

J O S T E C

BUILDING REGULATIONS COMPLIANCE SERVICES



ENERGY STATEMENT

**Land at Headley Road East, Woodley,
Reading, RG5 4JG**

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JosTec, Suite 107, Moda Business Centre, Stirling Way, Borehamwood, WD6 2BW
Tel: 01923 518 923
E-mail: Info@jostec.co.uk

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1. Quality Management

Prepared by		Checked by
Anita Kocsis		Mohamed Egal
Junior Energy Assessor		Principal Energy Assessor
Date: 23/02/2026		Date: 23/02/2026
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2. Introduction

JosTec has been commissioned by Colony Architect to prepare an Energy Statement in support of the planning application for the proposed development at Headley Road East. This development falls within the jurisdiction of the Wokingham Borough Council. Therefore, must adhere to the policies in the Borough Local Plan (Adopted January 2010).

3. Planning Policy

3.1. National Policy - England

The Department Ministry of Housing, Communities & Local Government released the National Planning Policy Framework (NPPF) in March 2012. The latest revision was released in December 2024; the Government's objective is to streamline the process encouraging sustainable development and promoting the needs and priorities of local communities.

This framework is to be used as the base by councils to develop their own local policy. Section 14 of the framework addresses climate change, flooding and coastal change. New development should be planned for in ways that:

- a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and
- b) help to reduce greenhouse gas emissions, such as through its location, orientation & design. Any local requirements for the sustainability of buildings in plans should reflect the Government's policy for national technical standards.

To help increase the use and supply of renewable and low carbon energy and heat, plans should:

- a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, and their future re-powering and life extension, while ensuring that adverse impacts are addressed appropriately (including cumulative landscape and visual impacts);
- b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and
- c) identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat Colony Architects and suppliers.

Local planning authorities also give significant weight to the need to should support energy efficiency and low carbon heating improvements to existing buildings, both domestic and non-domestic (including through installation of heat pumps and solar panels where these do not already benefit from permitted development rights). Where the proposals would affect conservation areas, listed buildings or other relevant designated heritage assets, local planning authorities should also apply the policies set out in chapter 16 of this Framework.

When determining planning applications for all forms of renewable and low carbon energy developments and their associated infrastructure, local planning authorities should:

- a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and give significant weight to the benefits associated with renewable and low carbon energy

generation and the proposal's contribution to a net zero future;

- b) recognise that small-scale and community-led projects provide a valuable contribution to cutting greenhouse gas emissions;
- c) in the case of applications for the repowering and life-extension of existing renewable sites, give significant weight to the benefits of utilising an established site.

Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas.

3.2. Local Policy – Wokingham Borough Council

The three planning policies affecting the sustainable design are:

- Policy CP1 – Sustainable Development
- Policy CP3 – General Principles for Development
- Policy CP4 – Infrastructure Requirements
- Policy CP6 - Managing Travel Demand

The Local Plan also references the Borough Wide Design Guide (Adopted June 2020) and the Environment and Climate Strategy 2020-2025 (Adopted December 2020); however, the focus will be the above documents.

3.3. Wokingham Borough Council: CP1 – Sustainable development

Planning permission will be granted for development proposals that:

- 1) Maintain or enhance the high quality of the environment;
- 2) Minimise the emission of pollutants into the wider environment;
- 3) Limit any adverse effects on water quality (including ground water);
- 4) Ensure the provision of adequate drainage;
- 5) Minimise the consumption and use of resources and provide for recycling;
- 6) Incorporate facilities for recycling of water and waste to help reduce per capita water consumption;
- 7) Avoid areas of best and most versatile agricultural land;
- 8) Avoid areas where pollution (including noise) may impact upon the amenity of future occupiers;
- 9) Avoid increasing (and where possible reduce) risks of or from all forms of flooding (including from groundwater);
- 10) Provide attractive, functional, accessible, safe, secure and adaptable schemes;
- 11) Demonstrate how they support opportunities for reducing the need to travel, particularly by private car in line with CP6; and
- 12) Contribute towards the goal of reaching zero-carbon developments⁴¹ as soon as possible by:
 - a) Including appropriate on-site renewable energy features; and
 - b) Minimising energy and water consumption by measures including the use of appropriate

layout and orientation, building form, design and construction, and design to take account microclimate so as to minimise carbon dioxide emissions through giving careful consideration to how all aspect of development form.

3.4. Wokingham Borough Council: Policy CP3 – General Principles for Development

Planning permission will be granted for proposals that:

- a) Are of an appropriate scale of activity, mass, layout, built form, height, materials and character to the area together with a high quality of design without detriment to the amenities of adjoining land users including open spaces or occupiers and their quality of life;
- b) Provide a functional, accessible, safe, secure and adaptable scheme;
- c) Have no detrimental impact upon important ecological, heritage, landscape (including river valleys) or geological features or water courses.
- d) Maintain or enhance the ability of the site to support fauna and flora including protected species;
- e) Use the full potential of the site and contribute to the support for suitable complementary facilities and uses;
- f) Contribute to a sense of place in the buildings and spaces themselves and in the way they integrate with their surroundings (especially existing dwellings) including the use of appropriate landscaping;
- g) Provide for a framework of open space in secure community use achieving at least 4.65 ha/1,000 population provision together with recreational/sporting facilities in addition to private amenity space;
- h) Contribute towards the provision of an appropriate sustainable network of community facilities;
- i) Do not lead to a net loss of dwellings and other residential accommodation or land; and
- j) Do not lead to a loss of community or recreational facilities/land or infrastructure unless suitable alternative provision is available.

Development proposals will be required to demonstrate how they have responded to the above criteria through the submission of Design and Access Statements, clear and informative plans, elevations and street scenes and where required Masterplans, Development Briefs, Concept Statements and Design Codes.

3.5. Wokingham Borough Council: Policy CP4 – Infrastructure Requirements

Planning permission will not be granted unless appropriate arrangements for the improvement or provision of infrastructure, services, community and other facilities required for the development taking account of the cumulative impact of schemes are agreed. Arrangements for provision or improvement to the required standard will be secured by planning obligations or condition if appropriate

3.6. Wokingham Borough Council: Policy CP6 – Managing Travel Demand

Planning permission will be granted for schemes that:

- a) Provide for sustainable forms of transport to allow choice;
- b) Are located where there are or will be at the time of development choices in the mode of transport available and which minimise the distance people need to travel;
- c) Improve the existing infrastructure network, including road, rail and public transport, enhance facilities for pedestrians and cyclists, including provision for those with reduced mobility, and other users;
- d) Provide appropriate vehicular parking, having regard to car ownership;
- e) Mitigate any adverse effects upon the local and strategic transport network that arise from the development proposed;

- f) Enhance road safety; and
- g) Do not cause highway problems or lead to traffic related environmental problems.

3.7.Climate Change Interim Policy Position Statement CC04 – Sustainable Design & Construction

Planning permission will only be granted for proposals that seek to deliver high quality sustainably designed and constructed developments by:

1. In respect of all new homes:
 - a) Seeking to achieve the requirements of the full Code for Sustainable Homes Level 4;
 - b) Meet internal potable water consumption targets of 105 litres or less per person per day (as part of the requirement to meet full Code for Sustainable Homes Level 4).
2. All new non-residential proposals of more than 100 sq m gross non-residential floorspace shall at least:
 - a) Achieve the necessary mandatory Building Research Establishment Assessment Method (BREEAM) requirements or any future national equivalent

3.8.Climate Change Interim Policy Position Statement CC05 – Renewable Energy Requirement

Planning permission will only be granted for proposals that deliver a minimum 10% reduction in carbon emissions through renewable energy or low carbon technology where the development is for:

- a) Schemes of more than 10 dwellings (gross), or
- b) Non-residential proposals of more than 1,000 sq m gross floorspace.

