

**Taylor Wimpey  
(Manchester)**

**Land Off Pendle Drive,  
Calderstones**

**Carbon Reduction  
Report**

**14<sup>th</sup> September 2011**

**Ref: 2011-061-001b**

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**Authorised for and on behalf NJL Consulting LLP**



**Rob White  
Partner**

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# 1.0 Introduction

NJL Consulting has been commissioned by Taylor Wimpey to review the approach to Carbon Reduction and assess the performance of the proposed residential development on Land off Pendle Drive, Calderstones, Whalley, in the Ribble Valley.

The aim of this report is to summarise the relevant policy background and requirements of Ribble Valley Borough Council and demonstrate the ways in which Taylor Wimpey have addressed the policy aims to achieve significant energy demand reductions throughout the proposed development.

Having briefly described the development proposals, the relevant national, regional and local policies are reviewed along with Building Regulations, Part L (2006) requirements for sustainable and low energy dwellings. The report then sets out the ways in which energy reduction will be effectively achieved by Taylor Wimpey at this proposed development site and demonstrate how the energy targets will be achieved using a number of representative SAP calculations for the site.

The scheme is registered under Building Regulations, Part L (2006).

## 1.1 Development Proposals

The proposed development site was previously occupied by buildings that were part of the Calderstones Hospital complex (see Figure 1.1).

**Figure 1.1 – Pre-development Site with Orientation**

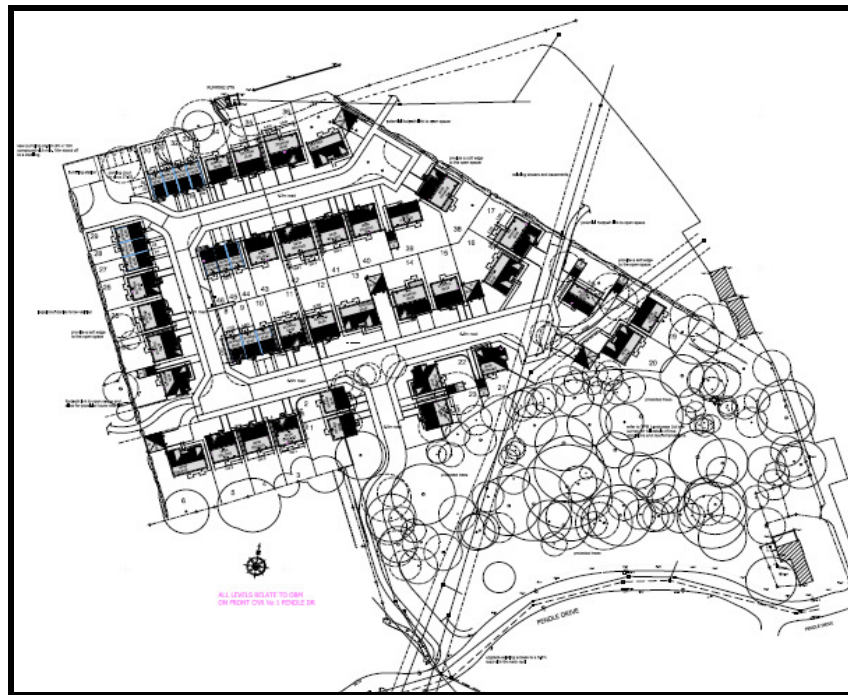


The scheme is for the construction of 46 residential dwellings comprising a mix of detached houses and terraced mews properties including 2, 3, 4 and 5 bed variants (see Figure 1.2).

Taylor Wimpey intends to design and build the dwellings to address the issue of climate change along with the need to reduce energy consumption and associated carbon dioxide emissions. The aim is to achieve a minimum site wide reduction in energy demand of 10% compared to Building Regulations (Part L, 2006).

This energy demand reduction will primarily be achieved through a fabric-led approach, increasing the thermal performance of the materials and construction techniques. An element of renewable energy technology will supplement this approach.

