DAVID WILSON HOMES / BARRATT HOMES – TATTENHOE PARK

BUILDING PROFILE
PROFILE: 003

DEVELOPERS
David Wilson Homes South Midlands, Barratt Homes Northampton

ABOUT
Both developers are part of Barratt Developments PLC, one of the UK’s largest house builders currently building around 16,000 homes a year.

START DATE
January 2013

COMPLETION DATE
August 2015

Profile supported by

OVERVIEW

Since our formation in 2008, the Zero Carbon Hub continues to work with Government and industry to identify risks, remove barriers to innovation and help demonstrate that energy efficient, healthy new homes can be delivered by the mainstream house building industry.

This series of building profiles gives examples of manufacturers, developers and clients who have embraced the challenge and are developing practical, commercially viable ways of delivering the next generation of homes in preparation for the nationwide introduction of Nearly Zero Energy Homes from 2020.

SUMMARY
Tattenhoe Park, Milton Keynes, was a development scheme secured through a Homes and Communities Agency (HCA) tender process in 2011. David Wilson Homes South Midlands and Barratt Homes Northampton commenced work on site in 2013. The scheme includes a total of 154 units, combining a range of sizes and configurations, including 24 affordable apartments, of mixed tenure.

SPECIAL FEATURES
The project was designed to comply with Code for Sustainable Homes (CSH) Level 4 and the Fabric Energy Efficiency Standard (FEES), as well as requiring an overheating assessment to be conducted, in accordance with CIBSE Guide A Environmental Design benchmarks (2006). The homes are also in compliance with Lifetime Homes Standards, Building for Life and HCA Standards.
PROJECT STRATEGY

KEY PLANNING CHALLENGES

Tattenhoe Park was the first scheme designed by Barratt Homes and David Wilson Homes to comply with the Fabric Energy Efficiency Standard. At the time of the tender process (2011) the FEES was not yet a core element of the Building Regulation requirements but was instead only a recommended proposal.

Therefore looking to meet the FEES, amongst an array of other HCA requirements, such as CSH Level 4, Flexible Extendable Homes, Overheating Assessments, Secured By Design, Lifetime Homes, Building For Life, Minimum Space Standards and Construction Efficiency Statements within the timescales required for the HCA Tender Process was a particularly demanding challenge. During delivery of this development the Government has sought to reduce this level of complexity via the Housing Standards Review. A less onerous and more streamlined process is expected to be introduced during 2015 which will see the a number of areas replaced by more consistent national standards.

Applying the FEES in all house typologies also proved difficult, as detached Flat-Over-Garage units were found to be unable to comply with the FEES requirements, the inherently less energy efficient heat loss geometry of these types require special consideration when looking to achieve high fabric performance standards. More information on the ‘FEES Sliding Scale’ can be found here on our website.

DELIVERY PROCESS

Aiming to deliver a scheme compliant with the FEES, resulted in the energy performance of the constructed homes being a major consideration throughout the delivery process. A ‘Fit and Forget’ delivery process was therefore considered to be a key ethos in the design approach, a legacy of Barratt Homes involvement in the AIMC4 project. This has resulted in a focus on high performance fabric design and construction, combined with air tightness standards that allowed the continued use of well established building services and ventilation strategies.

The final key element has been to ensure homes can be lived in by occupants, in an energy efficient way, without the need to rely upon education or increased interaction with systems and controls.

PRODUCTS AND SYSTEMS

FABRIC

- To comply with the FEES requirements for the scheme the insulation was enhanced in walls, floors and roofs
- Within the masonry walls for example cavities were increased to 125mm and thermally broken lintels used
- A critical element to success has been a focus on modelling and improving all thermal bridging junctions across the development. This has proved to be a highly cost effective strategy for all David Wilson Homes and Barratt Homes house type, of which there are in the region of 200 in their range

