



# SUSTAINABLE/ENERGY STATEMENT

FULL PLANNING PERMISSION FOR THE CONSTRUCTION OF A SINGLE DETACHED TWO-BEDROOM HOUSE WITH VEHICULAR PARKING, REFUSE STORE AND CYCLE RACKS ON LAND TO THE REAR OF 58 DOMINION ROAD, BRISTOL, BS16 3ET

LAND TO THE REAR OF 58 DOMINION ROAD, BRISTOL, BS16 3ET

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# TABLE OF CONTENTS

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<b>1</b>	<b>INTRODUCTION</b>
<b>2</b>	<b>SUSTAINABLE ENERGY STRATEGY EVALUATION</b>
<b>3</b>	<b>DETAILED MEASURES</b>
<b>4</b>	<b>PLANNING POLICY</b>
<b>5</b>	<b>SUMMARY AND CONCLUSIONS</b>



# 1.0 INTRODUCTION

- 1.1 This Sustainable and Energy statement has been prepared by SN Consultants Ltd on behalf of Mr Mohammad Asif Akbar (the **Applicant**) for planning consent for the construction of a single detached two-bedroom house with vehicular parking, refuse store and cycle racks on land to the rear of 58 Dominion Road, Bristol, BS16 3ET.
- 1.2 This application has been submitted to Bristol City Council Planning Department for the following permission to be granted:
- “Planning permission for the construction of a single detached two-bedroom house with vehicular parking, refuse store and cycle racks on land to the rear of 58 Dominion Road, Bristol, BS16 3ET”*
- 1.2 The following statement seeks to outline how the proposed development on land at Macey’s Road will comply with the requirements and objectives of policies BCS13-16 of the Bristol Development Framework Core Strategy.
- BCS13- Climate Change;
  - BCS14- Sustainable Energy;
  - BCS15- Sustainable Design and Construction;
  - BCS16- Flood Risk and Water Management
- 1.3 The statement below will assess how these issues will be addressed as a result of the proposed development.
- 1.4 Planning policy BCS13: Climate Change requires the development to mitigate and adapt to climate change.
- 1.5 The resultant plot allows for the construction of a two-storey two-bedroom dwelling to the rear of 58 Dominion Road.
- 1.6 In order to mitigate and adapt to climate change it is proposed that the new extension will be constructed to the highest standards, with energy saving materials, methods of construction and heating/ventilating equipment.
- 1.7 The building has been designed with a south facing roof structure which will provide 32 square metres of roof plane suitable for the installation of solar thermal panels or photovoltaic panels.
- 1.8 Policy BCS15: Sustainable design and construction requires all developments to engage with issues around sustainable design and construction.

- 1.9 The scale of this proposal does not warrant either BREEAM or CfSH assessment and rating, however, the following points reflect the level of commitment to sustainable design and construction;
- 1.10 The proposed development will embrace all aspects of energy saving by design and opportunity to economically integrate new technologies including:
- use of levels of insulation in excess of Building Regulations Part L requirements;
  - taking advantage of site orientation which enables limited openings on the north elevations and a southerly window aspect thereby limiting heat loss and exploiting passive solar gain.
  - Site orientation and topography will enable south facing roof slopes for the provision of solar panels for preheating of stored water in heating system pressure vessel.
  - Good levels of airtightness of the building to limit heat leakage.
  - Easily opened windows to provide ventilation and cooling for building users but solar control glass to control excessive heat gain.

### **Water Strategy**

- 1.11 The scheme will incorporate measures to provide zero rainwater runoff from the site including:
- Use of permeable hard surface paving on pedestrian approaches to the building and gravel in private areas.
  - Installation of storage tank for rainwater harvesting for re use to flush Wcs.
  - Specification of low water consumption appliances including spray taps in building.

### **Waste Management**

- 1.12 As far as is practicable all materials will be sourced locally to limit travel miles for products and materials will be selected as far as possible with reference to the BRE Green Guide ratings A or B.
- It is intended to reuse as many materials on site as possible including existing buildings, surface finishes and boundary treatments.
  - Ample space is provided within the yard for storage of reuse and recycle bins.

