



The Crossway Passivhaus

Private housing Category

Hawkes Architecture Ltd

UK Passivhaus Awards 2013

Residence of the Austrian Ambassador, London

4th July 2013



Project Overview

Project Team:

Client: Mr & Mrs Hawkes

Architect: Richard Hawkes

Consultants:

Michael Ramage – University of Cambridge

Philip Cooper – C.A.R.L.

Anthony Morgan – Newform Energy

Mark Saich – Approved Inspector

Contractor: Ecolibrium Solutions

Certifier: Ian Theoboldt



Project Overview

Name: Crossway Passivhaus

Type: Single family house

Build type: Timbrel vaulted arch
& Warmcell insulated Steico
timber frame

Location: Staplehurst, Kent

Occupancy: since Feb 2009

Budget: £445,000



View from the pillow of the guest bedroom

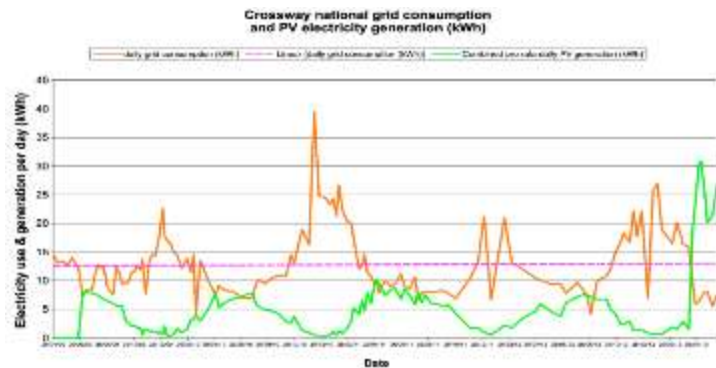
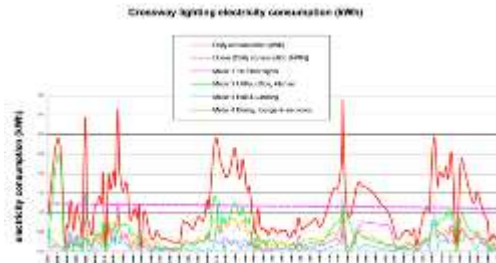
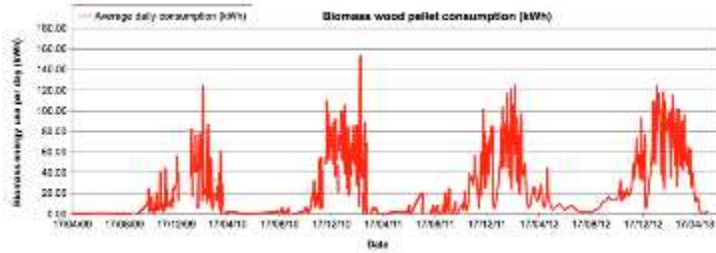
Measured Energy Performance

Primary Energy 54.59 kWh/m²/year

Measured over 4 years and includes entire resource consumption; grid electricity, on site PV use and wood pellet biomass consumption. Rated against P.H.P.P's 255.9m² T.F.A.

Heating Load 14.82 kWh/m²/year

580 litre PCM Thermal Store circulating heat through a 5kW in-line duct heater linked to the MVHR supply. Thermal store inputs via PV-T solar thermal, Immersun unit and an 11kW wood pellet boiler.



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Internal Environment

Simple; elegant & robust

The sculptural staircase is central within the house and instils a sense of solidity & strength.

MVHR is used Oct – March when heat is retained

Passive natural ventilation
April – September when windows are opened.

The temperature and air quality are stable and consistent everywhere.



