ENERGY & SUSTAINABILITY STATEMENT

125-127 Shirehampton Road,
Bristol,
BS9 2EA.

January 2024

Report Reference: 113462

Revision: -

Author: Beth Robinson

UK Building Compliance
1a Clarendon Road,
Hinckley,
Leicestershire,
LE10 0PJ

www.ukbuildingcompliance.co.uk

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1.0 EXECUTIVE SUMMARY

1.1 UK Building Compliance have been appointed to undertake an Energy & Sustainability Statement on a proposed commercial development at 125-127 Shirehampton Road, Bristol, BS9 2EA.

1.2 The development comprises of an extension to a shop, including a staff room and WC.

1.3 This document has been produced to satisfy:

- Policy BCS14 of Bristol City Council's Climate Change and Sustainability Local Plan.

- Part L2B of the Building Regulations England & Wales 2021

1.4 This document details how the targets are met via:

- Passive Design Measures
- Low U-Values
- Low Air Permeability
- Air Source Heat Pump

2.0 POLICY FRAMEWORK

2.1 The following section outlines the relevant policy frameworks at national, regional and local level.

2.2 NATIONAL POLICIES

2.3 In June 2022, Part L2B of the Building Regulations England & Wales was updated.

2.4 In addition to tightening of the previous 'Building Emission Rating' criteria, a new compliance metric 'Primary Energy Demand' was also introduced.

2.5 A combination of lower U-Values and the introduction of renewable technology can summarise the main changes between the previous and new Part L standards.

2.6 The new Part L standards ensure a carbon reduction of approximately 35%, compared to the previous version.

2.7 REGIONAL POLICIES

2.8 Bristol City Council's Policy BCS14 has four key parts:

- "Developments should meet and exceed requirements of the Building Regulations through energy efficiency measures alone.

- Developments should follow the heat hierarchy to connect to district heat networks, or utilise communal or individual renewable heat systems where connection to a heat network is not available or planned at the time of commencement.

- Developments should provide renewable technologies to achieve a 20% reduction in regulated carbon emissions compared to residual emissions.

- Any carbon reduction requirements that can't be met on site should be offset – usually by paying into the BCC allowable solutions fund."

(Climate Change and Sustainability. Bristol City Council. P. 2. [ONLINE] Available at: www.bristol.gov.uk/files/documents/5808-climate-change-and-sustainability-practice-note-addendum-and-faqs/file [Accessed Jan 2024]).

2.9 The following sections will outline that the building meets and exceeds the requirements of the building regulations and achieves a 20% carbon reduction.

2.10 This will be achieved by following the widely regarded energy hierarchy, whereby demand is reduced first and foremost, before the efficient supply of heating and energy is introduced.

3.0 BASELINE CALCULATIONS

3.1 SBEM Calculations have been carried out on a full sample using the Design Builder software version 7.2 to gain the regulated emissions for the site.

Regulated Emissions are the CO_2 emissions covered under Part L of the Building Regulations and comprise of:

a) Space Heating and Cooling
b) Hot Water
c) Lighting
d) Pumps and Fans
e) Equipment
f) Auxiliary Energy

A licensed and Level 4 NDEA accredited SBEM Assessor has carried out the calculations.

3.2 Development carbon emissions and energy demand at this stage of the hierarchy are as follows:

	Regulated C02 Emissions – kg of CO2 per annum	Regulated Energy – kWh/m^2 per annum	% Improvement on baseline
Baseline: Part L 2021 of the Building Regulations Target Emission Rating (Notional BER)	23.5		
Part L 2021 of the Building Regulations Building Primary Energy Demand (Proposed BER)			
Baseline: Part L 2021 of the Building Regulations Target Primary Energy Demand (Proposed BPER)		177.42	
Part L 2021 of the Building Regulations Building Emission Rate (Proposed BPER)			

4.0 BE LEAN CALCULATIONS

4.1 High energy efficiency standards are demonstrated in the table below. Construction Details have been selected to ensure that all fabric U-Values exceed the requirements of Part L of the Building Regulations (2021).

Elements	U Value	Development Notes
Ground Floor (Existing)	0.70 $W/m^2/K$	
Ground Floor (Proposed)	0.14 $W/m^2/K$	
External Walls (Existing)	0.70 $W/m^2/K$	
External Walls (Proposed)	0.20 $W/m^2/K$	
Flat Roof (Existing)	0.35 $W/m^2/K$	
Flat Roof (Proposed)	0.15 $W/m^2/K$	
Windows	1.40 $W/m^2/K$	
Air Permeability	N/A – default of 15 $m^3(h.m^2)$	
Ventilation	Natural Ventilation	Extraction in WCs
Heating	Air Source Heat Pump	
Water Heating	Electric Instantaneous	
Secondary Heating	No	
Lighting	100% LED	
Renewable Technology	N/A	

4.2 The table below demonstrates that the development meets and exceeds requirements of the Building Regulations through energy efficiency measures alone.

