

REPORT 1 — ENERGY & SUSTAINABILITY STATEMENT

Proposed Development:

Demolition of Existing Dwelling and Erection of Two Detached Dwellings with Associated Garaging, Parking, Landscaping and Access.

Site:

Oranjeburg, Hornbury Hill, Minety, Wiltshire, SN16 9QH

Applicant:

Rugrat Developments Ltd

Prepared by:

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1. Introduction

This Energy and Sustainability Statement has been prepared in support of the planning application for the redevelopment of land at Oranjeburg, Hornbury Hill, Minety.

The proposed development comprises the demolition of the existing bungalow and associated outbuildings and the construction of two detached residential dwellings together with associated garaging/carport, parking, access and landscaping. The submitted pre-application documentation describes the site as approximately 905 m².

The development comprises one four-bedroom dwelling of approximately 153 m², excluding the integral garage, and one three-bedroom dwelling of approximately 126 m², excluding its open carport.

The purpose of this statement is to demonstrate the applicant's commitment to delivering a modern, energy-efficient and sustainable residential development incorporating a fabric-first approach, low-carbon heating technology **and** on-site renewable electricity generation.

2. Energy Strategy

The overall energy strategy for the development follows a simple hierarchy:

1. Reduce energy demand through a highly insulated and appropriately airtight building envelope.

2. Provide energy efficiently through low-temperature heating and modern controls.
3. Avoid direct fossil-fuel heating through the use of air-source heat pumps.
4. Generate renewable energy on site through photovoltaic solar panels.
5. Facilitate low-carbon transport through electric vehicle charging provision.

The combined approach will substantially reduce the operational energy requirements and associated carbon emissions of the proposed dwellings compared with older conventional housing stock.

3. Fabric-First Approach

Both dwellings will be designed and constructed to meet or exceed the applicable requirements of the Building Regulations in force at the time of construction, including the relevant energy-efficiency requirements.

Particular attention will be paid to the thermal performance of the external envelope, including:

- highly insulated external walls;
- high levels of roof insulation;
- insulated ground-floor construction;
- energy-efficient double-glazed windows and external doors;
- appropriate treatment of junctions to minimise thermal bridging;
- appropriate levels of airtightness; and
- careful detailing around openings, service penetrations and structural junctions.

The objective will be to minimise heat loss through the building fabric before considering the energy required to heat the dwelling.

This fabric-first approach reduces the size and demand placed upon the mechanical heating system and provides benefits throughout the lifetime of the buildings.

4. Air-Source Heat Pumps

Each dwelling will be provided with an individual air-source heat pump (ASHP) as its principal source of space heating and domestic hot water.

The development will therefore not rely upon a conventional gas or oil-fired boiler as its principal heating source.

Air-source heat pumps extract heat energy from the outside air and convert this into useful heat for the dwelling. As a significant proportion of the heat delivered by the

system is obtained from the ambient environment rather than being generated directly from a fossil fuel, ASHP technology provides an efficient means of heating modern, well-insulated homes.

The heat pumps will be appropriately sized at the detailed Building Regulations/design stage following assessment of the calculated heat losses of the respective dwellings.

5. Underfloor Heating

The ASHP systems will be combined with low-temperature underfloor heating, principally throughout the ground-floor accommodation and elsewhere where appropriate to the final mechanical design.

Underfloor heating is particularly well suited to heat-pump technology because it operates using considerably lower water temperatures than traditional radiator-based systems.

The large heated floor area allows comfortable internal temperatures to be maintained while permitting the heat pump to operate efficiently.

Individual heating zones and appropriate thermostatic/time controls will be incorporated so that occupants can regulate temperatures according to the use and occupancy of individual areas.

6. Domestic Hot Water

Domestic hot water will also be provided through the air-source heat-pump systems.

Each dwelling will incorporate an appropriately sized hot-water storage cylinder compatible with the selected ASHP installation.

The system will be designed to satisfy normal domestic hot-water demand while maximising the use of low-carbon heat-pump technology.

Final equipment sizes, storage capacities and controls will be determined during the detailed Building Regulations and mechanical design stages.

7. Solar Photovoltaic Panels

Both dwellings will incorporate solar photovoltaic (PV) panels located on the most appropriate roof slopes having regard to orientation, available roof area, efficiency and visual considerations.

This commitment is already established within the submitted Design & Access Statement, which confirms that solar panels are proposed to supplement the heating and hot-water systems and offset electricity consumed by the ASHP installations.

The photovoltaic installations will generate renewable electricity on site for use within the respective dwellings.

Where generation coincides with demand, the electricity produced can contribute towards:

- operation of the air-source heat pump;
- domestic hot-water production;
- household electrical consumption; and
- potentially electric vehicle charging.

The final number, output and arrangement of PV modules will be determined through detailed energy calculations and consideration of the available roof areas.

The intention is to provide a meaningful PV array to each dwelling, rather than merely nominal renewable-energy provision.

