 3,000L rainwater tank with pump, connected to garden taps, toilets and washing machine

PASSIVE DESIGN, HEATING & COOLING
- Optimised north orientation for passive solar gain
- Protection for west-facing glazing
- Window design to capture cross ventilation from summer bay breezes

WINDOWS & GLAZING
- Kommerling profile triple-glazed uPVC tilt-and-turn windows with warm edge spacers (around U1.1)

BUILDING MATERIALS
- Timber frame construction, 140mm deep with 45mm service cavity
- Cladding: rough sawn silvertop ash (PEFC-certified) board and batten cladding from Radial Timbers, Weathertex Weathergroove, and James Hardie cement sheet weatherboards
- Colorbond roof
- Ozlek Wormy Chestnut floorboards
- Insulation: HD glasswool batts (R4) to walls plus 45mm glasswool batts to service cavity (R1.1) gives total external wall insulation of R5.1; glasswool batts to ceiling (R8) and underfloor (R5)
- Walls, roof and subfloor wrapped with Pro Clima vapour-permeable membranes (over ventilated cavities for walls and roof)
- Laminex E0 joinery

LIGHTING
- All LED lighting from lights lights lights

COOKING
- Electrolux 90cm induction cooktop
- Electrolux 90cm multifunctional pyrolytic oven

ACTIVE HEATING, COOLING & VENTILATION
- Zehnder ComfoAir Q350 mechanical ventilation system with heat recovery (MVHR)
- Daikin 3.5kW bulkhead reverse-cycle air conditioner
- Breeze DC ceiling fans to all bedrooms and living room

PAINTS, FINISHES & FLOOR COVERINGS
- Dulux UltraAir paint (low-VOC)
- Vesting LED-cured hardwax oil (zero-VOC) to floorboards

OTHER ESD FEATURES
- Ventilated cavity to walls and roof to drain moisture and condensation
- Final blower door test result: 0.41ACH