Energy Statement

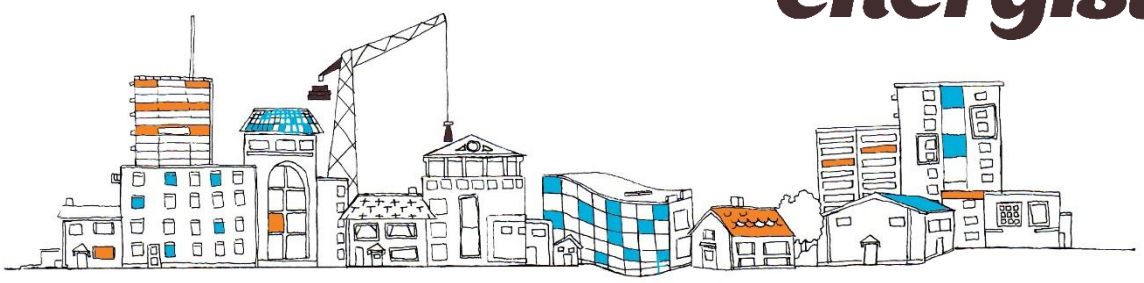
Henfield Road, Albourne, Hassocks

Croudace Homes

CR.HR.BN6

Revision 01

Date: 27th July 2022



REVISION HISTORY

Revision	Issue Date	Description	Issued By	Checked By
R00	31/03/2022	Original Document	TW	RP
R01	27/07/2022	Plan update	TW	

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Calculations contained within this report have been produced based on information supplied by the Client and the design team. Any alterations to the technical specification on which this report is based will invalidate its findings.

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CONTENTS

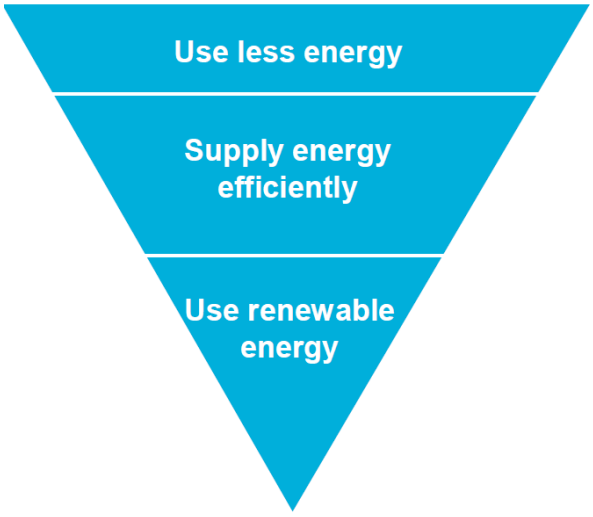
1. EXECUTIVE SUMMARY

This Energy Statement has been produced by Energist UK on behalf of Crudace Homes ('the Applicant') and is written in support of the Planning Application for Henfield Road, Albourne, Hassocks (the Development).

It will set out the measures planned by the Applicant to achieve CO_2 reductions at the proposed development site demonstrating compliance with:

i) National Planning Policy Framework.
ii) Approved Document Part L of the Building Regulations 2013.
iii) The local planning policy requirements for Mid Sussex District Council.

The Energy Statement sets out how design measures will be incorporated as part of the Development, aligning with the principles of the energy hierarchy.



The Energy Statement concludes that the following combination of measures, summarised overleaf in Table 1, will be incorporated into the Development demonstrating how the energy standard will be delivered by the Applicant. This is described in this Statement as an improvement in CO_2 emissions over the Approved Document Part L (ADL) 2013.

Table 1: Measures incorporated to deliver the energy standard.

Fabric first: Demand-reduction measures	▪ Energy-efficient building fabric and insulation to all heat loss floors, walls and roofs. ▪ High-efficiency double-glazed windows throughout. ▪ Quality of build will be confirmed by achieving good air-tightness results throughout. ▪ Efficient-building services including high-efficiency heating systems. ▪ Low-energy lighting throughout the building.
Renewable and low-carbon energy technologies	▪ Communal Air Source Heat Pumps to generate heating and hot water throughout the development (min 350% efficiency).

The impact of these design measures in terms of how the Applicant delivers the energy standard for the residential areas is illustrated in Figure 1 and Table 2 below.

Figure 1: How the Development meets the energy standard.

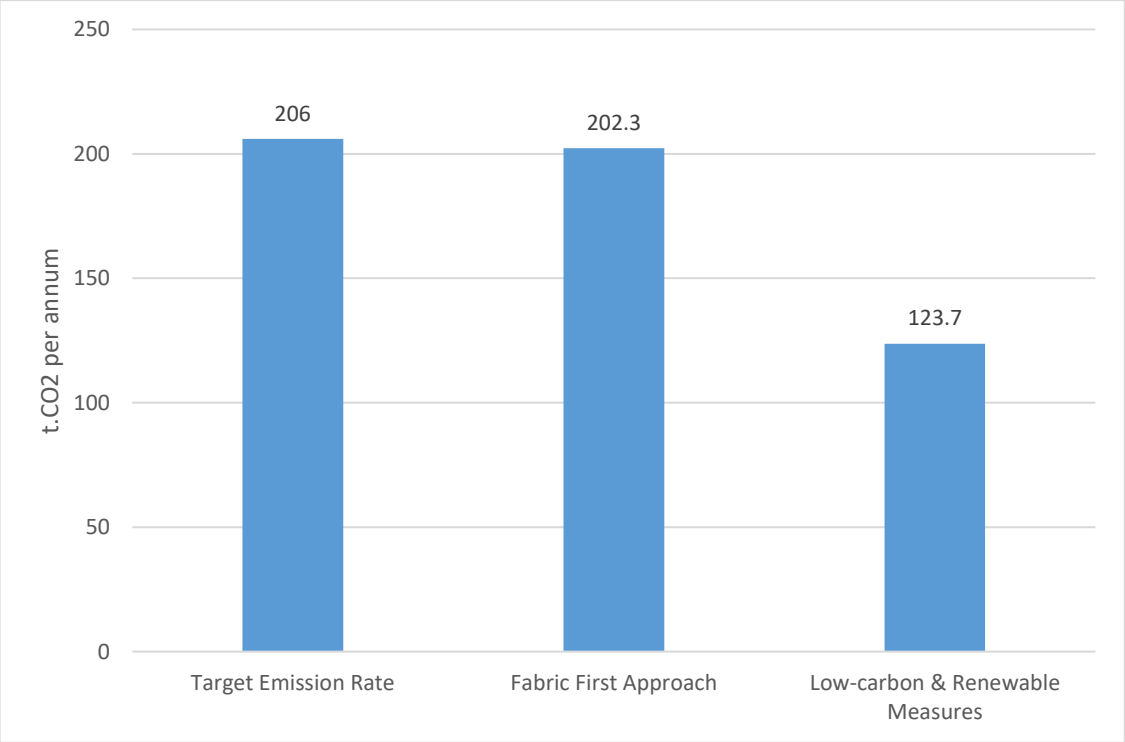


Table 2: CO_2 emissions and percentage reduction over ADL 2013.

