JMDC SERVICES LTD

DESIGN CONSULTANCY | BUILDING COMPLIANCE | BUILDING SIMULATION

ENERGY & SUSTAINABILITY STATEMENT

Conversion and refurbishment of
11-13 Whiteladies Road,
Bristol
Creating 20no. Sui Generis Apartments

For:

SHU Architects Ltd

JMDC Services Ltd. 129 Walton Lane, Nelson, Lancashire.
T. 01282 788032 | E [redacted] W [redacted]

ISSUE SHEET

Report Title:	Energy & Sustainability Statement		
Completed For:	SHU Architects		
Date of First Issue:	20.03.2025		
Revision:	/	Date:	/
Completed By:	[redacted]	Signed:	[redacted]

[1] Bristol Development Framework Core Strategy. Adopted June 2011
[2] Bristol Climate Change and Sustainability Practice Note. June 2023

INDEX

APPENDICES:

[1] Bristol Development Framework Core Strategy. Adopted June 2011

[2] Bristol Climate Change and Sustainability Practice Note. June 2023

1. EXECUTIVE SUMMARY

This Energy & Sustainability Statement has been prepared to support the Planning Application for the proposed new apartments, created by change of use, at 11-13 Whiteladies Road, Bristol.

The report will address the requirements of policies BCS13-BCS16 of the Bristol City Council Core Strategy[1], which relate to Climate Change, Sustainable Energy, Sustainable Design and Construction and Flood Risk and Water Management.

The calculations and methodology used within this assessment and report structure, are in accordance with the Policy Guidance and the Bristol Climate Change and Sustainability Practice Note[2].

In order to establish predicted figures for the development, and to accurately assess the most feasible solution for the Energy & CO^2 Reduction Strategy, the project has been modelled using the governments Standard Assessment Procedure (SAP10). This is the relevant SAP calculation methodology for assessing residential compliance and for producing the correct EPC type at completion.

In accordance with the Energy Hierarchy, a baseline has been established, which is the proposed design with a Gas boiler and with the minimum U Values and efficiencies required under Part L.

After establishing this baseline, the saving in emissions from energy efficiency measures can be calculated in the 'Be Lean' stage before calculating the saving from any renewable or LZC technologies.

The Heating & Hot Water will be provided via a centralised communal system, utilising air source heat pumps, with centralised MEV and 14kWp of PV to reduce the electricity consumption.

SITEWIDE ENERGY & CO2 SUMMARY

	ENERGY demand (kWh pa)	**CO2 Emissions** (kgCO2 p.a.)	**CO2 Reduction** (kgCO2 p.a.)	**CO2 Reduction** (%)
BASELINE Part L (2021) Target	113469.6	23684		
BE LEAN After Efficiency Measures	94653.0	19622.0	4061.62	**17.15%**
BE CLEAN Heat Network & CHP	94653.0	19622.0	0	**0.00%**
BE GREEN After Renewables	24663.1	3951.8	15670.18	**79.86%**
TOTAL Reduction over BASELINE			19731.8	**83.31%**

The targeted water consumption is 109.30L/Person/Day.

A full breakdown of the energy demand and associated CO2 can be seen in section 5 of this report and Appendix A.

[1] Bristol Development Framework Core Strategy. Adopted June 2011

[2] Bristol Climate Change and Sustainability Practice Note. June 2023

2. INTRODUCTION

This Energy & Sustainability Statement has been prepared to support the Planning Application for the proposed new apartments created by change of use, at 11-13 Whiteladies Road, Bristol.

The report will address the requirements of policies BCS13-BCS16 of the Bristol City Council Core Strategy[1], which relate to Climate Change, Sustainable Energy, Sustainable Design and Construction and Flood Risk and Water Management.

The calculations and methodology used within this assessment and report structure, are in accordance with the Policy Guidance and the Bristol Climate Change and Sustainability Practice Note[2].

In order to establish predicted figures for the development, and to accurately assess the most feasible solution for the Energy & CO^2 Reduction Strategy, each apartment has been modelled using the governments Standard Assessment Procedure (SAP10). This is the relevant SAP calculation methodology for assessing residential compliance and for producing the correct EPC type at completion.

In accordance with the Energy Hierarchy, a baseline has been established, which is the proposed with a Gas boiler and with the minimum U Values and efficiencies required under Part L.

After establishing this baseline, the saving in emissions from energy efficiency measures can be calculated in the 'Be Lean' stage before calculating the saving from any renewable or LZC technologies.