Proposals for renewable energy and decentralised energy works, including wind turbines, must demonstrate that:

- a) They are appropriate in scale, location and technology type;
- b) Are compatible with the surrounding area, including the impact of noise and odour;
- c) Do not have a damaging impact on the local topography and landscape;
- d) There is no significant impact upon heritage assets, including views important to their setting;
- e) In the case of wind turbines, take account of their cumulative effect and properly reflect their increasing impact on the landscape and on local amenity

Adaptation measures need to be built into all new developments to ensure the sustainable development of housing, businesses and the economy of the Royal Borough.

1. Applicants should refer to the adopted Sustainable Design and Construction Supplementary Planning Document (SPD), the Borough Wide Design Guide SPD and the Environment and Climate Strategy 2020-2025, or successor documents for further guidance.

4. Building Regulations – England Approved Document L

Approved document L1A – Conservation of Fuel and Power sets the standard for carbon emissions for new dwellings and was last revised in 2023 (Part L: 2021). Residential development will need to comply with the criteria set out in the document, as follows:

1. The predicted Dwelling Emission Rate of CO₂ emissions from dwellings (DER) are not greater than the Target Emission Rate (TER).
2. The predicted Dwelling Primary Energy Rate from dwellings (DPER) are not greater than the Target Primary Energy Rate (TPER)
3. The performance of the building fabric and fixed building services should be no worse than the design limits set out in the Approved Document.
4. The dwellings will have appropriate passive control measures to limit the effect of solar gains on indoor temperatures in summer.
5. That the performance of dwellings as built comply with the DER values achieved, including site testing of a representative sample of dwellings demonstrating that the 'air permeability' rate achieved is as per that specified, or better.
6. The necessary provisions for energy-efficient operation of dwellings are put in place, including operation and maintenance instructions aimed at achieving economy in the use of fuel and power in a way that householders can understand.

Compliance with the Approved Document Parts L1 should be demonstrated at the detailed design stage, prior to construction.

5. Assessment Methodology Domestic (SAP)

The Standard Assessment Procedure (SAP) is the official methodology endorsed by the Government for evaluating the projected energy consumption and carbon dioxide emissions of new constructions. The outcomes are determined based on the building's floor area and account for energy usage (kWh/m²/yr) as well as the associated CO₂ emissions (kg.CO₂/m²/yr). These calculations encompass the following factors:

- Space heating
- Domestic hot water
- Ventilation
- Lighting
- Ancillary pumps and fans
- Energy-generating technology.

A trained and accredited Elmhurst Energy Assessor has used Elmhurst SAP 10 software (Version: 1.7.44) to assess compliance and generate the necessary results data.

SAP calculations have been conducted for the intended residential dwelling, and the outcomes have been employed to ascertain the anticipated energy consumption and CO₂ emissions for the entire development. An overview of the input data utilised in these calculations can be found in the Appendix. Furthermore, comprehensive SAP Calculations will be included in the Appendix to support these findings will be included in the Appendix as well.

The client has provided a detailed fabric and systems specification, and the model was based on the respective information.

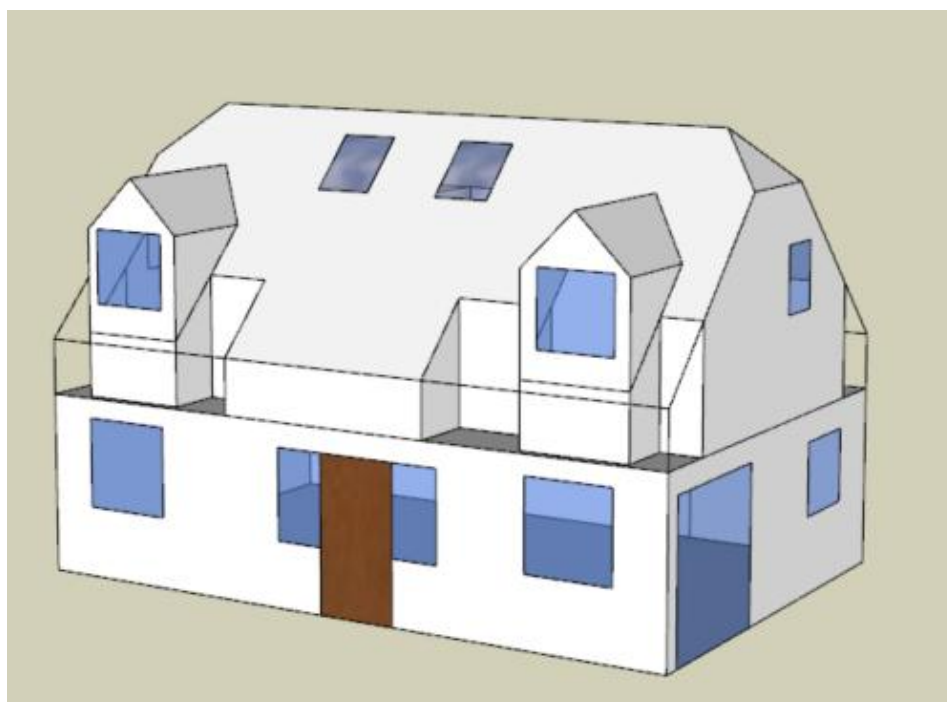


Figure 1. Site Location Plan

6. Target Emission Rates

The following results are calculated using approved SAP 10 software with minimum standards used to achieve Part L 2021 Building Regulations compliance, including a notional gas-fired system boiler to provide heating and hot water.

The 2021 Building Regulations referred to within local planning policies are the Approved Document L 2021: Conservation of Fuel and Power – Edition 2021 incorporating 2023 amendments. For the ease of this document, we will refer to this as “Part L 2021 Building Regulations or ADL: 2021”.

6.1. Baseline Calculation

Fundamental to achieving energy efficiency in any new building is the specification of a thermally efficient building envelope. Passive design features such as high levels of insulation, designing to maximise solar gain and limiting heat loss through reduced air leakage and enhanced thermal bridging are all proven techniques to reduce energy consumption and emissions.

The baseline “compliant” case for emissions will be determined by using the Target Emissions Rates (TER) from the compliance calculations. These figures provide an emission rate, and hence a figure for acceptable total regulated emissions from a dwelling, as shown in Table 1 below for this project.

The emissions savings from efficiency measures will be determined by comparing the total emissions based on the TER figures with the predicted emissions based on the actual proposed specification. The emissions savings from the low and zero-carbon technologies will be calculated separately and incorporated into the final residential results using the SAP methodology.

	ADL:2021 Emission Rate KG CO ² /m ² /year (TER/DER)	ADL:2021 Primary Energy kWh/m ² /year (TPER/DPER)	ADL:2021 Fabric Energy Efficiency kWh/m ² /year (TFEE/DFEE)
TER	12.04	63.07	45.65

Table 1. Target Rates – ADL:2021

We can now explore several options to reduce the Dwelling Emission Rates (DER) in order to comply with the local authorities' requirements.

FABRIC FIRST

Use Less Energy

7.1. Building Fabric - Residential

Limited assumptions have been made on this development to meet the fabric efficiency targets for Building Regulations 2021, as the majority of the specification has been provided by the client.

Compliance has been achieved by aiming for values corresponding to the prescribed notional U-values specified in Table 1.1: Summary of concurrent notional dwelling specification, as outlined in Approved Document L 2021. The Target Fabric Energy Efficiency (TFEE) has been successfully met by targeting a thermal bridging Y Value lower than 0.05, where possible. This will likely entail incorporating improved thermal bridging details into the design to minimise heat losses.