	CO_2 emissions	
	t.CO_2 per annum	% reduction
Target Emission Rate: Compliant with ADL 2013	206.0	-
Fabric-first Approach	202.3	1.8 %
Low-carbon & Renewable measures	123.7	38.9%
Total savings	**82.3**	**40.0 %**

2. INTRODUCTION

2.1 Site Description

This Energy Statement has been prepared for the residential development at Henfield Road, Albourne, Hassocks. This falls under the jurisdiction of Mid Sussex District Council.

The Development provides circa 120no. new build dwellings consisting of one and two bed flats and two, three and four bed houses.

Map 1: Site location for Henfield Road, Albourne, Hassocks.

Source: Omega Architects (3117.C.1006.SK.L)

2.2 Purpose of the Energy Statement

This Statement sets out how the Applicant intends to meet:

i) National Planning Policy Framework.
ii) Approved Document Part L of the Building Regulations 2013.
iii) The local planning policy requirements for Mid Sussex District Council

For a detailed overview of the planning policy requirements specific to this development, refer to Appendix 2.

The way in which the Applicant meets the energy standard at Henfield Road, Albourne, Hassocks will be set out in this Statement as follows:

- **Baseline energy demand**: The Development's Target Emission Rate (TER) will be calculated to establish the minimum on-site standard for compliance with ADL 2013.

- **Fabric first – reduced energy demand:** The Development's Dwelling Emission Rate (DER) will be calculated to explain how the Applicant's design specification will lead to a reduced energy demand and an improved fabric energy efficiency. The better the design of the building fabric in terms of, for example, insulation, air tightness and orientation to maximise solar gain, the less energy required to heat the dwelling and so the better the fabric energy efficiency.

- **Low-carbon and renewable energy:** Low-carbon and renewable energy technologies will be assessed for their suitability and viability in relation to the Development. Solutions will be put forward for the development and the resulting CO_2 emission savings presented.

2.3 Methods

Energist UK has used SAP 2012 methodology to calculate energy demand for six sample dwellings. The data has been extrapolated to reflect more accurately the expected CO_2 emission rates and energy demand for all 120no. proposed properties included in the development proposals.

3. BASELINE ENERGY DEMAND

3.1 Introduction

In order to measure the effectiveness of demand-reduction measures, it is first necessary to calculate the baseline energy demand, and this has been done using SAP 2012 methodology. This can also be referred to as the Target Emission Rate (TER.)

The resulting ADL 2013 TER for Henfield Road, Albourne, Hassocks, has been calculated using Part L model designs which have been applied to the Applicant's Development details. The TER, or baseline energy demand, represents the maximum CO_2 emissions that are permitted for the Development in order to comply with ADL 2013.

3.2 The Development Baseline

The resulting TER, representing the total maximum CO_2 emissions permitted for the Development, has been calculated as 206 t.CO_2 per annum. To ensure compliance with ADL 2013, CO_2 emissions should not exceed this figure.

4. FABRIC-FIRST APPROACH - REDUCED ENERGY DEMAND

4.1 Introduction

Many Local Planning Authorities are now recognising the benefits of a fabric-first approach, where the lifetime energy consumption of a building takes precedence over the use of bolt-on renewable energy technologies.

It is clear that the fabric-first approach can create buildings with a very comfortable living and working environment. The internal temperature is consistent and fuel bills are kept to a minimum. One key advantage of a fabric-first approach is that it does not require changes to the behavioural patterns of the occupants and, as such, a building designed using a fabric-first approach will often perform more effectively once completed than a building that incorporates a low-carbon or renewable-energy technology that requires behavioural change (e.g., solar thermal). This becomes an increasingly important consideration as energy costs rise and the issue of fuel poverty becomes commonplace.

Energist UK has considered a fabric-first approach as the priority solution for this Development.

4.2 The Development – Fabric-first reduction measures

The Applicant will integrate the following design measures to reduce energy demand:

- Energy-efficient building fabric and insulation to all heat loss floors, walls and roofs.
- High-efficiency double glazed windows throughout.
- Quality of build will be confirmed by achieving good air-tightness results throughout.
- Efficient-building services including high-efficiency heating systems.
- Low-energy lighting throughout the building.

The Applicant's design specification and intended demand-reduction measures for the Development have been modelled using the same SAP 2012 methodology as before. This allows us to assess the effectiveness of demand-reduction measures as a percentage reduction in CO_2 emissions over the Baseline.

The total calculated CO_2 emissions for the residential areas at Henfield Road, Albourne, Hassocks, is 202.3t.CO_2 per annum, which is a reduction of 3.7t.CO_2 per annum or 1.8% over the Baseline. Refer to Appendix 3 for sample SAP Results and Table 3 for the fabric-first design specification.

Table 3. The fabric-first design specification at Henfield Road, Albourne, Hassocks

Element	Fabric-First Design Specification
Ground Floor U-Value (W/m^2.K)	0.12
External Wall U-Value (W/m^2.K)	0.19
Party Wall U-Value (W/m^2.K)	0.00
Roof – Flat U-Value (W/m^2.K)	0.11
Glazing U-Value – including Frame (W/m^2.K)	1.2
Door U-Value (W/m^2.K)	1.6
Design Air Permeability	4
Space Heating	Communal Gas Boiler
Heating Controls	Heating System Controls
Domestic Hot Water	Communal Gas Boiler
Ventilation	MVHR
Low Energy Lighting	100%
Thermal Bridging	Bespoke Psi Values

5. LOW-CARBON AND RENEWABLE ENERGY

5.1 Introduction

The Applicant adopts a fabric-first approach as the priority solution for this Development and steps have been taken to reduce energy demand through high-quality sustainable design. The planned integration of efficient building fabric and building services has been modelled and is predicted to lead to the required enhancement over Part L of the Building Regulations 2013.

The low-carbon and renewable energy solutions applicable to this development scheme are assessed and potentially-viable solutions recorded.

