

Cheadle Road, Upper Tean

Keepmoat Homes

Energy Statement

AES Sustainability Consultants Ltd

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This statement has been commissioned by Keepmoat Homes to detail the proposed approach to energy and CO₂ reduction to be employed in the development at Cheadle Road, Upper Tean. It should be noted that the details presented, including the proposed specifications, are subject to change as the detailed design of the dwellings progresses, whilst ensuring that the overall commitments will be achieved.

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1. Introduction

Preface

- 1.1. This Energy Statement has been prepared on behalf of Keepmoat Homes in support of the application for development of the site at Cheadle Road, Upper Tean.

Development Description

- 1.2. The proposed development would deliver 67 new build dwellings, comprising of two to four bed detached, semi detached and terraced units. The proposed layout for the development is shown in Figure 1.

Purpose and Scope of the Statement

- 1.3. The statement will demonstrate that, through following a fabric first approach to demand reduction, combined with low carbon or renewable energy systems, the proposed development will deliver a level of energy performance and a reduction in CO2 emissions significantly beyond the current Building Regulation standards whilst addressing a range of additional sustainable design considerations.
- 1.4. This statement demonstrates that the development will be designed and constructed to meet the revised Part L 2021 standards, equating to a circa 31% improvement over current regulatory standards, exceeding the requirements of current policy.



Figure 1. Proposed site layout.

2. Planning Policy

Local Policy

- 2.1. This statement is principally concerned with sustainable construction, energy use and CO₂ emissions, therefore the relevant policies are SD1, SD2 & SD3 of the Staffordshire Moorlands Local Plan, Adopted September 2020, as extracted below:

Policy SD1: Sustainable Use of Resources

The Council will require all development to make sustainable use of resources, and adapt to climate change. This will be achieved by:

1. Having regard to the BMV agricultural classification of the land, with a preference for the use of lower quality over higher quality agricultural land. Development should also aim to minimise soil disturbance and to retain ecological connectivity as far as possible
2. Supporting or promoting proposals that remediate brownfield sites affected by contamination.
3. Re-use of sites affected by mining activity will be supported, provided that any mining legacy is appropriately addressed and it can be demonstrated that the site is safe and stable for the development proposed.
4. Supporting development that is located and designed to minimise energy needs and to take advantage of maximised orientation (subject to design and landscape policies) to achieve energy savings in line with Policy SD 3.
5. The Council will require applicants for all major-scale planning applications (10 or more residential units or 1,000+ square metres floor area) to demonstrate that they have considered the energy efficiency, water conservation, sourcing of construction materials, and site orientation aspects of the scheme, and where possible the feasibility of integrating micro-renewables. The degree of detail expected will depend on the scale/complexity of the proposal.
6. The Council will encourage developers to investigate the potential for re-using construction or construction waste materials, especially those sourced locally (which can include those minerals available on site, as appropriate) and integrates where possible on-site waste management facilities.

Policy SD2: Renewable/Low-Carbon Energy

The Council will strive to meet part of the District's future energy demand through renewable or low-carbon energy sources (which could be through a variety of technologies, for example solar energy, biomass etc), in line with current evidence which identifies the feasibility of these forms of energy across the District. The Council will assess wind turbine schemes in line with the Government's specific policy on wind turbines. For all other forms of renewable energy the Council will support small- and large- scale stand alone renewable or low-carbon energy schemes subject to the following considerations:

- the degree to which the scale and nature of a proposal impacts on the landscape, particularly having regard to relevant Landscape Character evidence and impact on the Peak District National Park (taking into account both individual and cumulative effects of similar proposals);
- the degree to which the developer has demonstrated any environmental/economic/social benefits of a scheme, as well as how any environmental or social impacts have been minimised (e.g. visual, noise or smell);
- the impact on designated sites of European (or successor), national and local biodiversity and geological importance in accordance with policy NE 1;
- the impact on the amenity of residents and other interests of acknowledged importance, including the historic environment;
- the degree to which individual proposals reflect current local evidence regarding the feasibility of different types of renewable or low-carbon energy at different locations across the District;
- in the case of solar energy proposals that are not affixed to buildings or structures, applicants will be expected to demonstrate that they have examined whether previously developed land is available before greenfield land. Where agricultural land is proposed, poorer quality land should be utilised before higher quality agricultural land.

Policy SD3: Sustainability Measures in Development

The Council will support further carbon-saving or water-saving measures in both new and existing developments, in the following ways:

1. Supporting developers who propose exceeding the thermal efficiency or water conservation standards required by law for new buildings or extensions, at the time of the application. In the case of larger developments such as housing estates the Council will support measures such as 'communal' renewables, or District Heating installations.
2. The Council will support measures by landowners/developers designed to contribute to existing or emerging District Heating networks (for example by connecting 'exporters', with receptors, of heat).
3. The Council will support measures designed to improve the sustainability of existing buildings (such as improved thermal insulation, water conservation, or the installation of micro-renewables).