Table 2 shows the proposed building fabric specification applied to the SAP calculations with respect to the upper limits stipulated by Part L: 2021. The values represent, in some areas, a significant improvement of the mandatory requirements set out in the current Building Regulations.

Fabric	ADL:2021 Notional Values W/m²K	Proposed Values W/m²K
Walls	0.18	0.11-0.18
Roof	0.13	0.11 – 0.15
Floor	0.13	0.12
Windows	1.40	1.4
Doors	1.40	1.4
Air Permeability	8.0 m³ / (h. m²) at 50 Pa	3.0 m³ / (h. m²) at 50 Pa
Ventilation	Natural Ventilation (openable windows + trickle vents)	Natural Ventilation + MVHR (openable windows + trickle vents)
Thermal bridging	Default Psi Values Y = 0.05	Psi Values Calculated Y = 0.052

Table 2. Building Fabric Specification

7.2. Building Services - Residential

For the early design stage, space heating and domestic hot water (DHW) will be supplied by an 89.5% efficient combi boiler, adhering to the guidance provided. To ensure energy efficiency, heating controls will be implemented, including a programmer with independent time and temperature zone controls, in accordance with Part L 2021 Approved Document. These controls will enable effective management of heating requirements based on specific zones and desired temperature settings.

The dwelling will be ventilated primarily through natural means, utilising openable windows and trickle vents. Additionally, in the wet room areas and kitchen, demand-controlled mechanical extract ventilation (dMEV) systems will be installed. These systems will provide efficient and targeted extraction of air in specific areas where moisture and pollutants are likely to be generated, ensuring a healthy and comfortable indoor environment.

To promote energy efficiency, low-energy lighting will be selected for the development. In accordance with Part L 2021 Building Regulations, the specified lighting will possess a luminous efficacy exceeding 75 lumens per circuit watt and an output greater than 400 lamp lumens. This requirement is typically met by utilising LED or compact fluorescent lights, rather than low-voltage Halogen variants. By opting for these energy-saving lighting options, the development can reduce its overall electricity consumption and contribute to sustainability objectives.

Element	Specification
Boilers	89.5% Efficiency
Heating emitter	Underfloor heating – pipes in screed above insulation and radiators upper floor
Heating control	Time and temperature zone control.
Domestic hot water	From the main heating system/Hot water cylinder
Water consumption	≤125 litres/person/day
WWHR Considered	Yes – ShowerSave QB21
Internal fixed lighting	100% low energy
Ventilation	Natural Ventilation with MVHR (openable windows + trickle vents)
Thermal bridging	Psi Values Calculated $\Psi = 0.052$
Thermal mass parameter	Calculated

Table 3. Building HVAC/TMP

The above specifications aim to reduce emissions by aiming for an indicative target of 10% reduction in fabric energy efficiency from the fabric-first approach. A figure of 10% not a requirement, but any reductions will have a knock-on effect on the overall reductions. The results below show the results from a “fabric first” approach.

7.3. Results Summary – Fabric First

	ADL:2021 Emission Rate KG CO ₂ /m ² /year (TER/DER)	ADL:2021 Primary Energy kWh/m ² /year (TPER/DPER)	ADL:2021 Fabric Energy Efficiency kWh/m ² /year (TFEE/DFEE)	Percentage Reduction DER %	Percentage Reduction DPER %	Percentage Reduction DFEE %
TER	12.04	63.07	45.65	-	-	-
DER Fabric First	17.34	98.22	44.92	0.00	0.00	1.59

Table 4. Fabric First Results

7.4. Summertime Overheating

In recent years, the impacts of overheating have been extensively studied and qualified, in part, to climate change and modern construction practices. The industry has developed various guidelines to assess and predict the risk of overheating. However, it is crucial to address design considerations during the concept stage to implement effective measures for adequate mitigation.

By acknowledging the potential risks of overheating early in the design process, appropriate strategies can be incorporated to prevent or minimise excessive heat buildup within buildings. These strategies may include optimising building orientation, incorporating effective shading systems, implementing natural ventilation techniques, utilising thermal insulation, and integrating efficient cooling systems.

Considering these design considerations ensures that the development can effectively mitigate the adverse effects of overheating and create comfortable and sustainable indoor environments for occupants.

7.5. Common Causes

The Zero Carbon Hub states three factors most associated with overheating risk: location, building design and occupational usage.

7.6. Location

A specific site's climate, or microclimate, is influenced by its geographic location. Factors such as sunlight, wind patterns, and rainfall intensity vary based on the site, and the design approach must be tailored accordingly. For instance, average summertime temperatures are typically higher in the southeast of England compared to the northeast. Therefore, in the southeast, increasing ventilation levels may have a limited impact on reducing internal temperatures.

Dense urban developments with limited open green spaces may be susceptible to the "urban heat island" effect. This phenomenon occurs when heat is absorbed by dense man-made structures during the day and then radiated at night, leading to elevated local temperatures. To mitigate this effect, increasing the amount of green space and incorporating solar reflective materials and coatings can help reduce heat absorption and minimise heat retention.

By recognising and addressing the specific climate characteristics and potential risks associated with a site, the design can be optimised to create comfortable and sustainable environments that mitigate the effects of climate-related factors such as high temperatures and urban heat islands.

7.7. Building Design

There are multiple aspects of building design that impact its performance in terms of overheating. The orientation of a building, along with the size and placement of glazing areas, plays a significant role in determining the amount of solar heat gain. If solar gain cannot be effectively absorbed or removed, it can lead to increased internal temperatures. While harnessing "free" solar energy for heating purposes can be beneficial, controlling the amount of solar energy entering the building is essential to prevent overheating.

Modern structures are frequently built with high levels of energy efficiency in mind, resulting in improved insulation and airtightness. However, these design features, combined with reduced levels of thermal mass compared to older buildings, can limit the ability to absorb or naturally dissipate heat. As a result, modern buildings may be more prone to overheating if not properly designed and equipped with appropriate mitigation strategies.

To address these challenges, designers need to consider various factors such as building orientation, glazing design, solar shading systems, insulation techniques, and ventilation strategies. By integrating these elements effectively, the building's ability to manage solar gain and control internal temperatures can be optimised, ensuring a comfortable and energy-efficient indoor environment.

7.8. Occupants

While occupants' specific use and behaviour cannot be controlled in new construction projects, it is important to consider the impact of room use type and location when planning a building. The arrangement of spaces should consider the potential solar and other incident heat gains. The risk of overheating is influenced by factors such as occupant density and the anticipated activity type within a particular zone.

For instance, rooms with glazed perimeter areas that are predominantly occupied in the afternoon may benefit from being situated in east-facing locations. The direct solar heat gain can be minimised by positioning them where the sun has already passed its peak. This thoughtful placement considers the potential heat load and aims to create a more comfortable indoor environment.

Considering the occupant activities and their corresponding heat generation patterns, along with the solar exposure of different spaces, allows for better design decisions that help mitigate the risk of overheating and enhance occupant comfort.

7.9. Mitigation

When it comes to new-build construction projects, it is crucial to consider design considerations for reducing the risk of overheating at the earliest opportunity. While performance measures can be incorporated at later stages, the most effective and robust techniques are often inherent to the building's design.

The "cooling hierarchy," outlines the preferred approach to mitigating overheating risks and minimising reliance on mechanical cooling. The hierarchical steps include:

1. Minimizing heat generation through energy-efficient design.
2. Reducing the amount of heat entering the building in summer through considerations such as orientation, shading, albedo, fenestration, insulation, and the incorporation of green roofs and walls.
3. Managing heat within the building using exposed thermal mass and high ceilings.
4. Implementing passive ventilation strategies.
5. Considering mechanical cooling as a last resort.

