Energy & Sustainability Statement

94 Arlington Rd, London NW1 7HT

Jan 2025

Pro Sustainability Ltd
Stow House
Stowhill
Childrey
OX12 9XQ
www.prosustainability.co.uk

DOCUMENT REVISION HISTORY			Ref: 94 Arlington
Rev	**Author**	**Date**	**Comments/ Status**
-	Halla Huws	13/1/2025	Planning Submission V1

Executive Summary

- Pro Sustainability Ltd has undertaken this Energy Assessment in support of the planning application being submitted to the Camden Council in relation to the proposed erection of a single storey building with green roof within the rear garden for the use of the site as commercial use, at 94 Arlington Rd, London NW1 7HT Inn Road, London ('The Site').
- This report addresses the relevant planning policies with regards to Camden's Core Strategy, Camden's Planning Guidance (CPG) and London Plan. Moreover, it demonstrates compliance with Part L 2021 of the Building Regulations. It is important to highlight that Part L 2021 adopts a 30% uplift in CO2 emission standards compared with Part L 2013.
- Opportunities to connect the planned development to existing or future decentralised heat distribution networks have been investigated with reference to the London Heat Map. No networks exists within 500m of the site. Due to that and the size of this development, it is unfeasible for the site to cater for a connection for decentralised future district heating network.
- The proposed unit has an area of 18sqm, nevertheless calculations has been carried out to insure energy and carbon reduction. The 'be lean' stage achieved a 6% reduction over Part L 2021 baseline. At the be 'be green' stage renewable technology was incorporated, PV panels were chosen based on their suitability, a 1.35kWp system, total of 3 horizontal panels, is proposed, resulting in a 37% CO2 reduction. Total cumulative savings are 43% compared to the Part L 2021 baseline.

INDEX

1. Introduction

This document has been prepared by Pro Sustainability Ltd on behalf of the applicant in support of a full planning application for the proposed erection of a single storey building with green roof within the rear garden for the use of the site as commercial use at 94 Arlington Rd, London NW1 7HT Inn Road, London.

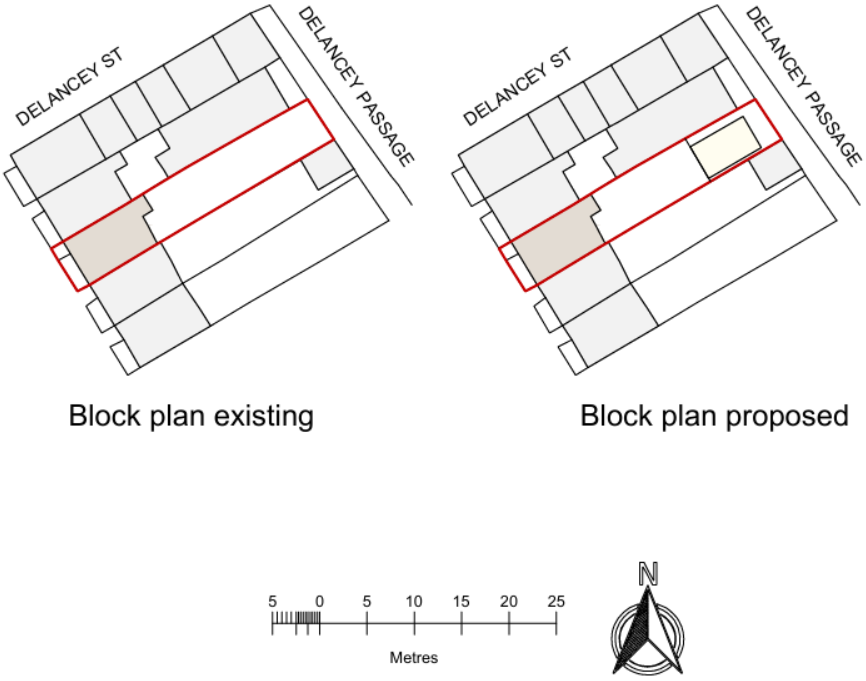

Figure 1: Existing and Proposed Block Plans

2. London Plan & CPG

This Energy statement will address the following documents:

- London Plan, Policy SI.2, Published March 2021
- Energy Assessment Guidance (June 2022)
- Camden Planning Guidance- Energy Efficiency & adaptation CPG, January 2021

The main emphasis within all policies has been given to the Energy Hierarchy for reducing carbon dioxide emissions as shown in Figure 2.