We have worked with the design team with regards to how the proposed development will address the issues of sustainability, resource efficiency and climate change to reduce its overall environmental impact and running costs for future occupants.

[1] Bristol Development Framework Core Strategy. Adopted June 2011

[2] Bristol Climate Change and Sustainability Practice Note. June 2023

3. THE POLICY REQUIREMENTS

Bristol City Council is committed, through the Core Cities Climate Change Declaration and the Climate Change Act 2008, to an 80% reduction in CO[2] emissions by 2050.

To achieve this goal, through the Core Strategy and Planning Policies, Bristol Council have set out a holistic approach to promote and assess the Sustainability of new developments, through good design, resource efficiency and Carbon reduction.

Developments should follow the heat hierarchy and if a connection to an existing district heat network is not possible, the project should employ communal or individual renewable heat technologies which are fossil fuel free.

Each unit should be modelled using the governments Standard Assessment Procedure (SAP10).

A baseline should be established, which is the proposed with a Gas boiler and with the minimum U Values and efficiencies required under Part L.

After establishing this baseline, the saving in emissions from energy efficiency measures can be calculated in the 'Be Lean' stage before calculating the saving from any renewable or LZC technologies.

Developments should then utilise renewable energy technologies to reduce residual emissions by at least 20%.

New dwellings should also incorporate water efficiency measures to achieve a consumption target of 110L/Person/Day.

[1] Bristol Development Framework Core Strategy. Adopted June 2011

[2] Bristol Climate Change and Sustainability Practice Note. June 2023

4. LZC TECHNOLOGY FEASIBILITY

Solar Hot Water (Thermal)

Solar water heating systems are one of the more familiar renewable technologies used at the moment. They use the energy from the sun to heat water, most commonly for hot water needs. Solar heating systems use a heat collector that is usually mounted on a roof in which a fluid is heated by the sun. This fluid is used to heat water that is stored in either a separate hot water cylinder or in a twin-coil hot water cylinder (the second coil is used to provide additional heating from a boiler or other heat source).

Solar Hot Water Panels were not included as it is preferred to incorporate PV to support the all-electric scheme and reduce grid supplied electricity.

Wind

Wind turbines convert the kinetic energy in wind into mechanical energy that is then converted to electricity. Turbines are available in a range of sizes and designs and can either be free-standing, mounted on a building or integrated into a building structure.

Wind generation would not be suitable for this property and location.

Photovoltaic (PV) Panels

Photovoltaic (PV) modules convert sunlight directly to DC electricity. The solar cells consist of a thin piece of semiconductor material, in most cases of silicon. Through a process called doping, a very small amount of impurities are added to the semiconductor, which creates two different layers called n-type and p-type layers.

Certain wavelengths of light are able to ionise the silicon atoms, which separates some of the positive charges (holes) from the negative charges (electrons). The holes move into the positive or p-layer and the electrons into the negative or n-layer. These opposite charges are attracted to each other, but most of them can only re-combine by the electrons passing through an external circuit, due to an internal potential energy barrier. This flow of electrons produces a DC current.

32no. 440W PV Panels are proposed in the roof valley.

Biomass Heating

Biomass is any plant-derived organic material that renews itself over a short period.

Biomass energy systems are based on either the direct or indirect combustion of fuels derived from those plant sources. The most common form of biomass is the direct combustion of wood in treated or untreated forms. The use of biomass is becoming increasingly common in some European countries (some countries such as Austria are heavily dependent on biomass).

The environmental benefits relate to the significantly lower amounts of energy used in biomass production and processing compared to the energy released when they are burnt. This can range from a four-fold return for biodiesel to an approximate 20-fold energy return for woody biomass. Biomass-fuels

[1] Bristol Development Framework Core Strategy. Adopted June 2011

[2] Bristol Climate Change and Sustainability Practice Note. June 2023

can be used to produce energy on a continuous basis (unlike renewables such as wind or solar energy) and it can be an economic alternative to fossil fuels as it is a potential source of both heat and electricity.

However, Biomass systems have particular design management and maintenance requirements associated with sourcing, transportation and storage and are therefore more commonly used in commercial developments rather than domestic installations. It can be less convenient to operate than mains-supplied fuels such as natural gas and are more management intensive and require expertise in facilities management. Sources of biomass can also fluctuate, so boilers should be specified to operate on a variety of fuels without risk of overheating or tripping out.

A biomass system is not suitable for this property type, scale and location.

