ENERGY STATEMENT

KERESFORTH ROAD, DODWORTH

JSP SUSTAINABILITY LTD
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GLOSSARY OF TECHNICAL TERMS

U-Values – a measure of heat loss through a structure, for example an external wall or ground floor.

U-Values Backstops – The Building Regulations Approved Document L1A sets minimum u-values that new homes must achieve. These represent backstops. Standards worse than these represent failures.

Standard Assessment Procedure (SAP) – The approved methodology for calculating the energy requirement and associated CO_2 emissions of a residential property.

SAP Target Recipe – A schedule or u-values, heating and ventilation specification used by approved SAP software to determine the Target Emission Rate, Target Fabric Energy Efficiency Rating and Target Primary Energy Rating. The Government proposes to amend the Recipe to deliver progressive reductions in CO_2 emissions.

Target Emission Rate – The maximum CO_2 emissions a new build home can emit, as determined by SAP.

Fabric Energy Efficiency – A measure of the energy efficiency of a new home. It is the forecasted space heating and cooling requirement of home. The target is determined by SAP and only considers u-values, thermal bridging, thermal mass, solar gain and air leakage.

Target Primary Energy Rate – A new metric of assessment, to be incorporated into the forthcoming version of SAP and Part L. It considers the total amount of energy required to heat, light and ventilate a home and the total amount of energy expended to deliver energy to the home, dependent on the fuel source.

EXECUTIVE SUMMARY

- The proposed development at Keresforth Road, Dodworth includes the construction of up to 215 no. homes

- The developer, Keepmoat Homes, is required by local and national policy to construct energy efficient homes capable of complying with national sustainable design benchmarks.

- The energy strategy for the development will include robust standards of energy efficiency and renewable or low carbon technologies capable of delivering a 31% saving in CO_2 emissions over current Part L of the Building Regulations.

1 INTRODUCTION

JSP Sustainability Ltd has been commissioned by Keepmoat Homes to prepare an Energy Statement to accompany the outline planning application for the proposed residential development at Keresforth Road, Dodworth. The application seeks permission for the construction of up to 215 no. homes and ancillary works with all matters reserved except access.

As an outline application, with the detailed design to follow at the reserved matters stage, it is not possible to calculate the site's emission rate or prescribe a definitive energy efficiency and renewable energy solution to local and national policy. However, this Statement does provide details on the sustainable design measures, including energy efficiency and renewable energy measures that can be incorporated into the detailed design and construction of every home at Keresforth Road such that compliance with emerging policy and the Building Regulations will be assured.

The Government has confirmed that Part L of the Building Regulations will be amended in June 2022, though a one-year transition period will operate on existing development sites. The revised Regulations will deliver a 31% reduction in CO_2 emissions and are designed to mandate the provision of low carbon or renewable technologies, in addition to high levels of energy efficiency in every home. This Statement provides details on a range of measures that can be adopted by Keepmoat Homes in response to the new Regulations. It demonstrates that there exists sufficient flexibility and a range of technological solutions to Part L 2021.

A number of documents have been considered when completing this Statement. These include;

National Planning Policy Framework (NPPF) includes a presumption in favour of sustainable development. The Framework expands upon the guiding principles and objectives of a successful planning system. These include the building of a strong and competitive economy, delivering high quality housing, requiring good design and meeting the challenges of climate change.

Approved Document L1A – Conservation of Fuel & Power sets fabric efficiency standards and together with SAP, establishes a maximum CO_2 emission rate for new build residential properties. The Approved Document is the Government's sustainable design benchmark in England.

The Future Homes Standard: 2019 Consultation on changes to Part L and Part F of the Building Regulations for new dwellings. (January 2021) provides a summary of the received responses to the 2019 consultation and the Government's intentions to revise Part L of the Building Regulations in 2022 and introduce a FHS in 2025.

Barnsley Metropolitan Borough Council Local Plan 2019 includes Policy CC2, Sustainable Design and Construction, which requires all development "to minimise resource and energy consumption through the inclusion of sustainable design and construction features, where this is technically feasible and viable."

2 NATIONAL LEGISLATIVE AND POLICY CONTEXT

Today, buildings account for 39.2% of all CO_2 emissions, with homes accounting for 18.5% alone. Necessarily legislation and national standards must tighten or evolve to address the energy efficiency of buildings, thereby reducing consumption, but also to address the source of energy delivered to homes and other buildings if the UK is to meet its carbon dioxide reduction targets.

On the latter point, the UK has made significant progress. Low or zero carbon energy generation accounts for 52% of today's electricity mix. This increase, together with a rapid fall in coal fired electricity generation has delivered a 59% decrease in the CO_2 emissions of the energy supply sector of the economy. In total, CO_2 emissions for the whole economy have fallen by 44% from 1990 levels. It is within this context and the opportunity offered by a rapidly decarbonised generation sector that the Government consulted on Part L and the Future Homes Standards in 2019/2020.