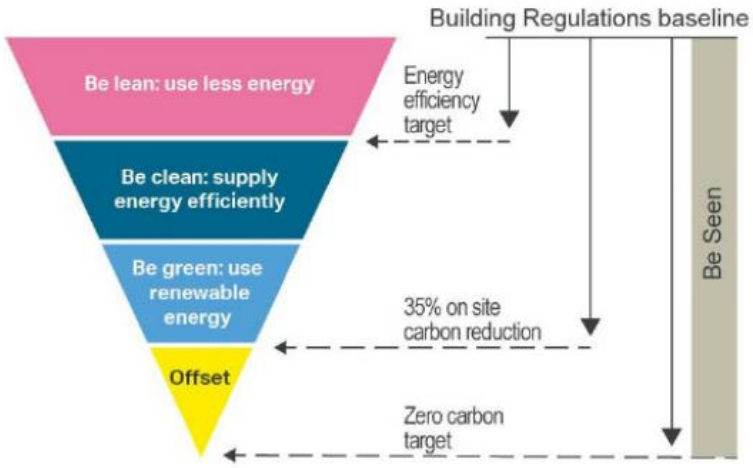

Figure 2 Energy Hierarchy

The non-domestic proposed unit , is 18 sqm therefore it is assessed as a 'Minor' non-domestic new build. As shown in Figure 3 below, the target is to achieve the greatest possible reduction in Carbon, with incorporating renewables where feasible. ***This will be under Part L 2021 based on London Plan latest guidance.***

It is important to highlight that Part L 2021 adopts a 30% uplift in CO2 emission standards compared with Part L 2013.

Table 2b Energy reduction targets, non-domestic

Development should comply with these standards/provide this information	Non-domestic New Build (assessed under L2A)			Non-domestic Refurbishment (assessed under L2B)		
	Major (>1,000 sqm)	Medium (500sq.m and <1,000 sqm)	Minor (<500sq.m)	Major (>1,000 sqm)	Medium (500sq.m and <1,000 sqm)	Minor (<500sq.m)
Energy and carbon reduction targets						
Overall carbon reduction targets	*Zero carbon, minimum 35% reduction below Part L Building Regulations on-site, with 15% reduction through on-site energy efficiency measures) (London Plan Local Plan CC1)*	*Greatest possible reduction below Part L of 2013 Building Regulations (Local Plan CC1)*	*Greatest possible reduction below Part L of 2013 Building Regulations (Local Plan CC1)*	*Greatest possible reduction, meeting Part L2B for retained thermal elements. (London Plan 5.4, Local Plan CC1)*	*Greatest possible reduction below Part L of 2013 Building Regulations (Local Plan CC1)*	*Greatest possible reduction below Part L of 2013 Building Regulations (Local Plan CC1)*
Reduction in CO2 from onsite renewables (after all other energy efficiency measures have been incorporated)	*20% (London Plan, Local Plan CC1)*	*20% (London Plan, Local Plan CC1)*	*Incorporate renewables where feasible*	*20% (London Plan, Local Plan CC1*	*20% (London Plan, Local Plan CC1*	*Incorporate renewables where feasible*

Figure 3: CPG Energy Efficiency Table 2b

3. Energy Benchmarking

In order to benchmark the proposed unit, estimated energy demands, and CO2 emissions data have been calculated. These estimated energy consumptions shown are relevant only to this stage. They demonstrate the percentage of the building's total energy consumption and CO2 emissions in accordance with the Energy Hierarchy.

In accordance with London Plan guidance, it is prudent for this report to reflect the benchmark data derived from approved Simplified Building Energy Model (SBEM) and the GLA carbon emissions reporting spreadsheet, which use government and industry agreed National Calculation Methodology (NCM) room templates containing standard operating conditions.