	Regulated C02 Emissions – kg of CO2 per annum	Regulated Energy – kWh/m^2 per annum	% Improvement
Baseline: Part L 2021 of the Building Regulations Target Emission Rating (Notional BER)	23.5		
Part L 2021 of the Building Regulations Building Primary Energy Demand (Proposed BER)	19.77		15.87%
Baseline: Part L 2021 of the Building Regulations Target Primary Energy Demand (Proposed BPER)		177.42	
Part L 2021 of the Building Regulations Building Emission Rate (Proposed BPER)		147.38	91.89%

5.0 SBEM CALCULATIONS

5.1 High energy efficiency standards are demonstrated in the table below. Construction Details have been selected to ensure that all fabric U-Values exceed the requirements of Part L of the Building Regulations (2021) and all Heating, Hot Water and Ventilation elements are in compliance with the Domestic Building Services Compliance Guide.

The proposed construction details for the unit are as follows:

Elements	U Value	Development Notes
Ground Floor (Existing)	0.70 W/m^2/K	
Ground Floor (Proposed)	0.14 W/m^2/K	
External Walls (Existing)	0.70 W/m^2/K	
External Walls (Proposed)	0.20 W/m^2/K	
Flat Roof (Existing)	0.35 W/m^2/K	
Flat Roof (Proposed)	0.15 W/m^2/K	
Windows	1.40 W/m^2/K	
Air Permeability	N/A – default of 15 m^3(h.m^2)	
Ventilation	Natural Ventilation	Extraction in WCs
Heating	Air Source Heat Pump	Efficiency: 5.03%
Water Heating	Electric Instantaneous	
Secondary Heating	No	
Lighting	100% LED	90 lm/W
Renewable Technology	N/A	

A full sample SBEM BRUKL document can be found in Appendix 1 to verify the above inputs.

5.2 Following SBEM Calculations, CO_2 emissions & energy demand at this stage of the hierarchy are as follows:

	Regulated C02 Emissions – kg of CO2 per annum	Regulated Energy – kWh/m^2 per annum	% Improvement
Baseline: Part L 2021 of the Building Regulations Target Emission Rating (Notional BER)	23.5		
Part L 2021 of the Building Regulations Building Primary Energy Demand (Proposed BER)	8.92		62.04%
Baseline: Part L 2021 of the Building Regulations Target Primary Energy Demand (Proposed BPER)		177.42	
Part L 2021 of the Building Regulations Building Emission Rate (Proposed BPER)		96.19	45.78%

5.3 The table above demonstrates the a carbon reduction of 62.04% is achieved.

6.0 RENEWABLE ANALYSIS

6.1 The potential renewable energy applicable to this development and its feasibility is investigated below:

Renewable	Advantages	Disadvantages	Feasibility
Photovoltaic Panels	Can have significant impact on carbon by offsetting electricity which has a high carbon footprint. Low maintenance. No noise issues associated with PV. No additional land use from the installation of PV panels.	High capital investment required. Needs unobstructed space on roof.	The development incorporates a low-pitched roof which is potentially suited to PV.
Solar Thermal Collectors	No additional land use from the installation of solar thermal collectors. Low maintenance and easy to manage. Low capital cost. No noise issues associated with Solar thermal collectors.	Limited CO_2 offset No Grants or Tariffs for new build installations.	Solar thermal collectors are feasible for the development, although it is not possible to meet the required carbon saving. The hot water demand as a percentage of total energy demand is relatively small.
Biomass Heating	Potential to reduce large component of the total CO_2. A biomass boiler would replace a standard gas heating system so some of the cost may be offset through money saved on a traditional boiler.	Regular maintenance will be required. Reliability of fuel may become a problem, therefore limited cost saving for residents. A plant room and fuel store will be required which may take additional land from the proposed development or surroundings. The fuel will need to be delivered, which can cause issues with access etc.	Biomass is not considered feasible for such a development due to the need for space to accommodate fuel storages, access for delivery vehicles and local NOX emissions. The total heating demand for a building of this size is too great to make this option feasible.
Ground Source Heat Pumps	Low maintenance and easy to manage Optimum efficiency with under- floor heating systems. As heat pumps would replace standard heating systems, some of the cost may offset through money saved on a traditional boiler.	The heat pump has a noise level around 45- 60dB so some attenuation may be required, and it should be sensibly located. Relatively high capital cost. Requires electricity to run the pump, therefore limited carbon savings in most cases. For communal systems plant room required which may take additional land from the proposed development/ surroundings. High payback.	Limited Space on site and large communal infrastructure required. Not suitable for an industrial estate.

