Centenary House
96-98 Camden High Street
Energy & Sustainability Statement

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JAW Sustainability

Contents

Executive Summary 3
1 Introduction 4
1.1 Assessment approach 4
2 Policy 4
2.1 Building Regulations Part L 2021 4
2.2 London Borough of Camden – Local Plan 6
3 Energy Strategy 7
3.1 Passive Design 7
3.2 Be Green 8
3.3 Energy and Carbon Savings 9
3.4 Water efficiency 9
3.5 Materials 9
3.6 Waste Management and Construction 9
3.7 Nature Conservation and Biodiversity 9
3.8 Climate Change Adaptation 10
3.9 Pollution Management 10
4 Conclusion 10

Executive Summary

This energy & sustainability statement has been prepared in order to assess the improvement in energy performance as a result of the change of use of second and third floors from Office (Use Class E) to 4 no. Residential Flats (Use Class C3), including roof extensions to provide an additional 2 no. flats (Use Class C3) at Centenary House. The site of the proposed development is located within the London Borough of Camden.

The existing building comprises 4 storeys of office space. The proposed development comprises the extension and conversion of the commercial property to create 6 flats.

An energy assessment has been carried out based on design information to identify the most appropriate way to reduce CO_2 emissions and energy demand.

Following the thermal and M&E equipment upgrades described, the energy strategy for the 4 material change of use dwellings has been demonstrated to be capable of achieving an improvement of 17% CO_2 emissions over the notional dwelling. The 2 newly constructed dwellings have been demonstrated to be capable of achieving an improvement of 85% CO_2 emissions over the Part L 2021 baseline

1 Introduction

This energy & sustainability statement has been prepared in order to support the planning application for the proposed extension and conversion of Centenary House. The site of the development is located in the London Borough of Camden.

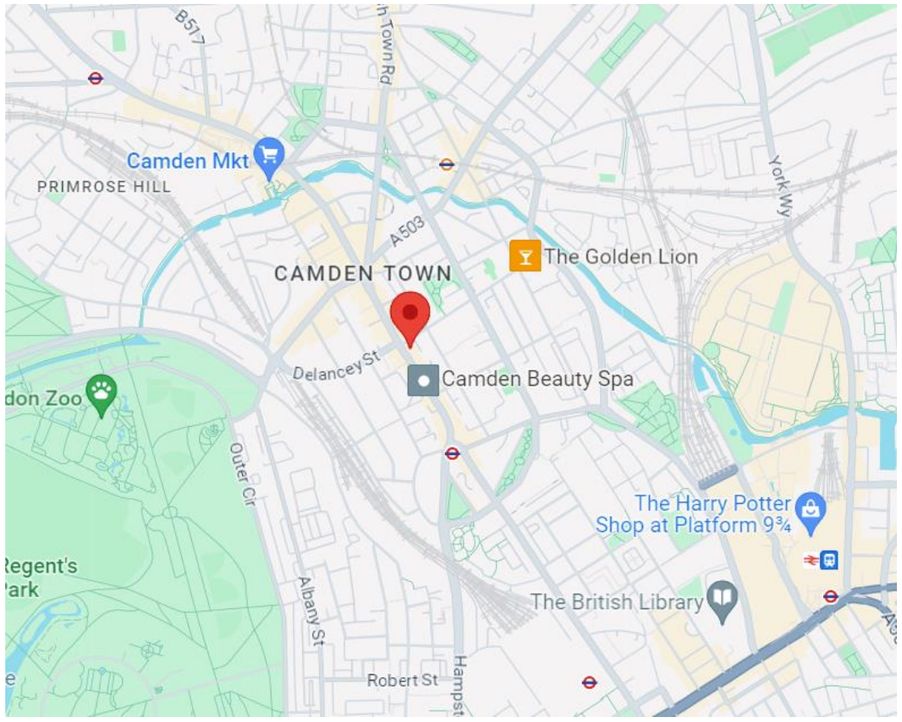

Figure 1.1 Map showing the location of the proposed development

The proposed development of Centenary House comprises the extension and renovation of an existing commercial property to create 6 residential dwellings (4 material change of use and 2 new dwellings).

1.1 Assessment approach

This report summarises the work undertaken to support the development of an energy strategy for the proposed development.