Viability of the following low-carbon and renewable energy technologies have been considered:

- Wind
- Solar
- Aerothermal
- Geothermal
- Biomass

5.2 Wind	*The ability to generate electricity via a turbine or similar device which harnesses natural wind energy. This could be considered as an onsite solution to reducing carbon emissions (turbines included within the development), or offsite (investing financially into a nearby wind farm).*
Installation considerations	▪ Wind turbines come in a variety of sizes and shapes. Turbines of 1 Kw can be installed to single house and large-scale turbines of 1-2 MW can be installed on a development to generate electricity to multiple dwellings and other buildings. In both instances the electricity generated can be used on site or exported to the grid. Vertical- or horizontal-axis turbines are available. ▪ A roof-mounted 1 kW micro wind system costs up to £3,000. A 2.5 kW pole-mounted system costs between £9,900 and £19,000. A 6 kW pole-mounted system costs between £21,000 and £30,000 (taken from the Energy Saving Trust, TBC by supplier) ▪ Local average wind speed is a determining factor. A minimum average wind speed of 6 m/s is required. ▪ Noise considerations can be an issue dependent on density and build-up of the surrounding area. ▪ Buildings in the immediate area can disrupt wind speed and reduce performance of the system. ▪ Planning permission will be required along with suitable space to site the turbine, whether ground installed, or roof mounted.
Advantages	▪ Generation of clean electricity which can be exported to the grid or used onsite. ▪ Can benefit from the Feed in Tariff, reducing payback costs.
Disadvantages	▪ Planning restrictions and local climate often limit installation opportunities. ▪ Annual maintenance required. ▪ High initial capital cost. It is usual for an investor to consider a series of turbines to make the investment financially sound.
Development feasibility	▪ Installing a large turbine in an area such as this is not considered to be appropriate due to its appearance and physical impact on the built-up environment. Residents' and neighbours' concerns may include the look of the turbine, the

hum of the generator and the possibility of stroboscopic shadowing from the blades on homes.

- Wind speed has been checked for the development scheme using the NOABL wind map: http://www.rensmart.com/Weather/BERR. The wind speed at ten metres for the development scheme is XX metres per second (m/s) which is (above/below) the minimum of 5 m/s and threshold for technical viability.

- Typical payback times for a single turbine are expected to be greater than 15 years which means that the cost of installing and maintaining a single wind turbine is not considered a commercially-viable option.

5.3 Solar PV and Solar Thermal

The ability to generate energy (either electricity, hot water, or a combination of the two) through harnessing natural solar energy. This could include the use of solar thermal panels, photovoltaic (PV) panels, or a combined solution. PV panels, similarly, to turbines, can be considered both on and offsite.

Solar Photovoltaics convert solar radiation into electricity which can be used on site or exported to the national grid.

Solar Thermal generates domestic hot water from the sun's radiation. Glycol circulates within either flat plate or evacuated tube panels, absorbing heat from the sun, and transferring this energy to a water cylinder. A well designed solar thermal system will account for 50-60% of a dwelling's annual hot water demand. Sizing the system to meet a higher demand will lead to excess heat generation in the summer months and overheating of the system.

Installation considerations

- Operate most efficiently on a south-facing sloping roof (between 30 and 45-degree pitch.)
- Shading must be minimal (one shaded panel can impact the output of the rest of the array.)
- Panels must not be laid horizontally on a flat roof as they will not self-clean. Panels will therefore need to be installed at an angle and with appropriate space between them, to avoid over-shading.
- Large arrays may require upgrades to substations if exporting electricity to the grid.

	▪ Local planning requirements may restrict installation of panels on certain elevations. ▪ Installation must take into account pitch and fall of the roof, along with any additional plant on the roof to ensure there is sufficient room. ▪ The average domestic solar PV system is 4kWp and costs £5,000 - £8,000 (including VAT at 5 per cent) - (taken from the Energy Saving Trust, TBC by supplier.)
Advantages	▪ Relatively straightforward installation, connection to landlord's supply and metering. ▪ Linear improvement in performance as more panels are installed. ▪ Maintenance free. ▪ Installation costs are continually reducing. ▪ Can benefit from the Feed in Tariff to improve financial payback.
Disadvantages	▪ Not appropriate for high-rise developments, due to lack of roof space in relation to total floor area. ▪ With Solar Thermal, performance is limited by the hot water demand of the building – system oversizing will lead to overheating.
Development feasibility 	▪ The suitability of Solar panels has been considered for this Development and are concluded as a technically-viable option. ▪ There are potential areas of roof space suitable for the positioning of unshaded Solar PV arrays. ▪ The Development is not on land, which is protected or listed, so it is considered that Solar panels would not have a negative impact on the local historical environment or the aesthetics of the area. ▪ If PV panels were to be used, the occupants may be entitled to claim the Feed-In-Tariff for any energy which is generated. If solar thermal panels were to be used, the occupants would see a reduction in hot water bills.

- The commercial viability of Solar PV or Solar Thermal would need to be fully explored if considered part of an Energy Strategy as the economical investment would need to be justified by the return on the Applicant's investment.
- Although a technical viable option for the scheme, the applicant has adopted to achieve the required target via low-carbon ASHP technology.

5.4 Aerothermal

The transfer of latent heat in the atmosphere to a compressed refrigerant gas to warm the water in a heating system. This includes air to water heat pumps and air conditioning systems.

Air Source Heat Pumps (ASHPs) extract heat from the external air and condense this energy to heat a smaller space within a dwelling or non-domestic building. A pump circulates a refrigerant through a coil to absorb energy from the air. This refrigerant is then compressed to raise its temperature which can then be used for space heating and domestic hot water.

They can feed either low-temperature radiators or underfloor heating and often have electric immersion heater back-up for the winter months.

Installation Considerations

- ASHPs operate effectively in buildings with a low energy demand, as they emit low levels of energy suitable for maintaining rather than dramatically increasing internal temperatures. It is therefore vital that the dwelling has a low heating demand to ensure the system can provide appropriate space-heating capability.
- Underfloor heating will give the best performance, but oversized radiators can also be used.
- Immersion heater back-up required to ensure appropriate Domestic Hot Water (DHW) temperature in winter months.
- Noise from the external unit can limit areas for installation.
- £7,000-£11,000 per dwelling (taken from the Energy Saving Trust, TBC by supplier.)

Advantages

- Air source systems are a good alternative solution to providing heating and hot water to well-insulated, low heat loss dwellings.

	▪ They require additional space when compared to a gas boiler. Space for an external unit is needed, as is space for the hot water cylinder and internal pump. ▪ Heat pumps are generally quiet to run, however if a collection of pumps were used, this could generate a noticeable hum while in operation. ▪ Running costs between heat pumps and modern gas boilers are comparable.
Disadvantages	▪ Residents need to be made aware of the most efficient way of using a heat pump; as the low flow rates used by such a system means that room temperature cannot be changed as reactively as a conventional gas or oil boiler system. ▪ Will not perform well in homes that are left unoccupied and unheated for a long period of time. ▪ Back-up immersion heating can drastically increase running costs. ▪ Noise and aesthetic considerations limit installation opportunities.
Development feasibility 	▪ ASHPs are considered a technically-viable option for this development scheme.

