



Energy and Sustainability Statement

15 Nancy Downs, Oxhey Hall, Watford, Hertfordshire, WD19 4NF

BE1560
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Executive Summary

This report has been produced on behalf of David O'Reilly to demonstrate how the application for the proposed new build house at 15 Nancy Downs, Oxhey Hall, Watford, Hertfordshire, WD19 4NF will address the carbon emission reduction set by Three Rivers District Council

The Energy Assessment demonstrates that the proposed specification achieves a reduction of **5%** in on-site regulated emissions, meeting the target of 5% beyond Building Regulations requirements. Methodology from the 'Guidance on producing and energy statement' document available on the 'Development Management Policies DPD' from the council's website has been followed.

	Energy (kWh/year)	CO₂ Emissions (kgCO₂/year)
Space heating energy used	44729.8	9661.64
Water heating energy used	3148.5	680.09
Electricity for pumps and fans	75	38.93
Electricity for lighting	1597.89	829.3
Total	49551.19	11209.96

DER – Dwelling Emission Rate (kgCO ₂ /m ² /year)	11.06
TER – Target Emission Rate (kgCO ₂ /m ² /year)	11.64
DER improvement on TER	5%

The DER is found by dividing the total yearly dwelling emissions by the floor area. Building Control compliance requires that the DER be equal to or lower than the TER. Three Rivers District Council requires the DER to be 5% lower than the TER. In this design, the DER is 5% lower than the TER, therefore meeting the planning requirement.

An overheating assessment has been carried out through SAP 2012, finding the proposed development to be compliant and posing a 'not significant' risk of overheating.

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

Introduction to the Proposed 15 Nancy Downs Development

The proposed dwelling is a substantial seven-bedroom detached dwelling which is well situated for commuter links.



The architectural design is in keeping with the local area.



Energy Assessment

This assessment has been prepared in accordance with 'Guidance on producing an energy statement – Three River District Council' and outlines the measures and specification proposed to achieve a reduction of **5%** over Part L of the Building Regulations.

The Executive Summary of this report contains tables demonstrating carbon dioxide emissions savings.

Summary of Targets

Targets set by Three Rivers District Council

In the case of a minor development, it is the responsibility of the Local Authority to set a target, in this case Three Rivers District Council.

Targets Applicable to 15 Nancy Downs

The proposed 15 Nancy Downs development is within the area of Three Rivers District Council, so targets set by this council apply. As such there is a **5%** target reduction in CO₂ emissions over Part L of the Building Regulations through on-site solutions.

Demand Reduction

The following section of the report outlines 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.

Demonstrating CO₂ Savings from Demand Reduction Measures

Active design measures to reduce energy demand are to include high efficiency lighting and ventilation. Other possible measures include enhanced U-values, air tightness improvement and the development's approach to limiting thermal bridges. The specification for these items as proposed for the project is outlined below:

Demand Reduction Measures	Specification
<i>Building Fabric - U-Values (W/m²K)</i>	
Walls	0.18
Floors	0.13
Roofs	0.13
External opaque doors (whole frame)	1.0
Glazing (glazed doors, windows & rooflights (whole frame)	1.4
<i>Building Fabric - Other</i>	
Air permeability (m ³ /hm ²)	5.0
Thermal bridging	Accredited Construction Details
<i>Services</i>	
Ventilation	Natural
Low energy lighting	100%
<i>Specification for 'Be Lean' Case</i>	

The proposed gas boilers achieve a NO_x rating of <40 mgNO_x/kWh.

The specification of the building is such to ensure that it meets Building Regulations compliance, without any further measures such as renewable energy, as a minimum. Opportunities to improve on this further will be considered at Building Regulations design stage and implemented if technically and economically feasible.

The carbon produced, and reductions achieved by the project when this specification is applied are shown below. SAP 2012 output documents including DER worksheets are also provided.

Passive design measures, including optimising orientation and site layout, natural ventilation and lighting, thermal mass and solar shading, have been accounted for in SAP calculations.

The glazing areas of the project are shown within the SAP documents which are included within the appendices of this report.

It is the intention of the applicant to provide smart meters to support the growth of demand side response.

Proposed Heating and Cooling Specification

SAP 2012 output documents including DER worksheets showing the carbon produced by the project is provided in the appendices of this report.

Cooling and Overheating

The Cooling Hierarchy

Although 15 Nancy Downs is considered a minor development, 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 buildings will be designed to minimise pipe lengths, particularly lateral pipework in corridors of apartment blocks, 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 nor mechanical ventilation for this development.

Overheating Risk Analysis

An overheating assessment has been carried out as a part of the process to produce SAP calculations for the proposed domestic dwelling. This assessment is related to the factors that contribute to internal temperature: solar gain (taking account of orientation, shading and glazing transmission), ventilation (taking account of window opening in hot weather), thermal capacity and mean summer temperature for the location of the dwelling. Full details of this methodology and relevant calculations can be found in the latest approved SAP document.