Standard Assessment Procedure for the Energy Rating of Dwellings (SAP) calculations have been carried out for the dwellings in order to assess the impact on energy demand and CO_2 emissions of improvements through the hierarchy and demonstrate the most appropriate solution for the proposed development to meet the relevant planning requirements, for compliance with Part L 2021.

2 Policy

2.1 Building Regulations Part L 2021

Renovating thermal elements

11.2 Renovation of a thermal element means one of the following.

a. Providing a new layer through cladding or rendering the external surface of a thermal element.

b. Providing a new layer through dry-lining the internal surface of a thermal element.

c. Replacing an existing layer through stripping down the element to expose basic structural components (e.g. bricks, blocks, rafters, joists, frame) and then rebuilding.

d. Replacing the waterproof membrane on a flat roof.

e. Providing cavity wall insulation.

11.3 If a thermal element is renovated and one of the following applies, then the whole of the thermal element should be improved to achieve at least the U-value given in Table 4.3, column (b).

a) More than 50% of the surface of the individual thermal element is renovated (see paragraph 11.4).

b) The work constitutes a major renovation. A major renovation is when more than 25% of the surface area of the external building envelope is renovated.

If paragraph 4.13 applies, Appendix C provides examples of renovation of an existing thermal element that are technically, functionally or economically feasible.

11.4 When assessing the percentage area that will be renovated of an individual thermal element, consider whether the element is being renovated from the outside or the inside, following Diagram 11.1 and Diagram 11.2, respectively.

Material change of use and change to energy status

11.5 A material change of use, in relation to dwellings, is when a building satisfies any of the following:

a. is used as a dwelling, where previously it was not

b. contains a flat, where previously it did not

c. contains a greater or lesser number of dwellings than it did, having previously contained at least one dwelling.

11.6 A change to energy status is when a dwelling was previously exempt from the energy efficiency requirements but now is not. The change to energy status applies to the building as a whole or to parts of the building that have been designed or altered to be used separately. For example, when a previously unheated space becomes part of the heated dwelling in a garage or loft conversion, a change to energy status applies to that space. A material change of use may result in a change to energy status, for example if a previously unheated loft is converted into a flat.

11.7 If there is a material change of use and/or a change to energy status, elements should satisfy all of the following.

a. Existing thermal elements should meet the limiting standards in Table 4.3, following the guidance in paragraphs 4.11 and 4.12.

b. If both of the following apply to existing windows, roof windows, rooflights and doors (controlled fittings), they should be replaced to meet the limiting standards in Table 4.2.

i. They separate a conditioned space from an unconditioned space or the external environment.

ii. They have a U-value higher than either of the following.

- For windows, roof windows and doors – 3.30W/(m2·K).
- For rooflights – 3.80W/(m2·K), calculated by following paragraph 4.5.

In addition, all of the following should be met.

a. New or replaced thermal elements should meet the standards in Table 4.2, following the guidance in paragraphs 4.7 and 4.8.

b. New or replaced windows, roof windows, rooflights and doors (controlled fittings) should meet the standards in Table 4.2.

c. The area of openings in the newly created dwelling should not be more than 25% of the total floor area. In buildings that contain more than one dwelling a larger percentage area of openings may be achieved by following the guidance in paragraph 11.8.

d. Any fixed building services including building automation and control systems and/or on-site electricity generation that are provided or extended should meet the standards in Sections 5 and 6.

11.8 As an alternative to paragraph 11.7, in buildings that contain more than one dwelling, the Standard Assessment Procedure may be used to show that the dwelling primary energy usage and total CO_2 emissions from all dwellings in the building, after completion of the building work, would be no greater than if each dwelling had been improved following the guidance in paragraph 11.7.

Consequential improvements to energy performance

(2) Subject to paragraph (3), where this paragraph applies, such work, if any, shall be carried out as is necessary to ensure that the building complies with the requirements of Part L of Schedule 1.

(3) Nothing in paragraph (2) requires work to be carried out if it is not technically, functionally or economically feasible.

Limiting standards in existing dwellings – new and replacement elements

4.7 New fabric elements in existing dwellings should meet the limiting standards in Table 4.2.

4.8 The U-value of a replacement fabric element in an existing dwelling should both:

a. be no worse than that of the element being replaced

b. meet the limiting standards in Table 4.2.

4.9 Guidance on when a new element must meet the standards in Table 4.2 is given in Section 10. Elements that should meet the standards include both of the following. a. Elements in extensions to existing dwellings.

b. New or replacement elements in existing dwellings.