5.5 Geothermal	*The transfer of latent heat from the ground to a compressed refrigerant gas to warm the water in a heating system. This includes ground source heat pumps. Heat can be collected through the use of either horizontally laid or vertically installed coils.* Ground Source Heat Pumps (GSHPs) operate on the same principle as an Air Source Heat Pump (ASHP) in that they extract heat from a source (in this instance the ground) and compress this energy to increase temperature for space heating and hot water. Pipework is installed into the ground, either through coils or in bore holes and piles, circulating a mix of water and antifreeze to extract

	energy from the ground, where the year-round temperature is relatively consistent (approx. 10℃ at 4 metres depth). This leads to a reliable source of heat for the building. Again, an electrically powered pump circulates the liquid and powers the compressor, however annual efficiencies for GSHPs tend to be higher than those of ASHPs.
Installation considerations	▪ Require appropriate ground conditions to sink piles/bore holes or excavate for coils (which also require a large area of land.) ▪ Decision between coils or piles can lead to significant extra cost. ▪ Need to consider whether low temperature output is fed through underfloor heating (most efficient) or oversized radiators. ▪ Similar to ASHPs, perform best in well-insulated buildings with a low heating demand. ▪ Electric immersion heater required for winter use. ▪ £11,000-£15,000 per dwelling dependent on the size of the system (taken from the Energy Saving Trust, TBC by supplier.)
Advantages	▪ Perform well in well-insulated buildings, with limited heating demand. ▪ More efficient than ASHPs.
Disadvantages	▪ The coils can be damaged by natural earthworks and by intensive gardening practices – occupants would need to be aware of the location of the coils for this system, and how to operate the system efficiently. Coils may also be damaged within the dwelling where the circuit is connected to the internal unit. ▪ Will not perform well in buildings that are left unoccupied and unheated for a long period of time. ▪ Back up immersion heating can drastically increase running costs. ▪ Large area of ground needed for coil installation.
Development feasibility	▪ GSHPs are considered a technically-viable option for this development scheme as there are no physical constraints in terms of ground conditions and area available for installation.

	▪ The capital installation cost would, however, be high which leads us to the conclusion that GSHPs would not be a commercially-viable option for this development scheme.
5.6 Biomass	*Providing a heating system fuelled by plant-based materials such as wood, crops, or food waste.* Biomass boilers generate heat for space heating and domestic hot water through the combustion of biofuels, such as woodchip, wood pellets or potentially biofuel or bio diesel. Biomass is considered to be virtually zero carbon. They can be used on an individual scale or for multiple dwellings as part of a district-heating network. A back-up heat source should be provided as consistent delivery of fuel is necessary for continued operation.
Installation considerations	▪ Biomass boilers are larger than conventional gas-fired boilers and also require what can be significant storage space for the fuel source. This needs to be considered at planning stage to ensure an appropriate plant room can be provided. ▪ Flue required to expel exhaust gases – design needs to be in line with the requirements of the Building Regulations. ▪ Need to consider whether fuel deliveries will be reliable and consistent to the location of the site (especially relevant in rural areas) and whether the plant room can be easily accessed by the delivery vehicle. ▪ £9,000-£21,000 per dwelling dependent on size (taken from Energy Saving Trust, TBC by Supplier).
Advantages	▪ Considerable reduction in CO_2 emissions.
Disadvantages	▪ Limited reduction in running costs compared to A-rated gas boilers, but at a substantially higher up-front cost. ▪ Plant room space required for boiler and storage. ▪ Dependent on consistent delivery of fuel. ▪ Ongoing maintenance costs (need to be cleaned regularly to remove ash.)

Development Feasibility

- Biomass is considered a technically-viable option for this development scheme as there are no apparent physical constraints on site in terms of installing biomass boilers or storing a sufficient supply.
- There are, however, concerns regarding a sustainable supply of biomass to the site.
- The capital installation cost would, however, be high which leads us to the conclusion that biomass would not be a commercially-viable option for this development scheme.

5.7 Conclusion

The following renewable energy technologies, summarised here in Table 4, are considered potentially-viable options for the residential development scheme at Henfield Road, Albourne, Hassocks.

Table 4: Summary of Feasibility for Henfield Road, Albourne, Hassocks.

	Solar PV Photovoltaic Aerothermal
	Geothermal Wind Biomass

The Applicant has opted to incorporate the low-carbon communal ASHP technology in order to achieve the required CO2 emission rate reduction target.

6. SUSTAINABILITY - OVERHEATING AND COOLING

With a continual drive for energy efficiency through both the Building Regulations 2013 and Local Planning Authority requirements, the risk of overheating to buildings in the summer months is becoming more prevalent. Overheating can be a mild discomfort or a hazard to health if managed incorrectly so it is vitally important that overheating risk is mitigated to ensure a building is both energy efficient and comfortable to live in or occupy.

Summer overheating is caused when there is excess build-up of heat within a building. This can occur where there is excessive solar gain and limited means to absorb excess heat into the building fabric or purge this heat through ventilation. Summer overheating can be managed through a variety of measures and the chosen solution will vary from development to development.

6.1 Limiting Solar Gain

- Glazing g value: This is a measure of how much solar radiation penetrates the glazing. The lower the g value, the less solar gain that enters a building. Glazing with low g values may have a darker tint to the glazing so aesthetic considerations are also a factor. Lower g values (below 0.5) are often required in properties with single facades. Specifying g values below 0.2 will increase cost substantially and also limit the number of available suppliers for glazing.

- External shading: Windows can be shaded using solar shading to reduce solar gain in the summer months. If aligned correctly, external shading can reduce solar gain in summer whilst allowing solar gain in the winter when the sun is lower.

- Internal shading: Blinds can be used to limit solar gain in a building. They can either be automatic, triggered by the sun's presence on the window, or operated manually. Manual operation requires the occupant to be present, so this option is not reliable when trying to mitigate for the risk of overheating.

6.2 Purging Excess Heat Build Up

- Thermal Mass: Thermal mass is the measure of a building's ability to absorb energy. A building with a high thermal mass (high proportion of concrete) has the ability to absorb heat during the day which helps to maintain a steady internal temperature. This heat can be released back into the building at night-time when the temperature is lower, helping to maintain a consistent internal temperature.

- Ventilation: A building can be ventilated to purge excess heat build-up. This can be done through openable windows, especially where cross ventilation is possible. Where ventilation through windows is not possible, due to security, noise or pollution issues, Mechanical Ventilation can be used. The ventilation rates required to purge a building can often be quite high, requiring oversized systems.

