



NEW LEASE ON LIGHT

*Clever design brings light and warmth
into a quaint inner Melbourne home.*

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FOR ALL ITS PERIOD CHARM, THE QUEEN ANNE

house that Danielle and Nathan bought was dim, dark, and rated just one star for energy efficiency. On a typically tight inner-Melbourne block with close neighbours, their challenge was to increase solar gain and internal space without encroaching on the garden.

“The first thing that struck us when we saw the site was the limited solar access to the house,” agree Jeremy and Chi of design and build company Positive Footprints. “The home is very close to the boundary and the neighbour’s building,” says Chi. “This made it very hard for sun to penetrate to the ground floor.” Faced with this obstacle, their solution was a creative one: to reinterpret the existing roof angle to let in northern light.

The new roof pitch of the extension at the back of the house mimics that of the 1892 original but is inverted. A tall northern wall with high windows catches sunlight over the neighbour’s roofline. The light falls directly onto thermal mass in the new kitchen and living area (an original double brick wall and new polished concrete floor) to maintain stable internal temperatures. In summer, external blinds can be lowered to keep the room cool, and ambient heat is flushed out through windows and doors later in the day. Jeremy describes this as “an effective response to the limitations of solar access at ground level. When we design, we try to imagine it from the sun’s position, trying to get sunlight deep into the house.”

The second major challenge – of creating more space without reducing the size of the garden – was overcome by building into vacant areas beneath the roof and under the stairs. “It was a challenge fitting the downstairs bathroom under the stairs, because the height of the stairs encroaches into the headspace. The upstairs bathroom was also a challenge because it’s built within the existing roof pitch. We had to do a lot of tweaking!” says Chi. The successful outcome is evidence of how well designed small spaces can work wonders: in the downstairs bathroom, the shower is hidden behind the door, while the washing machine is tucked away under the low ceiling below the stairwell.

Because the original, front part of the house is 118 years old with double-brick walls and high ceilings, it’s usually cool. To control and distribute heat flow between the new and old sections of the house, a glazed dividing door and heat shifters were installed. The heat shifters, for use in cooler weather, are a system of ducts and vents within the

walls and ceilings that suck warm air from upstairs down into the front rooms. They can be regulated by individual controls. “It’s like opening a window and getting a warm breeze coming through,” says Danielle. Alternatively, on warm days, the couple can close the dividing door and retreat to the cool of the old part of the house.

The house is predicted to use one third of the average amount of water, thanks to measures including 100% roof area collection of rainwater and a 9000 litre tank; gravity-fed greywater diversion from the bathroom and laundry to the garden; efficient tapware, toilets and shower roses; and thermal transfer valves (which divert ‘cold’ hot water back to the water tank so it’s not wasted). The house also has a 1.5kW photovoltaic array, and an evacuated tube solar hot water system which provides about 75% of the couple’s annual hot water needs.

Preferring sustainable products and resource efficiency at every stage of construction makes this house a model of energy and materials conservation from the ground up – literally. The concrete slab in the living area replaces 60% of its cement content with waste products in a combination that broke new ground for the concrete and polishing companies involved. Timber for the entire house, from the frame to the floors, stairs, shelves and cabinets, is recycled or harvested from sustainable sources. Even the pipe bedding material for the greywater system is made from recycled plastic.

Jeremy explains, “The idea going from the foundations up is that we’ve looked for environmental alternatives where they’re existing and economically feasible. It makes a difference not only to saving precious energy and natural resources, but indoor air quality and health outcomes.” To that end, all paints and adhesives are low VOC; architraves, door jambs and skirtings are E0 MDF; and there are no dust-attracting surfaces like carpets.

The heart and soul of the home is the kitchen, and this new one celebrates Danielle’s feel for texture and colour. The cupboards and cabinets are crafted from reclaimed, Melbourne-sourced timbers. At the centre of the kitchen stands a magnificent apothecary’s cabinet whose karri and redwood frame is embellished with pressed metal to match the kitchen walls. True to its origins as a dispensary, it stores herbs, glasses and necessary items, and like the house itself, has found a new life and purpose.





The high wall lined with windows and inverted roof line along the boundary bring northern light onto the concrete slab. The kitchen cupboards are made from a poplar tree that blew down in a storm in 2005 in the Royal Botanic Gardens in Melbourne. The benchtop is Red Iron Bark originally used in the 1840s in the Botany Bay Wool Stores in Sydney. The old kauri pine floorboards at Albert Park Railway Station have been reborn as overhead kitchen cabinets. Cupboard carcasses are made from EO MDF and EO particle board. The splashbacks are pressed metal. Cabinets by Wally Johnson Antiques (03) 9376 9341.



