

# Playtime

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When it came to extending their house to fit their family, creating kid-friendly spaces with playful details was just as important to this Melbourne couple as achieving an energy efficient, light-filled home.

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## front and centre

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### THE MOTIVATION FOR CAROL AND

Andrew's renovation and second-storey extension to their 1920s Californian bungalow in the Melbourne suburb of Northcote is a common one – having moved in with one small baby, several years later they were a family of five and needed more space. However, the priorities and the rigorous commitment to energy efficiency and passive thermal performance they brought to the project set it apart from most.

“The brief focused on the house being a bit fun and quirky for the kids, as well as on sustainability and improving the existing envelope as much as possible,” explains their designer Penny Guild of Guild Architects. “Often, an upper level extension houses a parents’ retreat, but here it was all about a family home with three new bedrooms and an extra play area for the kids upstairs – with a walkway above the stair void and hidden hatches connecting

the bedrooms via the roof space. It made it a fun project.”

Another important driver for the design was the need to admit more light into the existing living space, without making drastic changes to the structure. Penny removed the central study that is a common feature of bungalows of this era, and opened up the hallway into a double-height void; cleverly located windows, the open treads of the staircase and deliberate spaces between floor boards on the landing all help admit winter sun deep into the dark south side of the house. “We used heat shifters and ceiling fans to offset the heating stratification you can get with voids like this,” says Penny: the warm air is directed into the tiny laundry where clothes airers hang from the ceiling.

It was a challenge to design the upper level extension to minimise its bulk when viewed from the street while still maintaining the original home's three-

metre ceilings, and the concept went through several iterations. The original ridgeline was retained at the front of the house, behind which a small flat section of roof sets the main height of the second storey back a little further. “I tapered the new roof in a little at the sides to reduce bulk,” says Penny. “It made the internal spaces more fun for kids’ bedrooms too. You can create interesting spaces with angles.”

Another favourite feature of the house is the large integrated fish tank in the wall between the hallway and the dining room. “It started as a joke,” laughs Penny. “We were conscious of the fact that there was no thermal mass in the house, and it's difficult and expensive to retrofit. As Andrew is a marine biology teacher and has always kept fish, I suggested we install an aquarium because water can be excellent thermal mass.” Although the aquarium is currently heated to house tropical fish and thus doesn't function as thermal mass, it could



⬆ Instead of creating an upstairs parents' retreat, Andrew and Carol designed the new second storey for their kids, now aged eight, six and four. Hidden in the upstairs ceilings, BioPCM phase change material will help stabilise internal temperatures, particularly in summer.



⬆ If indoor greenery is Carol's passion, the fish tank is Andrew's. Integrated into the wall between the hallway and the dining room, it provides interest and a sense of connection – and the large volume of water could also be used as thermal mass if Andrew decided to convert it to a cold-water ecosystem.



⬆ The above-ground recycled shipping container pool is, of course, one of the kids' favourite features of the house. Supplied as a self-contained unit complete with access steps, pump and filter, it was chosen for the minimal groundwork required to install it, avoiding the unknown cost of excavation needed for a conventional pool. Homeowners' photo.

be adapted to do so in the future – and in the meantime, it’s a striking design element and helps bring light into the dining area.

Upstairs, the problem of lack of thermal mass was addressed through the use of phase change material (PCM) in the ceilings to help moderate the internal temperature. “I’d been reading about it, and it seemed too good not to include, though it’s expensive,” says Carol. It was something of a leap of faith, as it’s a relatively new product for residential use and they were unable to experience it ‘in situ’. But Penny was supportive, explaining that “one of the good things about PCM is that unlike insulation, it doesn’t matter if there are gaps between the pieces of phase change blanket. The supplier calculates the optimal amount of material, and you just squeeze it in wherever it will fit above the ceiling and in the upper walls.” [See page 72 for the phase change material product review.]

Andrew and Carol’s quest for a “really energy efficient, passive thermal house” also involved careful attention to cross ventilation, shading and insulation. The existing house was retrofitted with underfloor and blow-in wall insulation. Upstairs, a variety of fixed and adjustable shading including fixed louvres, eaves, and roof windows with integrated honeycomb and blackout blinds ensures optimum summer shading and winter sunlight. Downstairs, an existing pergola to the north was extended and is fitted with Vergola adjustable roof louvres. Closed, the roof provides an outdoor living space protected from the rain; the louvres can be adjusted to regulate solar access to the interior as needed.

