

project homes, despite being architect-designed and pushing the envelope in terms of new technologies.

Tom says the cost effectiveness was achieved by keeping the overall design simple and straightforward, limiting the scheme to just three floor plans, and the fact that the group maintained strict controls around internal material selections.

“From our perspective, it’s been smooth throughout,” Jess says. “During the build stage we were up in Perth, so we’ve stepped into a completed house

which is comfortable and great. The incidental connections with our neighbours are really lovely. Our kids have ready-made playmates and the freedom to move around, and seeing how the shared spaces will evolve over time is part of the fun.” ⑤

SITE PLAN



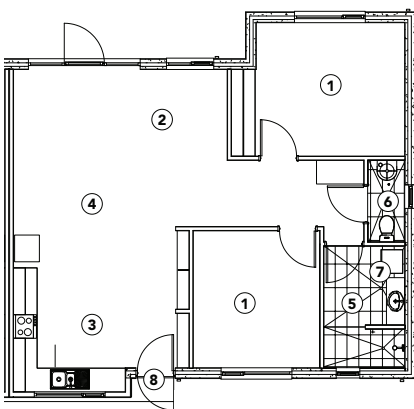
LEGEND

- ① Units
- ② Family houses
- ③ Community house
- ④ Central courtyard
- ⑤ Workshop
- ⑥ Water tanks
- ⑦ Carport
- ⑧ Creek



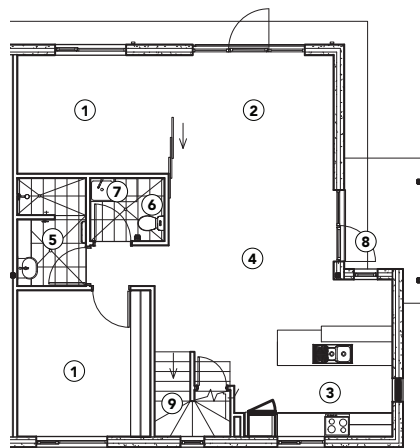
TYPICAL FLOOR PLANS

UNIT



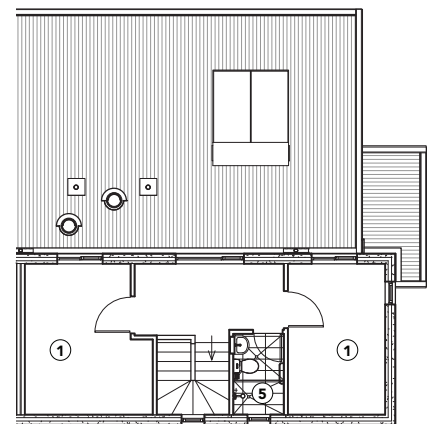
LEGEND

FAMILY HOUSE
GROUND LEVEL



- ① Bedroom
- ② Living
- ③ Kitchen
- ④ Dining
- ⑤ Bathroom
- ⑥ Toilet
- ⑦ Laundry
- ⑧ Entry

FAMILY HOUSE
UPPER LEVEL



- ⑨ Stairs to upper level, and to storage area in basement

HOUSE SPECIFICATIONS

HOT WATER

- 315L Sanden heat pumps each supply hot water to a pair of dwellings

RENEWABLE ENERGY

- Grid-connected communal 49kW solar PV system with battery storage from DSR Energy systems: 168 x 290W JA Solar panels, 48 x Narada REXC800 lead-carbon batteries, 6 x Schneider Xantrex inverters, Schneider Xantrex XW+ 80-600 regulators, Schneider CoMex digital communications

WATER SAVING

- 2 x 90,000L Pioneer GT90 rainwater tanks for non-potable and garden use
- Flowgen WPBE 5-62 pressure pump with 50L pressure vessel and PM Rain system for automatic switchover to mains water
- Houses plumbed to allow connection of showers, hand basins and laundries into planned Grey Flow Pro greywater system, a fully automated pumped diversion system to provide irrigation to communal garden areas
- Caroma 5 Star WELS-rated taps
- Stylus water-efficient toilet suites