4.10 If windows or fully glazed external pedestrian doors cannot meet the requirements of Table 4.2 because of the need to maintain the character of the building, either of the following should be met.

a. These fittings should not exceed a centre pane U-value of 1.2W/(m2·K).

b. Single glazing should be supplemented with low-emissivity secondary glazing.

Renovated and retained elements

4.11 The U-value of an existing thermal element that is being renovated should both:

a. be no worse than that of the element before it was renovated

b. meet the limiting standards in Table 4.3.

4.12 Guidance on when an existing element should meet the standards in Table 4.3 is given in Section 11. Elements that should meet the standards include both of the following.

a. Thermal elements being renovated in existing dwellings. Renovated elements should achieve the U-values in Table 4.3, column (b).

b. Elements being retained in existing dwellings, for example through a loft or garage conversion. Retained elements with a U-value that is higher than the threshold value in Table 4.3, column (a) should be upgraded to achieve the U-values in Table 4.3, column (b).

4.13 If achieving the U-value in Table 4.3, column (b) either:

a. is not technically or functionally feasible or

b. would not achieve a simple payback of 15 years or less then the element should be upgraded to the lowest U-value that both:

a. is technically and functionally feasible and

b. can achieve a simple payback not exceeding 15 years.

Generally, a thermal element once upgraded should not have a U-value greater than 0.7W/(m2·K). A lesser standard for the thermal element may be acceptable where work complies with Part C of the Building Regulations on protection from the harmful effects of interstitial and surface condensation.

Thermal bridging in existing dwellings

4.19 When carrying out work in existing dwellings, care should be taken to reduce unwanted heat loss through thermal bridging. Thermal bridges can be limited in an existing dwelling by following the junction details from a reputable non-government database containing independently assessed thermal junction details, such as Local Authority Building Control's Construction Details library. Follow the guidance in paragraph 4.17 where appropriate.

Air tightness in existing dwellings

4.23 When carrying out work in existing dwellings, care should be taken to reduce unwanted heat loss through air infiltration by doing all of the following.

a. When installing pipework or services, taping and sealing around service penetrations.

b. When installing or renovating thermal elements, the element being installed should be draught-proofed, and air-leakage gaps should be filled.

c. When installing windows, roof windows, rooflights or doors (all of which are controlled fittings), the controlled fitting should be well fitted and reasonably draught-proof.

Replacement building services in existing dwellings

5.4 A replacement fixed building service should be at least as efficient as the value set out in Section 6 and should comply with either of the following.

a. Use the same fuel as the service being replaced and have an efficiency that is not worse than that of the service being replaced.

b. Use a different fuel than the service being replaced. The system should both: i. not produce more CO2 emissions per kWh of heat than the appliance being replaced

ii. not have a higher primary energy demand per kWh of heat than the appliance being replaced.

2.2 London Borough of Camden – Local Plan

This development is not classified as a major development, therefore planning policies relating major developments do not apply.

Policy CC1: Climate Change Mitigation

The Council will require all development to minimise the effects of climate change and encourage all developments to meet the highest feasible environmental standards that are financially viable during construction and occupation.

We will:

a) promote zero carbon development and require all development to reduce carbon dioxide emissions through following the steps in the energy hierarchy;
b) require all major development to demonstrate how London Plan targets for carbon dioxide emissions have been met;
c) ensure that the location of development and mix of land uses minimise the need to travel by car and help to support decentralised energy networks;
d) support and encourage sensitive energy efficiency improvements to existing buildings;
e) require all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building; and
f) expect all developments to optimise resource efficiency.

For decentralised energy networks, we will promote decentralised energy by:

g) working with local organisations and developers to implement decentralised energy networks in the parts of Camden most likely to support them;
h) protecting existing decentralised energy networks (e.g. at Gower Street, Bloomsbury, King's Cross, Gospel Oak and Somers Town) and safeguarding potential network routes; and
i) requiring all major developments to assess the feasibility of connecting to an existing decentralised energy network, or where this is not possible establishing a new network.

To ensure that the Council can monitor the effectiveness of renewable and low carbon technologies, major developments will be required to install appropriate monitoring equipment.