Baseline Case

In order to benchmark the proposed new unit, estimated notional energy demands and resulting CO2 emissions data (known as the Target Emissions Rate [TER] have been calculated. The TER is used as the benchmark to assess the percentage of the building's total regulated CO2 emissions that could be reduced or offset in accordance with the Energy Hierarchy. The non-domestic calculations were carried in SBEM Compliance software IES-ve 2024.

The values upon which the results shall be based, are the new prospective carbon factors provided by the GLA guidance following the latest changes in London plan. The results are outputs extracted through the use of the GLA carbon emissions reporting spreadsheet. The carbon factors for gas and electricity used are as per the SAP 10.2 values below:

Table 1 Carbon Factors

Fuel Type	Fuel Carbon Factors (kgCO2/kWh)
	SAP 10.2
Natural Gas	0.210
Grid Electricity	0.136

4. Be Lean: Energy Efficiency

In order to deliver an environmentally responsible building, an exemplar approach is being proposed based on low energy design principles. In summary, this approach involves energy demand minimisation through effective floor layout and zonal orientation, good envelope design and proficient use of services; such that the building itself is being used as the primary environmental modifier.

Long term energy benefits are best realised by reducing the inherent energy demand of the building in the first instance before introducing Low and Zero Carbon (LZC) technology solutions to decarbonise the energy supply.

Energy Efficient Building Design

The building envelope is designed, to ensure that the fabric encompasses low energy sustainability principles. The new building elements are targeting new fabric requirements as per Part L 2021 enhanced U-values. The following table (Table 2) describes the proposed targeted building envelope thermal performance criteria.

Table 2: Building Fabric

Reference	Design Criteria
New External Walls	0.16 W/m²K
Flat Roof	0.13 W/m²K
Ground Floor	0.11 W/m²K
Rooflight	1.40 W/m²K
Windows	1.20 W/m²K

Daylight:

High levels of natural daylight will be provided, wherever possible, through effective window design. The glazing specification for the proposed unit will be optimised to ensure that the glazed elements provide excellent thermal performance combined with optimum solar reflectance to minimise summer solar heat gains along with high daylight transmittance factors to maximise daylight factors. Encouraging the correct quality and quantity of daylight to penetrate the building is key to reducing the amount of light required from artificial sources and hence energy requirements.

High Performance Lighting:

It is imperative that the lighting design philosophy provides the correct quality of lighting with minimum energy input and hence reduce internal heat gains. The latest low energy lighting technology will be employed throughout, including LED's, where appropriate. External lighting will be designed with consideration for security requirements and minimising nuisance, glare and light pollution to the surrounding area.

Table 3 demonstrates the output of the SBEM and GLA reporting spreadsheet values at the BE LEAN stage.

Table 3 Regulated CO2 Savings from Be Lean- Residential

Be Lean	Regulated Domestic CO2 Savings	
	Kg CO2 per annum	Reduction %
Savings from energy efficient measures	9	6%

5. Be Clean: Decentralised Energy

Although this is a minor development, opportunities to connect the proposed to existing decentralised heat distribution networks, including those featuring Combined Heat and Power (CHP) plant, have been investigated with reference to the London Heat Map.

There are no close existing heat networks within the site area, therefore no proposal is made for a connection at this time as shown in the Figure 4.

Figure 4 London Heat Map of the site showing Existing Heat Networks and distance from site

Table 4: Regulated CO2 Savings from Be Clean in Residential and Offices

Be Clean	Regulated Domestic CO2 Savings	
	Kg CO2 per annum	Reduction %
Savings from heat network	0	0

6. Be Green: Appraisal of Renewable and Low Carbon Technology

The technical feasibility and economic viability of installing LZC technologies at the proposed new unit has been assessed in order to discount any unsuitable options at an early stage and aid in deciding the most appropriate technology to proceed with on the proposed development. Details are shown in Appendix A.

Due to the size of the proposed building and its location, the most suitable technology is a Photovoltaic system. A 37% reduction in carbon is achieved from employing a PV system, This is based on having 3 moderately ventilated 0.45kWp panels, applied horizontally on the flat roof, with a total area of 4.8m^2. The flat roof above the proposed unit would be ideal to locate the panels, as shown in Fig 5.