6.3 Active Cooling

Where there is still a risk of overheating and it is not possible to mitigate this through any of the measures listed above, mechanical cooling can be considered. Also known as comfort cooling or air conditioning, mechanical cooling uses energy to extract excess heat from a building using a refrigerant, expelling this heat to the atmosphere. There is no allowance for the electricity used in this process when the Target Emission Rate for SBEM is calculated, meaning that if this system is used, CO_2 emissions of a property will increase. However, the outcome is that the target is left unaltered.

7. SUSTAINABILITY - MITIGATION AND ADAPTATION TO CLIMATE CHANGE

The Applicant has taken a high standard of energy efficiency including optimal levels of thermal insulation and passive ventilation. By doing this, the Applicant works in partnership with Mid Sussex District Council in delivering their vision for a design that enhances the existing qualities of the brough whilst also making positive steps towards mitigating and adapting to climate change.

The Applicant addresses their potential impact on climate change by designing a development scheme that reduces energy demand and, in doing so, takes positive action towards meeting their CO_2 reduction target.

The Development has been designed to encourage walking, cycling and the use of public transport. Private, secure and covered cycle storage will be provided to each property to help encourage cycling over car use. The Development also has good access to local transport. Electric car charging points will also be provided to all properties across the site.

Policies and procedures will be put in place by the Applicant to in order to minimise the possible negative effects of construction, such as air pollution, noise and vibration, traffic congestion, dust and contamination of land and water.

It is also worth noting that the BRE Guide states *"the advice given here is not mandatory and should not be seen as an instrument of planning policy"* and that *"daylight criteria should be interpreted flexibly because natural Daylighting is only one of many factors."* It is also clear that excessive over glazing of a development can increase the overheating risk, so a careful balance is required.

8. SUSTAINABILITY – WATER

Water Management

It is acknowledged that the water consumption of homes has a significant impact on not only direct operational running costs (i.e., water consumption charges), but also indirectly through additional energy usage and the heating of water for domestic use. This is, in part, reflected in SAP 2012 methodology which assumes reduced energy consumption should a dwelling be compliant with Approved Document Part G.

A water-efficiency calculation will be completed to measure the anticipated average water consumption by adding up flow rates for taps and showers as well as the size of devices such as baths, dishwashers and washing machines. Assumptions are included within this model to accommodate how frequently these are likely to be used.

The Applicant will reduce water demand across the Site by incorporating water-efficient fixtures and fittings as a standard specification within each new dwelling which will ensure a standard of 110 litres per person per day is achieved.

A specification for smart water meters for each dwelling to facilitate water consumption management and monitoring to reduce the impacts of inefficiencies and leakage.

Flow control devices that regulate the supply of water to each WC area/facility will be considered as an installation across the Site in order to reduce water wastage. Examples of flow control devices are listed below:

- A time controller, i.e., an automatic time switch device to switch off the water supply after a predetermined interval.
- A programmed time controller, i.e., an automatic time switch device to switch water on and/or off at pre-determined times.
- A volume controller, i.e., an automatic control device to turn off the water supply once the maximum pre-set volume is reached.
- A presence detector and controller, i.e., an automatic device detecting occupancy or movement in an area to switch water on and turn it off when the presence is removed.
- Have the mains water supply - and any other water-consuming plant or building areas that are consuming 10% or more of the building's total water demand - metered.
- Have a leak detection mechanism in place capable of identifying a major leak on the mains-water supply within the building.
- Require that the main contractor on-site monitors water consumption during the construction process. The Applicant will set targets with the contractor and implement measures to ensure water consumption from site activities is managed and reduced wherever possible.

9. SUSTAINABILITY – WASTE & MATERIALS

Sustainable Waste Management

The Applicant is committed to prioritising steps of the waste hierarchy and implements the following Strategy to ensure a sustainable and environmentally responsible approach is taken to the management of domestic waste and waste during the design and construction of the development.

This will be managed through the effective implementation of an on-site plan that will focus on steps in the waste hierarchy:

- Prevention
- Minimisation
- Reuse
- Recycling
- Energy recovery
- Disposal

Domestic Waste

In line with Mid Sussex District Council guidance on the provision of recycling and refuse waste collection services the applicant will encourage recycling by making suitable space for off-street storage space for wheeled bins and storge for recycling.

Construction Waste

The Applicant will implement guidance on sustainable waste management. As a primary objective, and in accordance with the waste hierarchy, the Applicant will seek to prevent waste in the first instance. This will be achieved through a site waste management plan.

The Applicant will work with a principal contractor for the Company in delivering the objective of reducing the proportion of waste diverted to landfill. The Applicant will monitor and review this commitment by defining the following:

- Waste minimisation actions to be undertaken.
- Procedures for minimising hazardous waste.
- Procedures for sorting, reusing, and recycling construction waste into defined waste groups, either on-site or through a licensed external contractor. The delivery of this target will be managed through the effective implementation of an on-site plan that will focus on steps in the waste hierarchy.

These approaches will ensure that waste from the site is minimised, and environmental impact is reduced.

Sustainable Materials

The impact of materials selection is an important consideration when designing a new development. The energy and natural resources consumed over the course of extraction or procurement, processing and manufacturing can be significant.

The Applicant will implement an environmentally responsible approach to the procurement of construction materials and supply chain management for the development where possible.

The Development will be designed to incorporate sustainably sourced materials and where possible, these will have:

- Low embodied impact.
- High recycled content where possible.
- High durability.
- A sustainable source with appropriate certification. For example, Forestry Stewardship Council (FSC), Environmental Management Systems (EMS), PEFC, ISO 14001 (International Organisation for Standardisation).
- Use of locally sourced materials where possible.

10. SUSTAINABILITY – AIR QUALITY & NOISE

Air pollutants can be a contributing factor to health problems as well as damaging ecosystems, biodiversity and value habitats. Exposure to high concentrations of certain pollutants is associated with numerous effects on human health ranging from premature deaths caused by heart or lung disease to worsening of asthmatic conditions, which often leads to a reduced quality of life.

In most urban areas in the UK, the main local source of air pollutants is road traffic, emissions from vehicles causing a complete mixture of pollutants, quantities of which varies from car to car. Other sources of air pollutants will generally include public transport, building heating systems and industrial processes.

Noise at low levels is not necessarily harmful. Environmental noise can also convey a sense of liveliness in an area, which can be desirable. However, the adverse effects of noise exposure could include: interference with speech or other 'desired' sounds, annoyance, sleep disturbance, anxiety, hearing damage and stress-related cardiovascular health problems.

