



Energy & Sustainability Statement

For

Proposed Development at

Land Adjacent to 236 Reading Road, Winnersh, RG41 5AA

Prepared on behalf of:

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Executive Summary

This report has been produced on behalf of Mr C. Youell to demonstrate how the application for the proposed dwelling at land adjacent to 236 Reading Road, Winnersh, RG41 5AA will address the carbon reduction and sustainability requirements set by Wokingham Borough Council.

The Energy Assessment demonstrates that the proposed specification achieves an 61.98% reduction in carbon emissions beyond Part L of the 2021 Building Regulations

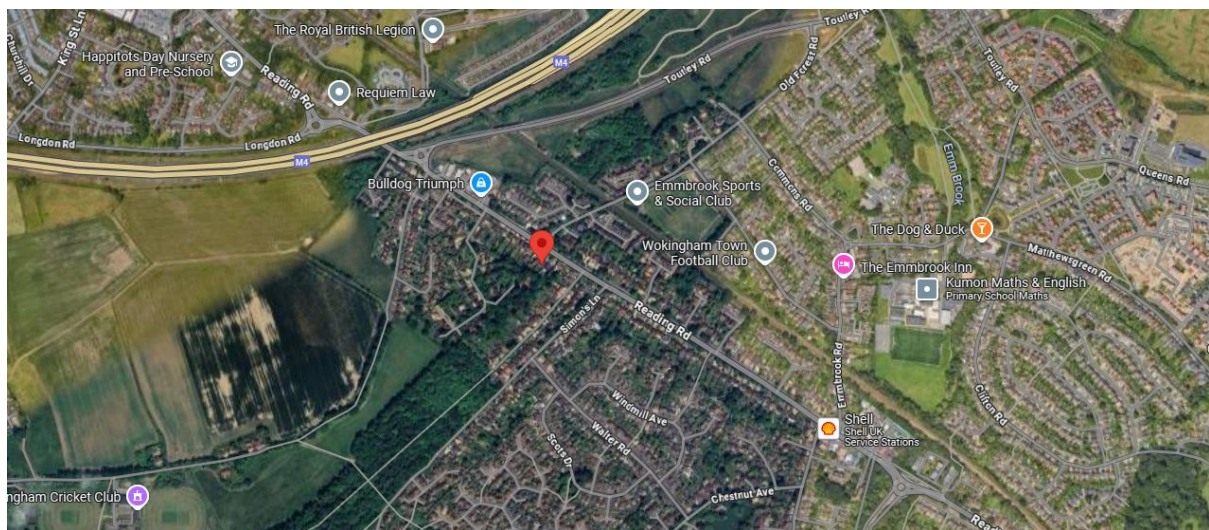
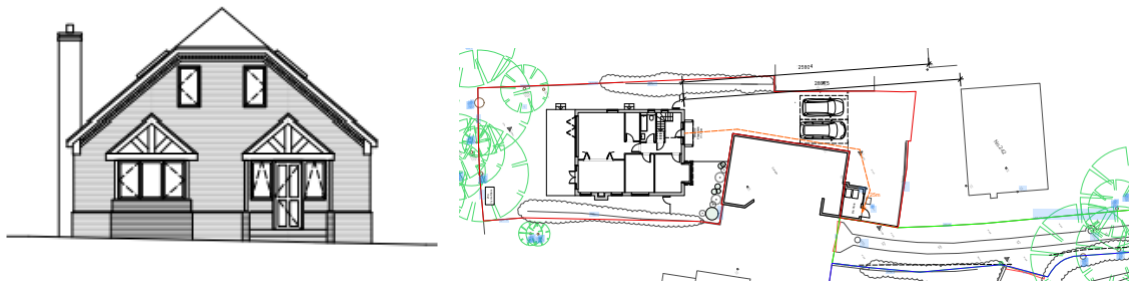
The design has been informed by the energy hierarchy and passive design which is demonstrated throughout this report.

A sustainability statement has been prepared to demonstrate a commitment to enhance the environmental performance of the development. This includes specification of materials, waste reduction, biodiversity and internal water use limited by design to 105 litres/per person/per day.

Introduction to the Proposed Development

The proposed 3 bedroom dwelling will be situated on the land adjacent to the existing dwelling at No. 236 Reading Road. It will provide family living and will be sympathetically designed in keeping with the local area.

The area is well established within easy reach of commuter belts, public transport, schools, recreational grounds, medical centres and supermarkets.