And while the family has not gone off gas yet, they put in a circuit for the induction cooktop they plan to install, and a full energy transition is very much on the

cards for the future. “Carol and Andrew opted to retain the existing gas-boosted solar hot water system, as it wasn’t that old and had plenty of life left,” explains Penny.

“However, they took the opportunity to install the larger hydronic heating panels that they’ll need when they upgrade from gas to a heat pump for their hydronic heating down the track.” Air-to-water heat pumps operate at a lower temperature than a boiler and consequently larger panels are required to provide correct comfort.

The result of the clients’ and the designer’s commitment to the project is a collection of practical, inviting spaces in which Carol’s cherished indoor plants now have sufficient light to thrive everywhere.

Perhaps most importantly, “the kids love it”, she says. “We wanted them to enjoy it and be part of caring for the house, learning to ‘sail’ it for its best performance.”

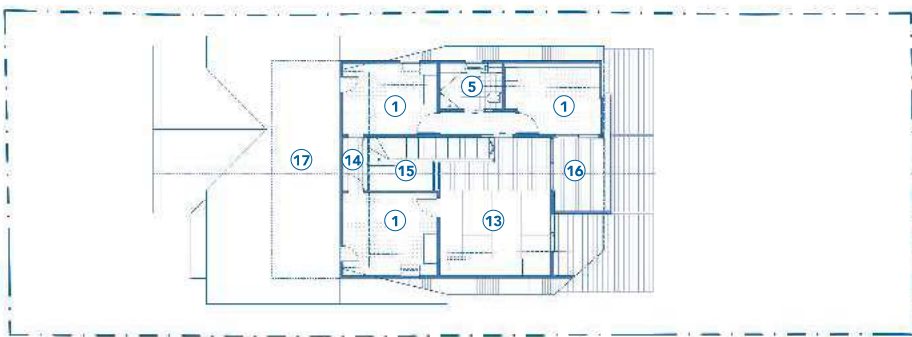


“The stairs that let the light in sum up what we wanted for the house: plenty of north light into the dark south side,” says homeowner Andrew. The double-height void accommodating the hallway and stairs is Penny’s core design strategy for natural light and ventilation. Open treads and lightweight balustrades help let light filter through, as do the spaces left between floor boards on the landing. This space also supports family life: a large corkboard wall for displaying the kids’ artwork surrounds the built-in aquarium, and deep drawers under the stairs provide storage for shoes and school bags. Recycled Baltic pine floorboards were sourced to match the existing floors.



⬆  
 The back of the house faces north, so a variety of strategies was employed to ensure sunlight can be admitted when it's desired and excluded when it's not. A large pergola with adjustable Vergola louvre roofing covers the deck, while upstairs a carefully designed eave, fixed louvres and blinds provide shading when needed.

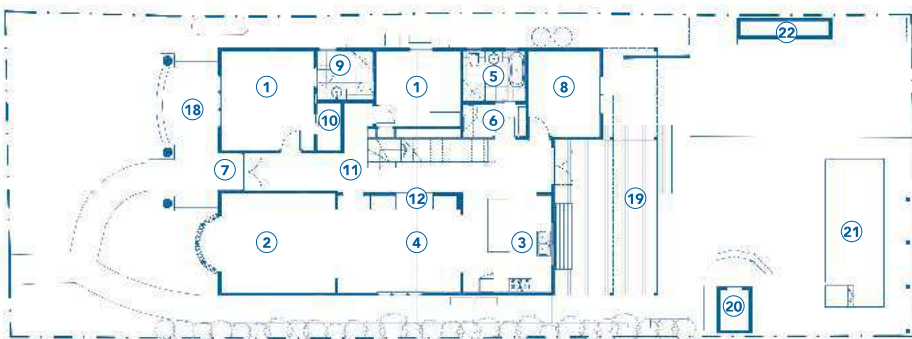
### FIRST FLOOR PLAN



### LEGEND

- |                  |                                  |
|------------------|----------------------------------|
| ① Bedroom        | ⑬ Playroom                       |
| ② Living         | ⑭ Walkway                        |
| ③ Kitchen        | ⑮ Void                           |
| ④ Dining         | ⑯ Balcony                        |
| ⑤ Bathroom       | ⑰ Roof storage                   |
| ⑥ Laundry        | ⑱ Verandah                       |
| ⑦ Entry          | ⑲ Deck with roof<br>louvres over |
| ⑧ Study/playroom | ⑳ Cubby                          |
| ⑨ Ensuite        | ㉑ Pool                           |
| ⑩ Walk-in robe   | ㉒ Shed                           |
| ⑪ Hallway        |                                  |
| ⑫ Aquarium       |                                  |