In addition to appropriate siting and orientation, several properties and functions influence the performance of overheating mitigation measures. One such consideration is the location, proportion, and specification of glazing. It is important to strike a balance between the benefits of natural light and "free heat" while ensuring that the levels of solar gain are not excessive. Glass manufacturers offer a variety of products, including those

with solar control coatings, which can help reduce the transmitted solar gain (measured by the "g-value") without significantly impacting visual performance. Different glass specifications may be more suitable for specific orientations, such as using lower g-value glass for south-facing facades compared to north-facing ones.

7.10. Solar shading

In line with solar control glass coatings, the use of external solar shading is another effective approach to prevent direct transmission of solar gain while allowing for the maintenance or maximisation of glazed areas. The selection of the appropriate type of external shading depends on the orientation of the windows and the sun angles at different times of the day.

Horizontal overhangs are typically more suitable for windows facing south, with higher sun angles. These overhangs can effectively block the high-angle summer sun while allowing the lower-angle winter sun to penetrate and provide natural daylight.

On the other hand, for windows facing east and west, where the sun angles are lower, vertical fins are often a better choice. These fins can help minimise the direct entry of the low-angle morning and afternoon sun, reducing the potential for overheating while allowing for views and daylight.

By carefully selecting and designing external solar shading devices based on the orientation of the windows and the specific solar angles, it is possible to achieve optimal control of solar heat gain and create comfortable indoor environments with ample natural light.

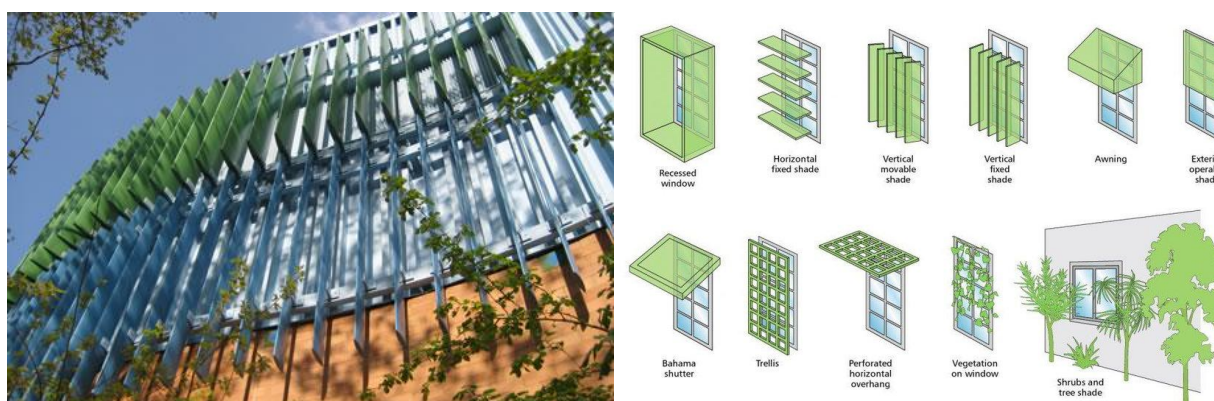


Figure 2. Examples of External Shading Systems

7.11. Thermal Mass

Thermal mass refers to the capacity of an object or construction to absorb and store heat energy. Objects with higher thermal mass can absorb heat during the day and release it at night. This characteristic can help reduce daytime temperatures and enhance the overall thermal stability of a building. However, it's important to note that increasing thermal mass may require more energy to heat the building fabric, potentially leading to increased energy consumption in certain cases. Therefore, achieving a balance is crucial when considering the use of thermal mass in building design.

There are various ways to increase thermal mass. One approach is to expose dense materials, such as concrete or masonry, which naturally possess higher thermal mass properties. Another method involves improving the physical connection between finishing materials and the building structure, ensuring efficient heat transfer between them. By increasing the physical connection, the thermal mass of the building elements can be effectively utilised.

By strategically incorporating thermal mass into the design, it is possible to optimise energy performance and enhance thermal comfort within the building. However, it's important to consider the project's specific requirements and strike a balance between the benefits of thermal mass and the potential energy implications to achieve the desired outcomes.

For example, plaster and the structural core, e.g., blockwork.

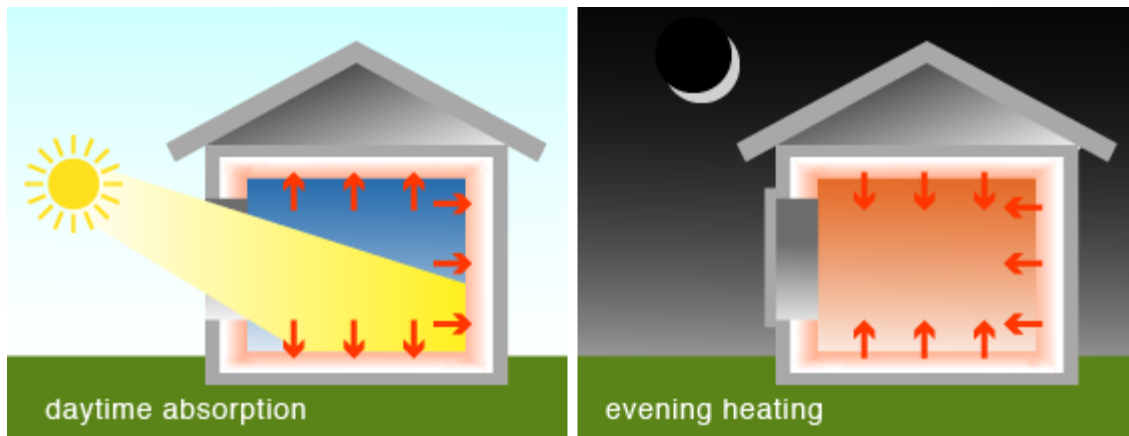


Figure 3. Thermal Mass Explained

7.12. Ventilation

The ventilation strategy plays a crucial role in managing overheating performance. While background ventilation levels are typically low, they may not be sufficient to purge excess heat from a building effectively. Therefore, the ventilation strategy must allow for significant air movement when required.

Several factors influence the potential rate of ventilation, including:

- Opening type, size, and duration: The design of ventilation openings, such as windows or vents, should consider maximising the size of the openings and their ability to remain open for an extended period, allowing for effective air exchange when needed.
- Building height and exposure: The height and exposure of the building to external factors such as wind can impact ventilation rates. Tall buildings or those in exposed locations may benefit from additional consideration in the ventilation strategy to ensure adequate air movement.
- Number of storeys and cross-ventilation opportunities: Buildings with multiple storeys offer cross-ventilation potential, where air can flow through the building from one side to the other. This design consideration can enhance ventilation rates and improve the cooling potential.

It is essential to balance the need for effective ventilation with considerations such as security and protection against water ingress. Ventilation openings should be designed to allow for the greatest possible opening size and duration without compromising the building's security or introducing the risk of water penetration.

By carefully considering these factors and incorporating an appropriate ventilation strategy, it is possible to optimise the ventilation rates and improve the building's ability to manage overheating, ensuring a comfortable and healthy indoor environment.

7.13. Calculating Overheating Risk

Numerous guidance documents are available that outline the assessment of overheating risk and establish acceptable thresholds. These include CIBSE Guide A, BB101, TM52, and TM59. To evaluate the risk, these methodologies involve conducting a Dynamic Simulation Modelling (DSM) exercise to estimate projected internal temperatures. These predicted temperatures are then compared to recommended limits to ascertain their acceptability or if they exceed the prescribed thresholds.