Energy Assessment

This assessment outlines the measures and specification proposed to meet the requirements outlined Wokingham Borough Council local plan.

The carbon savings by the proposed development are shown at each stage of the Energy Hierarchy in the table and figures below.

The proposed dwelling has been modelled using SAP 10.2 and is designed to achieve an **61.98%** reduction in carbon emissions beyond Part L 2021 Building Regulations surpassing the requirements of Policy CP1.

Part L 2021 results

	Results
Target Emission Rate (TER) TER worksheet	8.68
Dwelling Emission Rate (DER) DER worksheet	3.3
Target Fabric Energy Efficiency (TFEE)	41.46
Dwelling Fabric Energy Efficiency (DFEE)	40.03
Target Primary Energy Rate (TPER)	45.71
Dwelling Primary Energy Rate (DPER)	34.16
% Improvement DER/TER	61.98
% Improvement DFEE/TFEE	3.45
% Improvement DPER/TPER	25.27

Appendix A

On-Site Renewable Energy

	Plot 1	Total
Renewable energy from heat pump	1556.28	1556.28
Renewable energy from wood burner	0.00	0.00
Renewable energy from PV	0.00	0.00
Total renewable energy use	1556.28	1556.28
Total dwelling energy use	10489.16	10489.16
% renewable energy	14.8%	14.8%

Appendix B

This has been achieved based on the following design specification.

Energy & Sustainability Statement – Land Adjacent to 236 Reading Road, Winnersh, RG41 5AA

Proposed Design Specification

The following section outlines the measures which have been taken to reduce the energy demand of the proposal. This includes both architectural and building fabric measures (passive design) and energy efficient services (active design) considered at the earliest design stage.

Passive design measures, including optimising orientation and site layout, natural ventilation and lighting, thermal mass and solar shading, are set out in the Design and Access statement. These factors are also accounted for in SAP calculations

Active design measures to reduce energy demand are described as including high efficiency lighting and ventilation. Other measures include enhanced U-values, air tightness improvement and the development's approach to limiting thermal bridges. The specification for the proposal is listed below:

Demand Reduction Measures	Specification
<i>Building Fabric - U-Values (W/m²K)</i>	
Walls	0.17
Ground floor	0.13
Roofs	0.11
External solid doors (whole frame)	1
External half glazed doors (whole frame)	1.2
Glazing (glazed doors & windows (whole frame)	1.3
<i>Building Fabric - Other</i>	
Air permeability (m ³ /hm ²)	5.0
Thermal bridging	SAP 10.2 approved
<i>Services</i>	
Ventilation	Natural
Low energy lighting	100%
Heating & Hot Water	ASHP

The proposed dwelling is both well insulated and designed to minimise heat loss, therefore, the client has chosen an air source heat pump to provide heating and hot water.

Heating Infrastructure

Heat Networks

The energy systems for use at the development have been considered and selected. No existing heat networks can be found near the site.

Combined Heat and Power

A Combined Heat and Power system (CHP) or cogeneration is the simultaneous generation of both heat and power (thermal energy and electricity). This is achieved through recovering heat generated in the production of electricity, which can be utilised in providing space heating and hot water.

The most common fuel used in the UK to power a CHP engine is natural gas although LPG, biogas, ethanol, methane, hydrogen, biofuel, oil or any fuel that can drive an engine can be used. A CHP operating on fossil fuels, e.g. gas, diesel, is not considered a renewable technology. A biomass CHP, however, is considered to be a renewable energy technology but it is only suitable for developments with larger heat and electricity demands.

A CHP system uses on average 35% less primary energy compared to conventional heat-only boilers and power stations approaching efficiencies as high as 75%. Although not a renewable technology, except if biomass is being used, CHP is considered very efficient, reducing carbon emissions related to a site's energy consumption while providing electricity and heat to occupiers.

Generally, CHP is not recommended for use in developments consisting of 500 units or less, as 'at this scale it is generally not economical'.

CHP requires significant infrastructure and a substantial heat demand. In order to obtain maximum efficiency, it is necessary to have an energy demand profile which is evenly spread throughout the day and night. A CHP unit will operate efficiently when running continuously and so requires its energy to be used continuously to avoid wastage. This usage profile does not match that of the proposed development.

As neither CHP nor connection to a heat network has been found to be viable, they do not form part of the proposed specification.