The original home as seen from the street. The new addition is not visible. Photo by Positive Footprints



Insulation was installed in the ceiling in the original part of the home and all drafts were sealed. The heat shifting system feeds warm air from the ceiling into this room in the cooler months.

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From the roof terrace, views over the backyard illustrate some of the more obvious elements of the green renovation: the tank and photovoltaics. The rear fencing is Outdoor Timber Tanalised-E H3 pine treated with an arsenic-free preservative (www.OutOfoorTimber.com.au). The posts for the fence are reclaimed cypress from Golden Cypress Rescued Timbers (www.goldencypress.com.au).





↳ Staying true to a philosophy of embracing the existing, the designers made a feature of the original external brick wall of the house, repainting the detail and incorporating it into the design of the living room. It also acts as thermal mass when low winter sun passes through the clerestory windows set high in the ceiling.

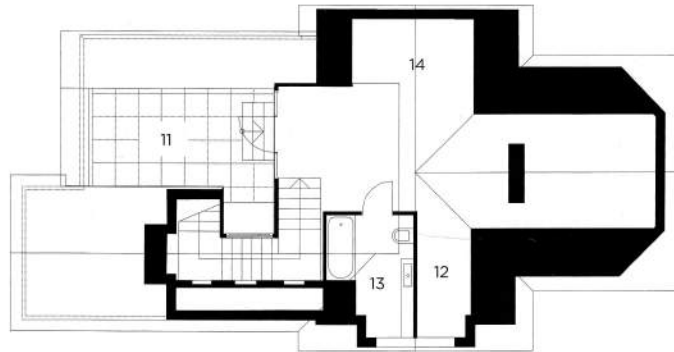
GROUND FLOOR PLAN

- 01 Deck
- 02 Dining
- 03 Kitchen
- 04 Living Room
- 05 Bathroom
- 06 Laundry
- 07 Bedroom 1
- 08 Entrance
- 09 Bedroom 2
- 10 Lounge



FIRST FLOOR PLAN

- 11 Upper Deck
- 12 Study "nook"
- 13 Bathroom
- 14 Bedroom 3



↑
The upstairs addition includes spare bedroom, study "nook" and second bathroom. Nullarbor Timber recycled spotted gum floors were chosen and finished in Livos low VOC oil. The grilles for the heat exchange system are visible to the right of the original chimney (retained as a feature of the room).



↑
Tiles are from Erneste Tile Concepts, while the shelves are recycled Tallowood from the seats of a demolished Melbourne Cricket Ground stand.

Thornbury Residence

Designer & Builder

Positive Footprints

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Website

www.positivefootprints.com.au

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Project type

Renovation

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Project location

Thornbury, VIC

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Cost

\$289,000

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Size

house 160 sqm; land 330 sqm

SUSTAINABLE FEATURES

Hot water

Apricus evacuated tube solar hot water system with 315L stainless steel tank and Bosch 21E instantaneous gas booster www.apricus.com.au
www.bosch.com.au

Renewable energy

1.5kW eko-Kinetics grid connected crystalline solar panel array www.eco-kinetics.com

Water saving

- 9000L Teampoly rainwater tank plumbed to laundry and toilets and available for garden watering www.teampoly.com.au
- Pentair Onga Waterswitch, coupled with pump and float switch for automatic mains diversion if required www.ongawaterswitch.com.au
- Enviro Save Water System diverts cold water in the hot water pipes back to the water tank www.enviro.net.au
- Methven Genesis Satinjet 7.5L showerhead with twin jet “big drop” technology to both showers www.methven.com
- Caroma Smartflush 4 star (3/4.5L) suites in both bathrooms www.mycaroma.com.au
- Silvan H2o Tadpole Primary Filter to each downpipe (\$49) www.silvanh2o.com.au
- Silvan H2o Wet Frog secondary filter to tank (\$87) www.silvanh2o.com.au

Passive heating & cooling

- Reflex electric external venetians to kitchen north facing windows. These cost around \$6000 for around 14sqm of venetians www.reflexshade.com.au
- CSR Bradford Anticon R1.5 foil backed blanket with up to 80% recycled glass wool to roof www.bradfordinsulation.com.au
- R3.5 Tontine 85% recycled (from PET bottles) polyester batts between roof rafters
- CSR Bradford SoundScreen R2.5 batts plus EnviroSeal reflective foil to walls

Active heating & cooling

- Martec Precision marine grade stainless steel reversible ceiling fans. This fan has the optional light fitting with CFL globes installed and runs (forward) at 9.9W and 68RPM www.martecceilingfans.com.au
- Radiant gas boosted hydronic heating (retained and expanded from original house)

Windows & glazing

- Mouldright Joinery recycled karri bifold doors and plantation hoop pine windows each with 14mm spaced argon filled double glazing and low-e coating. Windows include a pull-down flyscreen www.mouldright.com.au