7.14. Part O Outline

The recently introduced Building Regulations Part O, 2021 edition, marks the first comprehensive effort to address overheating specifically in new residential buildings. The primary objective of Part O is to promote the design and construction of buildings that effectively mitigate excessive solar heat gain during summer periods and ensure occupants have suitable means to alleviate indoor heat levels. It is essential to understand that the measures implemented under Part O do not guarantee occupants' comfort but are primarily aimed at safeguarding their health and well-being.

7.15. Buildings Covered by Part O

Table 0.1 Residential buildings within the scope of this approved document	
Title	Purpose for which the building is intended to be used
Residential (dwellings)	Dwellings, which includes both dwellinghouses and flats.
Residential (institutional)	Home, school or other similar establishment, where people sleep on the premises. The building may be living accommodation for the care or maintenance of any of the following. a. Older and disabled people, due to illness or other physical or mental condition. b. People under the age of 5 years.
Residential (other)	Residential college, hall of residence and other student accommodation, and living accommodation for children aged 5 years and older.

Figure 4. Approved Document Part O Overview

7.16. Part O Calculation

Part O of the Approved Document is satisfied by utilising either of the following methods:

7.17. Simplified Method:

- This method considers factors such as risk location and the presence of cross ventilation.
- Risk location is categorised as high (e.g., Greater London and Manchester) or medium (other areas).
- Threshold tables in Part O are referenced to determine the maximum glazing area for the building and the most glazed room.
- In high-risk locations, specific shading requirements must be met, including external shutters with ventilation, glazing with specific g-values and light transmittance, or overhangs on due south-facing facades.

7.18. Dynamic Thermal Modelling:

- This methodology is applicable to all residential buildings and offers greater design flexibility compared to the simplified method.
- CIBSE's TM59 methodology is used for predicting overheating risk, and the limits provided in Part O are applied during the assessment.
- Dynamic Thermal Modelling allows for a more detailed analysis of the building's thermal performance and can inform design decisions.

Our Team is committed to helping your project achieve compliance with Part O using either the simplified method or dynamic thermal modelling, ensuring that the proposed development meets the necessary criteria and guidelines to mitigate overheating risks in residential buildings.

Clean Energy

Supply Energy Efficiently

8.1. District Heating

The potential for connecting the development to an existing district heating network, or contributing to the establishment of a new network, has been considered in accordance with national and local planning policy requirements. District heating networks can deliver significant carbon, energy and operational efficiency benefits by enabling the use of low-carbon and renewable heat sources at scale. These may include technologies such as Combined Heat and Power (CHP), heat pumps, energy from waste, anaerobic digestion (AD), geothermal sources, and waste heat recovery from industrial or commercial processes

District heating systems allow for the efficient distribution of heat across multiple buildings, improving overall system performance through load balancing and centralised plant optimisation. They also provide flexibility for future decarbonisation, as heat sources can be upgraded over time without requiring major alterations to individual dwellings.

The feasibility of district heating is typically influenced by factors such as heat demand density, proximity to existing or planned heat networks, infrastructure requirements, capital investment, and distribution losses. Where applicable, consideration is given to published heat network mapping, Local Authority energy strategies, and any relevant heat network zones or safeguarding areas identified within planning policy.

In line with the energy hierarchy, the potential for connection to a heat network is assessed alongside on-site low-carbon heating solutions to determine the most appropriate and deliverable strategy for the development. Further detail on the preferred heating approach and justification is provided in the following sections of this Energy Statement.

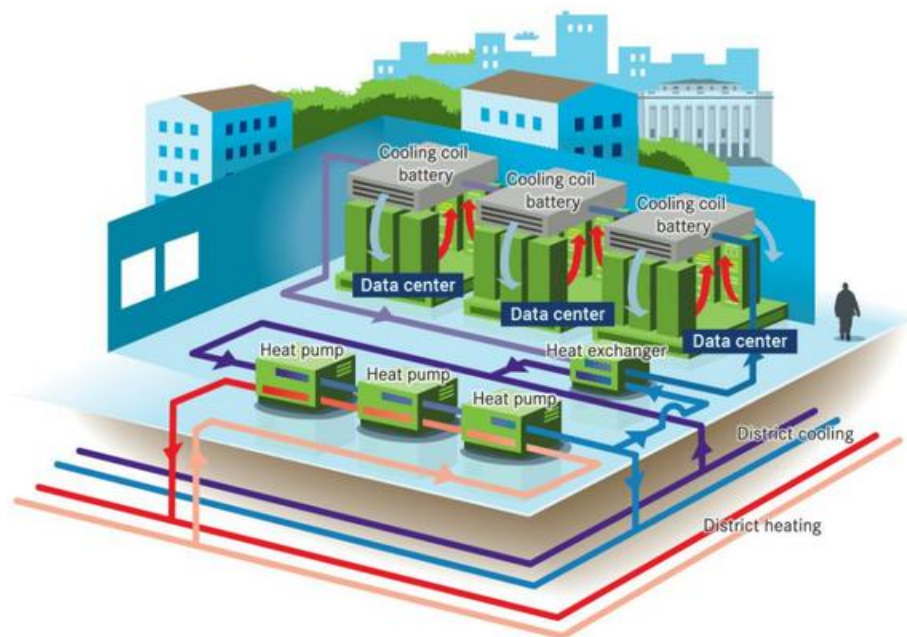


Figure 5. District Heating Underground Pipework

8.2. Network Creation

Given that the proposed development consists of only one dwelling, it is important to consider the specific characteristics and energy demands of the project. In this case, the predominant annual energy load is expected to come from heating and domestic hot water (DHW), with limited peak periods during the day.

When evaluating the suitability of district heating or community networks for the project, it is essential to consider not only the capital costs but also the thermal losses and circulation energy associated with such systems. In smaller-scale developments like this, the thermal losses and energy required for circulation within a district or community network may outweigh the potential benefits and render them technically and economically unviable.

In such cases, alternative energy supply solutions should be explored. This may involve implementing high-performance specifications for the individual dwellings, including efficient heating systems and insulation, to minimise energy demand and optimise energy efficiency. Localised heating solutions, such as individual boilers or heat pumps, may be more suitable for meeting the specific heating and DHW requirements of each dwelling.

By carefully considering the energy needs, cost implications, and technical feasibility of various options, the most appropriate and cost-effective energy supply solution can be identified for the proposed development.