Policy CC2: Adapting to Climate Change

The Council will require development to be resilient to climate change. All development should adopt appropriate climate change adaptation measures such as:

a) the protection of existing green spaces and promoting new appropriate green infrastructure;
b) not increasing, and wherever possible reducing, surface water runoff through increasing permeable surfaces and use of Sustainable Drainage Systems;
c) incorporating bio-diverse roofs, combination green and blue roofs and green walls where appropriate; and
d) measures to reduce the impact of urban and dwelling overheating, including application of the cooling hierarchy.

Any development involving 5 or more residential units or 500 sqm or more of any additional floorspace is required to demonstrate the above in a Sustainability Statement.

Sustainable design and construction measures

The Council will promote and measure sustainable design and construction by:

e) ensuring development schemes demonstrate how adaptation measures and sustainable development principles have been incorporated into the design and proposed implementation;
f) encourage new build residential development to use the Home Quality Mark and Passivhaus design standards;
g) encouraging conversions and extensions of 500 sqm of residential floorspace or above or five or more dwellings to achieve "excellent" in BREEAM domestic refurbishment; and
h) expecting non-domestic developments of 500 sqm of floorspace or above to achieve "excellent" in BREEAM assessments and encouraging zero carbon in new development from 2019.

3 Energy Strategy

An energy strategy has been developed for the proposed development using a fabric first approach. Where possible, measures have been taken to improve the energy performance of the building as much as feasibly possible, which is set out in the report.

Energy calculations using Building Regulations approved and accredited software have been undertaken to calculate the savings associated with the measures incorporated.

The energy consumption and carbon emission figures within this report have been calculated using the approved Standard Assessment Procedure for the Energy Rating of Dwellings (SAP).

3.1 Passive Design

As part of the passive design approach, passive design measures have been considered to reduce initial energy demand. Energy efficient equipment has then been addressed to further reduce the energy demand of the proposed refurbishment.

Solar Gain Control and Daylight

Solar gains are a passive form of heating from the sun's radiation and are beneficial to a building during winter months as they provide an effective source of heat and reduce internal heating requirements. However, during summer months they must be controlled in order to mitigate the risk of overheating. They can be controlled through glazing and shading design in order to allow low level winter sun to enter the building and to limit access to high level summer sun.

As a renovation, the orientation of the building with glazing orientations is fixed. However, the existing windows will be replaced and will be highly efficient with high emissivity coating to maximise solar gain control.

Building Fabric

The new build elements of the proposed extension have been specified to ensure high fabric standards across the site. The renovated elements will be upgraded as much as feasibly possible and in line with Part L regulations.

Table 3.1 below provides details of the notional fabric elements for the renovated dwellings which represent the minimum upgrade values under Part L 2021 regulations and the proposed change of use specifications.

Fabric Component	Assumed Existing Specifications	Notional Building Specifications	Proposed Building Specifications
External Wall	1.50 W/m²K	0.55W/m²K	0.30 W/m²K
Roof	1.50 W/m²K	0.16 W/m²K	0.16 W/m²K
Floor to Commercial Space	1.20 W/m²K	0.25 W/m²K	0.16 W/m²K
Door	3.0 W/m²K	3.0 W/m²K	1.20 W/m²K
Windows	4.8 W/m²K	4.8 W/m²K	1.40 W/m²K
Air Tightness	-	No test	No test
Thermal Bridging	-	Default	Default

Table 3.1 Fabric efficiencies used in notional and proposed refurbishment

These are based on the assumed U-values based on Appendix S and information provided by the design team, where threshold values are not met, the baseline scenario utilises the improved U values as outlined in Part L.

Table 3.2 below provides details on the proposed fabric specifications for the new build dwellings.

Fabric Component	Residential Specification
External Walls	0.18 W/m²K
Roof	0.11 W/m²K
Windows	Double Glazing 1.40 W/m²K, G=0.4
External Doors	1.2 W/m²K
Air Tightness	4m³/m²/h
Thermal Bridging	0.08 W/K

Table 3.2 Fabric efficiencies used in the new dwellings

Material Change of Use

As per the Part L1 material change of use criteria, all the minimum fabric standards for the existing units have been met. However the criteria also require that where the glazing to floor area ratio is more than 25% that this is compensated for. Table 3.3 demonstrates the ratio of the total openings' area to the total floor area of the proposed units.