Ground Source Heat pumps

A heat pump is a device that takes up heat at a certain temperature and releases it at a higher temperature. The essential components of a heat pump are heat exchangers (through which energy is extracted and emitted) and a means of pumping heat between the exchangers. The effectiveness of the heat pump is measured by the ratio of the heating capacity to the effective power input, usually known as the coefficient of performance (COP).

Ground-source heat pumps (GSHP) extract heat from the ground. They are classified as either water-to-air or water-to-water units depending on whether the heat distribution system in the building uses air or water. Ground source heat pumps either use long shallow trenches or deep vertical boreholes to take low grade heat from the ground and then compress it to create higher temperatures.

A GSHP system was deemed not feasible for this property type, scale and location.

Air Source Heat pumps

Air source heat pumps absorb heat from the outside air. This is usually used to heat radiators, underfloor heating systems, or warm air convectors. An air source heat pump extracts heat from the outside air in the same way that a fridge extracts heat from its inside. The system performs down to air temperatures of -20°c which means that they are more than suitable for installations within the UK. Hot water and Heating can be provided 365 days a year. The hot water is produced without the aid of electrical immersions and at 55°c is more than hot enough for baths and showers. There are two main types of air source heat pump system:

An air-to-water system distributes heat via your wet central heating system. Heat pumps work much more efficiently at a lower temperature than a standard boiler system would. So they are more suitable for under-floor heating systems or larger radiators, which give out heat at lower temperatures over longer periods of time. An air-to-air system produces warm air which is circulated by fans. They are unlikely to provide you with hot water as well.

A centralised communal Air Source Heat Pump arrangement has been proposed to provide the heating and hot water in accordance with the Heat Hierarchy.

[1] Bristol Development Framework Core Strategy. Adopted June 2011

[2] Bristol Climate Change and Sustainability Practice Note. June 2023

5. ENERGY STRATEGY

Each apartment has been modelled using Elmhurst's Certification SAP10 Software, a DCLG approved software program for carrying out the Standard Assessment Procedure (SAP). SAP is the UK Government's methodology for calculating the energy performance of dwellings, and to generate the Energy Performance Certificates for the project once complete.

In accordance with the Energy Hierarchy, a baseline was established, which is the proposed with a Gas boiler and with the minimum U Values and efficiencies required under Part L.

STAGE 1 - BASELINE Demand & Emissions

BASELINE Calculation	ENERGY demand (kWh pa)	CO2 Emissions (kgCO2 p.a.)
Baseline	113470	23683.6

BASELINE Calculation Specification		
	Part L1 Limiting Fabric Parameters	**BASELINE Specification**
Exposed Floors (W/m2K):	< 0.7	0.4
External Walls (W/m2K):	0.3	0.3
Roof (W/m2K):	0.16	0.16
Windows & G Doors U Value (W/m2K):	1.4	1.4
Air Permeability:	-	-
Ventilation:	-	Natural Vent + local intermittent extract
Heating:	-	Gas Boiler, S88.9%, W80.3%
Hot Water:	-	From Boiler
Lighting:	Minimum Efficacy 75 lm/W	Minimum Efficacy 75 lm/W

STAGE 2 - BE LEAN Demand & Emissions

You should then reduce energy consumption by amending the design to include additional energy efficiency measures that exceed the energy requirements of Building Regulations and result in a DER lower than the Baseline. Heating systems used in the Be Lean calculation should be as per the baseline to show only the reductions from energy efficiency improvements.

BE LEAN Calculation	ENERGY demand (kWh pa)	CO2 Emissions (kgCO2 p.a.)
Be Lean Figures	94653	19622.0
Reduction from Energy Efficiency	18817	4062
Reduction from Energy Efficiency (%)	**16.58%**	**17.15%**