Using these criteria, the proposed 15 Nancy Downs development has been found to be compliant with overheating rules within SAP, posing a 'not significant risk' of overheating.

Renewable Energy

The use of renewable technology in the proposed design of the development has been fully considered as outlined in Appendix A.

Photovoltaic solar panels have been identified as a suitable technology for incorporation into the design. The proposed system will provide 1.25 kWp. This is equivalent to an area of approximately 8.25 m², depending upon the array and configuration chosen.

Due to limited roof space, solar hot water cannot be used effectively alongside photovoltaic arrays. Accordingly, it is considered preferable to install photovoltaic arrays in the available space identified, as these represent a greater carbon saving. Heat pumps will be considered as an alternative form of heating at design stage.

The carbon produced by the project when this specification is applied is shown below. The results of these improvements show a **5%** reduction in emissions over the Part L compliant base case, meeting the target.

Carbon Offsetting

This report demonstrates that it is possible to reduce the regulated on-site carbon dioxide emissions of the proposed 15 Nancy Downs development by 5% over Part L of the Building Regulations with the specification described, based on the modelling undertaken.

This reduction meets the required target of 5%, as such there are no further requirements for carbon offsetting stipulated by Three Rivers District Council.

Monitoring

The applicant will consider options for post occupancy monitoring and 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 report so far has sought to address the energy and sustainability targets set out in the 'Guidance on preparing energy assessments. The following section of this report looks to address issues not covered within this document, such as where there may be additional requirements set by Three Rivers District Council, or where additional sustainability measures have been considered during the design.

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	4 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

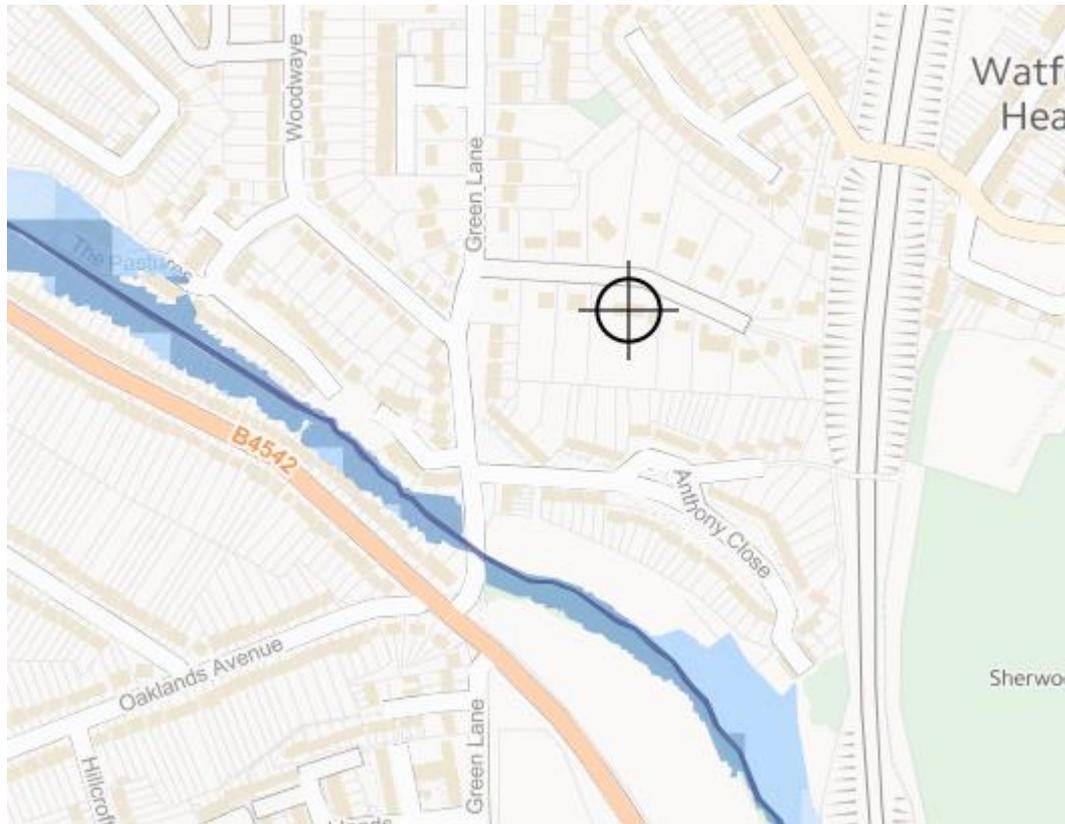
Proposed Fittings to Achieve 105/L/p/d for each dwelling proposed.

This specification of fittings achieves an internal water consumption rate of 101.3 litres per person per day, meeting the required result of 105 litres per person per day.