***Figure 1.2 - Development Proposals, Provisional Layout***



## 2.0 Policy Review

### 2.1 Low Carbon Agenda

The UK has established carbon targets within the 2008 Climate Change Act which aim to cut UK emissions by 34% by 2020 and at least 80% by 2050. Dwellings account for approximately 27% of the UK's carbon footprint hence, there is great potential to reduce energy demand and carbon dioxide emissions through addressing the energy efficiency of new and existing homes in the UK.

To tackle this and ensure a greener future, policies and programmes have been set up at all levels to guide development towards significant carbon emissions reduction. The principal elements are listed below.

### 2.2 Building Regulations

Building Regulations, Part L - Conservation of Fuel and Power sets the compliance standards for energy demand and carbon dioxide emissions from buildings. Approved Document L1A specifically addresses the conservation of fuel and power in new dwellings.

The proposed development is registered against Building Regulations, Part L (2006). Since 2006, all newly constructed dwellings need to comply with the 5 criteria set out in Approved Document L1A unless exempted through the transitional provisions:

- I. The predicted rate of carbon dioxide emissions from the dwelling (the Dwellings Emission Rate DER) is not greater than the Target Emissions Rate (TER).
- II. The performance of the building fabric and fixed building services should be no worse than the design limits set out in Table 2 of the Approved Document.
- III. The dwelling has appropriate passive control measures to limit the effect of solar gains on indoor temperatures in summer.
- IV. The performance of the dwelling as built, is consistent with the DER, including site checking that the air permeability is within reasonable limits.
- V. The necessary provisions for energy efficient operation of the dwelling are put in place including operating and maintenance instructions aimed at achieving economy in the use of fuel and power in a way that householders can understand.

**The proposed residential development at land off Pendle Drive, Calderstones will seek to achieve at least a 10% reduction in energy demand compared to a Part L, 2006 compliant dwelling. The proposed dwellings will be therefore more efficient and result in significantly reduced energy demand and carbon dioxide emissions than a Building Regulations, Part L (2006) compliant build. This will be demonstrated through Standard Assessment Procedure (SAP) calculations for reports for representative units.**

## 2.3 National Policy

### *National Planning Policy framework (NPPF)*

The Coalition government published the draft National Planning Policy Framework (NPPF) on 27th July 2011, and is out for consultation until 17 October 2011. The NPPF is a key part of the Coalition's reforms to make the planning system less complex and more accessible, and to promote sustainable growth.

The National Planning Policy Framework gives a clear direction of travel under the Coalition government and is identified by the Planning Inspectorate as being of critical importance to the determination of planning applications as well as appeals.

The Planning Inspectorate (PINS) has already issued advice to its Inspectors to the effect that they should consider, *'... on a case by case basis whether the draft NPPF is a material consideration of some weight, its relevance to the issues and whether in the interests of natural justice, the matter is referred to the parties before determination'*.

The NPPF provides the following key messages that are of relevance to the planning application proposals:

- The planning system should plan for prosperity (an economic role) and build a strong, responsive and competitive economy, by ensuring that sufficient land of the right type, and in the right places, is available to allow growth and innovation; and by identifying and coordinating development requirements.
- The planning system should plan for people (a social role) and promote strong, vibrant and healthy communities.... by creating a good quality built environment, with accessible local services that reflect the community's needs and supports its health and well-being; and
- The planning system should plan for places (an environmental role) and use the planning system to protect and enhance our natural, built and historic environment, use natural resources prudently and mitigate and adapt to climate change, including moving to a low-carbon economy.

Planning must operate to encourage growth and not act as an impediment, with significant weight placed on the need to support economic growth.

- At the heart of the planning system is a presumption in favour of sustainable development.
- Local planning authorities should plan positively for new development, and approve all individual proposals wherever possible.
- Local planning authorities should:
  - Prepare Local Plans on the basis that objectively assessed development needs should be met, and with sufficient flexibility to respond to rapid shifts in demand or other economic changes
  - Approve development proposals that accord with statutory plans without delay; and grant permission where the plan is absent, silent, indeterminate or where relevant policies are out of date.

- All of these policies should apply unless the adverse impacts of allowing development would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole.