Table 5 Regulated CO2 Savings from Be Green

Be Green	Regulated Domestic CO2 Savings	
	Kg CO2 per annum	Reduction %
Savings from PVs	53	37%

Figure 5 Proposed Plans with PV location (Rahul Taheem Ltd)

7. Sustainable Measures

Based on the Sustainable design and construction requirements, the following has been addressed

Water consumption

The commercial unit will aim to meet the higher water efficiency standards of water consumption target. This will be achieved by:

- Dual flush WCs
- Spray and aerating taps
- Water efficient appliances

Building Materials

Construction materials are selected in a way to reduce the environmental impact, key issues during selection are:

- Use of sustainably sourced materials
- Use and recycle of onsite materials where possible
- Low embodied energy materials
- The use of recycled and reclaimed materials where possible, as well as materials with high recycled content
- Use of recycled or secondary aggregate

Waste Reduction

Operational waste reduction by adopting the Waste Hierarchy in the design. Enabling users to minimise operational waste and maximise both reuse and recycling through the provision of dedicated storage facilities and space.

The aim will be to also reduce construction waste by encouraging reuse, recovery and best practice waste management practices to minimise waste going to landfill.

Measures will include:

1. Sorting of waste materials into separate key waste groups (bricks, concrete, insulation, timber, tiles, etc.), either on site or through a licensed contractor for recovery.
2. Return packaging for reuse
3. Design to use fewer materials

Overheating

With climate change already meaning that the country is experiencing higher than average temperatures and more severe hot weather events it is imperative that developments are designed to minimise overheating.

Camden Council's cooling hierarchy has been followed by using the principles for reducing heat in the proposed building.

The proposed building aims to rely only on passive measures to cool the building with no active cooling. This is by:

1. Reduce heat entering the buildings through energy efficient design; The proposed building aims to improve the fabric performance to reduce the heat gains through the fabric, this is by reducing the conduction through the external walls and the roof by adding insulation, where a green roof is proposed adding an additional layer to protect the dwelling from the external elements. Moreover, high specification double glazing is proposed to reduce the solar transmission through the glazed areas, a g-value of 0.63 has been proposed to reduce the solar gains and the risk of overheating. Finally adding shading elements such as opening recess.
2. Reduce internal heat generation; by using energy efficient design, low energy lighting and equipment.
3. Use natural cooling; sufficient amount of openable area to allow for sufficient natural ventilation.
4. Exposed thermal mass, helping to stabilize temperatures.

8. Part L 2021 GLA Spreadsheet Output

	Carbon Dioxide Emissions for non-residential buildings (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	0.1	1.0
After energy demand reduction (be lean)	0.1	1.0
After heat network connection (be clean)	0.1	1.0
After renewable energy (be green)	0.1	1.0

Figure 6 GLA output- Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-residential buildings (rounded by GLA Tool)

	Total regulated emissions (Tonnes CO_2 / year)	CO_2 savings (Tonnes CO_2 / year)	Percentage savings (%)
Part L 2021 baseline	0.1		
Be lean	0.1	0.0	6%
Be clean	0.1	0.0	0%
Be green	0.1	0.1	37%
Total Savings	-	0.1	43%
	-	**CO_2 savings off-set (Tonnes CO_2)**	-
Off-set	-	**2.4**	-

Figure 7 GLA Output: Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-residential buildings (rounded by GLA Tool)

	Regulated non-residential carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: savings from energy demand reduction	0.0	6%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	0.1	37%
Total Cumulative Savings	**0.1**	**43%**
Annual savings from off-set payment	0.1	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**2**	-
Cash in-lieu contribution (£)	**232**	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development

Figure 8: GLA output: Table 2 Regulated Carbon Dioxide Savings from each stage of the Energy Hierarchy for non-residential buildings

Non-residential

Building type	EUI (kWh/m^2/year) (excluding renewable energy)	Space heating demand (kWh/m^2/year) (excluding renewable energy)	EUI value from Table 4 of the guidance (kWh/m^2/year) (excluding renewable energy)	Space heating demand from Table 4 of the guidance(kWh/m^2/year) (excluding renewable energy)	Methodology used (e.g. 'be seen' methodology or an alternative predictive energy modelling methodology)
Office	78.91166667	66.66666667	55	15	Part L2 - SBEM &

Figure 9: GLA Output: EUI & Space Heating Demand

9. Summary and Conclusions

Pro Sustainability Ltd has undertaken this Energy Assessment in support of the planning application being submitted to the Camden Council in relation to the proposed erection of a single storey building with green roof within the rear garden for the use of the site as commercial use, at 94 Arlington Rd, London NW1 7HT Inn Road, London.