Air Source Heat Pumps	ASHP systems are generally cheaper than ground source as there is no requirement for long lengths of buried piping. Low maintenance and easy to manage. Optimum efficiency with under- floor heating systems. As heat pumps would replace standard heating systems, some of the cost may offset through money saved on a traditional boiler.	The heat pump has a noise level around 50- 60dB so some attenuation may be required, and it should be sensibly located. The potential noise from the external unit may mean there is local opposition to their installation. Requires electricity to run the pump, therefore limited carbon savings in most cases. For communal systems, plant room is required which may take additional land from the proposed development/surroundings Potential noise issues.	This option is highly suitable to the building. There is adequate space for the system and it achieves the required reduction.

6.2 The most feasible renewable options have been selected in order to achieve compliance in the most viable way.

6.3 An Air Source Heat Pump is deemed the most suitable technology for the nature of this building.

7.0 SUSTAINABLE CONSTRUCTION

7.1 The Developer will monitor and record waste produced from site activities to ensure that the maximum possible will be diverted from landfill and reused in line with the waste hierarchy (below). This may be via a SWMP or via a licensed waste contractor.

7.2 All timber will be purchased in line with the Government's Policy for UK Timber Procurement.

7.3 As per local authority requirements - a minimum of 10% of the total value of materials to be used will be derived from recycled content in products and materials selected.

7.4 Should the developer and client wish to go further than the mandatory requirements, the following voluntary BREEAM options could be considered when sourcing materials;

- Responsible sourcing certifications e.g. EMS (EMAS, ISO14001).

- Chain of custody and/or BES6001 for key and supply chain processes.

- Legally sourced timber: Chain of custody and certificate (FSC, SFI, PEFC, MTCC, SGS, TFT, Verified etc).

8.0 CONCLUSION

8.1 This document is written in accordance with the guidelines and requirements of:

i) Policy BCS14 of Bristol City Council's Climate Change and Sustainability Local Plan.

ii) Part L of the Building Regulations England & Wales 2021

8.2 The development has CO_2 baseline emissions that are Part L compliant via passive Energy Efficiency Measures as highlighted in Section 4.

8.3 In addition to the passive measures and high energy efficiency standards, utilizing an air source heat pump achieves beyond the 20% required C02 reduction.

8.4 The waste hierarchy will be followed on site in order to minimise whole-life carbon emissions of the development, as well as to ensure wider sustainability.

Appendix 1

BRUKL Report

Address: 1a Clarendon Road
Hinckley
Leicestershire
LE10 0PJ
Tel: 01455 634 855
Email: info@ukbuildingcompliance.co.uk
Website: www.ukbuildingcompliance.co.uk

25th January 2024

To whom it may concern,

Part L Justification Statement in support of proposed extension at 125-127 Shirehampton Road, Bristol, BS9 2EA.

In accordance with the criteria set out In Approved Document Part L2B we have used Design Builder to model the unit to a notional standard and the dwelling to the proposed standard. The BRUKL reports for both scenarios are appended to this Statement.

The Notional Unit has a Building CO2 Emission Rate of 23.5 kg/ m².
The Notional Unit has a Building Primary Energy Rate of 177.42 kWh/ m².

The Proposed Unit has a Dwelling CO2 Emission Rate of 8.92 kg/ m².
The Proposed Unit has a Dwelling Primary Energy Rate of 96.19 kWh/ m².

The proposed building is more efficient than the notional dwelling and therefore compliant with regulations.

If any information contained in this report is unclear or requires additional explanation please do not hesitate to contact a member of our team.

Regards

Beth Robinson

Senior Environmental Consultant

UK Building Compliance

NOTIONAL REPORT

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Building 1

As designed

Date: Thu Jan 25 15:03:03 2024

Administrative information

Building Details

Address:

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.2.0

BRUKL compliance module version: v6.1.e.1

Certifier details

Name: Bethany Robinson

Telephone number: 01455634855

Address: Unit 5 Carr House 8 Hawley Road, Hinckley, LE10 0PR

Foundation area [m²]: 259.58

The CO_2 emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	5.4	
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	23.5	
Target primary energy rate (TPER), kWh_{PE}/m^2.annum	18.87	
Building primary energy rate (BPER), kWh_{PE}/m^2.annum	177.42	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.54	0.7	Existing - Exist Entrance_W_10
Floors	0.18	0.19	0.36	Existing - Exist Store_S_3
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.25	0.35	Existing - Exist Shop_R_5
Windows** and roof windows	1.6	1.6	1.6	Existing - Exist Shop_G_10
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	2.82	2.82	Existing - Exist Entrance_D_11
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [W/(m²K)] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [W/(m²K)]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [W/(m²K)]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m²K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	25

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Project HVAC

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.81	-	-	-	-
Standard value	0.93*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for gas single boiler systems <=2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.

