

LZ CARBON PROFILE

Profile: 022
January 2011



Brookwood Farm

Level 5 Code for Sustainable Homes

CO2 emissions: **At least 100% reduction over Part L2006**
Developer: **William Lacey Group/Woking Borough Homes**
Architect: **J Richard Bell (William Lacey Group)**
Completed: **July 2010**
Location: **Woking, Surrey**



Brookwood Farm is a development of 12 homes built by the William Lacey Group in partnership with Woking Borough Homes. The houses incorporate the very latest methods of construction, but offer a traditional appearance, with natural slate roofs, rustic brick dentil courses and arches to blend with the existing street scene. In 2011, the 10 semi-detached homes on the development were made available on shared ownership (through Woking Council's 'Hometrak' scheme which aims to provide affordable, sustainable homes.

Low carbon approach

Fabric The structural walls have been built using Insulated Concrete Forms (ICF). This system was chosen because it provides flexibility on design, allows a variety of external finishes, provides fast track construction and achieves high energy efficiency, including good airtightness. These walls, together with highly insulated roofs, triple glazed windows and high performance doors, minimise heat loss through the fabric.

Heat and power generation A high performance gas condensing boiler provides underfloor heating and hot water. This is supported by an MVHR system, which recovers waste heat while providing fresh air throughout the house. Photovoltaic slates generate electricity from the sun. This is fed into a private wire system and collected into the Woking Borough Homes grid. Power is then redistributed to the homes and street lights that generated the electricity. Any excess power is fed back and used elsewhere in the Borough.



Outline energy strategy

The high performance fabric (an integrated system of ICF wall construction, triple glazed windows and doors) together with a photovoltaic microgeneration system achieves a CO₂ emissions reduction of at least 100% compared to AD Part L1A 2006.

Envelope

Walls U = 0.15 W/m²K
250mm ICF (100mm concrete form) with facing brickwork cladding and internal insulated dry lining. A+ rated in the BRE Green Guide to Environmentally Sustainable Products.

Roof U = 0.10 W/m²K
Attic roof trusses with 450mm of layered glass insulation quilt at ceiling joist level.

Windows U = 0.78 W/m²K
Triple glazed with low e glass, krypton gas filled, slim UPVC frame, robust enough to meet the requirements of Secured by Design.

Airtightness 3.0 m³/m²/hr at 50 Pa.

Low impact heat and power

A high performance gas condensing boiler with indirect mains unvented hot water cylinder provides underfloor heating and hot water.

Photovoltaic Solar Slates

These blend seamlessly into the roof finish producing energy that is fed into a private wire network, with surplus being fed into the Woking Borough Council network.

Mechanical Ventilation Heat Recovery

A Vortice MVHR whole house system provides fresh air and recovers heat, from out-going air, for use in the home.

Contacts

Design: J Richard Bell (William Lacey Group)
E Contact: bellr@laceysimmons.co.uk
Construction: William Lacey Group
E contact: laceyc@laceysimmons.co.uk

Low energy alignment with the Code for Sustainable Homes (Design stage)

Energy Issue	Credits awarded
ENE 1 Dwelling Emission Rate 54% reduction in carbon emissions	14 of 15
ENE 2 Building Fabric Heat loss parameter of 1.02	2 of 2
ENE 3 Internal Lighting 100% of fixed fittings are dedicated and energy efficient	2 of 2
ENE 4 Drying Space Rotary dryer in garden and secured by fence and gate	1 of 1
ENE 5 Energy Labelled White Goods B rated washer dryer and A+ rated fridge freezer	2 of 2
ENE 6 External Lighting Space light fittings are dedicated and energy efficient, and security lighting not supplied so credit awarded by default	2 of 2
ENE 7 Low or Zero Carbon Technologies 100% reduction in carbon emissions	2 of 2
ENE 8 Cycle Storage Bicycle sheds are water-proofed, of adequate size and readily accessible, with fixings set into the ground for security	2 of 2
ENE 9 Home Office Bedroom provided with desk, operable windows for ventilation and daylighting, power sockets and telephone sockets for internet connectivity	1 of 1
Total 28 Credits*	

* out of maximum of 29 credits for the Energy Category

Construction type

Foundation: Concrete strip

Walls: ICF high performance wall clad with facing brickwork externally, finished internally with insulated plasterboard

Floors: Precast beam and block with 150mm slab insulation

Roof: Attic trusses finished with natural slates and integrated photovoltaic slates, fixed on an innovative galvanised system

Key learning points

- 1 By ensuring attention to detail via integrating training techniques and monitoring at site level, high airtightness performance can be achieved.
- 2 For this company, the learning process is seen as ongoing: post occupation evaluation is planned. Expectations will hopefully be met or exceeded and there will be low running costs. Focus must be on actual not theoretical energy savings.
- 3 The design requirements for lifetime flexibility provide many desirable features for these new homes.