

One of the first Passivhaus standard, affordable housing schemes in the country

The project has presented many challenges in designing a robust solution to achieve Passivhaus performance levels on a large scale multiple unit development. The design solutions needed to be robust and repeatable, being readily achieved on a regular basis on the current site, and to be easily transferable to future developments. Working closely with the architect,

structural engineer and Passivhaus consultants, we have addressed the conflicting requirements of achieving the client's specification, code for sustainable homes, Secured by design, NHBC requirements and planning, whilst producing an aesthetically pleasing site. *For more information, please contact: ccurrie@mansell.plc.uk*

Randall Simmonds

To deliver an affordable housing scheme on a rural site to achieve Passivhaus and Code 4

Some of the key lessons that we have learnt about the application of the Passivhaus design standard to affordable housing are:-

1. Achieving Passivhaus requires a determined client, a skilled architect, a knowledgeable assessor and a willing contractor;
2. Selecting products that are both affordable and robust e.g. triple glazed windows, that achieve and maintain air-tightness, requires detailed research and product analysis;

3. The optimum method of water heating on an off gas network site also has to be considered;
4. The design and construction process cannot be fast-tracked;
5. We strongly recommend that a dedicated quality control resource is employed on site by the contractor to deliver a Passivhaus certifiable dwelling to the required air-tightness standard.

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Technical information

Passivhaus is primarily a comfort standard; the idea being to create a house that is warm everywhere with no drafts, no cold surfaces and plenty of fresh air.

To achieve the standard we chose the following construction:

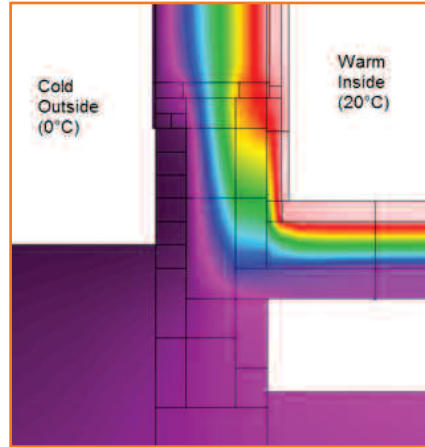
a. Roof: Insulated at rafter level with 500mm+ blown insulation which gets into all of the cracks and crevices of the roof to ensure a complete blanket. Typical U-value = 0.079W/m²K

b. Walls: A pre-constructed timber frame was brought to site by Holbrook with a very low timber content. Typical U-value = 0.104W/m²K

c. Floor: A beam and block floor was used with 150mm PIR insulation over, U-value = 0.147W/m²K

d. Windows: Careful selection and design was critical to energy and cost so we used Rationel with U-values in the region of 1.0W/m²K

e. High performance heat recovery ventilation: This was essential and we used the Zehnder Comfoair 200 which is Passivhaus certified.



Above: Modelling of the wall-floor junction with the colours representing temperatures; the calculation shows there is no thermal bridge for this detail.



Above: A thermographic picture of the inside of the windows on a cold day; the temperature on the glass is high meaning it is comfortable to sit next to.

f. Services: Kept as simple as possible, hot water is provided by solar thermal with electric backup with careful design of distribution to reduce energy consumption whilst the heating is all electric (another reason to get the fabric right!)



Passivhaus at Ford Close, St Ive, Cornwall



Using Passivhaus to address rural fuel poverty

Ford Close, St Ives, was a typical rural site, with no mains gas or drainage available, when Aster Communities (formerly Sarsen Housing Association) purchased it with the idea of developing 20 affordable homes that would meet the Passivhaus standard.

The success of the scheme has been a result of significant collaboration over an 18-month period with the design team and the contractor. The research and development phase involved learning together as none of us had delivered a Passivhaus scheme before. The aim was to provide attractive high-quality new homes with low running costs, helping to address fuel poverty issues faced by many residents in rural areas.

This was to be achieved with simple technologies that would be straight forward for the residents and economic for Aster to maintain. Early feedback from the residents has been extremely positive.

This is the first affordable housing development in Cornwall to be built using Passivhaus principles and Aster is delighted with the results.

It has been a great example of partnership working, which has been made possible with the support of Cornwall Council and the Homes and Communities Agency.

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WARM: Low Energy Building Practice

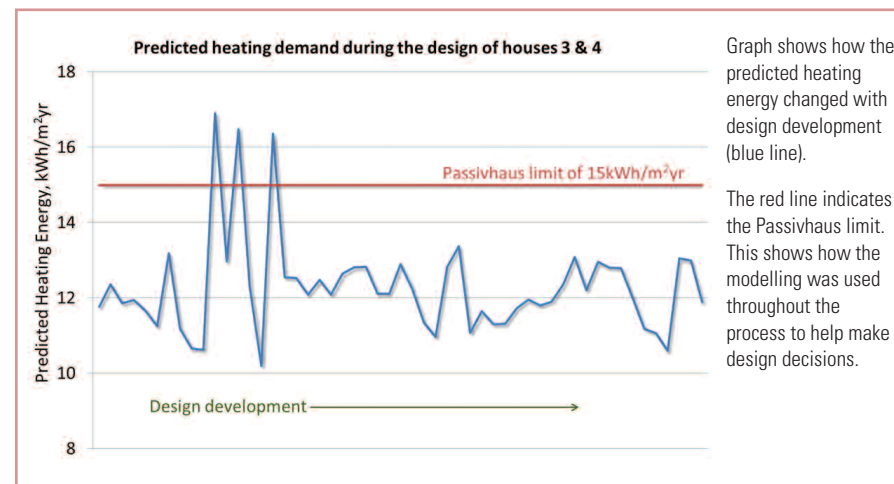
Low energy houses that also really improve the environment for their occupants

To meet the Passivhaus standard it is critical that the design is reviewed and modelled at every stage. As energy consultants, this was our role as well as developing a complementary services scheme.

Our experience tells us that keeping things simple is the best approach; we have seen too many complicated renewable systems which have been turned off or replaced because they are impossible to use. From our perspective the real advantage of the Passivhaus standard is that it is based on comfort. These houses are not only low energy, but also really improve the environment for the occupants (unlike a wind turbine).

An effective Passivhaus needs to have a simple shape. Alongside this, was a desire from the client, design team and planners to create something bespoke and interesting. This led to a design where the thermal and aesthetic forms were disengaged, with a simple thermal envelope and then pitched roofs, overhangs, balconies and porches added on top. This simplicity of form also meant that it was easier to achieve low airtightness and minimal thermal bridging later on. Cost was considered throughout: windows, for instance, were standardised and their performance carefully assessed.

For more information, please contact: helen@peterwarm.co.uk



Designing an affordable Passivhaus scheme

To have been involved with the St Ives Passivhaus project has been a great experience from the conceptual stage right through to getting positive feedback from the residents.

A fabric first approach to building is clearly the correct way to be constructing housing and with the Passivhaus route being a tried and tested philosophy it was clear from the outset that this scheme could be a beacon for future developments in the South West.

Designing to Passivhaus standards meant we included necessary features which enhanced the overall appearance without looking like the stereotypical 'eco house'. The design has maintained a clean, modern

look whilst being sympathetic to the local vernacular. The entire team involved subscribed to the Passivhaus philosophy straight away and together went on a journey with the same objective – to achieve Passivhaus accreditation on all 20 units. We all got stuck in when the inevitable site issues cropped up but together we found solutions and moved the project forward.

With fuel becoming ever more expensive this methodology is the future and by sharing knowledge and experience the economic viability becomes easier to achieve.

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