Unit Number	Floor area (m²)	Glazed area (m²)	Glazed to floor area ratio
2.1	57.7	8.46	14.66%
2.2	67.4	11.30	16.76%
3.1	57.7	8.46	14.66%
4.1	67.4	11.30	16.76%

Table 3.3 Glazing to floor area ratio

Building Services

Services have been specified to maximise efficiency therefore reducing energy used. Table 3.4 shows the proposed services strategy and energy efficiency measures for the renovated dwellings.

Table 3.4 shows the proposed refurbishment services strategy and energy efficiency measures. The services for the dwellings meet or exceed the minimum requirements under Part L change of use criteria.

Services Component	Specification for the Proposed Change of Use Dwellings
Heating distribution & water storage	NIBE F370 Exhaust Air Heat Pump Wet System 55° SCOP 3.38
Heating Controls	Programmer and room thermostats
Ventilation	NIBE F370
Cooling	Energy Efficiency Ratio 3
Lighting & Controls	75 lm/W
Metering	Metering

Table 3.4 Building Services for the Notional & Proposed Dwellings

Table 3.5 shows the proposed services strategy and energy efficiency measures for the new build dwellings.

Services Component	Residential Specification
Heating distribution & water storage	Underfloor Heating 200L hot water cylinder Measured Loss: 1.9kwh\day
Cooling	-
Heating Controls	Time and temperature zone control
Ventilation	Mechanical Ventilation with Heat Recovery, SFP 0.61, 89% Efficiency
Lighting & Controls	100% Low Energy Lighting

Table 3.5 Proposed energy efficient design measure

3.2 Be Green

Renewable systems

Air Source Heat Pumps (ASHP) and Photovoltaic Panels (PV) have been identified as the most appropriate technologies for the proposed refurbishment, due to constraints within the development, the ASHPs and PVs will only serve the new build dwellings.

System	Residential Specification
ASHP	Individual Air Source Heat Pump (ASHP) system providing 100% of heat and hot water 5kW SCOP 3.33
Photovoltaic Panels	4.8kWp SW Facing Min. 20% Efficiency

Table 3.6 Proposed LZC specifications

ASHP System

The specified heat pump will need to be taken from the SAP appendix Q database to allow the correct efficiencies to be applied. For the purposes of this preliminary assessment, we have used the Mitsubishi Ecodan 5kW heat pump.

Photovoltaic Panel System

PV arrays are specified as above and are based on 400W panels. This array utilises the maximum available rooftop capacity. The only sections of the developments roof not utilised for PV arrays are required for roof top ASHP equipment. Export capable meters should be provided to maximise carbon savings associated with the PV panels.

3.3 Energy and Carbon Savings

Energy Use

The breakdown of carbon and energy use has been identified for the notional dwelling and the proposed dwelling.

Table 3.7 shows the performance of the proposed refurbishment over the notional dwelling.

	Residential		
	CO_2 Emissions (tonnes /annum)	CO_2 Savings (tonnes /annum)	% Saving
GLA Baseline	2.5		
Be Lean	2.3	0.2	7%
Be Clean	2.3	0.0	0%
Be Green	2.1	0.2	10%
Total Savings		0.4	17%

Table 3.7 Summary of SAP Results for the Renovated Flats over the GLA Notional Building

Table 3.8 shows the performance of the proposed new build dwellings over Part L 2021 baseline.

	Residential		
	CO_2 Emissions (tonnes /annum)	CO_2 Savings (tonnes /annum)	% Saving
Part L 2021 Baseline	2.3		
Be Lean	1.0	1.4	59%
Be Clean	1.0	0.0	0%
Be Green	0.3	0.6	26%
Total Savings		2.0	85%

Table 3.8 Summary of SAP Results for the New Build Flats

3.4 Water efficiency

Water fittings will be specified with the following or similar flow rates to meet the target water consumption of 105L/Person/Day in line with London plan and London Borough of Camden water efficiency requirements:

- Wash basin taps – 6.5 l/min
- Showers – 7.5 l/min
- Bath – 120l to overflow
- Dishwasher - 1.2 l/place setting
- Washing machine - 9 l/kg load
- WC – 6/4 litre dual flush
- Kitchen taps – 6.5 l/min

Water meters will be installed.

3.5 Materials

All timber used on site during the construction phase and within the building will be from legal sources, FSC or equivalent timber will be used. Sourcing of other materials will include products where the manufacturer employs an environmental management system such as ISO 14001 or BES 6001. Where possible, materials will be sourced locally.