This report details the performance of the development against the Carbon Dioxide (CO2) emissions set out in the CPG and the London Plan, March 2021, and GLA 2022 guidance. All calculations were carried out under Part L 2021. It is important to highlight that Part L 2021 adopts a 30% uplift in CO2 emission standards compared with Part L 2013.

Fabric improvements energy efficiency measures in the 'be lean' stage, resulted in reducing the carbon emissions by 6% compared to the notional baseline. Employing a 1.35kWp PV system reduces CO2 emissions by 37%. The proposal therefore achieves an overall reduction of 43% saving 62Kg of CO_2.

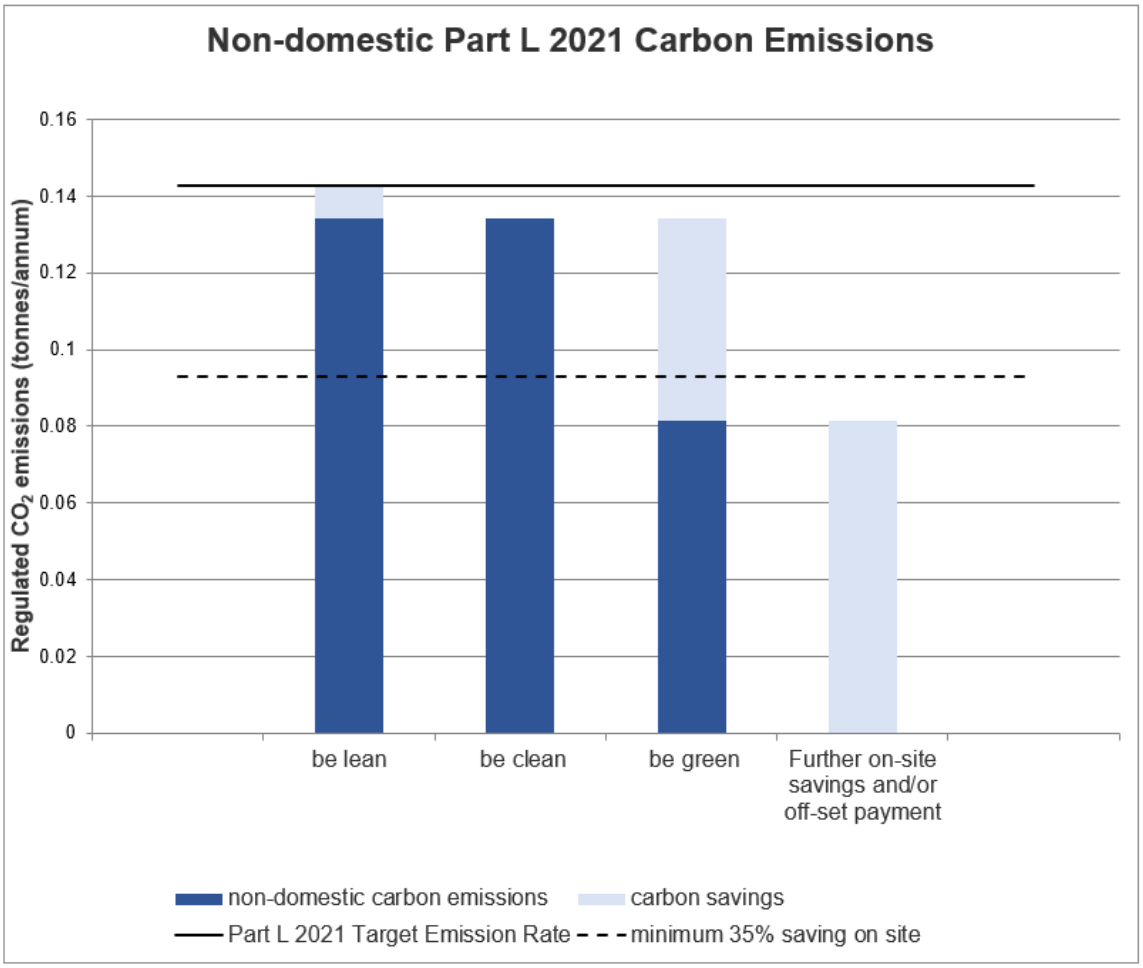

Figure 10 Carbon Dioxide Emissions after each stage of the Energy Hierarchy

Appendix A: Renewable and Low Carbon Technology Energy Options Appraisal

1. *Solar Photovoltaic*

Solar photovoltaic panels convert solar radiation into electrical energy through semi conductor cells

Benefits:

- Low maintenance/ no moving parts
- Ability to integrate into the building design

Limitations:

- Overshadowing reduces panel performance
- Panels ideally need to be inclined at 30˚ to the horizontal facing a southerly direction

Feasibility for site: YES

2. *Solar Thermal*

Solar thermal energy can be used to contribute towards space heating and hot water requirements. The two common forms of collector are panel and evacuated tube.

Benefits:

- Low maintenance/ no moving parts

Limitations:

- Must be sized for the building hot water requirements
- Panels ideally need to be inclined at 30˚ to the horizontal facing a southerly direction

Feasibility for site: No

- Flat roof area will be utilized for PV panels, as they would result in a greater reduction than Solar thermal.

3. *Ground Source Heat Pump (GSHP)*

GSHP systems tap into the earth's considerable energy store to provide both heating and cooling to buildings. A number of installation methods are possible including horizontal trench, vertical boreholes, piled foundations (energy piles) or plates/pipe work submerged in a large body of water. The design, installation and operation of GSHPs is well established.