Cooling and Overheating

The developer will address the following as a matter of priority to reduce overheating risk and the requirement for active cooling:

1. Minimise internal heat generation through energy efficient design

For example, heat distribution infrastructure within the building will be designed to minimise pipe lengths and adopting pipe configurations which minimise heat loss e.g. twin pipes.

2. Reduce the amount of heat entering the building in summer

For example, through use of carefully designed shading measures, including balconies, louvres, internal or external blinds, shutters, trees and vegetation.

3. Manage the heat within the building through exposed internal thermal mass and high ceilings

Increasing the amount of exposed thermal mass can help to absorb excess heat within the building.

4. Passive ventilation

For example, through the use of openable windows, shallow floorplates, dual aspect units, designing in the 'stack effect'.

5. Mechanical ventilation

Mechanical ventilation can be used to make use of 'free cooling' where the outside air temperature is below that in the building during summer months. This will require a by-pass on the heat recovery system for summer mode operation.

6. Active cooling systems

If air conditioning is necessary, the lowest carbon options should be used.

Cooling demand has been reduced through addressing the first four measures which are considered passive measures. It has not been considered necessary to specify air conditioning.

Overheating Risk Analysis

An overheating analysis will be carried out at design stage using either the Simplified Method or Dynamic Thermal Modelling to demonstrate compliance with the Approved Document Part O 2021

Renewable Energy

The use of renewable technology in the proposed design of this dwelling has been fully considered as outlined in Appendix E.

An air source heat pump has been identified suitable to provide space heating and hot water which has been shown to meet the requirements in Policy NRM11 by surpassing the 10% renewable energy.

An ASHP operates by converting the energy of the outside air to heat, creating a comfortable temperature inside the building as well as supplying energy for the hot water system

Monitoring

The applicant will consider options for post occupancy monitoring of the dwelling. It is the intention of the applicant to provide smart meters at the development to support the growth of demand side response.

Sustainability Statement

The following section of this reports looks to address sustainability measures in addition to the Design and Access Statement.

Internal Water Use

It is the intention of the applicant to reduce the consumption of potable water within the proposed dwellings from all sources, using efficient fittings and flow restrictors where required.

Performance in domestic properties is assessed under the methodologies set out in Part G of the Building Regulations and the former Code for Sustainable Homes, achieving a maximum internal water use of **105 L/p/d** (litres per person per day) by design.

Although a variety of specifications are available to meet this target, the proposed flow rate criteria for dwellings at the development has been chosen as follows:

Fitting	Flow Rate / Capacity
<i>Sanitary Fittings</i>	
Dual Flush WC	6 litres per flush (full) 2.6 litres per flush (part)
Taps (main)	5 litres per minute
Bath (if present)	170 litres to overflow
Shower	8 litres per minute
Taps (kitchen/utility)	6 litres per minute
<i>Appliances</i>	
Washing Machine	8.17 litres per kilogram (dry load)
Dishwasher	1.25 litres per place setting

Appendix C

This specification of fittings achieves an internal water consumption rate of 104 litres per person per day, meeting the required result of 105 litres per person per day.

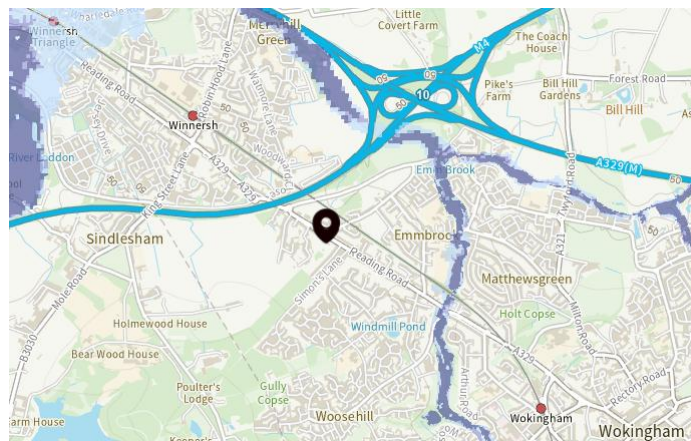
The developer will minimise the use of mains water by:

- A. Incorporating water saving measures and equipment.
- B. Designing residential development so that mains water consumption would meet a target of 105 litres or less per head per day (excluding an allowance of 5 litres or less per head per day for external water consumption).