**The application proposes to redevelop an existing brownfield site, thereby make efficient use of the land and creating a high quality development in a highly accessible location. Brownfield development is deemed to be prudent use of natural resources.**

**As evidenced hereafter, this residential scheme will be specified beyond the regulatory compliance standard, thus creating a good quality built environment. Furthermore, the development proposals can be considered to support the government's aim of promoting strong, vibrant and healthy communities.**

### ***2.3.1 PPS1 – Delivering Sustainable Development – 2005***

PPS1 sets out the overarching principles of the delivery of sustainable development through the planning system: “*Sustainable development is the core principle underpinning planning*”. The policy provides a framework for the achievement of the government's objectives for sustainable development, which as previously stated in *A Better Quality of Life – A Strategy for Sustainable Development in the UK* (1999) are:

- Social cohesion and inclusion;
- Protection and enhancement of the environment;
- Prudent use of natural resources; and
- Sustainable economic development.

### ***2.3.2 Supplement to PPS1 – Planning and Climate Change – December 2007***

This supplement to PPS1 (sPPS1) sets out how planning should contribute to reducing greenhouse gas emissions, stabilising climate change and adapting to its foreseen effects. The document sets a series of Planning Objectives (Para 9) covering general, social, environmental and economic objectives for the delivery of sustainable development which includes:

*‘Provide for the homes, jobs, services and infrastructure needed by communities, and renew and shape the places where they live and work, secure the highest viable resource and energy efficiency and reduction in (carbon) emissions.’*

### ***2.3.3 Planning Policy Statement 22: Renewable Energy***

This supplement to PPS1 provides policy guidance relevant to consideration of planning for renewable energy. The document establishes a number of key principles which Regional planning bodies and local planning authorities should adhere in their approach to planning for renewable energy.

PPS22 states that Local planning authorities may include policies in local development documents that require a percentage of the energy to be used in new residential, commercial or industrial developments to come from on-site renewable energy developments.

Such policies:

- I. Should ensure that requirement to generate on-site renewable energy is only applied to developments where the installation of renewable energy generation equipment is viable given the type of development proposed, its location, and design;
- II. Should not be framed in such a way as to place an undue burden on developers, for example, by specifying that all energy to be used in a development should come from on-site renewable generation.

The Companion Guide to PPS22 cites the London Borough of Merton as an example of how to promote the delivery of a proportion of on-site generation. Specifically, Policy E.11 of the **London Borough of Merton UDP (2003) states:**

*“To achieve environmental benefits, employment developments will be expected to be of high quality and layout. All new industrial, warehousing, office and live/work units outside Conservation Areas and above a threshold of 1,000sqm will be expected to incorporate renewable energy production equipment to provide at least 10% of predicted energy requirements...”*

**The approach set out for this development is aligned with the requirements of PPS1 and its Supplement, as it allows for a prudent use of natural resources and significant carbon reduction through energy conservation. In reducing energy demand and associated carbon dioxide emissions, the development proposal are accord with the requirements of sPPS1 and PPS22.**

### **2.3.4 Definition of Zero Carbon Homes and Non-Domestic Buildings**

The full definition of zero carbon for new homes built from 2016 is currently under consultation. The approach however, has been determined and includes a three-stage process to achieving zero-carbon dwellings, as follows:

1. **Fabric Energy Efficiency** – focuses on the fabric of the home, to secure long lasting benefit for home owners and occupiers, and to make sure that energy efficiency plays a proportionate part in the ultimate delivery of zero carbon homes.
2. **Carbon Compliance** – Reducing CO<sub>2</sub> emissions on-site through low and zero carbon technologies and connected heat networks.
3. **Allowable Solutions** – Mitigating the remaining carbon emissions through Allowable Solutions, which secure carbon savings away from the site.

**In line with the agreed approach to Zero-Carbon Developments, the proposed scheme addresses energy efficiency primarily through enhanced insulation measures to achieve at least 10% energy demand reduction against (Part L, 2006) Building Regulations compliance requirements.**

## **2.4 Regional Spatial Strategy**

The Regional Spatial Strategy for the North West (NW RSS) was adopted in September 2008. The Plan addresses the issues of carbon reduction and energy conservation.