Noise from transportation is typically emitted by machinery (e.g. the engine or exhaust) and aerodynamic noise (see aerodynamics and aircraft noise) caused by the compression and friction in the air around the vessel during motion. Environmental noise from the railway specifically is variable depending on the speed and quality of the tracks used for transportation.

Acoustic and Air Quality assessments are currently being carried out on the surrounding site, looking at the effects on the development as a whole and will accompany this report. The results of these surveys will determine the requirement for additional measures in order to mitigate the potential overheating risks caused by the heightened noise within the area. These may include a more efficient ventilation system, improved glazing and acoustic reduction systems.

11. TRANSPORT

A site-specific Travel Plan is currently underway and will to provide more details of comprehensive sustainable measures to influence travel choice with a provision of modal share targets. Furthermore, Delivery and Servicing and Construction Logistics Plans will also be developed to mitigate the impact of vehicle activities during the operational and build stages, i.e. reducing the number of trips to the sites during peak hours, ensuring that adequate recycling and freight consolidation measures are introduced to reduce the number of lorry movements, and encouraging use of cleaner vehicles.

The development will be designed to discourage the use of cars by residents.

Substantial secure cycle parking will be available for residents and visitors and in line with the new regulations, all vehicle parking will incorporate passive Electric Vehicle Charge point (EVCP) provisions to encourage those in need of cars to adopt electrical solutions.

12. BIODIVERSITY

The aim will be to significantly increase biodiversity at the site through the utilisation of biodiverse green roofs and the provision of new planting, including new trees. The extent of this provision will be investigated during the detailed design to ensure that the right solution is implemented.

The landscaping proposals will target a mixture of native species designed to create a hospitable habitat for a variety of insects, birds and small mammals. The urban landscape may present difficulties in increasing the green cover at the site, however sympathetic greening will be implemented wherever possible throughout the scheme. In order to minimise emissions, it is expected that most of the roof substrate and general landscaping may consist of materials retained from demolition and clearance of the site. This shall significantly reduce embodied energy and waste.

Ecology assessments are currently underway and will accompany this report.

13. CONCLUSIONS

The Applicant demonstrates commitment to delivering the energy standard at Henfield Road, Albourne, Hassocks as follows:

- This energy standard is shown to be delivered through a fabric-first approach to design and low-carbon communal ASHP technologies.

A combination of demand-reduction measures, energy-efficiency measures and low-carbon heating will deliver the Applicant's target for on-site reduction in CO_2 emissions.

The following measures, summarised here in Table 5, are incorporated in the development proposals.

Table 5. Measures incorporated to deliver the energy standard.

Fabric first: Demand-reduction measures	▪ Energy-efficient building fabric and insulation to all heat loss floors, walls and roofs. ▪ High-efficiency double-glazed windows throughout. ▪ Quality of build will be confirmed by achieving good air-tightness results throughout. ▪ Efficient-building services including high-efficiency heating systems. ▪ Low-energy lighting throughout the building.
Renewable and low-carbon energy technologies	▪ Communal Air Source Heat Pumps to generate heating and hot water throughout the development (min 350% efficiency).

The way in which these design measures deliver the Applicant's commitment to the site-wide energy standard is illustrated in Figure 3 and Table 6 overleaf.

Figure 3: How the Development delivers the energy standard

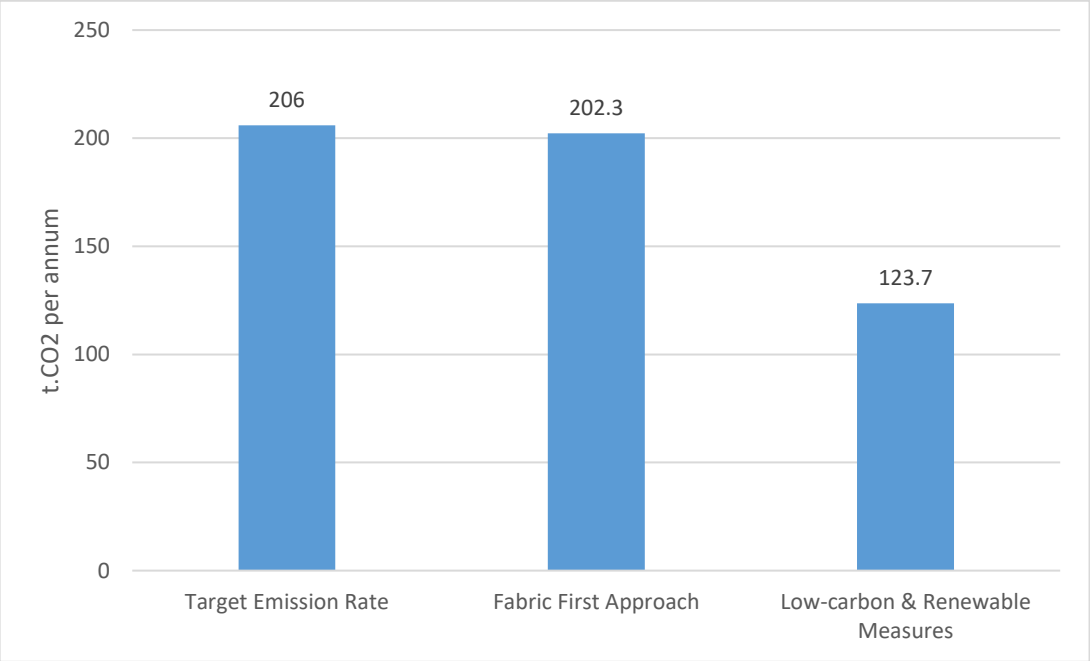


Table 6: How the Development reduces CO_2 emissions

	CO_2 emissions	
	t.CO_2 per annum	% reduction
Target Emission Rate: Compliant with ADL 2013	206.0	-
Fabric-first Approach	202.3	1.8 %
Low-carbon & Renewable measures	123.7	38.9%
Total savings	**82.3**	**40.0 %**

14. APPENDICES

APPENDIX 1: LIST OF ABBREVIATIONS

ACDs	Accredited Construction Details
ADL 2013	Approved Document Part L of Buildings Regulations 2013
ASHP	Air Source Heat Pump
BER	Building Emission Rate
CHP	Combined Heat & Power
DER	Dwelling Emission Rate
DHN	District Heat Network
DHW	Domestic Hot Water
ESCO	Energy Services Company
GSHP	Ground Source Heat Pump
LPA	Local Planning Authority
NCM	National Calculation Method
PV	Photovoltaics
SBEM	Simplified Building Energy Model
SAP	Standard Assessment Procedure
TER	Target Emission Rate