Flood Risk

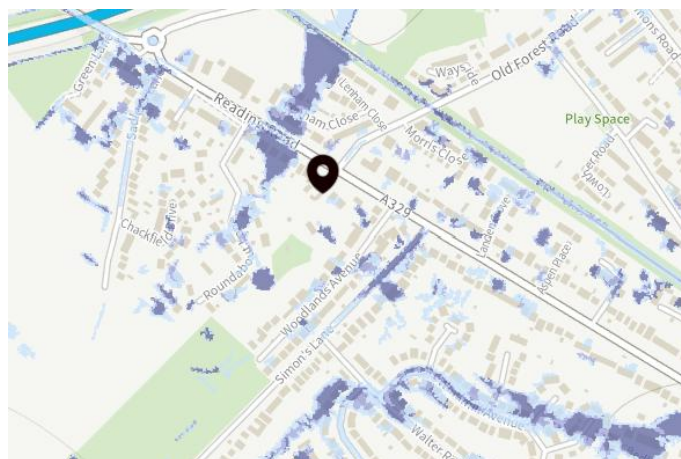
Flood risk from rivers or the sea

Using GOV.UK's map, the development has been found to be in a Flood Zone 1 (there is less than a 0.1 per cent chance of flooding occurring each year). The yearly chance of flooding is very low staying at very low between 2036 to 2069.



Flood risk from surface water

Using the GOV.UK's map, the development is within Flood Risk 1 from surface water. This means that there is less than a 0.1% of flood each year and staying very low between 2040 to 2060.



Materials and Waste Reduction

Materials will be chosen to lower the environmental impact of the development wherever possible. BRE's Green Guide will be consulted when finalising specifications of products and element build types. This applies primarily to:

- Roofs
- External walls
- Internal walls (including separating walls)
- Upper and ground floors (including separating floors)
- Windows

In all cases, it is the applicant's intention to secure Green Guide ratings of between A+ and D, exceeding the requirements of the former Code for Sustainable Homes. All timber used during the development will come from a 'legal source' and will not be on the CITES list, or in the case of Appendix III of the CITES list, it will not have been sourced from a country seeking to protect this species as listed in Appendix III.

To promote the reduction of emissions of gases with high Global Warming Potential (GWP) associated with the manufacture, installation, use and disposal of foamed thermal and acoustic insulating materials, products will be chosen with a GWP of <5 wherever possible. They may also be chosen to comply with additional voluntary industry standards for responsible sourcing, including FSC Chain of Custody and BES 6001:2008 Framework Standard for Responsible Sourcing of Construction Products certifications where applicable. Products such as paints and varnishes will be sourced to minimise the use of Volatile Organic Compounds (Formaldehyde, VCM, etc.).

Minimising Site Waste

A Site Waste Management Plan (SWMP) will be created to include procedures, commitments for waste minimisation and diversion from landfill, as well as setting target benchmarks for resource efficiency in accordance with guidance from:

- DEFRA (Department for Environment, Food and Rural Affairs)
- BRE (Building Research Establishment)
- Envirowise
- WRAP (Waste & Resources Action Programme)
- Environmental performance indicators and/or key performance indicators (KPI) from Envirowise or Constructing Excellence.

The applicant will seek to establish a 'take back' scheme from suppliers in order to avoid the unnecessary waste of excess materials. Care will also be taken to minimise loss through breakage etc. following guidance from the Waste and Resources Action Programme (WRAP) and others.

Biodiversity

The presence of any significant ecological features as defined using guidance from BRE will be noted, and the appropriate measures for protection and conservation undertaken before works begin. Features to promote biodiversity, such as bird and bat boxes, will be incorporated into the design wherever feasible.

Additional planting will be carried out to ensure a net gain in vegetation.

Conclusion

This report outlines how a variety of sustainability criteria have been considered and solution successfully incorporated into the proposed design of the development.

Based on the modelling undertaken, it has been demonstrated that it is possible to reduce regulated on-site carbon dioxide emissions of the proposed dwelling adjacent to 236 Reading Road by 61.98% beyond the requirements of Part L 2021 of the Building Regulations, where the building and services specification described in this report are implemented.

Fabric performance has been improved to meet and surpass the requirements of Part L of the Building Regulations, whilst heating, hot water equipment and controls have been chosen to maximize carbon savings. An air source heat pump will provide space heating and hot water.

Additional efforts to enhance the environmental performance of the development include the specification of materials, waste reduction, biodiversity and internal water use limited by design to 105 Litres/per person/per day.

Appendices

Appendix A – BREL

Appendix B – TER/DER

Appendix C – Water calculations