Current and Future National Policy Standards

- 2.2. Government policy in relation to the energy performance of buildings has been evolving over the past decade, following government commitments to reduce the emission of greenhouse gases – particularly CO₂. This obligation was enshrined in the Climate Change Act 2008, which commits the UK to achieving a mandatory 80% reduction in the UK's CO₂ emissions by 2050, compared with 1990 levels.
- 2.3. In 2016, the UK government ratified the Paris Agreement, which provides a framework for governments to pursue the target of limiting global warming below 2°C.
- 2.4. In June 2019, the Government announced it had set a new net zero greenhouse gas emission target for the UK by 2050, compared with the previous target of at least 80% reduction from 1990 levels.
- 2.5. The built environment has a key role to play in delivering on these international commitments, as it accounts for approximately a third of overall CO₂ emissions. These commitments have been translated into national policies within the built environment driven by, amongst other mechanisms, the EU Energy Performance of Buildings Directive and the 2012 Energy Efficiency Directive.

- 2.6. Following the introduction of the 2013 edition of Building Regulations Part L, the successive updates now require regulated CO₂ emissions levels from new build domestic buildings to be approximately 30% lower than 2006 levels.
- 2.7. The Government proposes that the Building Regulations are the appropriate mechanism to drive future standards with respect to energy consumption, with local authorities able to apply the optional requirements of the national technical standards with respect to water consumption and space.
- 2.8. In January 2021 the Government released its response to the consultation for the Future Homes Standard, confirming the standards and compliance metrics to be adopted as part of the changes to Approved Document L1A. This was released in response to the new UK law which targets to bring all greenhouse gas emissions to net zero by 2050.
- 2.9. These changes will be regulated for in December 2021 to come into effect in June 2022 and will require new homes to reduce their carbon emissions by 31% over current levels. This is considered an appropriate interim step prior to the introduction of the Future Homes Standard in 2025.

Proposed Approach

- 2.10. Due to the development timescales, it is considered that the majority of the development is likely to fall under Part L 2021, and therefore the whole development should be designed to meet these increased standards.
- 2.11. With respect to carbon reduction, this will deliver a >31% reduction compared with current regulatory standards, thereby exceeding the requirements as set out in the Staffordshire Moorlands Local Plan, Policies SD1 & SD3.
- 2.12. The development will achieve these carbon reductions through higher fabric standards and low carbon and renewable energy systems being installed to offset emissions and reduce fuel bills for residents.
- 2.13. This statement provides an indicative fabric specification and a strategy which would enable the dwellings to meet these higher standards, however as elements of the regulatory standards are still under consultation it is primarily the carbon reduction objective that is being expressed, with the precise strategy to achieve this being subject to change as this progresses.

3. Energy & CO₂ Reduction Strategy

- 3.1. The proposals will follow the Energy Hierarchy approach to sustainable construction (fabric first).

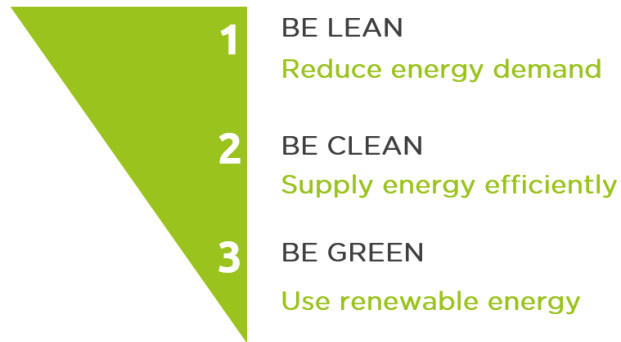


Figure 2. The Energy Hierarchy

Be Lean – reduce energy demand

- 3.2. The design of a development - from the masterplan to individual building design - will assist in reducing energy demand in a variety of ways, with a focus on minimising heating, cooling and lighting loads. Key considerations include:
- Building orientation – maximise passive solar gain and daylight
 - Building placement – control overshadowing and wind sheltering
 - Landscaping – control daylight, glare and mitigate heat island effects
 - Building design – minimise energy demand through fabric specification

Be Clean – supply energy efficiently

- 3.3. The design and specification of building services to utilise energy efficiently is the next stage of the hierarchy, taking into account:
- High efficiency heating and cooling systems
 - Ventilation systems (with heat recovery where applicable)
 - Low energy lighting
 - High efficiency appliances and ancillary equipment

Be Green – use low carbon / renewable energy

- 3.4. Low carbon and renewable energy systems form the final stage of the energy hierarchy and can be used to directly supply energy to buildings, or offset energy carbon emissions arising from unavoidable demand. This may be in the form of:
- Low carbon fuel sources – e.g. biomass
 - Heat pump technologies
 - Building scale renewable energy systems
 - Small-scale heat networks
 - Development-scale heat networks
- 3.5. As this hierarchy demonstrates, designing out energy use is weighted more highly than the generation of low-carbon or renewable energy to offset unnecessary demand. Applied to the development, this approach is referred to as 'fabric first' and concentrates finance and efforts on improving U-values, reducing thermal bridging, improving airtightness, and installing energy efficient ventilation and heating services.