**Policy EM16: Energy Conservation and Efficiency** states that Local Authorities and Developers should ensure that *“their approach to energy is based on minimising consumption and demand”*.

In accordance with PPS22, **NW RSS Policy EM18: Decentralised Energy Supply** states that, in advance of local targets being set, new residential developments of ten or more units should secure at least 10% of their predicted energy requirements from decentralised and renewable or low-carbon sources, unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable.

**The proposed development meets the requirement of EM16 by minimising energy consumption throughout the proposals by increasing insulation and committing to a 10% reduction in energy demand against a Building Regulations, Part L (2006) compliant build. This approach is considered more feasible and viable than achieving solely the renewable energy or low carbon target prescribed by policy EM18 however, the development proposals include an element of renewable energy on a number of dwellings. Furthermore, the proposed build fabric enhancements will deliver energy demand reduction in excess of the 10% target required by Policy EM18.**

## 2.5 Local Policy

### *Local Plan*

The adopted Local Plan (1998) does not contain specific requirements for energy conservation within development proposals nor does it have requirements for decentralised renewable and/or low carbon technologies to be provided as part of new developments.

The Ribble Valley Borough Council (RVBC) Local Development Framework (LDF), which will eventually replace the Local Plan, is currently under consultation and does not at present include policies (usually through Supplementary Planning Documents) for energy conservation in new build or for the provision of decentralised energy sources.

### *Formal Planning Response*

Following Taylor Wimpey's Pre-Application meeting with Ribble Valley Borough Council in March 2011, the following formal planning response was issued. This provides guidance which relates to the acceptable approach to renewable energy integration and energy conservation at the site, as follows:

*‘...the Council seeks to promote the development of renewable energy resources in accordance with PPS1 and as such will be seeking a minimum contribution of 10%.’*

As outlined above, the appropriate national and regional policy guidance which justifies this percentage contribution are PPS22 and RSS EM18 respectively. Both PPS22 and Policy EM18 state that the target for renewable technology or low carbon provision relates to energy demand, rather than carbon dioxide emissions. Hence, RVBC's guidance for this development is interpreted to relate to reduction in energy demand.

The formal planning response also confirms that:

*‘...the mixed approach principle of energy demand reduction (from fabric enhancement and renewable energy integration) is acceptable to RVBC.’*

It should be noted that the previously developed adjacent site of Calderstone Green benefited from a fabric led approach to reducing the dwellings' initial energy demand and associated carbon dioxide emissions. The enhanced fabric specification was supplemented with renewable energy provision, incorporated in 13% of dwellings. This approach and level of renewable energy provision was accepted by RVBC.

**Despite the RVBC Local Plan not currently containing adopted policies on carbon and/or energy reduction, the proposed development will adopt a low energy approach and will accord with the guidance provided in RVBC's formal planning response.**

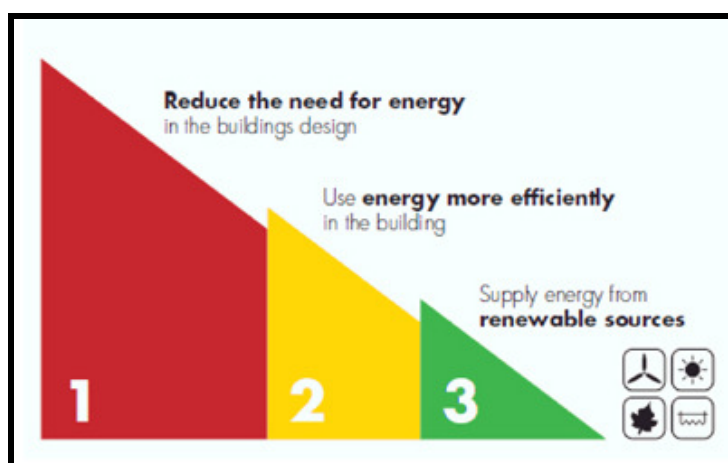
## 3.0 Achieving Carbon Reduction

### 3.1 Taylor Wimpey and Carbon Reduction

Taylor Wimpey is committed to offer new designs and techniques for improving the energy efficiency of the houses they build. The proposed construction and design specification for this scheme will deliver dwellings that are inherently efficient and cost effective during occupation.

