PROPOSED RESIDENTIAL DEVELOPMENT
Phases 2, 3 & 4 Pendle Road, Standen, Clitheroe

ENERGY REPORT

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Introduction

This Energy and Sustainability Report has been prepared by Award Energy Consultants on behalf of Taylor Wimpey UK Ltd ("Taylor Wimpey") in connection with the proposed residential development of 426 dwellings in Phases 2, 3 & 4 at Pendle Road, Clitheroe.

This report considers the issues surrounding sustainable construction with regards to the proposed residential development. In particular, it considers and evaluates the measures incorporated into the design of the development to reduce the predicted energy usage of the site.

Proposal

The performance of the building fabric, the efficiency of the building services and the management strategies of the occupants of a dwelling broadly determine the energy consumption and carbon emissions of a dwelling. Taylor Wimpey has appointed Award Energy to use SAP 2012 to analyse the potential energy needs reduction that can be achieved through an enhanced fabric specification. In addition, measures to ensure sustainability throughout the lifetime of the development have been evaluated and incorporated into the design process.

Policy Context

The following documents were considered:

Building Regulations 2013 - as new build dwellings, Part L1A is of particular note. Part L1A sets minimum standards for fabric and energy efficiency for new build dwellings

National Planning Policy Framework 2019 - strengthens the emphasis on sustainable development, and requires new developments to secure the highest viable resource and energy efficiency and reduction in emissions by considering Governments and other national standards

Condition 4 of Planning Application Ref 3/2015/0895: requires at least 10% of the total energy requirements of the development will be reduced via renewable technology or alternative methods

Method

The Target Fabric Energy Efficiency (TFEE) has been used as a Baseline against which to measure specification performance. The comparison of the Dwelling Fabric Energy Efficiency (DFEE) against a notional Target Fabric Energy Efficiency (TFEE), as calculated via SAP 2012, is currently the only mandatory Building Regulatory requirement which specifically relates to energy. This approach, therefore, appears the most logical. The Fabric Energy Efficiency ratings DFEE and TFEE (as developed by the Zero Carbon Hub, and implemented into Building Regulations Part L1a 2013) are defined as the space heating and cooling requirements, per square metre of floor area, per year, for the as-defined and notional dwelling, respectively, and are measured in units of kWh/m²/year.

Award Energy have compared the specification that will achieve minimum compliance with Part L1a 2013 with the intended enhanced specification that Taylor Wimpey will submit as part of the agreed details, as shown in Table 1. Within the enhanced specification, all heat loss elements have been insulated beyond regulation requirements and regulated u-values for external walls, floors and roofs have been surpassed. A design air pressure test of 5 has also been targeted and efficient boilers have been included with high specification heating controls. In addition, Taylor Wimpey commissioned thermal model results were used; thermal bridging is an important element within Part L1a 2013 and can be calculated by thermally modelling standard structural details.

Table 1

Element	Value required By 2013 regulations* (u-value)	Enhanced specification (u-value)	% Improvement
Walls (w/m²k)	0.30	0.27	10%
Roofs (w/m²k)	0.20	0.10	50%
Floors (w/m²k)	0.25	0.15	40%
Windows (w/m²k)	2.0	1.4	30%
Doors (w/m²k)	2.0	1.5	25%
Design air pressure test ($m^3/h/m^2$)	10	5	50%

* For U-values: See Approved Document L1a 2013 Building Regulations

Results of Energy Demand Reduction Calculations

Using SAP2012 software and the specification detailed in Table 1, the average predicted energy demand for each house type in kWh/m2 per year was calculated, as shown in Table 2 below.

