



**Building Services
Consulting Engineers**

MECHANICAL SERVICES

AT

THE LYDHURST ESTATE

FOR

GRANT & DELPHINE HORSFIELD

ENERGY AND SUSTAINABILITY STATEMENT

DOCUMENT REVISION RECORD

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1 PROJECT DESCRIPTION

ION Consulting Engineers have been commissioned by Grant and Delphine Yip-Horsfield to provide an Energy and Sustainability Statement for the proposed replacement dwelling at Lydhurst Estate.

Within this report the land areas will be referred to as 'the site'.

1.1 RELEVANT POLICY CONTEXT

The objective of this report is to provide a response to the Mid Sussex District Plan – Policies:

DP39 Sustainable Design and Construction

DP42 Water Infrastructure and the Water Environment

1.2 SITE ADDRESS

The site comprises the following two adjacent proposed developments:

Development	Address
The Lydhurst Estate	Warninglid, Haywards Heath, West Sussex RH17 5TG

2 DP39 SUSTAINABLE DESIGN AND CONSTRUCTION & DP42 WATER INFRASTRUCTURE AND THE WATER ENVIRONMENT

2.1 MINIMISING ENERGY USE THROUGH DESIGN AND LAYOUT

The proposed dwelling has been carefully designed to reduce operational energy demand through Passivhaus design principles:

- Building orientation has been optimised to maximise solar gain in winter while limiting overheating in summer, with larger glazed areas facing south and shading provided through roof overhangs.
- External blinds will operate to actively reduce solar gains when undesirable and increase when desirable.
- The building envelope will incorporate high levels of insulation and enhanced airtightness, exceeding both the minimum Building Regulations standard and notional dwelling to reduce heating and cooling loads.

Table 1 - Fabric efficiency comparison

U-value (W/(m ² .K))				
Element	Part minimum standards	Part L notional dwelling	Proposed dwelling	Improvement to notional dwelling
External walls	0.26	0.18	0.09	50%
Floor	0.18	0.13	0.11	15%
Roof	0.16	0.11	0.1	9%
Solid Door	1.6	1	0.85	15%
Window	1.6	1.2	0.85	29%
air permeability (m ³ /(h.m ²))@50Pa				
	8	5	0.6	88%

- Natural daylight is maximised through carefully positioned windows, reducing the need for artificial lighting during daylight hours.
- The layout supports natural ventilation, allowing effective cross-ventilation and night cooling to reduce reliance on mechanical cooling systems in the summer. During the heating season, Mechanical Ventilation Heat Recovery (MVHR) systems will recover heat from exhaust air to preheat fresh air supplied into the building.

2.2 EFFICIENT ENERGY SUPPLY

The national grid has rapidly de-carbonised over the past 10 years, increasing from 15% renewables in 2013 to 46% in 2023 (UK Energy In Brief 2024). This trend will continue with the Governments Clean Power 2030 initiative, which aims to reduce the grids carbon intensity to 'well below 50gCO₂/kWh', within 5-years. Therefore, an all-electric solution is proposed.

As a single dwelling in an area of low housing density, communal heating is not viable. However, the property will utilise an all-electric low-carbon heating system. Space heating and hot water will be produced by a highly efficient Ground Source Heat Pump (GSHP), operating at low flow temperatures to maximise efficiency, eliminating any need for fossil fuels. A GSHP also allows for passive cooling where water is circulated below ground and used to provide cooling where the only energy consumed is to run a circulation pump.

2.3 USE OF RENEWABLE SOURCES OF ENERGY

To reduce carbon emissions and promote energy independence:

- The dwelling will incorporate solar photovoltaic (PV) panels installed on the flat roof, generating renewable electricity to serve regulated and unregulated energy consumption. The PV array has been designed to provide a peak output of 40.05 kW_p.
- A battery storage system will be installed to increase the local utilisation of on-site renewable generation.
- An Electric Vehicle (EV) charger will be installed to provide the dwelling with infrastructure for zero-emission transport.
- Using the principles confirmed in the initial Passivhaus assessment combined with the approach to renewables technologies it has been shown that the dwelling will be better than net zero with regards to regulated annual energy consumption and carbon emissions.