2.1 Legislation

The Climate Change Act 2008, established a carbon budgetary framework which initially sought to achieve an 80% reduction in CO_2 emissions from a 1990 baseline by 2050. In 2019, the Government legislated to increase this to a 100% reduction or net zero by 2050. The Act established the Climate Change Committee, which has provided a roadmap to Government on how to achieve low carbon buildings and housing. Its 2019 publication "*UK housing: Fit for the future?*" provides a template on future Part L amendments and indeed has proven to be the basis for the recently completed Part L1A consultation.

The Planning and Energy Act 2008 provides Local Planning Authorities (LPAs) with the means to include targets for renewable energy generation in new development within local development plans. The Act also enabled local plan policies to include higher energy efficiency targets than those stipulated by the Building Regulations. However, the Written Ministerial Statement (WMS) of 2015 placed a gap or 19% improvement ceiling on such policies.

2.2 National Planning Policy Framework

Paragraph 150b) of the National Planning Policy Framework (NPPF) asks that new development should be planned for in ways that "*can help reduce greenhouse gas emission, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government policy for national technical standards*." As it relates to buildings, the Governments technical standards are those contained in the Building Regulations, specifically Part L.

Paragraph 153 requires new development to "*comply with any development plan policies on local requirements for decentralised energy supply….and take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.*"

2.3 Local Plan

Policy CC1, Climate Change, promotes "the reduction of greenhouse gas emissions through sustainable design and construction techniques." Policy CC2, Sustainable Design and Construction, further requires new development to "minimise resource and energy consumption through the inclusion of sustainable design and construction features." The supporting text to policy CC2 confirms the local planning authority will encourage betterments over the Building Regulations, however the policy does not establish higher targets for energy efficiency or renewable energy generation.

3 PART L 2021

The Government has legislated to achieve net zero carbon by 2050 at the latest and this necessarily will have considerable impacts on how new homes are constructed and heated. In January 2021 the Government published its response to the Future Homes Standard (FHS) consultation. In the response document the Government confirmed it would proceed with the Standard in 2025, subject to a public consultation on the full technical specification. The Standard is expected to deliver a 75% reduction in CO_2 emissions and require new homes to be heated from a low carbon heat source such that homes will be "zero carbon ready". It is expected that the Standard will represent the final step for the house building industry and further decarbonisation will be delivered as a consequence of the decarbonisation of the National Grid network.

In anticipation of the 2025 Standard, the Government will amend Part L in June 2022 to deliver a saving of 31% in CO_2 emissions. The revisions are expected to provide the industry and supply chains with the incentive, skills and time to prepare for the FHS in 2025.

3.1 Improved Energy Efficiency Standards

The forthcoming Part L 2021 Regulations include improved u-value backstops, the inclusion of a new Primary Energy target, updated CO_2 emission factors to take account of the progressive decarbonisation of the national grid and the retention of the Fabric Energy Efficiency Standard. The Government has opened a public consultation on the Fabric Energy Efficiency Standard calculation. This consultation closed on April 13th 2021, but it is expected to require substantial upgrades in energy efficiency over the backstops identified in Part L 2021.

The table below provides a summary of the Part L 2021 backstops, associated Target Recipe and a comparison to current standards

Table 1 – Part L 2013 & 2021 Fabric Efficiency Comparison

Element	Part L 2013 Backstops	Part L 2021 Backstops	Part L1A 2021 Target Recipe
Wall	0.30W/m^{2}K	0.26W/m^{2}K	0.18W/m^{2}K
Floor	0.25W/m^{2}K	0.18W/m^{2}K	0.13W/m^{2}K
Roof	0.20W/m^{2}K	0.16W/m^{2}K	0.11W/m^{2}K
Glazing	2.00W/m^{2}K	1.60W/m^{2}K	1.20W/m^{2}K
Door	2.00W/m^{2}K	1.60W/m^{2}K	1.00W/m^{2}K
Air Leakage	10 m^3/(h.m^2) @ 50 Pa	8 m^3/(h.m^2) @ 50 Pa	5.0 m^3/(h.m^2) @ 50 Pa
Thermal Bridging	N/A	N/A	0.05

It should be understood that Recipes do not represent minimum standards or fabric and service backstops. Instead, they are used by SAP to determine the correct Target Emission Rate and Primary Energy Rate. Developers still maintain a degree of flexibility to craft specifications which adhere to the fabric and services backstops, whilst also achieving the required emission and primary energy rate.

