

Auckland Road – CB5 8DW

Close to passive house standard new-build with green-roof nicknamed the ‘hairy house’

Meet your hosts Emma and Jeremy

‘We are both fully qualified Architects, running our own Cambridge based practice, Ashworth Parkes Architects.

We purchased the site for our house in 2006. It is very small, measuring 7.5m by 10.5m, and is flanked by 3m high walls to the East and the North, and a 2m high wall to the West.

The house is clad in a larch rain screen, there is a grass and wildflower roof and several roof lights to mitigate the restriction on windows on three of the main elevations.

A key idea in the house was trying to create different spaces and little moments of interest that would help to make the house feel larger than in fact it really is.

Inside the feeling is bright and spacious. Light floods in via big windows from the courtyard and lots of skylights from the flat roof – which couldn’t be higher than the neighbouring terrace’s eaves. The downstairs is sunken, to give more useable height. Rooms have high ceilings and the back of the house is full-height.

The house has a strong design philosophy:

- Really good insulation
- Lots of thermal mass
- Natural ventilation and cooling
- Build in eco-features, not add-ons.

Low energy measures

Our aim was to design a practical efficient house that would use as little energy as possible using the ‘keep it simple’ approach. That is, insulate as much as possible, maximise on natural daylight and build to a good standard of air-tightness.

We used 175mm of sheep’s wool insulation within the walls and the roof. We also incorporated 200mm of soil on the roof to create a semi-intensive green space for greater biodiversity which provides even more insulation, as well as dramatically reducing the rate of rainwater run-off.

We used large elements of fair faced concrete on the ground floor for thermal mass. This moderates the building’s temperature, keeping it warm in winter and cool in summer.

The ground floor also has an underfloor heating system, but there is no heating to the first floor apart from two heated towel rails in the bathrooms. The natural buoyancy of the hot air means that it rises-up the double height space into the first floor of the house in the winter. The levels of insulation mean that the first floor of the house warms up very nicely without need for heating of its own.

The house is behind high walls on three sides and the number of windows were severely limited for planning reasons. We installed several roof lights to maximize daylight within the house. This limits the time that artificial lighting is used.

Performance

Recent calculations have shown ‘the hairy house’ is close to passive house standard, apart from the small amount of gas consumption. Ventilating the bathrooms has been the only significant problem with the house – partly due to teenage boys taking long and frequent showers! We’ve now fitted a Nest heating controller that has learned our strange patterns and unusual heating requirements.



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Contacts and products

Groundworks and Concrete

Westwood Structural Services Ltd, Enterprise House, 10 Church Hill, Loughton, Essex, IG10 1LA. 020 85020203

Carpenter: Richard Barker, 44, Station Road, Dullingham, Newmarket, Suffolk CB8, 9UP 07970 596868

Structural Engineer: Gary Elliott, Elliott Wood, 241 The Broadway, Wimbledon, London SW19 1SD, 0208 544 0033; info@elliottwood.co.uk

Plumber: Kevin Turner, 10 Woburn Place, Duxford, Cambridge, CB224QJ, 07810 697233

Gas Condensing Boiler: EcoTech Plus by Vaillant

Overview

Age: 2009

Type: Custom built, detached

Construction: Part fairfaced concrete supporting walls with existing brick garden walls externally, timber framed timber clad to first floor

Floor area: 155 sq m

Project timescale: Planning 3 yrs, Build 1 yr

Cost of build: £240,000

Energy usage – 2 adults, 2 children:

32 kWh per sq m electric pa

55 kWh per sq m gas pa

Heating 4995 kWh/year

Water: 6.7m³ / month, which is 45% of East Anglian Average

Key features

- 'Keep it simple' principle: maximise insulation, natural daylight, air-tightness
- Insulation: roof, walls, floors, green roof
- Thermal mass: concrete, temperature moderation
- Heating: underfloor heating downstairs and two heated towel rails upstairs
- Stack effect: hot air buoyancy, passive heating
- Daylight: roof lights
- Flooring: Insulated screed
- Windows, doors: high-performance double-glazed
- Lighting: low energy throughout
- Water: dual low flush toilets, green roof
- Energy efficient appliances
- Internal bathrooms light: mirrored roof windows
- Whole house heat recovery: controlled ventilation.
- Natural materials: low VOC paints, wood, stone

Insulation

Underfloor: Underfloor – 100mm Rockwool ROCKFLOOR below 75mm underfloor heated screed

Walls: 175mm thickness Thermafleecce natural undyed sheep's wool insulation by Black Mountain Insulation Ltd, Unit B, Tir Llwyd Industrial Estate, Rhyl, Denbighshire, LL18 5JA, 01745 361911

Green Roof System: Zinco System by Alumasc Exterior Building Products Ltd, White House Works, Bold Road, Sutton, St Helens, Merseyside, WA9 4JG. United Kingdom, 01744 648400

Windows: Glas Facades, 30, Oxford Road London, N4 3EY, 020 7561 8749

Rooflights: Glazing Vision Ltd., 36 Wimbledon Avenue, Brandon, Suffolk, IP27 0NZ, 0333 8000 881

Ground floor & bathroom flooring: Stratum Resin Flooring, 4, Erringham Road, Sherham by Sea, West Sussex, BN12 5NQ, 0070 7704316

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