Internal Environment



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Further information

Annual running costs:

minus £400 per annum

Airtightness:

0.56 air changes / hour

0.72m³/(hr.m²) @ 50 pascals

U-values:

0.12 W/m²K Exterior walls & roofs

0.11 W/m²K Floor

0.70 W/m²K Windows & doors

5,500 kWh annual renewable electricity generation

1,800 kWh annual renewable solar thermal energy generation

1,600 annual grid consumption from Good Energy



Internal Environment

Natural & recycled materials

- Durable & great for living
- Crushed glass bottle resin flooring and car tyre matting
- Use of hygroscopic materials to regulate Relative Humidity
- Locally produced flax rope and scaffold tubing used for stair balustrade
- Natural citrus oil paints
- Bamboo flooring
- English Cedar cladding
- Crushed bottle sand used in lime mortar for brickwork



Design Philosophy/ Innovation

Concept

The land is peeled up and a viewing hide nestled beneath.

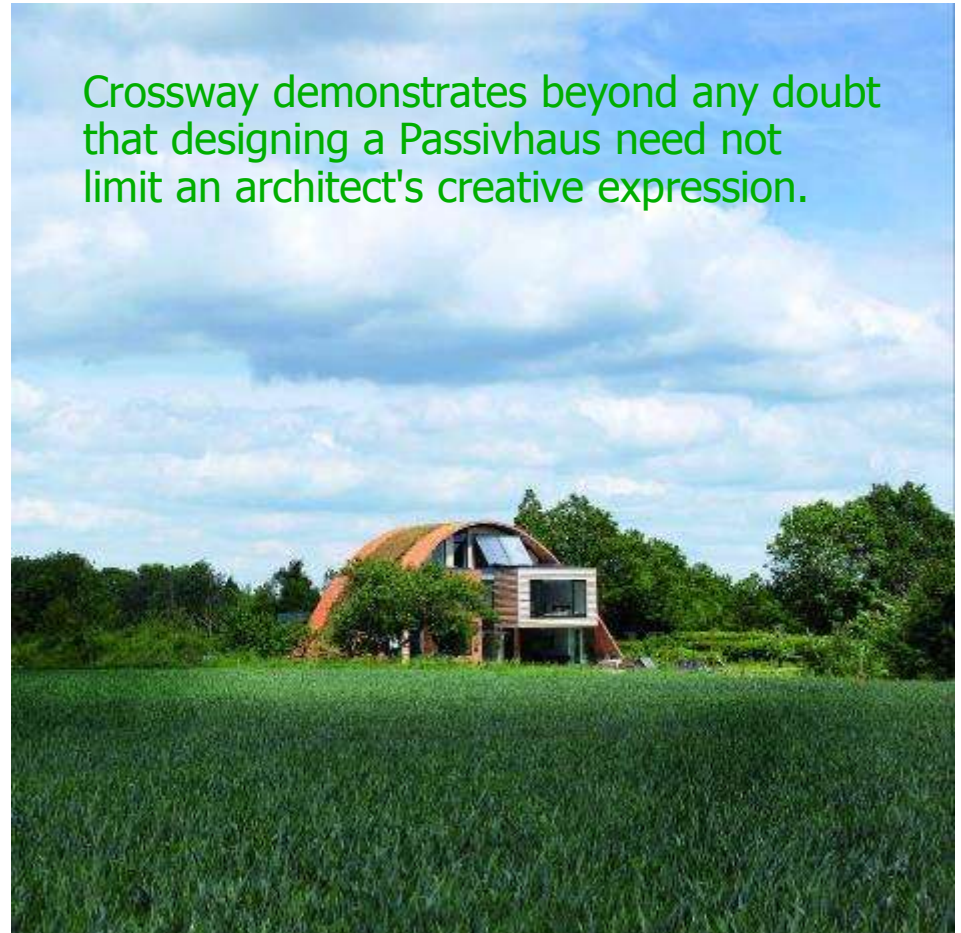


Sense of Place

Local clay and locally grown timber are combined to lock the house into the gently rolling Kent landscape.

Innovation

Building the world's largest timber vaulted arch incorporating 26,000 hand-made tiles dug from clay within 4 miles of the site. The tiles are glued together with plaster of paris without formwork.



Occupant Feedback

"I love being so protected from the elements while at the same time feeling so connected to the outside landscape."

"The house is flooded with daylight, the spaces are breathtaking and the air quality is fabulous."