Keepmoat Homes proposals for the application will be finalised at the reserved matters planning application stage, however the measures below will be incorporated into the detailed design of each house type;

- The construction specification of every home will include high levels of insulation in the ground floor, external walls and roof spaces, capable of exceeding the minimum benchmarks and delivering compliance with the Fabric Energy Efficiency standard;

- A masonry specification will deliver homes with a high level of thermal mass. This will enable each home to act as a store of heat during cold periods and conversely assist in cooling in warm periods;

- The detailed house type designs will incorporate the thermal bridging guidance produced by Constructive Details and others, thereby reducing a significant source of heat loss;

- The heating designs of each house type will include dual zone time and temperature controls with delayed start thermostats;

- Energy efficient lamps will be installed in every light fitting;

- Each property will be naturally ventilated using efficient decentralised extract fans to ensure the internal living environment will be healthy and comfortable. As part of the Building Regulations submission, SAP 10 calculations will confirm that every home has a low risk of summer overheating;

- The house type designs will have sufficient glazing in each of the principal living rooms to allow natural daylight to penetrate into each room, thereby lessening the lighting requirement, but also lessening the space heating requirement as each home can take advantage of passive solar gain;

- To aid in this, the glazing specification will have a solar transmittance value, or g-value, of 0.71 or better;

- Attention will be paid to the location of homes so that as many as possible have an advantageous orientation to take advantage of passive solar heating. However, the final

site design is necessarily a compromise determined by the size and shape of the site, access and road network within the site, the location of public open space and the desire to achieve a mix of tenures and style through the site; and

- Each entrance will be illuminated with an energy efficient external light or provision will be made for a purchaser to install such a fixture;

The formulation of the Regulations necessarily requires the installation of renewable technologies or low carbon heating to deliver compliance. The details overleaf provide a summary of the most appropriate technologies for a residential development.

3.2 Heat Recovery Technologies

Waste water heat recovery (WWHR) extracts energy from the waste water in a shower drain pipe to pre-heat mains water, before sending it to a boiler or hot water cylinder. By pre-heating the cold-water supply, the boiler or cylinder will have to consume less energy to bring the water to the deliverable temperature. In this way energy is conserved and a CO_2 emissions saving is delivered.

Flue gas heat recovery (FGHR) extracts energy from the waste gases in the flue of a boiler to pre-heat mains water, before sending it to a boiler to bring to the correct temperature. By pre-heating the cold-water supply, the boiler will have to consume less energy to bring the water to the deliverable temperature. In this way energy is conserved and a CO_2 emissions saving is delivered.

3.3 Photovoltaic Panels

There are over 1 million photovoltaic (PV) installations in the UK generating 13,259MW of electricity, as of June 2019, with 93% of systems being below 4kW in size. Systems of 4kW or lower are typically installed on the roof slopes of buildings. The technology is compatible to most building designs, including the house types proposed at the application site.

The Government's Part L 2021 Recipe includes a PV provision in proportion to a building's footprint. This calculation methodology makes it all but certain that new homes would necessarily have a PV installation if serviced by a gas boiler or standard electric heating. PV arrays can be easily integrated into the roof designs of most house types. The arrays are most efficient with orientated in a southerly position and installed on a 30-45 degree roof pitch. However, it is possible to install arrays on other orientations, though such installations require a larger quantity of panels to satisfy generation targets.

3.6 Part L 2021 Specification

The published Part L 2021 Target Recipe provides guidance on how developers can expect to deliver compliance with the forthcoming Regulations. In the period 2022-2026 we expect much of the house building industry to continue to install gas boilers, at least initially. At the present time there does not exist the necessary skills base or supply chain infrastructure to deliver heat pumps to every new home in England from 2022. As such it is prudent to assume that many new homes will continue to be heated by efficient gas boilers. However, in recognition of this, the Part L 2021 Regulations require all new heating installations to be designed at a flow temperature of 55^0C. In this way news homes will be future proofed so that home owners can more easily install heat pumps at a later date. The table below provides a summary of a specification which is expected to deliver compliance to the new Regulations.

Table 2 – Example Part L 2021 Specification

Element	Part L 2021 Specification
Wall	0.26W/m^2K
Party Walls	0.00W/m^2K
Cold Roof	0.11W/m^2K
Floor	0.12W/m^2K
Glazing	1.20W/m^2K
Door	1.00W/m^2K
Lintels	Thermally broken insulated lintels
Air Permeability	5.0 m^3/(h.m^2) @ 50 Pa
Heating System	Efficient natural gas boilers
Flue Gas Heat Recovery	To properties with a combination boiler only
Waste Water Heat Recovery	To every home, with a preference for the first ensuite shower.
PV Arrays	3kWp for a 4 bedroom detached house 1.2kWp for a 2 & 3 bedroom terraced house

4 EVALUATION

JSP Sustainability was commissioned by Keepmoat Homes to provide an independent assessment of the proposed Energy Strategy for the development site at Keresforth Road, Dodworth. This Statement accompanies the outline planning application and understandably only provides broad outlines of the measures that will be necessary to deliver compliance with the forthcoming Part L changes and local policy. Full details will be submitted for approval at the reserved matters application stage. However, the following can be confirmed;

- It is expected that every home at the application site will have to comply with Part L 2021, due to come into force in June 2022 at the earliest;
- Each home will achieve robust levels of energy efficiency through the careful selection of insulation and intelligent building design and will comply with the forthcoming amended Fabric Energy Efficiency Standard;
- It is expected that every home will be provided with a renewable technology to deliver compliance with the forthcoming Primary Energy standard and CO_2 targets; and
- The proposals will deliver a 31% saving in CO_2 emissions over current Part L.

In conclusion there exists a range of options available to Keepmoat Homes to deliver compliance with national and local standards at the application site.