APPENDIX 2: PLANNING POLICY AND DESIGN GUIDANCE

The Climate Change Act (2008)
Passed in November 2008, the Climate Change Act mandated that the UK would reduce emissions of six key greenhouse gases, including Carbon Dioxide, by 80% by 2050. As a consequence, the reduction of carbon dioxide emissions is at the forefront of National, Regional and Local Planning Policy, along with continuing step changes in performance introduced by the Building Regulations Approved Document L (2013).
Approved Document L (2013)
This development is subject to the requirements of Approved Document L (2013). ADL 2013 represented an approximate reduction of 6% in the Target Emission Rate (Kg/CO_2/sqm per annum) over the requirements of Approved Document L (2010) for residential development and an aggregate 9% reduction for non-residential development. ADL (2013) also sees the introduction of a Fabric Energy Efficiency Target, a measure of heating demand (kW hrs/sqm per annum) to ensure new-build dwellings with low-carbon heating systems still meet satisfactory energy-efficiency standards.
National Planning Policy Framework (2021)
The National Planning Policy Framework encourages Local Planning Authorities to '*support the transition to a low carbon future in a changing climate, taking full account of flood risk and costal change' (*NPPF paragraph 152), *'whilst taking a proactive approach to mitigating and adapting to client change, taking into account the long-term implication for flood risk, costal change, water supply, biodiversity and landscapes, and the risk of over shading from rising temperatures'.* (NPFF Paragraph 153). Paragraph 155, upholds the requirement for Local Plans to: *'To help increase the use and supply of renewable and low carbon energy and heat, plans should: a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts); b) consider identifying suitable areas of renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and c) identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for collocating potential heat customers and suppliers.'* In paragraph 157, NPPF stipulates that local planning authorities should take account of the benefits of decentralised energy and passive design measures as a means of energy efficiency in new development: *'In determining planning applications, local planning*

authorities should expect new development to: a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and b) take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.'

Mid Sussex Adopted District Plan (2014-2031) Adopted March 2018

DP21: Transport

Strategic Objectives: 6) To ensure that development is accompanied by the necessary infrastructure in the right place at the right time that supports development and sustainable communities. This includes the provision of efficient and sustainable transport networks; and 15) To create places that encourage a healthy and enjoyable lifestyle by the provision of first class cultural and sporting facilities, informal leisure space and the opportunity to walk, cycle or ride to common destinations.

Evidence Base: Mid Sussex Transport Study; West Sussex Transport Plan 2011-2026.

Development will be required to support the objectives of the West Sussex Transport Plan 2011-2026, which are:

- A high-quality transport network that promotes a competitive and prosperous economy;
- A resilient transport network that complements the built and natural environment whilst reducing carbon emissions over time;
- Access to services, employment and housing; and
- A transport network that feels, and is, safer and healthier to use.

To meet these objectives, decisions on development proposals will take account of whether:

- The scheme is sustainably located to minimise the need for travel noting there might be circumstances where development needs to be located in the countryside, such as rural economic uses (see policy DP14: Sustainable Rural Development and the Rural Economy);
- Appropriate opportunities to facilitate and promote the increased use of alternative means of transport to the private car, such as the provision of, and access to, safe and convenient routes for walking, cycling and public transport, including suitable facilities for secure and safe cycle parking, have been fully explored and taken up;
- The scheme is designed to adoptable standards, or other standards as agreed by the Local Planning Authority, including road widths and size of garages;

The scheme provides adequate car parking for the proposed development taking into account the accessibility of the development, the type, mix and use of the development and the availability and opportunities for public transport; and with the relevant Neighbourhood Plan where applicable;

- Development which generates significant amounts of movement is supported by a Transport Assessment/ Statement and a Travel Plan that is effective and demonstrably deliverable including setting out how schemes will be funded;
- The scheme provides appropriate mitigation to support new development on the local and strategic road network, including the transport network outside of the district, secured where necessary through appropriate legal agreements;
- The scheme avoids severe additional traffic congestion, individually or cumulatively, taking account of any proposed mitigation;

• The scheme protects the safety of road users and pedestrians; and
• The scheme does not harm the special qualities of the South Downs National Park or the High Weald Area of Outstanding Natural Beauty through its transport impacts.
Where practical and viable, developments should be located and designed to incorporate facilities for charging plug-in and other ultra-low emission vehicles.
Neighbourhood Plans can set local standards for car parking provision provided that it is based upon evidence that provides clear and compelling justification for doing so.

DP29: Noise, Air and Light Pollution
Strategic Objectives: 3) To protect valued landscapes for their visual, historical and biodiversity qualities;
and 12) To support sustainable communities which are safe, healthy and inclusive.
Evidence Base: Data held by Environmental Health, Air Quality Action Plan – Stonepound Crossroads, Hassocks.
The environment, including nationally designated environmental sites, nationally protected landscapes, areas of nature conservation or geological interest, wildlife habitats, and the quality of people's life will be protected from unacceptable levels of noise, light and air pollution by only permitting development where:
Noise pollution:
• It is designed, located and controlled to minimise the impact of noise on health and quality of life, neighbouring properties and the surrounding area;
• If it is likely to generate significant levels of noise it incorporates appropriate noise attenuation measures;
Noise sensitive development, such as residential, will not be permitted in close proximity to existing or proposed development generating high levels of noise unless adequate sound insulation measures, as supported by a noise assessment are incorporated within the development.
In appropriate circumstances, the applicant will be required to provide:
• an assessment of the impact of noise generated by a proposed development; or
• an assessment of the effect of noise by an existing noise source upon a proposed development;
Light pollution:
• The impact on local amenity, intrinsically dark landscapes and nature conservation areas of artificial lighting proposals (including floodlighting) is minimised, in terms of intensity and number of fittings;
• The applicant can demonstrate good design including fittings to restrict emissions from

proposed lighting schemes;
Air Pollution:
• It does not cause unacceptable levels of air pollution;
• Development on land adjacent to an existing use which generates air pollution or odour would not cause any adverse effects on the proposed development or can be mitigated to reduce exposure to poor air quality to recognised and acceptable levels;
• Development proposals (where appropriate) are consistent with Air Quality Management Plans.
The degree of the impact of noise and light pollution from new development or change of use is likely to be greater in rural locations, especially where it is in or close to specially designated areas

and sites.