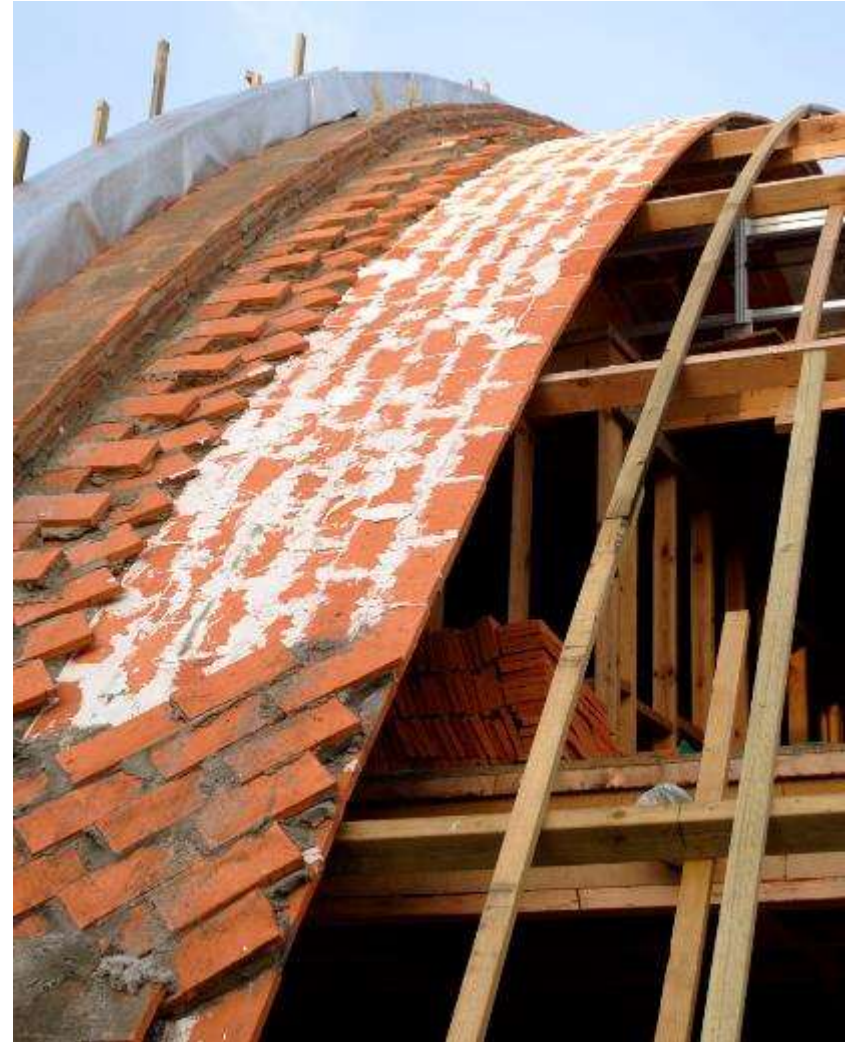
"Between April & September we open the windows to hear the birds because we don't need to worry about heating or cooling."

"Crossway is better than my wildest dreams and costs minus £400 a year to run ! Who wouldn't love that."