BUILDING SERVICES

- Systems which were not reliant on new or enhanced skills, to design or install, were preferred in order to reduce the risk of performance loss and increased maintenance, due to lower quality installations
- Efforts to refine junctions and the air tightness strategy at the design and sequencing stage have allowed the homes to meet energy efficiency requirements whilst retaining a traditional trickle ventilation and intermittent extract from wet rooms strategy
- Space heating domestic hot water is supplied by standard high-efficiency gas boilers
- Photovoltaic systems of around 1kWp were used on select-ed homes levels to achieve the required CSH 4 Energy

A primary aim of this development has been to achieve high levels of energy efficiency by optimising traditional materials and skills whenever possible. The construction site has followed a standard build process supported by continual feedback between site and design teams. This has involved regular progress meetings and ad-hoc correspondence when issues occurred. The Barratt Homes SHE (Safety, Heath and Environment process) and quality processes includes a ‘Site Start’ meeting to ensure all key design information and quality processes are handed over to the construction team before work commences.

The Site Manager and Contracts Manager take responsibility for workmanship quality on site, supported by the NHBC Assessment process. The final approach adopted was viewed as low-risk due to the strategy of evolving standard practice rather than changing to a completely revolutionary new approach.
PROJECT SOLUTIONS

PART L 2010

Fabric Energy Efficiency Standard

ACHIEVED
39 Kwh/m²/yr Flats and Apartments
46 Kwh/m²/yr Detached/Semi-Detached

The specifications shown here are typical across the development. Certain house types required additional insulation upgrades due to their less efficient basic geometry.

PART L 2010

Carbon Emissions

ACHIEVED
12.39 kgCO₂/m²/year Average

The airtightness layer of the dwellings was built up through the construction phase with plasterboard finish being the final layer.

By specifying the more commonly understood ‘System 1 - Natural ventilation with intermittent extract fans’, the team have sought to reduce the risks related to requiring additional skills and knowledge on site for the installation and / or commissioning of whole house mechanical ventilation systems.

PART L 2010

OVERHEATING

The Tattenhoe development was designed in accordance with CIBSE 2006 Guide A Environmental Design (modelled with existing weather data) benchmarks. Homes on the development were shown to be low risk. In addition pergolas and deciduous planting was included on plots with large south facing glazing, to minimise summer solar gain whilst allowing the more beneficial winter solar gain.

PART L 2010

Carbon Emissions

AIRTIGHTNESS AND VENTILATION

THERMAL BRIDGING

y = 0.023 – 0.045 W/m²K

Typical Y-value range

WALLS

U = 0.22 W/m²K

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KEY LESSONS

DESIGN STAGE

A key lesson learnt through the development at Tattenhoe has been that whilst it can be commercially viable to achieve the FEES standard at such a scale, even while incorporating a number of house typologies and orientations, it is vital that the solutions employed adopt a pragmatic and customer friendly approach. Furthermore it must also be understood that for the development to perform as designed, and for customer comfort to be guaranteed, this approach must be backed by both the relevant skills and knowledge within the design and construction teams, as well as the knowledge and desire of a client to insist upon an energy efficient, low carbon approach.

Lessons were also learnt regarding the practicality of adopting additional design standards. For example when considering overheating; while certainly a valuable exercise, there are significant challenges and practicality limitations in employing CIBSE Guide A benchmarks at scale. Both additional training and an understanding of high-level risk analysis are required to understand which typologies are practical to review on this basis.

Innovative new product and material options do exist and should be explored. However close involvement of the technical and construction teams is important to ensure issues such as build ability and commissioning are properly considered. As always information flow across the delivery team, including procurement, is important, irrespective of the energy efficiency standards being built.

CONSTRUCTION AND COMMISSIONING STAGE

During the construction phase it was recognised that keeping designs standardised, and appropriate to traditional forms, was preferable even when achieving enhanced energy performance design standards. This allows construction to continue largely unhindered and reduces the risk of performance loss from lack of knowledge or skills on site.

The project team used a formal Site Project Management protocol unique to Barratt Homes and David Wilson Homes called 'Unite', which ensures all necessary feedback loops are in place. This process includes both internal and external stakeholders in the project and enabled Tattenhoe to be delivered to the higher performance standards and ahead of schedule.