### **BCS14: Sustainable Energy**

- 1.13 Policy BCS14: Sustainable Energy seeks to minimize energy use and promote energy from renewable sources. Developments should aim to achieve a minimum reduction in carbon dioxide emissions of 20% from onsite renewable energy generation.
- 1.14 The proposed development features the following key energy efficient design measures. High levels of insulation in building fabric and high specification energy efficient measures including:
1. Walls U-value of 0.24 w/m2k;
  2. Ground floor U-value of 0.18 w/m2k;
  3. Roof U-value of 0.16w/m2k;

4. Glazing U-value of 1.2 w/m<sup>2</sup>k;
  5. "A" Rated condensing boiler;
  6. Load/weather compensator
  7. Design air permeability of 5m<sup>3</sup>/hm<sup>2</sup>
  8. Natural Ventilation;
  9. Time and temperature zone control;
  10. 100% low energy lighting
- 1.15 The proposed heating and hot water by efficient gas boiler with full time and temperature zone control.
- 1.16 All technologies were investigated for suitability to this proposed development and 3.5kWp Photovoltaic panel array is proposed.

#### **High Standards of Energy Efficiency**

- 1.17 Insulation in the thermal elements will exceed that which is required by Approved Document L1A.

#### **Encouraging more environmentally friendly transport**

- 1.18 The proposed development is situated in close proximity to a major of bus routes on Ridgeway Road with good access to either St Pauls, Fishponds, or the City of Bristol which is situated a 2.3km distance away.

#### **Water Conservation and Flood Risk**

- 1.19 According the Flood Risk map available from Bristol City Council maps, the development site is not located within any flood zone and a flood risk assessment confirms the site is well above any known flood levels.

#### **Minimising Energy Requirements**

- 1.20 The proposed development will provide 100% dedicated low energy internal lighting.

#### **Energy Strategy**

- 1.21 Due to the location, size and type of development most renewable technologies are appropriate for this site. Although Air source heat pumps would be feasible, gas central heating is desired for this project.
- 1.22 However, photovoltaic panels do offer an immediate, appropriate solution. The number of panels can be scaled to achieve the 20% reduction in CO<sub>2</sub>.

1.24 Please see below the baseline energy demand calculations.

#### Baseline energy demand

Baseline energy demand (kWh pa)	10301.6
Regulated emissions (kg pa)	2348.91

#### Proposed Renewables

Showing renewables added to the specification Category	Item	Reference/Source	Value/Details
Additional Features	Renewables	Calculated	2.00 kWp PV Panels

#### Renewables Specification

Total Array Size	Direct/ landlord's Supply	Orientation	Inclination	Overshading	Notes
2.00 kWp	Direct supply	South east	30° (nominal)	None or very little	1.00 kWp per dwelling

Baseline Energy Demand (kWh pa)	Baseline CO2 (kg pa)	Renewables Demand (kWh pa)	Renewables CO2 (kg pa)
12104	1843.44	6930.17	1416.12



## 2.0 SUSTAINABLE/ENERGY STRATEGY EVALUATION

2.1 The development has been evaluated for compliance with the Bristol Core Strategy BCS14 'Sustainable Energy' in accordance with the Sustainable Energy Strategy set out in the Climate Change & Sustainability Practice Note (December 2012).