Benefits:

- Minimal maintenance
- Unobtrusive technology
- Flexible installation options
- Income generated from Renewable Heat Incentive scheme (RHI)

Limitations:

- Large area required for horizontal pipes
- Full ground survey required to determine geology
- More beneficial when cooling is required

Feasibility for site: No

- Prohibitively expensive installation costs
- Intrusive to adjacent area
- Space limitations

4. Air Source Heat Pump (ASHP)

Electric or gas driven ASHP's extract thermal energy from the surrounding air and transfer it to the working fluid (air or water).

Benefits:

- Efficient use of fuel
- Relatively low capital costs
- Income generated from Renewable Heat Incentive scheme (RHI)

Limitations:

- Specialist maintenance
- More beneficial when cooling is required
- Noise issues due to proximity to other buildings

Feasibility for site: No

- Noise issues

5. Wind Turbine (Stand-alone)

Wind generation equipment operates on the basis of wind turning a propeller, which is used to drive an alternator to generate electricity. Small scale (1kW – 15kW) wind turbines can be pole or roof mounted.

Benefits:

- Low maintenance
- Minimum wind speed available
- Excess electricity can be exported to grid

Limitations:

- Planning issues
- Aesthetic impact and background noise
- Space limitations on site
- Wind survey to be undertaken to verify 'local' viability

Feasibility for site: No

- Not suitable on this site

6. Wind Turbine (Roof mounted)

Benefits:

- Low maintenance
- Minimum wind speed available
- Excess electricity can be exported to grid

Limitations:

- Planning issues
- Aesthetic impact and background noise
- Structural/ vibration impact on building to be assessed
- Proximity of other buildings raises issues with downstream turbulence
- Wind survey to be undertaken to verify 'local' viability

Feasibility for site: No

- Not suitable on this site

7. Combined Heat and Power

A Combined Heat and Power (CHP) installation is effectively a mini on-site power plant providing both electrical power and useful heat. CHP is strictly an energy efficiency measure rather than a renewable energy technology.