PASSIVE DESIGN, HEATING & COOLING

- Optimised northern glazing to all dwellings for winter sun and minimal glazing on east and west facades to reduce heat gain in summer
- Insulated concrete slabs for thermal mass
- Roof forms maximise solar harvesting potential while maintaining solar access to rear rooms
- Compact floor plans and shared party walls minimise heat loss from the houses
- Windows positioned to maximise cross ventilation

ACTIVE HEATING & COOLING

- Ceiling fans to living areas
- Provision for future installation of reverse cycle air conditioning (as yet not required)

BUILDING MATERIALS

- Hempcrete installed over timber framing and raised above ground level on brick plinths; rendered externally with lime render and internally with lime plaster
- Colorbond Custom Orb cladding

- Colorbond Custom Orb roof sheeting over timber scissor trusses provide cathedral ceilings in living spaces
- Insulation: R2.5 Polymax acoustic batts to timber framed walls; R6 Bradford Gold fibreglass batts to ceiling; R1.3 Anticon blanket to roof; R1.25 Reflex polyisocyanurate (PIR) to underslab and slab edge

WINDOWS & GLAZING

- Nu Way argon-filled uPVC double-glazed doors and 'tilt and turn' windows

LIGHTING

- LED downlights and pendant lights

PAINTS, FINISHES & FLOOR COVERINGS

- Taubmans Endure low-VOC paints
- Lime exterior render made on site using lime putty and sand
- Interior walls: lime plaster, with some Venetian plaster as feature walls and splashbacks
- Concrete slabs lightly ground and finished with Crommelin water-based paving sealer

OTHER ESD FEATURES

- Site was carefully selected using a scoring matrix to ensure it met sustainable benchmarks including walkability to town centre, brownfield site and ability to create wildlife habitats
- Many shared facilities including community house, solar PV and battery storage, rainwater storage, greywater treatment and reuse, guest accommodation and a workshop
- All-electric houses with induction cooking
- Sub meters provided on electricity, rainwater, hot water and mains water supplies to all houses, networked to the community house to provide logging and monitoring
- Owners walk, use bikes and car-share to reduce vehicle ownership
- Provision made for electric car charging stations
- Food-producing gardens and beehives
- The creek area has been vested as public open space and revegetated to create a wildlife habitat
- Stormwater surface runoff is into vegetated filtration basins for nutrient and pollutant stripping prior to discharge into the creek

DESIGNER

H+H Architects, Albany

BUILDER

AK Homes

PROJECT TYPE

New build

LOCATION

Denmark, WA

COST

\$4.9 million for entire project including 12 dwellings, community house and workshop, landscaping, hardscaping; Jess and Dave's house cost them around \$490,000

SIZE

Dwellings: 8 x 80m² units, 4 x 130m² houses
Community house 125m²
Land 6500m²

ENERGY RATING

8.5 – 9.2 Stars

ENERGY RATER

Sid Thoo

INSIGHTS

"The solar system is designed to prioritise power loads, charge the batteries before exporting any excess power to the grid and operate in off-grid mode if there is a power cut."

Tom Stevens
H+H Architects

At home with hemp

LOCATION Chewton, VIC • WORDS Sasha Shtargot • PHOTOGRAPHY Leon Schoots & Shayne Hill



At a glance

- Striking hempcrete home with recycled timber and rusting steel cladding
- Unrendered internal hempcrete feature wall reflects the homeowners' creativity
- All-electric, energy efficient home with little need for active heating or cooling

Image: Shayne Hill

Opening for
Sustainable House Day
Sunday 15 September 2019

For more information visit sustainablehouseday.com and search for 'Chewton Hemp House'

This family home in central Victoria makes the most of the beauty and thermal properties of hempcrete, to satisfying effect.

When Brenna Jensen and Dominic Crinson's house build was underway, prominently positioned on the main road through the hamlet of Chewton near Castlemaine in central Victoria, passing motorists would often stop and wander over, keen to know more about what they were doing.