Table 2

Property Type	No	Energy Consumption (kWh/m²/yr) Baseline specification	Energy Consumption (kWh/m²/yr) Enhanced specification
Mid-Terrace	31	42.84	35.72
Semi-Detached	228	51.90	46.21
Detached	143	57.58	51.34
Apartments - Ground Floor	8	48.99	44.23
Apartments - Mid Floor	8	38.90	35.36
Apartments - Top Floor	8	52.35	43.68

Table 3 below shows the average predicted energy demand for each house type. The baseline weighted average predicted energy demand for the site is 53.27 kWh/m²/yr (with all properties meeting the minimum requirements of Part L1a 2013). The weighted average predicted energy demand with Taylor Wimpey's enhanced specification is 47.24 kWh/m²/yr – an **11.32%** reduction in site-wide energy requirements over the 2013 Building Regulations.

Table 3

Property Type	No	Weighted Energy Consumption (kWh/m²/yr) Baseline specification	Weighted Energy Consumption (kWh/m²/yr) Enhanced specification	% reduction in Energy Consumption
Mid-Terrace	31	3.00	2.50	16.66%
Semi-Detached	228	28.03	24.95	10.99%
Detached	143	19.58	17.45	10.88%
Apartments - Ground Floor	8	0.93	0.84	9.68%
Apartments - Mid Floor	8	0.74	0.67	9.46%
Apartments - Top Floor	8	0.99	0.83	16.16%
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Site-wide average energy demand (kWh/m²/yr)		**53.27**	**47.24**	**11.32%**

Not only will the specification deliver the aspirations of the National Planning Policy Framework 2019 but it will also serve to last the lifetime of the development with no future maintenance issues. Fabric first is therefore the most practicable approach to energy demand reduction.

Energy Efficiency Measures

Taylor Wimpey propose to incorporate the following additional measures into the 2013 designed dwellings in order to reduce carbon emissions and energy demand.

- Highly efficient space and hot water heating systems. These will be accompanied by thermostatic controls, zoned heating and programmers to ensure that heating is optimally controlled to use the least amount of energy
- High levels of insulation across all thermal elements within the build
- Thermal blocks are proposed for this development as they are made of a sustainable material which has a high recycled content and excellent insulation and acoustic absorption properties
- High levels of air tightness to be achieved within the construction of the dwelling to reduce unnecessary heat loss. As part of its design and build strategy, Taylor Wimpey is committed robust monitoring of the standard of construction on site and pre-completion air testing
- Addressing Thermal Bridging limits heat loss across junctions; Taylor Wimpey have looked at the standard details for thermal bridging and, in consultation with the Aircrete Products Association, the Concrete Block Association and the Energy Savings Trust, have modelled and proven enhancements from ACD standard details
- Party Wall u-values to be 0 w/m²k
- 100% dedicated low energy lighting
- Windows and doors will be a minimum of 25% more efficient than minimum standards with the Building Regulations
- All external light fittings will be provided with energy efficient light bulbs with appropriate control systems for efficient usage
- The benefits of passive solar design are well documented and have been considered by the design team of Taylor Wimpey. Sufficient glazing will be provided to the principal living rooms of each dwelling to ensure sufficient natural lighting, thus reducing the energy consumed in artificially lighting the room. In addition, it is well known that developments which are orientated to ensure that the principal glazed elevations are within 30 degrees of due south are most effective at utilising solar gain, thus reducing energy consumption. Where practicable and feasible this has been incorporated into the site design
- Natural ventilation is the most energy efficient form of ventilating a space. To this end, the dwellings will be naturally ventilated via open-able windows and trickle vents.

Conclusion

This report demonstrates that the proposed enhanced fabric specification reduces average energy demand on the site by a total of **11.32%** over the 2013 Building Regulations requirements**.** In addition, sustainable measures are proposed that are in line with the National Planning Policy Framework 2018, which emphasises sustainable development, energy efficiency and reduction in carbon emissions. The proposed strategy places a great importance on the efficiency of a property's thermal envelope and internal building services. Taylor Wimpey's energy strategy for the proposed Phases 2, 3 & 4 development at Pendle Road, Clitheroe therefore ensures that each dwelling on the development benefits from built-in energy reduction measures and that the development meets the needs of the present without compromising the ability of future generations to meet their needs.