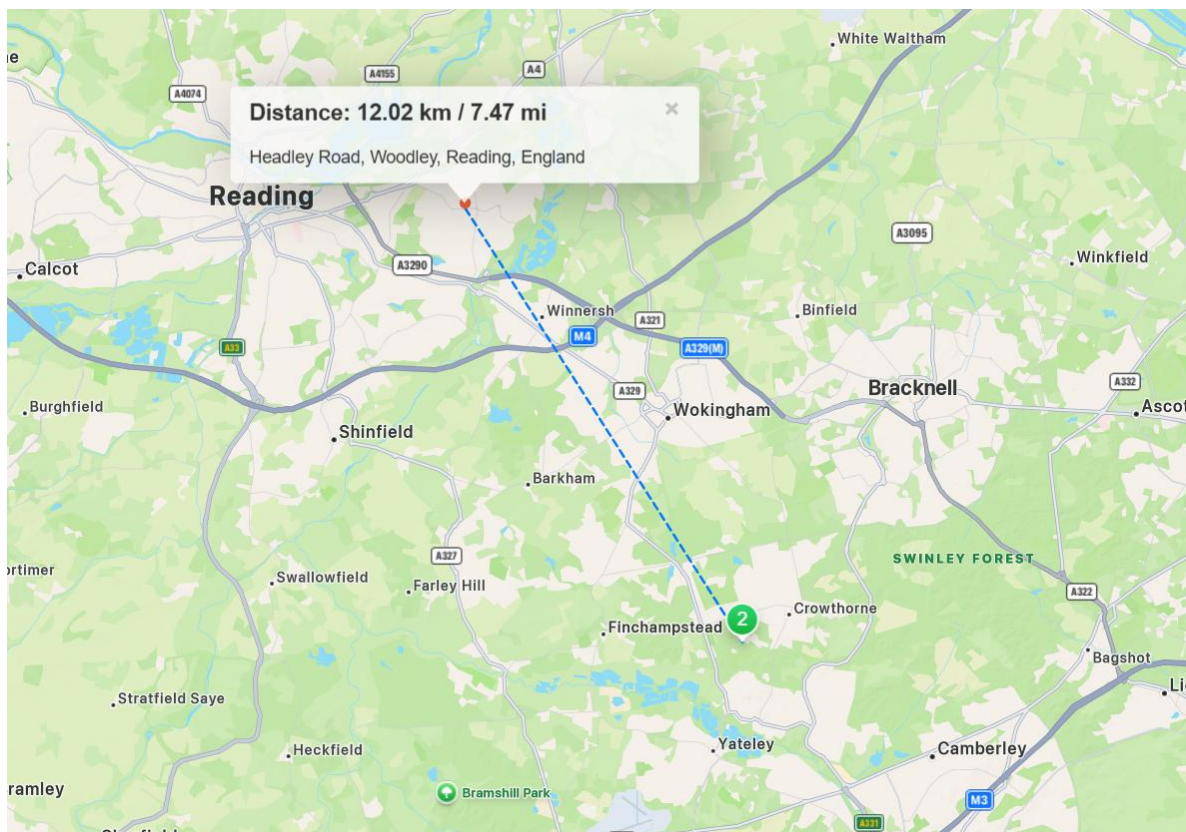


Figure 6. Location of Development Site Relative to Nearest DHN

By checking the Department for Business, Energy and Industrial Strategy (BEIS): Heat Networks Planning Database, where information provided on both district and communal heat network deployment across the UK is collated, we found that the closest operational DHN. This DHN is located at the Wellington College, Duke's Ride, Berkshire, Crowthorne RG45 7PU. Given that the site is 12.02km/ 7.47 miles away from the closest DHN network, which is under construction, as per Figure 6 above, it would be impractical to connect to this network.

Considering the absence of existing district heating networks in the vicinity of the development site and the low heat density within the region, connecting to an existing network is not a feasible option. Furthermore, the energy profile of the development, with a low and infrequent heat demand, does not support the development of a new district heating network.

In terms of integrating Combined Heat and Power (CHP) into the development, it would not be technically or economically viable. The low and infrequent heat demand of the project, combined with the high relative distribution losses associated with CHP systems, makes it impractical to implement CHP as an energy supply solution.

Given these constraints, it is advisable to explore alternative options for meeting the heating and domestic hot water (DHW) needs of the development. This may involve implementing individual heating systems for each dwelling, such as boilers or heat pumps, which can provide a more tailored and efficient heat supply without the need for a district heating network or CHP integration.

By considering the specific requirements and limitations of the development, an appropriate and cost-effective energy supply solution can be identified to meet the heating and DHW demands of the project.

8.3. Results Summary – Clean Energy

	ADL:2021 Emission Rate KG CO ² /m ² /year (TER/DER)	ADL:2021 Fabric Energy Efficiency kWh/m ² /year (TFEE/DFEE)	ADL:2021 Primary Energy kWh/m ² /year (TPER/DPER)	Percentage Reduction DER %	Percentage Reduction DFEE %	Percentage Reduction DPER %
TER	12.04	63.07	45.65	-	-	-
DER Fabric First	17.34	98.22	44.92	0.00	0.00	1.59
DER Clean Energy	-	-	-	0.00	0.00	0.00

Table 6. Clean Energy Results Summary

GREEN ENERGY

Use Renewable Energy

9.1. Green Energy – Use of Renewable Technology

The CO₂ emissions resulting from the implementation of 'Fabric First' measures have been evaluated and compared to the baseline CO₂ emissions. Reductions in CO₂ emissions have been observed at each stage, and the final stage – 'Green Energy' - will assess the impact of renewable energy generation.

Renewable energy is characterised as energy derived from naturally occurring and replenishable energy sources in the environment. Unlike fossil fuels or nuclear power, which can be depleted, renewable energy sources are sustained by ongoing natural processes. Therefore, the term "equipment to generate renewable energy" is somewhat contradictory, as the primary function of such technology is to harness and utilise natural energy flows.

Most renewable energy technologies, with a few exceptions, rely on energy derived from the sun, either directly or indirectly. The exceptions include true geothermal energy, which utilises heat from the Earth's core, and tidal/marine current electricity generation, which capitalises on gravitational forces between the Earth and the Moon (although solar energy also affects some marine currents). However, since this report focuses on practical on-site renewable energy options, these exceptions will not be further explored. Instead, the focus will be on the broad range of technologies listed below, some of which may not appear solar-related at first glance. These technologies can be summarised as follows: [Further details on the specific solar technologies can be provided if desired.

- Solar thermal – direct heating of water for space heating or domestic hot water
- Photovoltaic – direct generation of electricity from sunlight
- Hydroelectricity – use of solar (water cycle) driven water flows to generate electricity.
- Wind turbines – use of solar-driven air movement to generate electricity.
- Heat pumps – extraction of solar heat from the earth, atmosphere, or water bodies
- Bio-fuels – combustion of solid or liquid biofuels to produce heat or electricity.

While the technologies and their potential application to this site will be discussed in more detail in the subsequent sections, it is important to address another crucial point. The adoption of renewable energy technologies aims to reduce greenhouse gas emissions, primarily carbon dioxide. However, it is important to recognise that none of these technologies can be considered completely "zero carbon." This is because when considering the entire life cycle of these systems, energy is required for manufacturing, maintenance, and operation, and this energy is often sourced from non-renewable sources. For instance, the production and processing of silicon for manufacturing photovoltaic panels, the transportation of wood pellets using diesel fuel, and the energy used to produce fertilisers for biofuels are all examples of energy inputs derived from non-renewable sources.

Furthermore, it should be noted that the renewable energy technology industry is dynamic and innovative, and even seemingly similar products can vary significantly in practical details. As a result, the detailed design of installations must be carried out by experts, often in collaboration with product manufacturers. Virtually no two products are identical or interchangeable in this field.

The following section provides an overview of the technologies that have been considered for implementation in this development.

9.2. Solar Photovoltaics (PV)

Solar Photovoltaic (PV) panels consist of interconnected cells that use semiconductor technology to convert solar energy into electricity. The generated electricity, initially in high voltage direct current (DC), is converted into alternating current (AC) and integrated into the main supply through an inverter. PV panels are most efficient when installed on exposed areas facing south, with an inclination angle close to 30° from the horizontal.

This technology has been extensively tested and requires minimal maintenance. Most panels are designed to be self-cleaning when installed at the appropriate angles, and their design life typically surpasses the expected payback period by a significant margin. PV panels offer several notable advantages. They reduce energy consumption and costs for residents on-site while decreasing the demand for electricity from the national grid. In fact, they can even contribute surplus energy back to the grid. This saves considerable carbon dioxide emissions by reducing reliance on the relatively inefficient and fossil fuel-intensive national infrastructure for heat generation and promotes a more sustainable and environmentally friendly energy system.

9.3. Heat Pumps

Heat pumps are devices that collect low-temperature heat and amplify it to a usable temperature. Typically, a heat pump serving a heat network can deliver 2-3 kWh of useful energy for every 1 kWh of input energy. Therefore, it can be considered as providing 1-2 kWh of low-carbon energy.