[1] Bristol Development Framework Core Strategy. Adopted June 2011

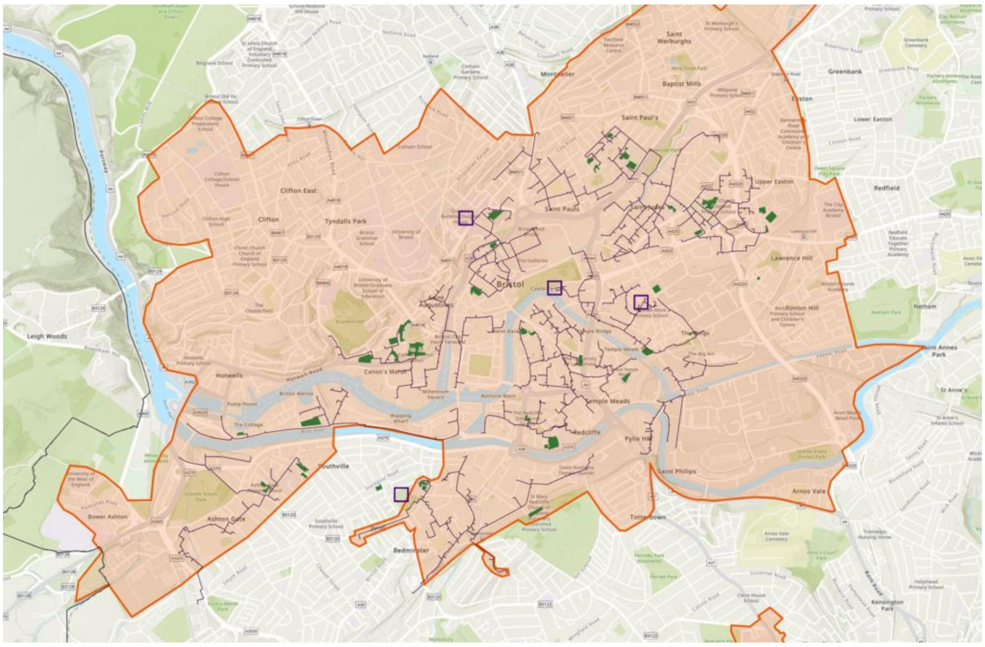
[2] Bristol Climate Change and Sustainability Practice Note. June 2023

BE LEAN Calculation Specification		
	BASELINE Specification	**BE LEAN Specification**
Exposed Floors (W/m2K):	0.4	0.25
External Walls (W/m2K):	0.3	0.3
Roof (W/m2K):	0.16	0.11
Windows & G Doors U Value (W/m2K):	1.4	1.4
Air Permeability:	-	3
Ventilation:	Natural Vent + local intermittent extract	Continous MEV
Heating:	Gas Boiler, S88.9%, W80.3%	Gas Boiler, S88.9%, W80.3%
Hot Water:	From Boiler	From Boiler
Lighting:	Minimum Efficacy 75 lm/W	Efficacy 100lm/W

STAGE 3 - BE CLEAN Demand & Emissions

The development is within the potential Heat Network Zone, however, is not on any existing or proposed Heat Networks or transmission routes.

The project will incorporate a centralised, communal low temp heating and hot water arrangement that will be beneficial for any future connection to a larger district heating network.



STAGE 4 - BE GREEN Demand & Emissions

Developments should then utilise renewable energy technologies to reduce residual emissions by at least 20% and this has been exceeded.

[1] Bristol Development Framework Core Strategy. Adopted June 2011

[2] Bristol Climate Change and Sustainability Practice Note. June 2023

BE GREEN Calculation	**ENERGY demand** (kWh pa)	**CO2 Emissions** (kgCO2 p.a.)
Be Green Figures	24663	3952
Reduction from Renewables	69990	15670
Reduction from Renewables (%)	**73.94%**	**79.86%**
Total Reduction (%)	**78.26%**	**83.31%**

BE GREEN Calculation Specification		
	BE LEAN Specification	**BE GREEN Specification**
Exposed Floors (W/m2K):	0.25	0.25
External Walls (W/m2K):	0.3	0.3
Roof (W/m2K):	0.11	0.11
Windows & G Doors U Value (W/m2K):	1.4	1.4
Air Permeability:	3	3
Ventilation:	Continous MEV	Continous MEV
Heating:	Gas Boiler, S88.9%, W80.3%	Communal ASHP COP 4.5
Hot Water:	From Boiler	Communal ASHP COP 4.5
Lighting:	Efficacy 100lm/W	Efficacy 100lm/W
PV:	-	32NO. 440w (14kWp)

[1] Bristol Development Framework Core Strategy. Adopted June 2011
[2] Bristol Climate Change and Sustainability Practice Note. June 2023

6. SUSTAINABILITY STATEMENT

Designing for Energy Efficiency, Sustainability and Climate Change adaption

This report demonstrates that the policy requirements have been considered throughout the early design stages of this development.

A fabric first design approach has been taken, however this is limited by the building design and age. The refurbishment will be carried out to the highest standard with improved air tightness and continuous extract will be installed to ensure that the building is adequately ventilated, to control moisture and condensation within the building fabric, improving the building life span and to provide a healthier internal environment for the building occupants. The continuous low-level ventilation provided a reduction in energy consumption compared to the intermittent extract which runs at a higher rate.