Lighting

- Kitchen, upstairs bathroom spotlights and downlights in nooks are LEDs from The Environment Shop www.enviroshop.com.au
- Barc wall lighting in study and bathroom are from Axiom lighting www.axiomlighting.com

Building materials

- Alex Fraser Group recycled Ecobase is used to all greywater and stormwater subsurface piping and under paving. This product is made from recycled concrete and brick and can also include reclaimed asphalt pavement. Although Alex Fraser Group mainly supplies to commercial projects they will supply to residential projects; ring and enquire about delivery costs www.alexfraser.com.au
- Boral Envirocrete concrete slab with 60% cement replacement with slag and flyash www.boral.com.au
- Polish of the concrete slab by Pro Grind www.progrind.com.au
- Smorgon ARC 100% recycled steel mesh to concrete slab www.arcreeo.com.au
- Boral Enviro Plasterboard with up to 10% recycled content and GECA accreditation www.boral.com.au
- Key Plastics recycled PVC slotted pipe
- Bostik Roof & Gutter low VOC Silicone Sealant
- Carter Holt Harvey Ultraprime low VOC pre-primed Eo MDF was used for skirtings and architraves throughout the home



↑
The Tadpole downpipe filter is fixed at shoulder height and is easily removed for cleaning. Photo by Verity Campbell

Paints, finishes & floor coverings

- Livos low VOC finish on internal floors
www.livos.com.au
- Rockcote EcoStyle internal ultra low VOC paints with GECA accreditation
www.rockcote.com.au
- Intergrain UltraDeck low VOC finish on timber doors www.intergrain.com.au
- Wattyl Solagard high durability paint with 15 year between recoat warranty on Scyon Linea cladding. Light colour to maximise life
www.wattyl.com.au

SUSTAINABLE PRODUCTS

HEAT TRANSFER SYSTEM

This house has an IXL EasyDuct Thermal Transfer System installed. This is a heat shifting system, using 40W to shift heat from the new upper rooms back into the cooler rooms in the original part of the house. A thermostat is installed in the kitchen/living rooms; when the kitchen/living room reaches a certain temperature the occupants can turn on the heat shifter. The heat in the upstairs room is then pumped through insulated flexible duct and released from a ceiling mounted interior grille. This simple system cost around \$200, excluding installation.

www.ixlappliances.com.au

“WATER BRAKE” LEVER TAPS

Hansa Vantis Green six star taps with integrated two stage “water brake” installed in all basins. The “water brake” gives a subtle reminder to users (especially children) not to turn the tap on full if high flow is not needed. It works by use of Hansa’s ECO 3.5 Control Cartridge - when you lift the lever up a reduced flow is supplied; you need to lift further, through the friction point, to achieve full flow. \$285 per mixer

www.hansaaust.com.au

GREYWATER SYSTEM

Two Nylex Greywater Diverta systems are installed in the house, one for each bathroom. This is a simple gravity diversion system, in which greywater from the bathrooms runs to the units and is then diverted, by gravity, to subsurface irrigation around the garden. With this system no water is held in the unit or pipes, eliminating the possibility of water going septic, and relieving the need for pumping and electrical maintenance. The only downsides of this system are that you have to have external pipes to attach the diverter to and the filters are pretty basic and require regular rinsing. According to the Alternative Technology Association’s water projects manager, Anjali Brown:

“Low cost greywater diverter systems are a straightforward way to reuse your bathroom water. To be most effective, ensure that the water is being dispersed widely and is being absorbed subsurface by plants that can handle the constant quantity of water. Systems like the Nylex allow you to divert the water to the sewer, which would be recommended during winter rainy periods so you do not overwater your garden. The filters in simple diversion systems also need to be regularly cleaned out and users should be careful not to send any harsh chemicals or products high in sodium down their bathroom drains. These diverter systems give householders flexibility in the way they use their greywater and are straightforward to use - they’re a good place to start for ‘greywater novices’.”

Each Nylex Greywater Diverta unit costs around \$199, excluding subsurface irrigation

www.nylex.com.au



↑ This wall mounted interior grille is installed in the upper rooms. When turned on it transfers heat through ducts to the cooler rooms of the home. Photo by Verity Campbell



↑ Shown here are both Nylex Greywater Diverta units for the home. Photo by Verity Campbell



The block runs east-west with the northern side of the house up tight against the boundary. The design response brings light into the house, and includes a rooftop terrace and sun-drenched deck - without encroaching on the garden. Paddy's Bricks (www.paddysbricks.com.au) were used for garden paving, while reclaimed Red Iron Bark used for the deck is from Urban Salvage (www.urbansalvage.com.au).