Benefits:

- Potential high CO2 saving available
- Efficient use of fuel
- Excess electricity can be exported to the grid
- Benefits from being part of an energy center/district heating scheme

Limitations:

- Maintenance intensive
- Sufficient base thermal and electrical demand required
- Some additional plant space required
- In case of biomass, large area needed for fuel delivery and storage

Feasibility for site: No

- Not viable for this site

Appendix B: BRUKL report

Be Green

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

94 Arlington Commercial Unit- Be green As designed

Date: Thu Jan 09 15:15:13 2025

Administrative information

Building Details

Address: London, Postcode

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.2

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.27

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

Certifier details

Name:

Telephone number:

Address: , ,

Foundation area [m²]: 18

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

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	7.94	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	4.52	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	76.78	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	35.37	
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	0.16	0.16	FF000000_W1
Floors	0.18	0.11	0.11	FF000000_F
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.13	0.13	FF000000_C
Windows** and roof windows	1.6	1.2	1.2	FF000000_W2_O0
Rooflights***	2.2	1.4	1.4	FF000001_C_O0
Personnel doors^	1.6	-	-	No external personnel doors
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	3.5

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	YES
Whole building electric power factor achieved by power factor correction	0.9 to 0.95

1- Electric Heating

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

1- SYST0001-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**
WC Office	0.2	-	-	-	-	-	-	-	-	-	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
Office	140	-	-
WC Office	140	-	-

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?
Office	NO (-53.8%)	NO
WC Office	NO (-60.6%)	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	18	18
External area [m²]	94.6	94.6
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	4	3
Average conductance [W/K]	21.13	44.55
Average U-value [W/m²K]	0.22	0.47
Alpha value* [%]	22.63	29.16

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
100	**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/m²]

	Actual	Notional
Heating	66.71	68.3
Cooling	0	0
Auxiliary	0.08	0.17
Lighting	7.11	11.35
Hot water	2.89	2.89
Equipment*	42.19	42.19
TOTAL**	**76.79**	**82.7**

* 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/m²]

	Actual	Notional
Photovoltaic systems	57.61	33.37
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*57.61*	*33.37*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	348.67	528.94
Primary energy [kWh_{PE}/m^2]	35.37	76.78
Total emissions [kg/m²]	4.52	7.94

Be Lean

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

94 Arlington Commercial Unit- Be lean

As designed

Date: Thu Jan 09 15:06:55 2025

Administrative information

Building Details

Address: London, Postcode

Certifier details

Name:

Telephone number:

Address: , ,

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.2

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.27

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

Foundation area [m²]: 13

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), $kgCO_2/m^2.annum$	7.94	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	11.75	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	76.78	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	119.51	
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	0.16	0.16	FF000000_W1
Floors	0.18	0.11	0.11	FF000000_F
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.13	0.13	FF000000_C
Windows** and roof windows	1.6	1.2	1.2	FF000000_W2_O0
Rooflights***	2.2	1.4	1.4	FF000001_C_O0
Personnel doors^	1.6	-	-	No external personnel doors
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	3.5

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	YES
Whole building electric power factor achieved by power factor correction	0.9 to 0.95

1- Electric Heating

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

1- SYST0001-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
WC Office	0.2	-	-	-	-	-	-	-	-	-	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
Office	140	-	-
WC Office	140	-	-

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?
Office	NO (-53.8%)	NO
WC Office	NO (-60.6%)	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	18	18
External area [m²]	94.6	94.6
Weather	LON	LON
Infiltration [m³/hr/m²@ 50Pa]	4	3
Average conductance [W/K]	21.13	44.55
Average U-value [W/m²K]	0.22	0.47
Alpha value* [%]	22.63	29.16

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
100	**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/m²]

	Actual	Notional
Heating	66.71	68.3
Cooling	0	0
Auxiliary	0.08	0.17
Lighting	7.11	11.35
Hot water	2.89	2.89
Equipment*	42.19	42.19
TOTAL**	**76.79**	**82.7**

* 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/m²]

	Actual	Notional
Photovoltaic systems	0	33.37
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*33.37*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	348.67	528.94
Primary energy [kWh_{PE}/m^2]	119.51	76.78
Total emissions [kg/m²]	11.75	7.94

Appendix C: GLA Development Information

TABLE 1. APPLICATION COMPLETENESS CHECK	
Development information tab (Tables 1-4) completed and included in appendix of energy strategy?	yes
Part L outputs tab completed	yes
EUI & space heating demand completed	yes
Confirmation that the planning stage webform will be completed at planning application submission and that the Be Seen process and reporting responsibilities are fully understood, including the requirement for as-built and in-use stage reporting to be undertaken (or where the legal owner changes from one reporting stage to another that the responsible party will be notified).	