Non-toxic materials will be used wherever possible, including the specification of products with low VOC content in line with European testing standards.

Taking into account embodied carbon, where possible, low life cycle cost items will be selected. However, other factors, such as site restriction, cost and aesthetic preferences are considered when making design choices.

3.6 Waste Management and Construction

Construction site waste will be managed in such a way to reduce the amount of waste produced as much as possible, and the waste hierarchy will be followed. In addition, at least 95% of waste that does arise will be recycled using an external waste contractor and the Civil Engineer's Demolition Protocol. This will encourage materials to be re-used on site or where this is not possible, salvage appropriate materials to enable use off-site.

Household waste will be recycled through the local authority collection scheme. Internal recycling bins in the kitchen will be provided to facilitate this.

3.7 Nature Conservation and Biodiversity

Measures will be taken during construction to minimise impact on ecology by timing works appropriately and following best practice guidance. Urban greening opportunities will be maximised where possible. The incorporation of a green roof seeks to increase biodiversity on site.

3.8 Climate Change Adaptation

Tackling Increased Temperature and Drought

Windows will incorporate low emissivity coatings to reduce solar gain. Other than mandatory ventilation to meet AD Part F, the refurbished and new build flats will utilise a natural ventilation strategy.

Flooding

The site is in flood zone 1, therefore the development has a low probability of flooding from rivers and the sea.

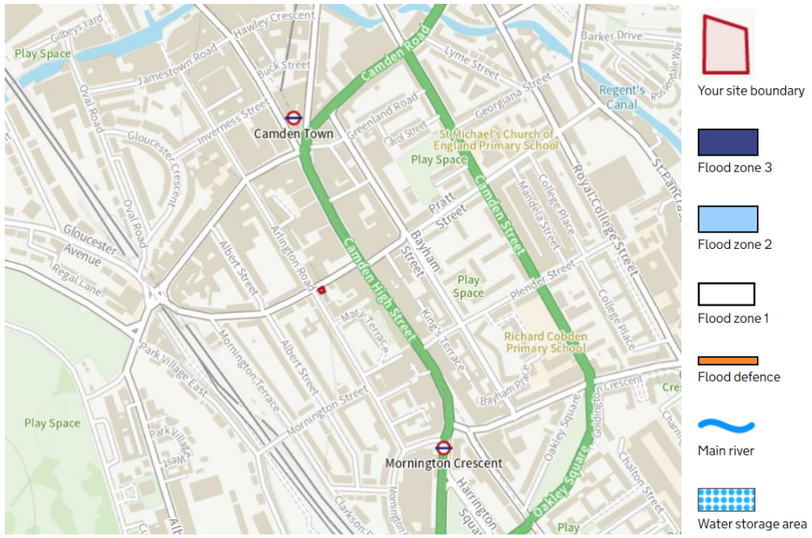

Figure 3.1 4 Centenary House Flood Risk Map

3.9 Pollution Management

Air Quality

The construction site will be managed in such a way that the environmental impact is minimised. This includes following best practice policies for dust pollution by using dust sheets, covering skips and damping down where appropriate.

Noise

The dwelling will comply with Building Regulations Part E providing a good level of sound insulation. All windows are to be specified as high efficiency double glazing to minimise the transmission of noise between the property and surrounding area.

A noise impact and sound insulation assessment will be undertaken prior to construction to ensure that noise from the plant is minimised.

Light Pollution

All external lighting will be adequately controlled to ensure that spaces are only lit out of daylight hours and when the area is occupied. There will be no illuminated signage or up lighting incorporated. The proposed dwelling is in an urbanised location, and therefore will not significantly contribute to increasing the effects of light pollution.

4 Conclusion

Following the thermal and M&E equipment upgrades described, the energy strategy for the proposed building has been demonstrated to be capable of achieving an improvement of 17% CO_2 emissions over the notional dwelling for the change of use dwellings and 85% for the new dwellings over Part L 2021.

The thermal fabric of the proposed refurbishment has been designed to meet or exceed Building Regulations and energy efficient equipment has been specified.

The savings represented in this report demonstrate that all reasonable measures will be employed within the proposed refurbishment in order to improve the building's environmental performance.

The findings and proposed energy strategy presented in this report are based on preliminary planning drawings and should be updated at detailed design in order to confirm the specification of the proposed equipment.