**Summary table, as requested in Appendix 2 of the Code for Sustainable homes.**

2.2 Limitations and assumptions of this table, the baseline has

	Energy Demand (kWh pa)	Energy Saving achieved (%)	Regulated CO2 emissions (kg pa)	Saving achieved on residual CO2 emissions
Baseline Part L Compliance	11,000	n/a	2831	n/a
Proposed Scheme after energy efficiency measures & CHP	10,232	6.98%	2600	8.16%
Proposed Scheme after onsite renewables (2.0 Kw)	8,731	20.673%	2,241	23.54%
Proposed Scheme offset for financial contribution or other allowable solution.	n/a	n/a	n/a	n/a
Total Saving on residual emissions	2269	27.6%	650	31.7%

## 2.3 U-Value Calculations

Walls		k-value	Thickness (mm)	r value	u value
Rsi	Internal air			0.13	
Rpb	Gypsum plaster	0.46	5	0.01087	
R1	Thermalite N7	0.19	100	0.526316	
Rins	Kingspan K108	0.018	100	5.555556	
Rair		n/a	25	0.18	
Rren	Brick	0.84	150	0.178571	
Rso	External air			.04	
			380		0.151027
Floor					
Rsi	Internal air			0.17	
Rse	Screed	0.41	70	0.170732	
Rins	Insulation	0.022	140	6.363636	
Rov	Oversite	1.4	100	0.071429	
Rss	Sand screed	0.41	50	0.121951	
Ric	Hardcore	0.41	50	0.121951	
Rso	External air			0.14	
					0.139005

## 3.0 DETAILED MEASURES

### Design

- 3.1 The proposed development will be infill, which will make use of the existing underused space at the rear of 58 Dominion Road.
- 3.2 The proposed development will implement and adopt a hierarchical approach for reducing energy. In order to implement the energy strategy, the first step will be to minimise energy use wherever possible through reduction of demand through passive design to reduce heating and cooling demand.
- 3.3 The proposed development comprises one detached dwelling.
- 3.4 The proposed design is based on the Part L1A New Build. As part of the design the modelled indicative SAP shows their energy demand and CO2 emissions.
- 3.5 The SAP calculations for the dwelling is shown below.

Detached 2-bedroom dwelling		
	Energy (kWh/yr)	Emissions (kgCO2/yr)
Space heating (main)	150359	780.37
Water heating	747.66	388.04
Auxillary Power	0	0
Lights	455.12	236.21
<b>Total</b>	<b>2706.37</b>	<b>1404.62</b>

- 3.6 The technologies considered for the proposed development considered are as follows: PV, Solar Thermal, Air Source Heat Pumps, Wind District Heating and CHP. Air Source Heat Pumps were considered the most appropriate option for the site. This was due to the nature of the site in terms of planning restrictions, surrounding existing development, financial investment required and limited potential for renewable energy generation.
- 3.7 Bristol City Council is leading the way with mixed use district heating and CHP schemes.
- 3.8 Gas-fired combined heat and power (CHP) schemes in high-density urban areas are the most popular because the costs are viable, the technology is mature and heat networks benefit many users. CHP systems requires a significant infrastructure, and a substantial heat demand to be viable and therefore has been discounted within development, as the infrastructure is not yet

available, however as the heating system will be electric there will be the opportunity to connect at a later stage.

### HEAT PUMPS

- 3.9 An air heat pump is appropriate for smaller dwellings as part of the heat hierarchy, this particular dwelling is well insulated, air-tight and can benefit from underfloor heating on both ground and first floor. Air Source Heat Pump can provide low temperature hot water and heating all year round. The house would likely require a 4 or 5kw model and could be sited externally on South or West facing wall that has ample air flow.
- 3.10 As supporting evidence to this report included is the expected Energy Performance rating of the site and the SAP reports generated from the theoretical model.

	Total Energy demand (kWh/yr)	Energy saving (%)	Total Regulated CO <sub>2</sub> emissions (kg CO <sub>2</sub> /yr)	Saving achieved on residual CO <sub>2</sub> emissions (%)
Baseline energy demand –“Baseline”	8394.45	0%	1973.83	0%
Proposed scheme after energy efficiency measures to achieve pass where it required to comply with New Building Part L1A standards – “Residual”	8342.1	0.62%	1962.53	0.57%
Proposed scheme after on-site renewables (compared to strict definition of BCS14 residual)	2706.37	67.56%	1404.62	28.43%
Proposed scheme offset for financial contribution or other allowable solution	N/A	N/A	N/A	N/A