Taylor Wimpey will construct these dwellings with material and design specifications which exceed Building Regulations standards, that will reduce energy demand and associated carbon dioxide emissions. With respect to the air permeability performance standard, Taylor Wimpey dwellings routinely perform significantly beyond the regulatory requirement.

**Figure 3.1 – Energy Hierarchy**



This approach is in accordance with the first principle of the energy hierarchy (see Figure 3.1) which states that reduction in energy demand should be achieved initially by energy efficiency.

### 3.2 Approach At Calderstones

Taylor Wimpey will deliver the target 10% energy demand reduction compared to a Building Regulations, Part L (2006) compliant build in accordance with Ribble valley Borough Council's aspirations for the site.

This will be achieved primarily by enhancing the insulation of the building fabric for all dwellings at the site, incorporating materials with high thermal performance and careful construction techniques to ensure low air permeability, thereby limiting heat loss from the buildings.

Additionally, 13% of the dwellings at the site will be specified with solar thermal water heating systems to further reduce energy demand. This approach will reduce demand and enhance efficiency of the dwellings which will guarantee efficiency of operation throughout their lifetime and occupation.

It should be noted that the previously developed adjacent site of Calderstone Green benefited from a fabric led approach to reducing the dwellings' initial energy demand and associated carbon dioxide emissions. The enhanced fabric specification was supplemented with renewable energy provision, incorporated in 13% of dwellings. This approach and level of renewable energy provision was accepted by RVBC.

### 3.3 Build Fabric And Thermal Performance

The standard measurement of heat transfer through a given building material or construction type is the U-value. The lower the U-value, the more slowly heat transfers and hence, is lost out of a building. In buildings, heat loss generally takes effect through:

- Ground Floor;
- External Walls;
- Roofs;
- Doors and windows;
- Thermal Bridging (heat loss through construction joints); and
- Uncontrolled ventilation.

Taylor Wimpey's material selection and build methods which will be incorporated within this development provide the following benefits:

- Good levels of thermal insulation to heat loss elements;
  - Efficient double glazing units and external doors;
  - An element of dedicated low energy light fixtures;
- Detailing to limit heat losses through thermal bridging; and
- Detailing to limit heat losses through air permeability.

Table 3.1 compares the material specification (U-values) necessary to achieve compliance with Building Regulations, Part L (2006) to the Taylor Wimpey enhanced specification proposed for this scheme.

**Table 3.1 – Material Specification Comparison**

| Construction Elements             | Detached House          |                        |
|-----------------------------------|-------------------------|------------------------|
|                                   | Compliant Specification | Proposed Specification |
| Ground Floor (W/m <sup>2</sup> K) | 0.25                    | 0.15                   |
| Ext Wall (W/m <sup>2</sup> K)     | 0.3                     | 0.25                   |
| Roof (W/m <sup>2</sup> K)         | 0.2                     | 0.1                    |
| Windows (W/m <sup>2</sup> K)      | 1.8                     | 1.5                    |
| Doors (W/m <sup>2</sup> K)        | 2.0                     | 1.1                    |
| Ventilation                       | 9                       | 5                      |

This build specification is significantly beyond that required by Building Regulations.

### 3.4 Solar Thermal

Solar collectors absorb the sun's energy and typically provide heat for domestic hot water (although they can also contribute to space heating in some cases, especially when coupled to under floor heating systems). The system transfers heat from the collectors to storage tanks. Such technology is suited to the UK climate and will work effectively on overcast days with diffuse sunlight. Their efficiency depends upon positioning; ensuring the panels are orientated approximately due south and mounted between 30° and 50° will deliver good performance.

As presented in Figure 1.2, the proposed site plan indicates a number of properties will have correctly orientated and sufficient area of roof space to accommodate solar collectors and facilitate efficient operation. The solar store (hot water cylinder) may be accommodated within the store cupboard on the first floor of the dwellings.

An example solar thermal specification is presented in Table 3.2 and has been utilised in the representative SAP calculations for the site.