Improved fabric specification

- 3.6. In order to ensure that the energy demand of the development is reduced, the building envelope will be designed to minimise heat loss through the fabric wherever possible.
- 3.7. Table 1 details an indicative fabric specification of the major building elements, with the first column in this table setting out the Part L1A limiting fabric parameters in order to demonstrate the potential improvements. The final specification will be subject to ongoing design work but will aim to deliver high standards of thermal insulation as a priority.

Table 1. Indicative construction specification – main elements

	Part L1a 2021 Limiting Fabric Parameters	Indicative Specification
External wall – u-value	0.26 W/m ² K	0.19 W/m ² K
Party wall – u-value	0.20 W/m ² K	0.00 W/m ² K
Plane roof – u-value	0.16 W/m ² K	0.10 W/m ² K
Ground floor – u-value	0.18 W/m ² K	≤ 0.17 W/m ² K
Windows – u-value	1.60 W/m ² K	1.30 W/m ² K
Doors – u-value	1.60 W/m ² K	1.10 W/m ² K
Air Permeability	8 m ³ /h.m ² at 50 Pa	4.50 m ³ /h.m ² at 50 Pa
Thermal Bridging	Y = 0.150 (default)	Junctions calculated

4. Low Carbon and Renewable Energy Systems

- 4.1. A range of technologies have been assessed for potential incorporation into the scheme in accordance with Regulation 25A of the Building Regulations and with the intent of delivering low carbon heating which meets the carbon emissions requirements of Part L 2021.

Combined Heat and Power (CHP) and District Energy Networks

- 4.2. There are currently no heat networks which extend near the proposed development. High network heat losses associated with distribution to individual houses, as opposed to large high-rise apartment blocks and commercial developments mean that a new heat network to serve the area is not considered viable or an environmentally preferred option. Due to these reasons, the provision for future connection to a district heating system is also not proposed.

Building Scale Systems

- 4.3. The remaining renewable or low carbon energy systems considered potentially feasible are at a building scale. These are as follows;
- Individual biomass heating
 - Solar thermal
 - Solar photovoltaic (PV)
 - Air Source Heat Pumps (ASHPs)
 - Ground Source Heat Pump (GSHPs)
 - Hot water heat pumps

Biomass

- 4.4. Biomass heating systems would only be feasible with a communal heating system, and would lead to significant air quality concerns from the production of NO_x emissions and particulates. This is not considered an appropriate approach for the location of the development.

Solar Thermal

- 4.5. Solar thermal systems are considered technically feasible on all buildings with suitable roof orientations. The generation from solar thermal systems is not well matched to typical heat demands of buildings in the UK so would not be expected to deliver substantial energy or carbon savings.

Air Source Heat Pumps

- 4.6. Air source heat pumps are technically feasible for the buildings in this scheme. At this stage the capital cost and running costs of these systems means they are a potential but not preferred option.

Ground Source Heat Pumps

- 4.7. Ground source heat pumps could be utilised, with a shared borehole arrangement. Ground conditions are unknown, and the significant capital costs of this approach means they are not considered a preferred approach.

Hot Water Heat Pumps

- 4.8. Hot water heat pumps would deliver the main energy demand of the proposed dwellings with very high efficiency (circa 300%), and being powered by grid sourced electricity would constitute a very low carbon option with the benefit of continued decarbonisation over time. At this stage the capital cost and running costs of these systems means they are a potential but not preferred option.

Solar Photovoltaic

- 4.9. PV panels are considered technically feasible for all buildings with suitable roof orientations. The relatively low cost, high carbon saving potential and limited additional impacts mean that PV is considered a feasible option for this development.

This is the preferred approach for the development.

5. As-Designed Performance

- 5.1. Through following the strategy described, the dwellings will reduce energy demand and consequent CO₂ emissions beyond a Part L 2021 compliant level of performance.
- 5.2. Part L 2021 reflects a 31% reduction in CO₂ emissions compared to the current Part L 2013, therefore the savings achieved on this proposed development will be significant when compared with a Part L 2013 baseline.
- 5.3. Table 2 shows the indicative site-wide CO₂ emissions savings beyond the Part L 2013 baseline.

Table 2. Indicative as-designed CO₂ emissions – (Part L 2013)

	Part L compliant emissions (kgCO ₂ /year)	As-designed emissions (kgCO ₂ /year)	Improvement %
Site-wide	109,665	73,913	32.60

- 5.4. The proposed approach therefore significantly exceeds the requirements of the Part L 2013 regulations and, by extension, the requirements of Policies SD1 & SD3 of the Staffordshire Moorlands Local Plan, Adopted September 2020.