Efficient low energy lighting is specified with an efficacy of 100Lm/W.

Materials - Consideration will be given to using materials and construction that have a low environmental impact, such as those achieving an A+ or A rated under BRE's Green Guide. Where possible, materials will be chosen that are local and responsibly sourced (such as FSC timber), recycled or reclaimed. All insulation materials will have a GWP (Global Warming Potential) of 5 or less.

Waste - The contractor will produce a Site Waste Management Plan (SWMP) to set targets and monitor to reduce waste and divert from landfill. The building will incorporate dedicated internal and external general waste and recyclable storage in accordance with the LA minimum collection requirements.

Water - The target water use for this development is 110L/Person/Day.

This will be achieved by the following targets:

Part G2 Water calculations		
Appliance Type:	Unit of measure:	Amount (litres) @ standard 3bar
WC (Dual flush)	Full flush volume	6
WC (Dual flush)	Part flush volume	3
Basin Taps (excluding kitchen)	Flow rate l/min	3
Kitchen taps	Flow rate l/min	6
Bath	Capacity to Overflow	0
Shower	Flow rate l/min	10
Washing Machine	Litres / kg dry load	8.17
Dishwasher	Litres / Place setting	1.25
TOTAL WATER USE (See App F)		109.30

Health & Wellbeing – Rooms will have good levels of day lighting, and décor will enhance this minimising the need for artificial lighting. Materials with low VOC emissions will be used. The Mechanical Ventilation system will provide a much healthier internal environment for the occupants as well as the building itself.

Transport – Parking and cycle storage is incorporated. There are residential amenities within walking distance in addition to well defined public transport links.

[1] Bristol Development Framework Core Strategy. Adopted June 2011

[2] Bristol Climate Change and Sustainability Practice Note. June 2023

7. SCOPE & EXCLUSIONS

JMDC Services Ltd has been commissioned to carry out this Energy & Sustainability Statement, which is required as part of the Planning Application, to advise how the project could meet the Sustainability, Energy & Carbon Emission targets identified in the Planning Policies.

This report and the calculations provided are therefore for the purposes of Planning only and do NOT confirm compliance with the Building Regulations nor provide construction specifications. The calculations carried out at this stage are also NOT suitable for the formal generation and lodgement of EPCs at completion.

SAP and SBEM Calculations;

The Standard Assessment Procedure (SAP) is adopted by Government as the UK methodology for calculating the energy performance of dwellings.

SBEM is a software tool developed by BRE in support of the National Calculation Methodology (NCM), the Energy Performance of Buildings Directive (EPBD) that provides an analysis of energy consumption for non-domestic buildings.

The calculations consider a range of factors that contribute to energy efficiency:

- Materials used for construction
- Thermal insulation of the building fabric
- Solar gains through openings
- Air leakage ventilation characteristics & ventilation equipment
- Fuel, type, efficiency's and controls of the heating, cooling and hot water systems
- Lighting
- Renewable Energy Technologies

Whilst not primarily for this purpose, until benchmark data becomes available that provides a suitable estimate of the regulated emissions of different development types, Local Authorities request that SAP and SBEM calculations are carried out as a way of providing this estimation and advising how the policy requirements can be met.

The calculations and report are based on the Planning application drawings and information available at the time, which at Planning Stage is limited and based on assumptions and estimations regarding the construction, mechanical and electrical specification, and has not be based on detailed design. This may mean that once the project progresses to the subsequent stages and detailed design is carried out, this specification is proved not feasible for the project for many different reasons.

The SAP and/or SBEM calculations are carried out in accordance with regulations at the time, therefore should the regulations change prior to the next stages being carried out, this could mean that these calculations are no longer suitable.

Should the Planning application be successful, detailed SAP and/or SBEM calculations will need to be carried once the design is developed, as required to confirm compliance with the Building Regulations or for EPC purposes.

[1] Bristol Development Framework Core Strategy. Adopted June 2011

[2] Bristol Climate Change and Sustainability Practice Note. June 2023

8. TERMS OF USE

This document is issued for the party which commissioned it, for this project ONLY and for the specific purposes detailed in section 8 of this report.

It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, being used for any other purpose or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Please contact us is you require any further information regarding the content, scope of terms of this report.

[1] Bristol Development Framework Core Strategy. Adopted June 2011

[2] Bristol Climate Change and Sustainability Practice Note. June 2023