1- Project DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
Standard value	1	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
Proposed - PROP WC	1.5	-	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Existing - Exist Entrance	50	-	-
Existing - Exist Shop	50	15	10
Existing - Exist Store	50	-	-
Proposed - PROP WC	50	-	-
Proposed - PROP Kitchen	50	15	10
Proposed - PROP SHOP	50	15	10

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Existing - Exist Shop	NO (-54.7%)	NO
Proposed - PROP Kitchen	NO (-68.9%)	NO
Proposed - PROP SHOP	NO (-79.6%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	259.6	259.6
External area [m^2]	558.2	558.2
Weather	CAR	CAR
Infiltration [m^3/hm^2@ 50Pa]	25	3
Average conductance [W/K]	208.1	166.33
Average U-value [W/m^2K]	0.37	0.3
Alpha value* [%]	18.24	23.79

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
100	**Retail/Financial and Professional Services**
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	67.75	32.43
Cooling	0	0
Auxiliary	3.27	1.37
Lighting	57.04	15.83
Hot water	6.54	6.54
Equipment*	19.85	19.85
TOTAL**	**134.6**	**56.17**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	35.69
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*35.69*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	286.61	187.55
Primary energy [kWh_{PE}/m^2]	177.42	18.87
Total emissions [kg/m^2]	23.5	5.4

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	176.3	110.3	67.8	0	3.3	0.72	0	0.81	0
	Notional	100.4	87.1	32.4	0	1.4	0.86	0	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type

PROPOSED REPORT

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

125-127 Shirehampton Road

As designed

Date: Thu Jan 25 13:25:42 2024

Administrative information

Building Details

Address:

Certifier details

Name: Bethany Robinson

Telephone number: 01455634855

Address: Unit 5 Carr House 8 Hawley Road, Hinckley, LE10 0PR

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.2.0

BRUKL compliance module version: v6.1.e.1

Foundation area [m²]: 259.58

The CO_2 emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	4.8	
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	8.92	
Target primary energy rate (TPER), kWh_{PE}/m^2.annum	51.21	
Building primary energy rate (BPER), kWh_{PE}/m^2.annum	96.19	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-Limit}}$	$U_{a\text{-Calc}}$	$U_{i\text{-Calc}}$	First surface with maximum value
Walls*	0.26	0.52	0.7	Existing - Exist Entrance_W_10
Floors	0.18	0.19	0.36	Existing - Exist Store_S_3
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.23	0.35	Existing - Exist Shop_R_5
Windows** and roof windows	1.6	1.4	1.4	Existing - Exist Shop_G_10
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	2.82	2.82	Existing - Exist Entrance_D_11
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a\text{-Limit}}$ = Limiting area-weighted average U-values [W/(m²K)] $U_{i\text{-Calc}}$ = Calculated maximum individual element U-values [W/(m²K)]

$U_{a\text{-Calc}}$ = Calculated area-weighted average U-values [W/(m²K)]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m²K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	15*

* Buildings with less than 500 m² total useful floor area may avoid the need for a pressure test provided that the air permeability used to calculate the BER and BPER is taken as 15 $m^3/(h.m^2)$ at 50 Pa.

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Copy of Project HVAC

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	5.03	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

1- Project DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
Standard value	1	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
Proposed - PROP WC	1.5	-	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Existing - Exist Entrance	90	-	-
Existing - Exist Shop	90	15	10
Existing - Exist Store	90	-	-
Proposed - PROP WC	90	-	-
Proposed - PROP Kitchen	90	15	10
Proposed - PROP SHOP	90	15	10

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Existing - Exist Shop	NO (-54.7%)	NO
Proposed - PROP Kitchen	NO (-68.9%)	NO
Proposed - PROP SHOP	NO (-79.6%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	259.6	259.6
External area [m^2]	558.2	558.2
Weather	CAR	CAR
Infiltration [m^3/hm^2@ 50Pa]	15	3
Average conductance [W/K]	198.17	166.33
Average U-value [W/m^2K]	0.36	0.3
Alpha value* [%]	19.15	23.79

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
100	**Retail/Financial and Professional Services**
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	9.45	10.56
Cooling	0	0
Auxiliary	3.27	1.37
Lighting	43.97	15.83
Hot water	6.54	6.54
Equipment*	19.85	19.85
TOTAL**	**63.22**	**34.3**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	250.74	187.55
Primary energy [kWh_{PE}/m^2]	96.19	51.21
Total emissions [kg/m^2]	8.92	4.8

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	152.6	98.1	9.4	0	3.3	4.49	0	5.03	0
	Notional	100.4	87.1	10.6	0	1.4	2.64	0	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type