What was the building material that was being busily mixed, tamped and used to create the walls of the house? Was it rammed earth? "Once or twice we had people who came past and recognised that it was hemp," Brenna says, "and they were so delighted."

The signature feature of the Chewton Hemp House, as the couple have called their project, was a work of love for them and their three small sons, friends and other volunteers who built the hempcrete walls over nine months in 2018. The project was a collaboration between the owners and fledgling local design-build business House Workshop, with local cabinetmaker and artist Mark Anstey

designing and building the kids' bedroom and kitchen cabinetry.

Facing sweeping bushland at the rear, Brenna and Dominic's house has a strong presence and sits comfortably in its environment thanks to the unrendered hempcrete walls and weathering steel cladding that echoes the colour of the red ironbark trees that are prominent on the site.

Inside, a short corridor leads to the children's room, which has a plywood mezzanine where the couple's sons sleep. Cupboards for toys are cleverly built into the stairs on either side of the room. There's a tiled bathroom for the children and a laundry on this side of the house.

Walking in the other direction you are greeted by a stunning hempcrete wall enhanced by wavy coloured oxide patterns from the layering process of its creation and the inclusion of earth and other materials in the mixture. The wall acts as a divider, hiding a quiet office space for Dominic away from the hustle of the living room and kitchen. A playful opening in the wall accommodates a feature leadlight window; in another opening around the corner, facing the expansive open plan living and kitchen area, a rack of textile yarn can be swivelled around to reveal a screen for entertainment. A fireplace is set



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In the centre of the beautiful hempcrete feature wall, a display of yarn spools pivots to allow the screen behind it to be viewed from either the living room or the study, tucked on the other side of the wall.

Image: Leon Schoots

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The parquet floor in the kitchen was made using salvaged timber offcuts. Deciduous vines will eventually cover the pergola outside for summer shade.

Image: Leon Schoots





↑

The children's room features twin staircases against each side wall leading to a sleeping loft above the play space; storage is tucked underneath. The concrete slab floor was burnished and oiled with natural oils. Image: Leon Schoots

in a third aperture.

The wall defines the internal space and expresses the couple's livelihoods – Dominic is an artist and Brenna is a textile designer who started a children's organic merino wool clothing business – as well as their playful creativity. But there's much more in this part of the house: the north-facing living area is filled with light thanks to clerestory windows and double-glazed hardwood sliding doors that open to views of the bush. Beyond the kitchen is the main bedroom with an ensuite and walk-in robe.

As well as a desire to be actively involved in the design and build of their dream home, the house is defined by the couple's strong values of environmental sustainability. Hempcrete, a hemp and lime mixture, was chosen as the building material, Dominic explains, because of its strong insulative properties, thermal

inertia and ability to regulate internal humidity. "Hemp acts as a carbon sink, absorbing carbon as it grows," he says. "It's the best plant you can grow for reducing carbon in the environment. And the finished building will absorb significant amounts of carbon over the next two decades."

The home is all-electric, with highly efficient appliances including an induction cooktop and hot water heat pump. For a family of five, Dominic says their energy bills have been very low since moving into the house in December 2018. There's been little use of the fireplace – despite the notably cold weather of a central Victorian winter – thanks to the home's passive thermal properties, bulk insulation in the ceiling and extensive double glazing.

Water saving comes in the way of a 22,500-litre corrugated steel rainwater

tank which is plumbed to feed the house and garden. When the tank is approaching empty, the family switches to town water. There's also an extensive greywater system that includes swales and reed beds allowing the watering of the family's newly planted orchard.

The couple have incorporated an ethic of salvage and reuse in the building of their home: the wooden cladding at the back of the house used to be part of an old squash court; the feature leadlight window and a quirky 19th century toilet cistern in the ensuite were from a secondhand sale; and in the kitchen the rangehood and sink have a few little bumps and bends that tell of being factory seconds.

Brenna and Dominic always had the idea that they wanted to build their own home and are justifiably proud of their achievement – in particular the hempcrete walls that are the stars of the build – but