8. Relationship Between ASHP and Solar PV

The combination of an air-source heat pump and photovoltaic panels provides a particularly appropriate energy strategy for the proposed development.

The heat pumps require electricity to operate, while the PV arrays will generate renewable electricity on site. Solar generation can therefore directly offset part of the electrical consumption associated with space heating, hot-water generation and general household use.

Although annual solar generation will not necessarily coincide precisely with heating demand at all times, the combination will reduce reliance upon imported grid electricity over the course of the year.

9. Building Services and Controls

Energy-efficient building services will be incorporated throughout the dwellings.

These are expected to include efficient fixed lighting, zoned heating controls, thermostatic control, appropriate hot-water controls and energy-efficient pumps and associated equipment.

Pipework and hot-water storage vessels will be appropriately insulated to minimise avoidable distribution and standing heat losses.

The final specification will be developed as part of the Building Regulations design and energy-assessment process.

10. Ventilation and Airtightness

As the thermal envelope of the proposed dwellings will be designed to modern airtightness standards, appropriate controlled ventilation will be incorporated to maintain good indoor air quality while avoiding unnecessary heat loss.

The final ventilation strategy will be designed to satisfy the applicable Building Regulations requirements and will be coordinated with the dwelling airtightness strategy.

11. Avoidance of Overheating

The detailed design will also consider summertime thermal comfort.

Window sizes, orientation, glazing specification, ventilation and solar gains will be considered together so that the dwellings achieve an appropriate balance between useful daylight, winter solar gain and avoidance of excessive summertime overheating.

The completed dwellings will comply with the applicable Building Regulations requirements concerning overheating.

12. Electric Vehicle Charging

Electric vehicle charging provision will be incorporated into the development, further supporting the transition towards lower-carbon transport.

The supporting information supplied with the application identifies a 7.4 kW smart EV charging unit as the proposed specification.

EV charging provision will therefore be available to the new dwellings and will complement the proposed on-site photovoltaic electricity generation.

13. Sustainable Drainage and Water Management

Although dealt with separately within the drainage information accompanying the planning application, the development's broader sustainability credentials also include a sustainable approach to surface-water management.

Surface water from the proposed development is intended to discharge to soakaways, as identified within the Design & Access Statement.

The submitted AquaCell information describes a Sustainable Drainage Systems approach whereby rainfall is managed close to where it falls, with water stored and subsequently infiltrated into the ground or released at an appropriate controlled rate.

This complements the energy strategy by providing a more holistic approach to sustainable development.

14. Landscape and Existing Vegetation

Existing landscape features also form an important element of the site's environmental approach.

The existing front boundary contains established trees and hedging, which the submitted Design & Access Statement proposes to retain and supplement where appropriate.

The submitted arboricultural assessment records a mixture of established trees and native hedgerow vegetation on the site and identifies opportunities for retention and enhancement of the existing front hedge through additional planting.

Retention and enhancement of established vegetation will complement the low-energy building strategy and help maintain the site's semi-rural character.

15. Building Regulations and Detailed Energy Assessment

Detailed energy calculations will be undertaken at the Building Regulations stage for each dwelling.

These calculations will determine the final requirements for matters including:

- building fabric U-values;
- thermal bridging;
- airtightness;
- glazing performance;

- heating and hot-water efficiency;
- ASHP capacity;
- photovoltaic array capacity;
- ventilation;
- lighting; and
- overall dwelling energy and carbon performance.

The final specification will be adjusted where necessary to demonstrate compliance with the applicable Building Regulations standards.

Accordingly, the planning-stage proposals establish the energy strategy and technologies to be incorporated, while precise equipment capacities and performance figures will be established through detailed design.

16. Conclusion

The proposed redevelopment of Oranjeburg provides an opportunity to replace an existing deteriorated and long-unoccupied bungalow with two modern, highly energy-efficient homes. The existing dwelling is described in the supporting Design & Access Statement as a circa-1950s bungalow which has deteriorated and remained unoccupied for a number of years.

The new development will adopt a coordinated low-energy strategy incorporating:

- a high-performance building envelope meeting the applicable contemporary Building Regulations standards;
- a fabric-first approach to reducing heating demand;
- individual air-source heat pumps to both dwellings;
- low-temperature underfloor heating;
- heat-pump-generated domestic hot water;
- solar photovoltaic arrays to both dwellings;
- efficient heating and energy controls;
- electric vehicle charging provision; and
- sustainable management of surface water.

The combination of a well-insulated building fabric, electrically driven heat-pump technology and on-site renewable electricity generation will substantially reduce dependence upon fossil fuels and provide an appropriate, robust and future-facing energy strategy for the development.

The proposals therefore demonstrate that energy efficiency and environmental sustainability have been considered as integral components of the design rather than as later additions, supporting the delivery of high-quality and sustainable new housing at Oranjeburg.

———— **Stephen Kingshott** MCABE ————

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