There are two common types of heat pumps: ground source and air source. Ground source heat pumps involve drilling boreholes up to 100m deep and spacing them at least 6m apart to extract heat from the ground. However, in urban areas like this development site, ground-source heat pumps are often not feasible due to the complexity of drilling and the need for a significant area for installation.

Air source heat pumps, on the other hand, collect heat from the ambient air using air-heat-exchanger units. While heat pumps can offer good performance, they have practical limitations. They need to be located externally, which can impact both acoustics and visual aesthetics. Additionally, their efficiency is affected by the temperature of the air. At peak heat demand, the system's efficiency is at its lowest. Moreover, since heat pumps rely on electricity from the national grid, their actual carbon emissions are influenced by the carbon intensity of the grid, which can vary.

9.4. Green Energy – Specification Applied

After thorough consideration, our team has determined that the most effective approach to meet policy and Building Regulation requirements is to incorporate both Air Source Heat Pump (ASHP) and Solar Photovoltaic (PV) panels into the proposed development. This approach significantly reduces carbon emissions.

Elements	Specification
Heating	Brand Name: TBC Model Name: TBC
Secondary Heating	None
Hot Water Cylinder	Size: 300 Litre Declared Heat loss kWh/24hr: 2.11
Ventilation	Natural Ventilation with MHVR (89% Efficient) Brand Name: Nuair Model Name: MRXBOXAB-ECO3
Renewable Technology	1KWP Solar PV System Facing West at 45 Degrees

Table 7. Green Energy Specifications

9.5. Green Energy – Results Summary

	ADL:2021 Emission Rate KG CO ₂ /m ² /year (TER/DER)	ADL:2021 Fabric Energy Efficiency kWh/m ² /year (TFEE/DFEE)	ADL:2021 Primary Energy kWh/m ² /year (TPER/DPER)	Percentage Reduction DER %	Percentage Reduction DFEE %	Percentage Reduction DPER %
TER	12.04	63.07	45.65	-	-	-
DER Fabric First	17.34	98.22	44.92	0.00	0.00	1.59
DER Clean Energy	-	-	-	0.00	0.00	0.00
DER Green Energy	4.31	46.74	44.92	64.20	25.89	1.59

Table 8. Green Energy Results Summary

As shown by the percentage reduction (DER %), the site has managed to reduce the overall carbon emissions by 64.20% via the use of renewable technology.

10. Conclusions

The Energy Statement presented in this document has detailed the proposed specification for the development, highlighting the significant savings achieved at each stage of the energy hierarchy compared to the current Building Regulations baseline. By adopting a fabric-first approach, substantial energy savings have been realised.

The fabric-first approach prioritises designing and constructing a highly energy-efficient building envelope, focusing on insulation, air tightness, and thermal performance. This approach ensures that the building's fabric itself acts as a primary source of energy efficiency, reducing the need for additional energy-consuming systems.

The proposed specification surpasses the minimum requirements of the Building Regulations by implementing advanced insulation materials, efficient windows and doors, and effective air-sealing techniques. This results in substantial energy savings throughout the lifetime of the development.

By emphasising the fabric-first approach, the proposed development achieves improved energy efficiency, provides enhanced thermal comfort for occupants, and reduces environmental impact. The combination of energy-saving measures implemented in the design contributes to a more sustainable and environmentally conscious building.

Overall, the Energy Statement confirms that the proposed specification, driven by a fabric-first approach, yields significant energy savings when compared to the baseline set by the current Building Regulations.

10.1. Fabric First Approach

The proposed development features a high-performance building envelope that incorporates low U-values, construction details designed for thermal efficiency, and minimal air permeability. The performance values of the building envelope show significant enhancements compared to the 2021 Notional building used as a reference for compliance assessment.

10.2. Clean Energy Approach

The assessment of determining local DHN/CHP and the feasibility has not yielded any positive results. With a CHP or DHN being impractical as well as the closest existing DHN being too far, this approach is not feasible.

10.3. Green Energy Approach

The inclusion of a PV system has been proposed along with an ASHP. This will help future-proof the dwelling with the envisaged decarbonisation of the National Grid.

11. Summary

This statement has outlined the approach taken by the development to incorporate an energy-efficient design that surpasses the requirements of Part L 2021 regulations. By integrating Solar Photovoltaic (PV) panels and ASHP and utilising an efficient fabric design & boiler specification, a significant carbon emission reduction can be achieved.

JosTec, Suite 107, Moda Business Centre, Stirling Way, Borehamwood, WD6 2BW

Tel: 01923 518 923

E-mail: Info@jostec.co.uk

SAP Calculations

Appendices

Fabric First SAP Reports

Summary for Input Data



Plot Reference	New Dwelling	Issued on Date	20/02/2026
Assessment Reference	New Dwelling - Fabric First	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	17.34	TER	12.04
Environmental	84 B	% DER < TER			-44.02
CO ₂ Emissions (t/year)	1.61	DFEE	44.92	TFEE	45.65
Compliance Check	See BREL	% DFEE < TFEE			1.59
% DPER < TPER	-55.72	DPER	98.22	TPER	63.07

Assessor Details	Mr. Mohamed Egal	Assessor ID	AW35-0001
Client	JosTec, -		

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2026	
4.0 Sheltered Sides	1	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	127.56	kJ/m²K

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	No
Smart gas meter fitted	No

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	30.38 m	55.14 m ²	2.42 m
	1st Storey:	33.50 m	47.80 m ²	2.68 m

8.0 Living Area	48.63	m ²
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Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	110.29	91.56	0.00	None	18.73	Enter Gross Area
Dormer Wall	Timber Frame	Timber framed wall (one layer of plasterboard)	0.15	9.00	11.58	9.48	0.00	None	2.10	Enter Gross Area
Loft Stud Wall (0.15x0.72)	Timber Frame	Timber framed wall (one layer of plasterboard)	0.11	9.00	23.49	23.49	0.00	None	0.00	Enter Gross Area

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall	Plasterboard on timber frame	9.00	142.74

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Flat Ceiling	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	8.12	8.12	None	0.00	Enter Gross Area	0.00
Sloped Ceiling	External Slope Roof	Plasterboard, insulated slope	0.15	9.00	56.02	54.52	None	0.00	Enter Gross Area	1.50
Sheltered (0.15x0.72)	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	7.34	7.34	None	0.00	Enter Gross Area	0.00

Description	Storey	Construction	Kappa	Area (m ²)
Internal Ceiling	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	9.00	47.80

Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
Ground Floor	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.12	None	0.00	75.00	55.14

Summary for Input Data

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	18.00	47.80

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40
H/G Door	Manufacturer	Half Glazed Door	Double Low-E Soft 0.1			0.63		0.70	1.40
Roof Window	Manufacturer	Roof Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
East - H/G Door	H/G Door	External Wall	East	2.05	
West - H/G Door	H/G Door	External Wall	West	2.25	
East - Window	Window	External Wall	East	1.96	
North - Window	Window	External Wall	North	2.08	
South - Window	Window	External Wall	South	5.91	
West - Window	Window	External Wall	West	4.48	
West - Window	Window	Dormer Wall	West	2.10	
West - Roof Window	Roof Window	Sloped Ceiling	West	1.50	45