2.4 EFFICIENT USE OF RESOURCES, WASTE MINIMISATION, AND RECYCLING

Resource efficiency and waste minimisation will be embedded throughout the project:

- Site waste will be carefully managed during the construction to limit material waste and promote reuse and recycling.
- The building specification will prioritise sustainably sourced, low-embodied-carbon, and recyclable materials, such as timber from FSC-certified sources and recycled aggregates. The use of external stone and timber construction materials will greatly improve the sequestered carbon within the scheme.
- Wood fibre insulation will be used where possible to limit petrochemical based insulation.
- During occupation, the home will feature integrated storage for recycling and composting in line with local waste collection systems.

2.5 LIMITING WATER USE TO 110 LITRES/PERSON/DAY

In compliance with Policy DP42:

- The dwelling will be fitted with water-efficient fixtures, including dual-flush toilets, low-flow taps and showerheads.
- Water sub metering will be installed so that informed action can be taken to reduce water usage.
- A leak detection system with automatic shut off feature will be installed to prevent wastage in the event of catastrophic water leak.
- A rainwater collection system will be installed for the purposes of garden irrigation, further reducing potable water use.

The Appendix A 'water efficiency calculator for new dwellings' assessment described in Approved Document Part G was used to assess compliance with Regulation 36 optional requirement para (2)b of the building regulations which provides a performance target of 110 litres per person per day.

Table 2 - AD Part G water efficiency calculation

Installation Type	Unit of measure	Value	Use factor	Fixed use	Litres/ person/day
WC (single flush)	Flush volume (litres)	0	4.42	0	0
WC (dual flush)	Full flush vol.	0	1.46	0	0
	Part flush vol.	0	2.96	0	0

Installation Type	Unit of measure	Value	Use factor	Fixed use	Litres/ person/day
WC (multiple fittings)	Avg. effective flush vol. (litres)	3.06	4.42	0	13.53
Taps (excl. Kitchen)	Flow rate (litres/min)	3	1.58	1.58	6.22
Bath (shower also present)	Capacity to overflow (litres)	200	0.11	0	2.2
Shower (bath also present)	Flow rate (litres/min)	9.1	4.37	0	39.77
Bath only	Capacity to overflow (litres)	0	0.5	0	0
Shower only	Flow rate (litres/minute)	0	5.6	0	0
Kitchen sink taps	Flow rate (litres/minute)	6	0.44	10.36	13
Washing Machine	Litres/kg dry load	8	2.1	0	16.8
Dishwasher	Litres/place setting	1	3.6	0	3.6
Waste disposal	Litres/use	0	3.08	0	0
Water softener	Litres/person/day	0.19	1	0	0.19
Total calculated use (litres/person/day):					115.21
Contribution from greywater (litres/person/day)					0
Contribution from rainwater (litres/person/day):					0
Normalisation factor:					0.91
Total Water Consumption (Code for Sustainable Homes) (litres/person/day):					104.8
External water use:					5
Total Water Consumption (litres/person/day):					109.8

The above calculation demonstrates that the water consumption for the property is below the maximum allowable 110 litres per person per day.

Table 3 - Summary of fitting types as-designed

Type	Description	Flow rates, volumes etc.	Qty
Taps	All	3 litres/min	11
Baths	Main Ensuite	260 litres to overflow	1
	All others	170 litres to overflow	2
Dishwashers	All	1 litres/place	1

Type	Description	Flow rates, volumes etc.	Qty
Washing Machines	All	8 litres/kg	2
Showers	Main Ensuite	13 litres/min	1
	All others	7 litres/min	6
WC's	All	4 / 2.6 litres flush vols.	9
Kitchen/Utility taps	All	6 litres/min	2

2.6 ADAPTING TO FUTURE CLIMATE CHANGE AND ENSURING LONG-TERM RESILIENCE

The scheme includes measures to address long-term climate risks:

- The home will incorporate sustainable drainage measures (SuDS) such as permeable paving and soakaways to manage surface water and reduce flood risk.
- Green landscaping and tree planting will provide shading and help to mitigate overheating during summer months.
- Materials and detailing have been selected to ensure the dwelling can withstand increased weather extremes, including enhanced design for summertime ventilation and solar shading features.
- The site layout ensures good air circulation, enhanced biodiversity, and access to outdoor amenity spaces, contributing to both environmental and occupant wellbeing.