TABLE 2. DEVELOPMENT DETAILS		Further notes	Response	Supporting comments (or signpost sections in the energy assessment)
Application details	Date of Application	Please provide the date the application was submitted to the Local Planning Authority.		
	Local Planning Authority	Please indicate the Local Planning Authority determining the application.	*Camden*	
	Confirmed carbon offset price (£/tonne of carbon dioxide)	Please confirm the agreed carbon offset price for the Local Planning Authority. If no value is entered then the GLA's recommend price of £95 per tonne of carbon dioxide will be used.		
	Evidence of communication on the carbon offset price included in the energy assessment (Y/N).			
	Residential units number (Part L1)		*0*	
	Non-residential floor area in m^2 (Part L2)		*18.00*	
Heat risk	CIBSE TM59 undertaken for residential development (Y/N)			
	CIBSE TM52 undertaken for non-residential development (Y/N)		*N*	
	All sample units meet CIBSE criteria with DSY1 weather file (Y/N)			
	DSY2 and DSY3 included in overheating assessments (Y/N)			
	Residential g-value			
	% Glazing Ratio over façade			
	External shading proposed (Y/N)			
Energy efficiency measures	Target Fabric Energy Efficiency met (Y/N)		*N*	
	Mechanical Ventilation with Heat Recovery included (Y/N)		*N*	
	Waste Water Heat Recovery (Y/N)		*N*	
	Low energy lighting (Y/N)		*Y*	
	Development in a Heat Network Priority Area			
Heating system performance	Heat Pump (Y/N)		*N*	
	Heat Pump source			
	Centralised Heat Pump capacity (kWth)			
	Heat Pump Seasonal Heating Efficiency (SCoP)			
	Heat Pump SCoP calculation includes heat source and heat distribution temperature and seasonal performance factor (Y/N)	See table 5 below for details.		
	Fraction of heat supplied by heat pump (only for hybrid systems with boilers) (%)			
	Low-emission on-site CHP enabling an area-wide heat network (Y/N)	Only low-emission CHP is suitable and only where it is facilitating an area-wide heat network. Therefore, new gas engine CHP is not suitable for any other purpose for new developments.		
	CHP (kWe)			
	Estimated end user cost (pence/kWh)			
	Energy assessment includes consideration of occupant running costs (Y/N)	Applicants should consider the estimated costs to occupants of the energy assessment and outline how they are committed to protecting the consumer from high prices.		
Solar technologies	Solar PV included (Y/N)		*Y*	
	Roof layout demonstrating solar PV technologies have been maximised included in energy strategy (Y/N)		*Y*	
	kWh generated		*172.83*	
	kWp		*1.35*	
	Total PV panel area (m^2) installed		*4.80*	
	Solar Thermal included (Y/N)		*N*	
	Solar Thermal panel area (m^2) installed			
Flexibility and peak energy demand	Site-wide peak demand, capacity and flexibility potential included in energy assessment (Y/N)	Table 9 in the energy assessment guidance to be completed.		
	Interventions for achieving flexibility included in energy assessment (Y/N)	Table 10 in the energy assessment guidance to be completed.		
	Estimated peak demand (MW)			
	Electrical energy storage (kWh) capacity			
	Heat energy storage (kWh) capacity			
Other technologies	System type (e.g. wind turbine)			
	Capacity (kW)			
Cooling	Cooling proposed - Residential (Y/N)	It is not expected that 'active cooling' will be proposed for any residential developments. It will be expected that applicants can fully demonstrate that all passive design measures have been thoroughly investigated before considering 'active cooling'.		
	Cooling proposed - Non-residential (Y/N)		*N*	
	Residential Cooling consumption (kWh p.a.)	See note in cell C60.		
	Commercial Cooling consumption (MJ p.a.)			