DP37: Trees, Woodland and Hedgerows
Strategic Objectives: 3) To protect valued landscapes for their visual, historical and biodiversity qualities;
4) To protect valued characteristics of the built environment for their historical and visual qualities; and
5) To create and maintain easily accessible green infrastructure, green corridors and spaces around and within the towns and villages to act as wildlife corridors, sustainable transport links and leisure and recreational routes.
Evidence Base: Green Infrastructure mapping; Mid Sussex Ancient Woodland Survey, Tree and Woodland Management Guidelines, Tree Preservation Order records.
The District Council will support the protection and enhancement of trees, woodland and hedgerows, and encourage new planting. In particular, ancient woodland and aged or veteran trees will be protected.
Development that will damage or lead to the loss of trees, woodland or hedgerows that contribute, either individually or as part of a group, to the visual amenity value or character of an area, and/ or that have landscape, historic or wildlife importance, will not normally be permitted.
Proposals for new trees, woodland and hedgerows should be of suitable species, usually native, and where required for visual, noise or light screening purposes, trees, woodland and hedgerows should be of a size and species that will achieve this purpose.
Trees, woodland and hedgerows will be protected and enhanced by ensuring development:
• incorporates existing important trees, woodland and hedgerows into the design of new development and its landscape scheme; and
• prevents damage to root systems and takes account of expected future growth; and
• where possible, incorporates retained trees, woodland and hedgerows within public open space rather than private space to safeguard their long-term management; and
• has appropriate protection measures throughout the development process; and
• takes opportunities to plant new trees, woodland and hedgerows within the new development to enhance on-site green infrastructure and increase resilience to the effects of climate change; and
• does not sever ecological corridors created by these assets.
Proposals for works to trees will be considered taking into account:
the condition and health of the trees; and
• the contribution of the trees to the character and visual amenity of the local area; and
• the amenity and nature conservation value of the trees; and
• the extent and impact of the works; and
• any replanting proposals.
The felling of protected trees will only be permitted if there is no appropriate alternative. Where a protected tree or group of trees is felled, a replacement tree or group of trees, on a minimum of a 1:1 basis and of an appropriate size and type, will normally be required. The replanting should take place as close to the felled tree or trees as possible having regard to the proximity of adjacent properties.
Development should be positioned as far as possible from ancient woodland with a minimum buffer of 15 metres maintained between ancient woodland and the development boundary.

DP38: Biodiversity
Strategic Objectives: To protect valued landscapes for their visual, historical and biodiversity qualities; and to create and maintain easily accessible green infrastructure, green corridors and spaces around
and within the towns and villages to act as wildlife corridors, sustainable transport links and leisure and recreational routes.
Evidence Base: Biodiversity 2020; Biodiversity Action Plan; Biodiversity Opportunity Areas; Green Infrastructure mapping; Habitats and Species Records; Mid Sussex Ancient Woodland Survey; Mid Sussex Infrastructure Delivery Plan; The Natural Choice: Securing the Value of Nature; WestSussex SNCI Register.
Biodiversity will be protected and enhanced by ensuring development:
• Contributes and takes opportunities to improve, enhance, manage and restore biodiversity and green infrastructure, so that there is a net gain in biodiversity, including through creating new designated sites and locally relevant habitats, and incorporating biodiversity features within developments; and
• Protects existing biodiversity, so that there is no net loss of biodiversity. Appropriate measures should be taken to avoid and reduce disturbance to sensitive habitats and species. Unavoidable damage to biodiversity must be offset through ecological enhancements and mitigation measures (or compensation measures in exceptional circumstances); and
• Minimises habitat and species fragmentation and maximises opportunities to enhance and restore ecological corridors to connect natural habitats and increase coherence and resilience; and
• Promotes the restoration, management and expansion of priority habitats in the District; and
• Avoids damage to, protects and enhances the special characteristics of internationally designated Special Protection Areas, Special Areas of Conservation; nationally designated Sites of Special Scientific Interest, Areas of Outstanding Natural Beauty; and locally designated Sites of Nature Conservation Importance, Local Nature Reserves and Ancient Woodland or to other areas identified as being of nature conservation or geological interest, including wildlife corridors, aged or veteran trees, Biodiversity Opportunity Areas, and Nature Improvement Areas.
Designated sites will be given protection and appropriate weight according to their importance and the contribution they make to wider ecological networks.
Valued soils will be protected and enhanced, including the best and most versatile agricultural land, and development should not contribute to unacceptable levels of soil pollution.
Geodiversity will be protected by ensuring development prevents harm to geological conservation interests, and where possible, enhances such interests. Geological conservation interests include Regionally Important Geological and Geomorphological Sites.

DP39: Sustainable Design and Construction
Strategic Objectives: 1) To promote development that makes the best use of resources and increases the sustainability of communities within Mid Sussex, and its ability to adapt to climate change.
Evidence Base: Gatwick Sub Region Water Cycle Study; West Sussex Sustainable Energy Study, Mid Sussex Sustainable Energy Study.
All development proposals must seek to improve the sustainability of development and should where appropriate and feasible according to the type and size of development and location,

incorporate the following measures:
• Minimise energy use through the design and layout of the scheme including through the use of natural lighting and ventilation;
• Explore opportunities for efficient energy supply through the use of communal heating networks where viable and feasible;
• Use renewable sources of energy;
• Maximise efficient use of resources, including minimising waste and maximising recycling/ re-use of materials through both construction and occupation;
• Limit water use to 110 litres/person/day in accordance with Policy DP42: Water Infrastructure and the Water Environment;
• Demonstrate how the risks associated with future climate change have been planned for as part of the layout of the scheme and design of its buildings to ensure its longer term resilience.

The Housing Standards Review and implications on Local Planning Policy

On March 25th, 2015, the Government confirmed its policy to limit energy-efficiency targets that can be imposed on a development as a result of the Housing Standards Review. New developments should not be conditioned to achieve a reduction in Carbon Emissions exceeding a 19% improvement over the requirements of Approved Document L (2013) – the equivalent energy performance of a Code for Sustainable Homes Level 4 dwelling.

In addition, the Government confirmed that the Code for Sustainable Homes is no longer an applicable standard for planning permissions granted on or after March 26th, 2015. If a Local Planning Authority has an existing policy requirement for the CSH it may still condition the Ene 1 and Wat 1 requirements for CSH Level 4 but cannot require assessment against the remaining categories and full CSH Certification.

Sites with planning permission granted prior to March 25th, 2015, can still be assessed, and certified against the Code for Sustainable Homes, where there is a requirement to do so (known as legacy sites).

A CSH requirement can also apply where a previously approved Outline Planning Permission has been granted prior to March 25th, 2015.

APPENDIX 3: SAMPLE SAP12 RESULTS

Dwelling Type	Target Emission Rate	Dwelling Emission Rate
2 Bed House	19.01	11.64
3 Bed House	18.31	11.14
4 Bed House	15.56	9.24
1 Bed Flat (mid floor)	18.48	11.26
2 Bed Flat (type A GF)	17.88	10.35
2 Bed Flat (type B mid)	15.42	8.92