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	16.28	0.03	0.03 RCD	No
E3 Sill	Non Gov Approved Schemes	12.20	0.02	0.02 RCD	No
E4 Jamb	Non Gov Approved Schemes	35.20	0.02	0.02 RCD	No
E5 Ground floor (normal)	Non Gov Approved Schemes	30.38	0.07	0.07 RCD	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	30.38	0.00	0.00 RCD	No
E11 Eaves (insulation at rafter level)	Non Gov Approved Schemes	16.36	0.02	0.02 RCD	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	4.29	0.04	0.04 RCD	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	13.70	0.04	0.04 RCD	No
E16 Corner (normal)	Non Gov Approved Schemes	21.50	0.04	0.04 RCD	No
R1 Head of roof window	Table K1 - Default	1.56	0.24	0.24	No
R2 Sill of roof window	Table K1 - Default	1.56	0.24	0.24	No
R3 Jamb of roof window	Table K1 - Default	3.84	0.24	0.24	No
R4 Ridge (vaulted ceiling)	Table K1 - Default	16.86	0.12	0.12	No
R5 Ridge (inverted)	Table K1 - Default	5.91	0.12	0.12	No
R6 Flat ceiling	Table K1 - Default	3.78	0.12	0.12	No
R7 Flat ceiling (inverted)	Table K1 - Default	4.29	0.12	0.12	No
R8 Roof to wall (rafter)	Table K1 - Default	28.30	0.12	0.12	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500501
Configuration	4
Manufacturer SFP	0.75
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	4
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0

Summary for Input Data

Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP ₅₀	3.00	m ² /(h.m ²) @ 50 Pa
Test Method	Blower Door	

22.0 Lighting
No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting	80.00	5.00	400.00	10

24.0 Main Heating 1

Percentage of Heat %

Fuel Type

SAP Code

In Winter

In Summer

Model Name

Manufacturer

Controls SAP Code

Controls description

Delayed Start Stat

Burner Control

Flue Type

Fan Assisted Flue

Is MHS Pumped

Heating Pump Age

Heat Emitter

Underfloor Heating

Flow Temperature

Flow Temperature Value

Boiler Interlock

25.0 Main Heating 2

26.0 Heat Networks

27.0 Secondary Heating

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Summary for Input Data

Solar Panel	No
Water use <= 125 litres/person/day	Yes
Cold Water Source	From mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower 1	Combi boiler or unvented hot water system	11.00		No	
Shower 2	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Measured Loss
Cylinder Volume	200.00
Loss	2.06
Pipes insulation	Fully insulated primary pipework

L

kWh/day

31.0 Thermal Store

None

34.0 Small-scale Hydro

None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating	£4,000 - £7,000	£64	B 82	B 86
Photovoltaic	£8,000 - £10,000	£298	B 89	B 88
Wind turbine			0	0

Green Energy SAP Reports

Summary for Input Data

Plot Reference	New Dwelling	Issued on Date	19/02/2026
Assessment Reference	New Dwelling	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	80 C	DER	4.31	TER	12.04
Environmental	96 A	% DER < TER			64.20
CO ₂ Emissions (t/year)	0.39	DFEE	44.92	TFEE	45.65
Compliance Check	See BREL	% DFEE < TFEE			1.59
% DPER < TPER	25.89	DPER	46.74	TPER	63.07

Assessor Details	Mr. Daniel Towns	Assessor ID	Y077-0001
Client	JosTec, -		

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2026	
4.0 Sheltered Sides	1	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	127.56	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	30.38 m	55.14 m ²	2.42 m
	1st Storey:	33.50 m	47.80 m ²	2.68 m

8.0 Living Area	48.63	m ²
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Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	110.29	91.56	0.00	None	18.73	Enter Gross Area
Dormer Wall	Timber Frame	Timber framed wall (one layer of plasterboard)	0.15	9.00	11.58	9.48	0.00	None	2.10	Enter Gross Area
Loft Stud Wall (0.15x0.72)	Timber Frame	Timber framed wall (one layer of plasterboard)	0.11	9.00	23.49	23.49	0.00	None	0.00	Enter Gross Area

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall	Plasterboard on timber frame	9.00	142.74

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Flat Ceiling	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	8.12	8.12	None	0.00	Enter Gross Area	0.00
Sloped Ceiling	External Slope Roof	Plasterboard, insulated slope	0.15	9.00	56.02	54.52	None	0.00	Enter Gross Area	1.50
Sheltered (0.15x0.72)	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	7.34	7.34	None	0.00	Enter Gross Area	0.00

Description	Storey	Construction	Kappa	Area (m ²)
Internal Ceiling	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	9.00	47.80

Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
Ground Floor	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.12	None	0.00	75.00	55.14

Summary for Input Data

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	18.00	47.80

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40
H/G Door	Manufacturer	Half Glazed Door	Double Low-E Soft 0.1			0.63		0.70	1.40
Roof Window	Manufacturer	Roof Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
East - H/G Door	H/G Door	External Wall	East	2.05	
West - H/G Door	H/G Door	External Wall	West	2.25	
East - Window	Window	External Wall	East	1.96	
North - Window	Window	External Wall	North	2.08	
South - Window	Window	External Wall	South	5.91	
West - Window	Window	External Wall	West	4.48	
West - Window	Window	Dormer Wall	West	2.10	
West - Roof Window	Roof Window	Sloped Ceiling	West	1.50	45

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	16.28	0.03	0.03 RCD	No
E3 Sill	Non Gov Approved Schemes	12.20	0.02	0.02 RCD	No
E4 Jamb	Non Gov Approved Schemes	35.20	0.02	0.02 RCD	No
E5 Ground floor (normal)	Non Gov Approved Schemes	30.38	0.07	0.07 RCD	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	30.38	0.00	0.00 RCD	No
E11 Eaves (insulation at rafter level)	Non Gov Approved Schemes	16.36	0.02	0.02 RCD	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	4.29	0.04	0.04 RCD	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	13.70	0.04	0.04 RCD	No
E16 Corner (normal)	Non Gov Approved Schemes	21.50	0.04	0.04 RCD	No
R1 Head of roof window	Table K1 - Default	1.56	0.24	0.24	No
R2 Sill of roof window	Table K1 - Default	1.56	0.24	0.24	No
R3 Jamb of roof window	Table K1 - Default	3.84	0.24	0.24	No
R4 Ridge (vaulted ceiling)	Table K1 - Default	16.86	0.12	0.12	No
R5 Ridge (inverted)	Table K1 - Default	5.91	0.12	0.12	No
R6 Flat ceiling	Table K1 - Default	3.78	0.12	0.12	No
R7 Flat ceiling (inverted)	Table K1 - Default	4.29	0.12	0.12	No
R8 Roof to wall (rafter)	Table K1 - Default	28.30	0.12	0.12	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500501
Configuration	4
Manufacturer SFP	0.75
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	4
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0

Summary for Input Data

Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP₅₀ m²/(h.m²) @ 50 Pa

Test Method

22.0 Lighting
No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting	80.00	5.00	400.00	10

24.0 Main Heating 1

Percentage of Heat %

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Controls description

Is MHS Pumped

Heating Pump Age

Heat Emitter

Underfloor Heating

Flow Temperature

Flow Temperature Value

25.0 Main Heating 2

26.0 Heat Networks

27.0 Secondary Heating

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Cold Water Source

Bath Count

Supplementary Immersion

Immersion Only Heating Hot Water

28.1 Showers

Summary for Input Data

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower 1	Combi boiler or unvented hot water system	11.00		No	
Shower 2	Combi boiler or unvented hot water system	11.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Measured Loss
Cylinder Volume	200.00
Loss	2.06
Pipes insulation	Fully insulated primary pipework

L

kWh/day

31.0 Thermal Store

None

32.0 Photovoltaic Unit

One Dwelling
Export Capable Meter?
Yes
Connected To Dwelling
Yes
Diverter
No
Battery Capacity [kWh]
0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
1.00	West	45°	None Or Little		No	1.00		

34.0 Small-scale Hydro

None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
Solar water heating	£4,000 - £7,000	£90	B 82	A 96
Photovoltaic			0	0
Wind turbine			0	0