Flood Risk

Flood risk from rivers or the sea

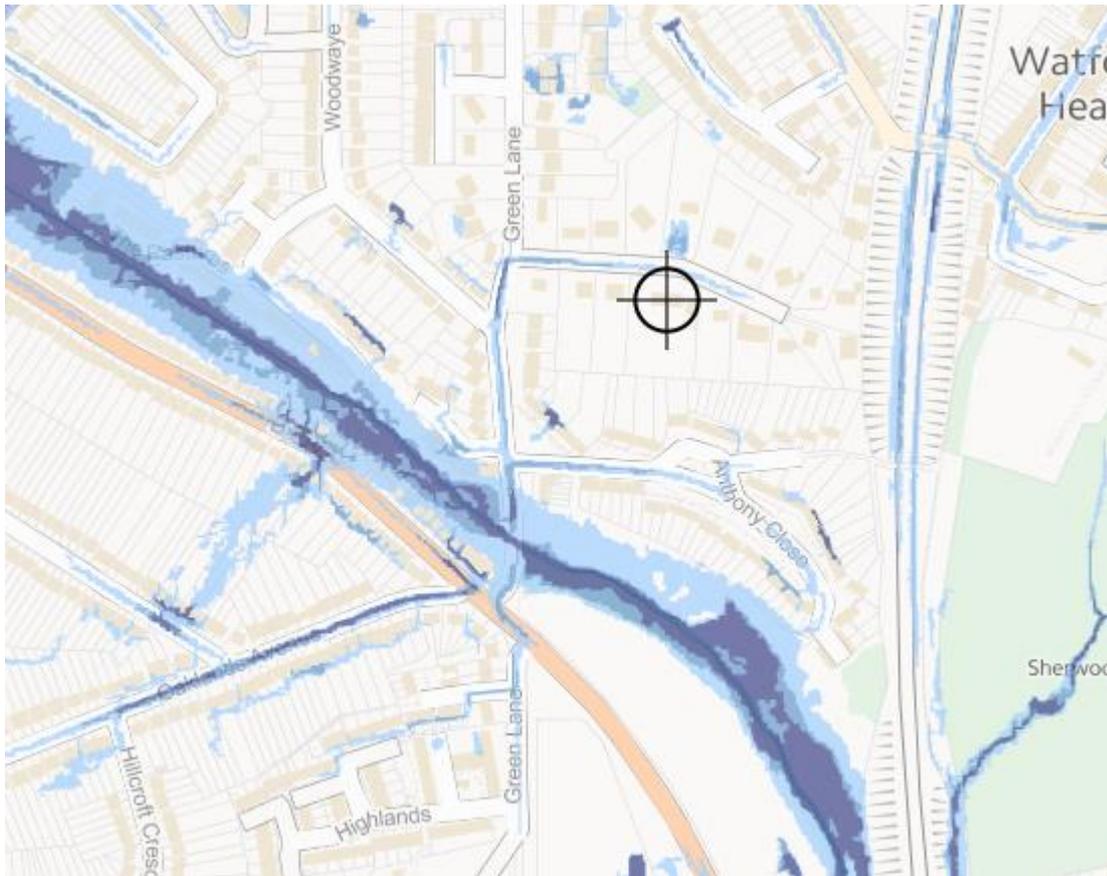
Using GOV.UK's map, the development has been found to be in a Flood Zone 1 (there is less than a 0.1 per cent chance of flooding occurring each year).



Flood risk from rivers or the sea, map for 15 Nancy Downs

Flood risk from surface water

Using the GOV.UK's map, the development is not within an area of flood risk from surface water, however there are some nearby areas at risk, mainly the adjacent roads. Therefore, the developer will consider Sustainable Drainage Systems on the site so that it does not increase the site's risk of flooding.



Flood risk from surface water, map for 15 Nancy Downs

Materials and Waste Reduction

Sustainable Specification

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 vanishes 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.

Conclusion

This report outlines how a variety of sustainability criteria have been considered and solutions 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 15 Nancy Downs development by **5%** beyond the requirements of Part L of the Building Regulations, where the building and services specification described in this report is implemented. This is sufficient to meet the target of 5% and is therefore compliant with the carbon reduction policies of Three Rivers District Council.

This has been achieved by following the 'Guidance on producing energy statements' from Three Rivers District Council. Fabric performance has been improved to meet and surpass the requirements of Part L of the building regulations, whilst heating and hot water equipment and controls have been chosen to maximize carbon savings. Photovoltaic panels have been incorporated into the design to provide 1.25 kWp.

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 L/p/d (litres per person per day).

Appendices

Appendix A - Consideration of Renewable Technology

Appendix B - SAP Worksheets

Appendix C - Overheating Calculation

Appendix D - Water Calculation