Sophie Hawkes



Design Philosophy/ Innovation

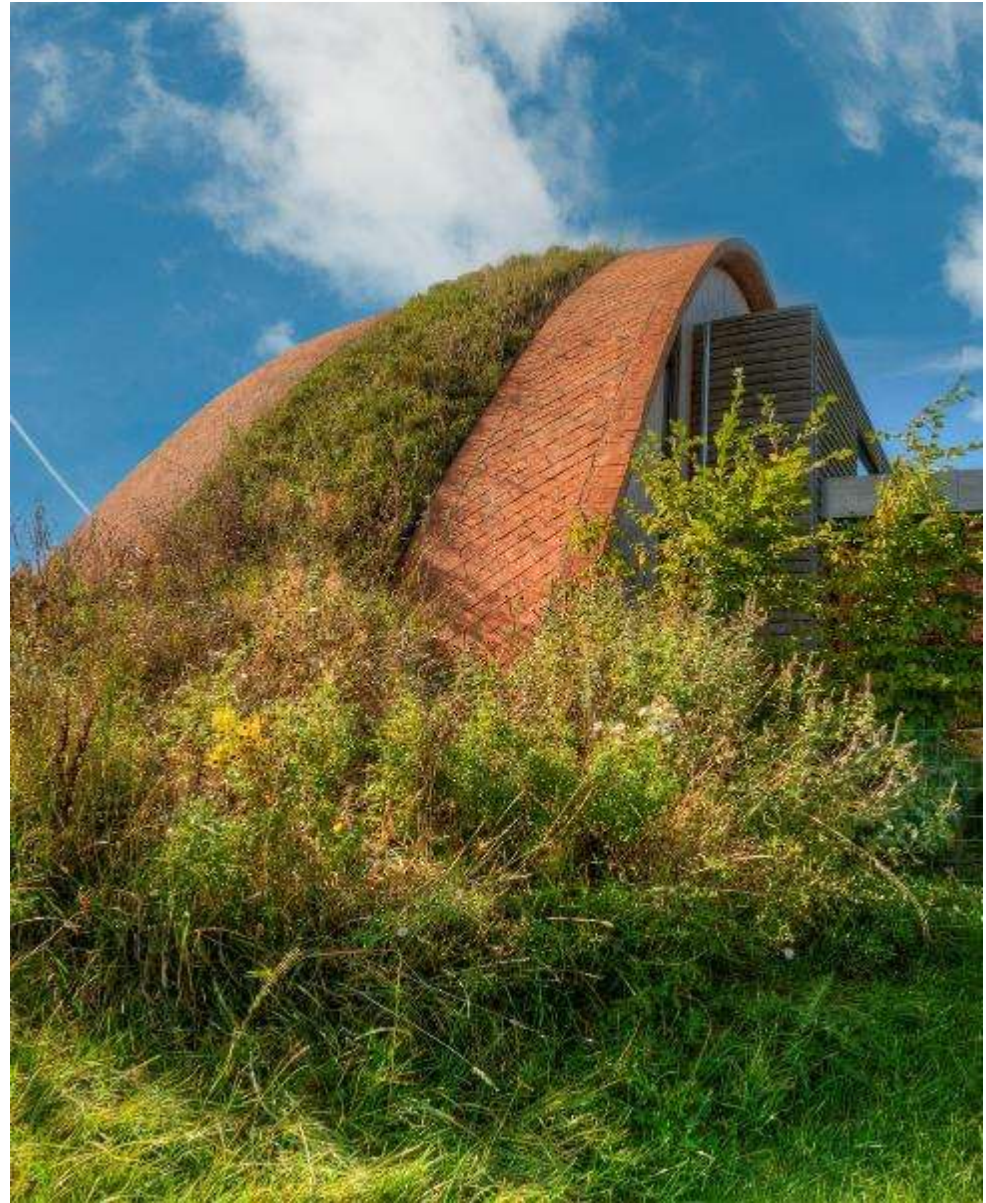


Aesthetics



Costs

Groundworks:	£59,000
Timber superstructure:	£70,000
Vault superstructure:	£93,700
Windows & doors:	£40,900
Cladding & external finishes:	£26,000
Plumbing, elec & I.T.	£33,900
Renewable technologies	£25,000
Monitoring system	£5,600
Waste water treatment & rainwater harvesting	£4,500
Recycled flooring products	£8,400
Kitchen	£8,400
Fees	£23,000
Other	£46,600
Total	£445,000
Equates to £1,739 per sq.m of T.F.A.	



Aesthetics



Other sustainability features

- 580 litre PCM Thermal Store. Heat inputs via;
- 3.42kW Photovoltaic Thermal (PV-T) system
- 11kW wood pellet boiler
- Additional 4.5kW PV array & Immersun unit
- Vacuum insulated doors & triple glazing
- 5kW in-line duct heater
- 100% on-site waste water treatment
- Voltage optimisation, LED lighting & induction cooking
- Extensive rainwater harvesting
- Native wildflower meadow roof
- High thermal mass including PCM board to provide a high level of thermal resilience
- Comprehensive ongoing building physics & resource monitoring



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