Baseline energy demand (kWh/yr)	8394.45
Regulated emissions (kg/yr)	1973.83

Energy savings from energy efficiency measures (kWh)	0
Emission savings from energy efficiency measures	11.30
Total regulated emissions after energy efficiency measures	1962.53

Saving on residual emissions from use of renewables (kg/yr)	557.91
Saving on residual emissions from the use of renewables (%)	<b>28.43%</b>

## 4.0 PLANNING POLICY

### BCS14 -SUSTAINABLE ENERGY

4.1 In December 2012, Bristol City Council published their “Bristol Development Framework, Core Strategy”. This Core Strategy has set out a strong commitment to promote sustainable development and high-quality urban design. This publication clearly outlines the objectives and strategy for sustainable communities in Bristol, tackling the causes and effects of climate change, and maximising energy savings and energy efficiency within new buildings.

4.2 The key policy from the BCS (Bristol Core Strategy) that will be addressed in this report will be BCS 14 Sustainable Energy:

*“This policy sets out a requirement for development to minimise its energy requirements and incorporate renewable and low-carbon energy supplies to reduce its carbon dioxide (CO2) emissions. The policy also sets out broad criteria to be considered in assessing proposals for renewable and low-carbon energy development.”*

4.3 In essence, BSC14 requires that developments in Bristol should include measures to reduce carbon dioxide emissions from energy use in accordance with the following energy hierarchy:

1. Minimising energy requirements.
2. Incorporating renewable energy sources.
3. Incorporating low-carbon energy sources.

4.4 Policy BCS14- Sustainable Energy provides criteria for assessing new renewable energy within the policy, with a presumption in favour of large-scale renewable energy installations. Requires new development to minimise its energy requirements and then incorporate an element of renewable energy to reduce its CO2 emissions by a further 20%.

4.5 In order to conform with Bristol’s energy hierarchy policy, passive measures and energy efficiency have been prioritised over on-site generation to minimise energy demand in the proposed development.

## 5.0 CONCLUSION

- 5.1 The Sustainability and Energy Strategy has been prepared by SN Consultants Ltd on behalf of Mr Mohammad Asif Akbar (the **Applicant**) for full planning permission “*for the construction of a single detached two-bedroom house with vehicular parking, refuse store and cycle racks on land to the rear of 58 Dominion Road, Bristol, BS16 3ET*”.
- 5.2 It is in our opinion that sufficient design works have been carried out at this early stage to demonstrate that the proposal is successfully addressing those requirements of Bristol City Councils Sustainability requirements.
- 5.3 The preferred energy strategy of Bristol City Council is to take a fabric first approach. The glazing roof and heating system elements will all improve on Part L required values for a new build this will decrease the energy demand to improve the efficiency of the Air Source Heat Pump specified to meet the heating and hot water demand for the development. The development proposed also considered the use of solar panels as discussed above.
- 5.4 This makes an 0.5% reduction on the overall energy demand of the development. Consequently, the amount of renewable energy required for the development at Dominion Road to achieve accordance with the BCS 14 is reduced.
- 5.5 The development makes a 28% reduction on the total CO2 emissions as detailed within Bristol’s Climate Change and Sustainability Practice Note. The table shows that there is a significant improvement on the energy and CO2 for the development compared to the baseline.
- 5.6 The proposal is compliant with Policy BCS13 of the Bristol Core Strategy. Policy BCS13 states that “*Design techniques will be implemented to mitigate the buildings impact on climate change and adapt to the effects of climate change:*
- *High standards of energy efficiency including off-site construction, optimal levels of thermal insulation, passive ventilation and the efficient use of natural resources;*
  - *Measures to conserve water supplies and minimise the risk and impact of flooding.*
- 5.3. As provided in the energy strategy set out within this statement the proposed development for the detached 2-bedroom dwelling is compliant with policy BCS13 of the Bristol Core Strategy.

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Sustainable Energy Statement

Land to the rear of 58 Dominion Road, Bristol, BS16 3ET