**Table 3.2 – Example Solar Thermal Specification**

|                     |                          |
|---------------------|--------------------------|
| <b>Manufacturer</b> | Kingspan Solar           |
| <b>Collector</b>    | Marvel, Flat Plate 2108  |
| <b>Cylinder</b>     | Tribune Solar, 250 litre |

It is proposed that solar thermal systems will be incorporated within plots 12, 13, 14, 15, 16 and 17. This equates to 13% of the total number of dwellings proposed for the site.

The previously developed adjacent site of Calderstone Green benefited from a fabric led approach to reducing the dwellings' initial energy demand and associated carbon dioxide emissions. The enhanced fabric specification was supplemented with renewable energy provision, incorporated in 13% of dwellings. This approach and level of provision was accepted by RVBC.

Each of these units has suitable roof space and is specified with a 'system boiler' which facilitates simple integration of the solar thermal technology to the heating system.

### 3.5 SAP Calculations

Approved SAP 2005 software (NHER Plan Assessor v4.5) has been used to generate energy demand models for representative housetypes. This software calculates the regulated energy demand of the dwellings and associated carbon dioxide emissions, in accordance with the requirements of Building Regulations, Part L (2006) under which this development has been pre-registered.

A number of representative SAP calculations have been undertaken to demonstrate the site wide energy demand reductions arising from the enhanced material specification and the

integration of solar thermal collectors to 13% of the dwellings. The dwellings assessed are presented in Table 3.3. These unit types have been selected as they are the most numerous and/or the largest housetypes (and therefore greatest energy demand) of their kind at the site.

The benefits of this approach are listed below:

- Large housetypes incorporating;
  - Large roof space to accommodate the panels
  - 'System' boiler to allow simple integration of solar store
- South – South East orientation
- Limited / no shading issues facilitating efficient operation of solar thermal technology
- Highly visible plots, providing good, visible evidence of the site's sustainable credentials.
  - Plots 11 - 14 in sight of main site entrance
  - Plots 16 & 17 potentially also visible from Mitton Road

**Table 3.3 – Representative Housetypes**

| Unit Type | Representative Housetype |
|-----------|--------------------------|
| Detached  | D1670                    |
| Mews      | H745                     |

Using the proposed material specification detailed in Table 3.1, energy demand results for the representative SAP calculations are presented in Table 3.4.

**Table 3.4 – Energy Demand Reduction by Housetype**

| Unit Type                   | % Energy Demand Reduction over Part L (2006) Compliant Specification | No. Units represented |
|-----------------------------|----------------------------------------------------------------------|-----------------------|
| Detached (D1670)            | 16.7                                                                 | 27                    |
| Detached with solar (D1670) | 25.1                                                                 | 6                     |
| Mews (H745)                 | 16.1                                                                 | 13                    |

**Based upon the representative energy demand calculations, the estimated total site energy demand reduction is >17%**

In combination, the enhanced material specification outlined and renewable energy technologies will ensure Taylor Wimpey far exceeds the targeted 10% energy reduction for the site.



## 4.0 Conclusion

This report has reviewed the proposed development at land off Pendle Drive, Calderstones, against national, regional and local policies and details the approach Taylor Wimpey proposes to exceed the 10% energy reduction target against Building Regulations, Part L, (2006) throughout the development.

The climate change and low carbon agenda at national and regional levels encourage a reduction in energy demand and carbon emissions through application of the energy hierarchy, prioritising energy efficiency and conservation.

Enhanced material specification and integration of renewable energy technology will achieve an estimated site wide 17% energy demand reduction relative to a Building Regulations, Part L (2006) compliant specification.

Using the proposed material specification enhancement and integration of solar thermal technology, the site will exceed the 10% energy reduction policies contained within the PPS22 Companion Guide as well as the Northwest Regional Spatial Strategy. Furthermore, this report demonstrates that the site will exceed Ribble Valley Borough Council's energy demand reduction criteria. Taylor Wimpey's approach is aligned with the Council's approved guidance provided within the formal planning response.

**We therefore support the proposals at land off Pendle Drive, Calderstones and recommend that planning application be granted on the basis that the proposals exceed the target 10% energy reduction compared to the Building Regulations, Part L (2006) compliant specification.**