### GROUND FLOOR PLAN



# Playtime House

## —Specifications

### Credits

#### DESIGNER

Guild Architects

#### BUILDER

CRD Developments

#### PROJECT TYPE

Renovation

#### PROJECT LOCATION

Northcote VIC

#### SIZE

Land 479 m<sup>2</sup>

House 242 m<sup>2</sup>

#### BUILDING STAR RATING

5.3 Star (whole house)

### Sustainable Features

#### HOT WATER

- Reused existing gas-boosted solar hot water system.

#### RENEWABLE ENERGY

- Reused existing 1.25kW solar system and upgraded to Enphase microinverters, so in future when PFIT expires more panels can be added easily.

#### WATER SAVING

- All bathrooms and laundry connected to the existing EcoBowser greywater system which waters the non-edible garden
- All new and existing roofs plumbed to existing 7500L water tanks.

#### PASSIVE DESIGN / HEATING & COOLING

- Extension designed to maximise north light to existing ground areas and new first floor areas
- South-facing operable clerestory windows to bedrooms and void, for cross and displacement ventilation
- All new habitable rooms have windows on multiple sides for cross ventilation
- Vergola operable roof louvres to deck maximise winter sun and protect windows and deck from summer sun
- Fixed louvres and eave to first floor north-facing windows, designed for optimal summer shading and winter sunlight
- Fully adjustable blind to north-facing bedroom window
- East- and west-facing roof windows/skylights all with integrated honeycomb or blackout blinds.

#### ACTIVE HEATING & COOLING

- Hydronic heating throughout by Skyline Energy, with high efficiency Baxi Luna Duo-Tec GA 1.24 condensing boiler. System sized/ designed to be adapted to a heat pump system in the future allowing clients to transition off gas completely
- Daikin 5kW high efficiency reverse-cycle air conditioner on first floor
- Heat shifter moves stratified first floor heat to lower level laundry for clothes drying
- Big Ass Haiku fans in new bedrooms and living area.

#### BUILDING MATERIALS

- BioPCM Mat Q23 phase change material to first floor ceiling aids in temperature stability, particularly in summer
- High levels of insulation throughout: Supafill R2.3 blow in insulation from Enviroflex retrofitted to all existing walls; R2.0 polyester batts retrofitted to existing floor; all new ceilings and walls use a combination of R2.7 batts and Aircell, with ceilings achieving R5.4
- Cladding: Cemintel barestone and Colorbond to first floor for low maintenance exterior
- Blackbutt hardwood ply used for upper level flooring, stair treads and joinery, supplied by Big River Timbers
- Recycled Baltic pine flooring used downstairs.

#### WINDOWS & GLAZING

- Miglas high performance composite timber and aluminium windows to first floor; high performance

double glazing to east and west windows

- Velux skylights with integrated solar honeycomb blind and NEAT photocatalytic coating.

#### LIGHTING

- Energy efficient LED lighting from Richmond lighting.

#### PAINTS, FINISHES & FLOOR COVERINGS

- Natural sisal flooring from Floorspace for first floor bedrooms
- Dulux low-VOC paints to walls and ceilings
- Bona Traffic water-based two-component non-toxic finish to timber flooring.

#### OTHER ESD FEATURES

- Maximised retention of existing building structure to reduce embodied energy
- Lightweight building – minimal high embodied energy materials such as concrete and brick
- Pulley operated clothes hangers in laundry together with heat shifter from first floor, to aid low-energy winter clothes drying
- Above-ground recycled shipping container pool, from Shipping Container Pools, minimises excavation and allows for re-use
- Integrated 1000L aquarium has the potential to be converted to a cold water system in future to aid in temperature stability
- Deliberate choice of separate hot and cold water taps in upstairs bathroom to prevent unnecessary/accidental use of hot water.