

SUSTAINABLE ENERGY STATEMENT

Detailed Application

Replacement Single Storey 3 Bedroom Dwelling House



10 Highfields, Brighton Road, Warninqlid, West Sussex, RH17 5SY

1.00 Site Analysis:

1.01 The Proposal

The Gypsy & Traveller designated residential use site is located on the Eastern side of the A23, accessed via a private drive with direct access on to the Brighton Road which also serves the other Highfields residential properties, and comprises 0.22 Hectares of residential use land/ garden. Together with a the existing single storey dwelling house. The front of the existing accommodation house faces North as will the front of the proposed replacement detached dwelling house.

The landscaped existing garden use land surrounding the existing residential accommodation provides ample amenity space for the existing/ proposed development.

1.03 Use Class

Both the existing and proposed accommodation are for private residential use.

1.04 Topography

The location, site layout and orientation of the proposed accommodation has been determined by the topography of the site, combined with the location of the existing residential use dwelling house and ancillary use out buildings.

The topography of the site and immediate area is gently level.

The site has been identified by the Environment Agency as not being located in a designated functional flood plain.

2.00 Energy Requirements:

2.01 Electrical & Energy Consumption

The proposed replacement dwelling, if granted detailed planning consent, will be designed to meet the requirements of the Building Regulations, Part L : 2013 with (latest revision) as a minimum standard.

LM Associates are 'BRE' Accredited Domestic Energy Assessors and therefore are fully conversant with the latest requirements relating to achieving and surpassing Target 'U Values', Elemental 'U Values' and Carbon Index Emission requirements.

Accordingly, the replacement dwelling and domestic services will be designed as an energy efficient development within parameters determined by the site and Town Planning restraints.

The energy consumption of the replacement dwelling will without question be dramatically reduced from that of the existing accommodation to achieve Level 3 of the former Code for Sustainable Homes

3.00 Energy Conservation Design:

3.01 Renewable Energy Source Options-

- Biomass Fuelled Systems (Direct combustion, Anaerobic digestion & Gasification)
- Combined Heat & Power (CHP) Systems (Electricity & Space Heating or Water Heating)
- Fuel Cell Systems
- Greywater Systems
- Ground Source (Air) Systems (Cooling & Heating)
- Ground Source (Water) Systems (Cooling & Heating)
- Heat Pumps (Ground & Air) Source Systems (Space Heating, Water Heating, Cooling, Dehumidification, Pre-heat Ventilation Air)
- Photovoltaic Systems (Electricity)
- Rainwater Recovery Systems (Pumped & Gravity)
- Solar Air Heating Systems (Space Heating, Water Heating & Pre-heat Ventilation Air)
- Solar Cooling Systems (Absorption, Adsorption & Desiccant)
- Solar Water Heating
- Water Conservation Measures
- (Glazed Flat Plate, Evacuated Tube & Unglazed Plastic or Low Temperature)
- Surface Water Cooling Systems
- Water Conservation Measures

- Wind Power Systems (Horizontal & Vertical Axis)

3.02 Possible Energy Conservation measures to be incorporated-

- Air Source Heat Pump
- TRV's & Fully programmable & zoned controls
- Foil/ reflective faced Polyisocyanurate insulation board to all areas
- Thermally broken external frames (with Double/ Triple glazing)
- Increased airgap between panes of glass & 'Argon Gas' fill
- Specialist solar glass
- Insulated Cavity closures
- Low energy lighting (75%)
- Fully insulated envelope
- Water Conservation Measures
- Solar Water Heating
- Rainwater Recovery System
- Greywater Systems

3.02 Possible Ways to Minimise Energy Losses-

- Orientation of the facades to maximise the benefit of natural daylight
- Orientation of the facades to maximise the heat and light generated by the sun
- The use of Solar control glass and double glazing
- The provision of shading construction to South facing windows
- Maximise glazing areas to benefit from sun & daylight
- Fully insulated/ enhanced envelope

4.00 Consideration of Renewable Energy Options:

<u>Source</u>	<u>Opinion</u>	<u>Reason</u>
Biomass	Not Suitable	- Size of plant accommodation - Size of fuel storage - Transportation of Fuel - Low energy density provision - Management & maintenance restrictions - Requires intensive & expert management - Reliability of sourcing fuels - Economics - Town Planning policies

CHP	Potentially Suitable-	- Mini Chip, as a source of electricity & power - Effective efficiency relies on optimum use? - Noise & Fume pollution?
Fuel Cell	Not Suitable	- Excessive & disproportionate installation costs - Unfamiliar technology - No Hydrogen infrastructure in the UK & therefore relies on natural gas, - No certified installers/ training - High maintenance costs - Short stack life - Sensitive to pollutants - Very small amounts of Carbon Monoxide or Sulphur will potentially cause the cells to fail - Size of plant accommodation - Economics - Town Planning policies
Ground Source Air	Potentially Suitable-	- Suitability for small/ domestic use - Essentially used to pre-heat winter air & pre-cool summer air therefore limited application - High installation costs may not justify benefits? - Size of plant accommodation
Ground Source Water	Not Suitable	- Provides cooling normally for commercial use therefore limited application - Not suitable for clay soils - Susceptible to blockage & fouling - Susceptible to silting up - High installation costs may not justify benefits? - Size of plant accommodation
Ground Source Heat Pumps	Not Suitable	- Ground suitability - Provides cooling normally for commercial use therefore limited application - Caters for low heating demand

- Provides hot water heating
- High installation costs may not justify benefits?