2.7 COMPARISON TO EXISTING DWELLING

A comparison was made between the proposed and existing dwelling. An EPC for the existing house was completed in 2015, prior to market listing. The existing dwelling has an energy rating of F with a maximum potential rating of D. The average score for properties in England and Wales is 60, meaning that even with all the recommended improvements available to the property it cannot be improved above even the average score.

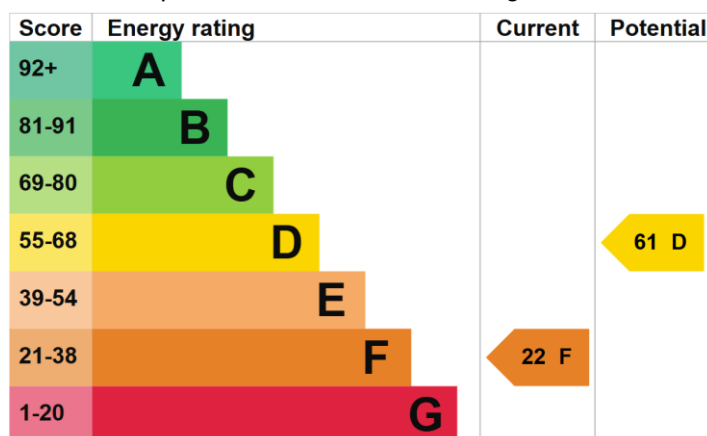


Figure 1 - Existing dwelling Energy Rating

A draft SAP assessment was undertaken for the proposed dwelling for comparison to the existing dwelling. A combination of low energy demand and large PV array results in a net positive energy building for the regulated energy under Approved Document Part L of the Building Regulations.

The proposed property will meet or better the stated primary energy use and carbon emission rate from the draft SAP assessment.

Table 4 - Comparison of existing to proposed dwelling

	Energy rating	Primary energy use (kWh _{PE} /m ²)	Carbon Emission Rate (kg.CO ₂ /m ²)
Existing dwelling	22 F	288	63
Proposed dwelling	101 A	-0.18	-0.58

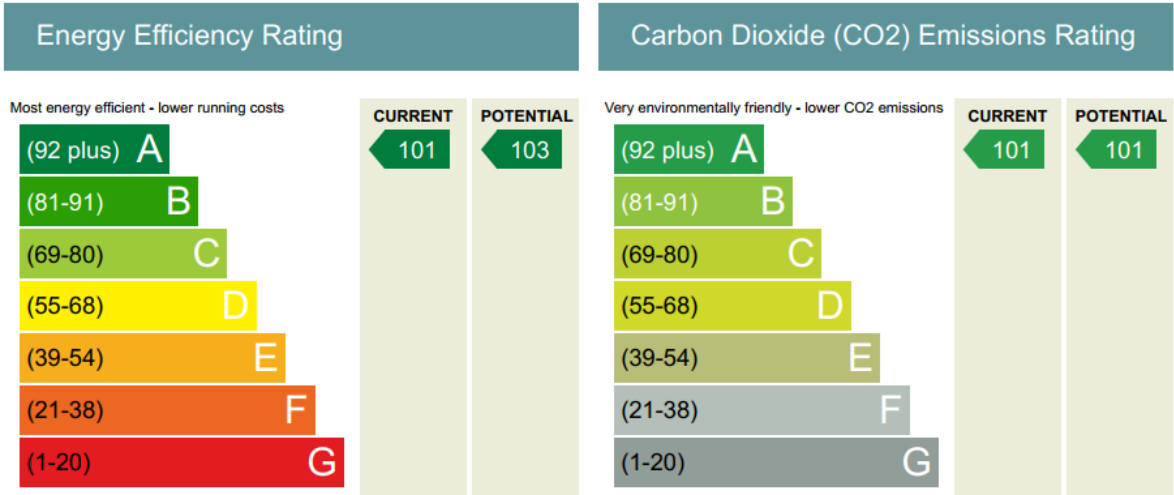


Figure 2 - Proposed dwelling draft energy efficiency rating and CO₂ emissions rating

2.8 CONCLUSION

This energy and sustainability approach ensures the proposed dwelling will be a high-performing, future-resilient home that aligns fully with the sustainable development objectives of the Mid Sussex District Plan and contributes meaningfully to local and national climate goals.