Air Source Heat Pump

Potentially Suitable - Provides heating & cooling
Provides hot water
Low running & maintenance costs
Does not require Gas Service or Oil or Solid Fuel deliveries and storage
Does not produce air pollution

Rainwater Recovery

Potentially Suitable - Rainwater quality issues relating to the roof covering selected?
- Dependent on roof design, adequate rainfall, retention/ absorption value of the roof covering?
- Adequate roof catchment area?
- Adequate alternative/ additional paved catchment area?
- Regular maintenance/ cleaning is required?
- Herbicides must not be used on catchment areas, a Health & Safety issue?
- Installation and ongoing maintenance costs may not justify savings?

Photo Voltaic Panels

Potentially Suitable - Critical siting & orientation issues to obtain optimum benefit
- Requires regular maintenance/ cleaning therefore Health & Safety issues are introduced
- Large area of collectors required
- Inverter reliability issues
- Aesthetic appearance/ Town Planning policies
- Relatively high installation costs may not justify benefits?

Solar Air Heating

Not Suitable - The low heat capacity of air
- Poor heat transfer
- A large volume of air flowrate is required, with fan power issues
- recommended primary use to pre-heat

		- ventilation air - Aesthetic appearance/ Town Planning policies - Requires regular maintenance/ cleaning therefore Health & Safety issues are introduced
Solar Water Heating	Potentially Suitable	- Wide range of mounting options - Well developed technology - Good installation to performance ratio - Optimum use requires due South orientation? - Area of collectors required? - Aesthetic appearance/ Town Planning policies? - Some non-integrated systems have exposed pipework?
Solar Cooling	Not Suitable	- Suitable for driving cooling systems - No certified installers/ training & very limited operating experience in the UK - Relatively high cost of solar collectors & absorption collectors - Aesthetic appearance/ Town Planning policies
Surface Water Cooling	Not Suitable	- Close availability of adequate water source required - Sufficiently deep water required to maintain sufficiently cool water temperature - Domestically could be used with a heat pump system only - Relatively high installation cost - Generally applied to commercial buildings
Wind Turbine	Not Suitable	- Optimim output in unrestricted/ non-urban location - Low cost effectiveness - Reliant on effective wind generation - Domestic options usually provide lower than rated output - Requires regular maintenance therefore

Health & Safety issues are introduced

- Low CO saving
- Aesthetics/ Town Planning policies
- Site Topography

Water Conservation

Potentially Suitable- Spray/ sensor taps?

- Cartridge tap?
- Tapmatic tap inserts?
- Designed restricted flow distances?
- Dual or Low flush toilets?
- Delayed action inlet valves?
- Water saving shower heads?
- Shower/ bath flow restrictors

Grey Water Harvesting

Potentially Suitable- Limited use of treated water?

- Limited storage time (3 days)?
- Potentially uneconomic installation & maintenance costs may not justify savings
- Size of storage accommodation
- Town Planning policies

5.00 Generation of Renewable Site Energy:

The generation of renewable energy for the re-provision of this residential accommodation is assessed as only being restricted by the following issues:

- The orientation and topography of the site & character of the area
- The size of the re-development site
- The Town Planning designation of the site & Design Policies
- Economic viability
- Availability of energy sources

Accordingly, a number of the renewable energy sources are not considered viable.

The environmental/ energy conservation issues will need to be specifically addressed by careful consideration of both renewable energy & technical/ construction design and material selection of each new dwelling envelope and internal services.

This will be achieved once Town Planning Consent has been granted & prior to the submission of a Full Plans Building Control Application.

6.00 Proposed Renewable/ Sustainable Energy Measures:

Based on the issues identified and considered earlier in this statement, it is currently considered that the introduction of the following measures constitute the viable renewable and sustainable energy conservation measures to be further investigated for possible incorporation into the proposed replacement dwelling proposals:

1. Rainwater Recovery - as a source of non-potable cold water for washing, bathing, & washing of clothes.
2. Solar Water Heating - as a source of hot water for washing, bathing, & washing of clothes.
3. Grey Water Harvesting - as a source of non-potable cold water for washing, bathing, & washing of clothes.
4. Water Conservation to limit to 105 Litres/ person/ day.
5. Air source heat pump.
6. Photo Voltaic Tiles

7.0 Proposed Energy Conservation Measures:

1. Air source heat pump
2. TRV's & Fully programmable & zoned controls
3. Foil/ reflective faced Polyisocyanurate insulation board to all areas to achieve (25%) increase above Building Regulation required 'U' values.
4. Thermally broken external frames (with Double/ Treble glazing)
5. Increased air gap between panes of glass & 'Argon Gas' fill
6. Specialist solar control glass
7. Insulated Cavity closures
8. Low energy lighting (100%)
9. Fully insulated envelope to achieve (25%) increase above Building Regulation required 'U' values.
10. Solar Water Heating, subject to planning consent
11. Polythene air tightness built envelope seal