9D The Grove

Highgate, London, N6 6JU

ENERGY STATEMENT | DECEMBER 2022

On behalf of Nir Cohen

i | Table of Contents

Section 1

Executive Summary.

1 | Executive Summary

1.1 Iceni Projects Ltd was commissioned by Nir Cohen to produce an Energy Statement for the proposed redevelopment of 9D The Grove, Highgate, London, N6 6JU.

1.2 This document details the carbon dioxide (CO_2) emissions reduction measures adopted by the proposed development and gives an overview of the design proposals that will ensure the development operates in an energy efficient manner over the lifespan of the scheme.

1.3 The application proposes the demolition of the existing property, and the construction of a new two storey plus basement family home, designed to be both contemporary and fit for the future.

1.4 Consideration has been given to the London Borough of Camden's Local Plan in the formulation of this outline energy strategy, which represents best practice in meeting the required standards of energy efficiency and carbon dioxide (CO_2) emissions.

1.5 The proposed energy strategy is based upon the principles of the Energy Hierarchy, on the basis that it is preferable to reduce carbon dioxide emissions through reduced energy consumption above decarbonisation through alternative energy sources.

1.6 The proposed strategy has been based around the objectives of the Local Plan Policy CC1 (Climate change mitigation) The key measures proposed to minimise carbon dioxide emissions from the proposed development are set out below:

- Specification of a high level of building fabric performance to minimise heat loss, whilst still providing effective ventilation to minimise the risk of overheating;
- A balanced proportion of façade glazing to ensure natural daylight provision without increasing overheating risk;
- Low energy LED lighting to minimise artificial lighting energy consumption;
- Openable windows provided on multiple aspects to enable a natural ventilation strategy, with mechanical ventilation with heat recovery also to be provided to deliver fresh air without the needto open windows;
- A high specification of heating controls to ensure operational efficiency;
- Employment of a highly efficient air source heat pump (ASHP) system to serve the space and heating demands of the proposed dwelling; and
- Provision of rooftop photovoltaic (PV) panels to generate renewable electricity on-site.

1.7 By designing to rigorous energy standards, and omitting the use of fossil fuels for space and water heating through the employment of an air source heat pump system (ASHP), the application will respond directly to the Climate Emergency declared by the Council in April 2019. These measures combine to provide a carbon dioxide emissions saving of 79.4%, compared to the Part L:2021 baseline, meeting and exceeding the requirements of the London Borough of Camden's policies through on-site means alone.

1.8 Overall, the proposals constitute sustainable development in accordance with national, regional and local policy requirements, and will provide a new dwelling seeking to promote these principles in operation.

Section 2
Introduction.

2 | Introduction

2.1 Iceni Projects have been appointed by Nir Cohen to prepare an Energy Statement for the proposed redevelopment of 9D The Grove, Highgate, London, N6 6JU.

2.2 This document details the carbon dioxide (CO_2) emissions reduction measures adopted by the proposed development and gives an overview of the design proposals that will ensure the development operates in an energy efficient manner over the lifespan of the scheme. The conclusions of this Energy Statement report will provide a framework for the project team to operate consistently within the sustainability guidelines set out by the London Borough of Camden.

2.3 The report is structured to meet these guidelines as follows:

- Section 3 summarises the proposals;
- Section 4 discusses the planning context and policies which are relevant to energy;
- Section 5 discusses the development response to the policy drivers for energy; and
- Section 6 summarises the development's design response.

2.4 The site is currently occupied by a detached ground plus two-storey residential dwelling, numbered 9D The Grove, within the Highgate ward of the London Borough of Camden.

2.5 The site is bound by The Grove to the east, and Fitzroy Park to the north. The surrounding area is dominated by residential uses in all directions, with residences typically being detached in nature, and up to four-storeys in height.

Figure 1.1 Aerial view of the site, marked in red

Section 3

The Proposal.

3.1 The proposal seeks to replace the existing dwelling on-site with a new family dwelling of high quality design and sustainability credentials that will serve to enhance the character and appearance of the surrounding area.

3.2 The proposed elevations and the illustrative floor plans are displayed to the right. The site location plan is provided in Appendix A1.

Figure 3.1 Proposed north elevation

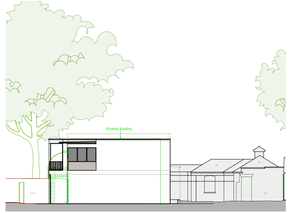


Figure 3.3 Proposed south elevation

Figure 3.2 Proposed east elevation

Figure 3.4 Proposed west elevation

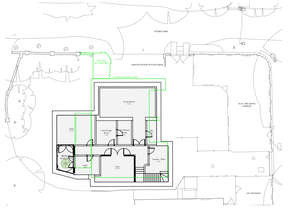


Figure 3.5 Proposed basement

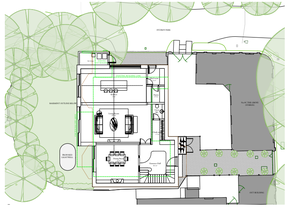


Figure 3.6 Proposed ground floor

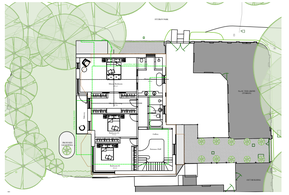


Figure 3.7 Proposed first plan

Section 4

Planning and Regulatory Context.

4.1 Built environment sustainability is incorporated within policy and regulation at a national, regional and local level, as set out below.

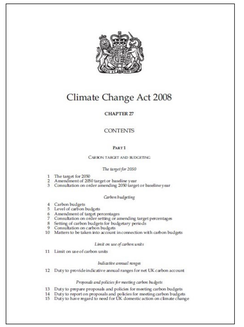
NATIONAL

Climate Change Act 2008

4.2 On 26th November 2008, the UK Government published the Climate Change Act 2008; the world's first long-term legally binding framework to mitigate against climate change. Within this framework, the Act sets legally binding targets to increase greenhouse gas emission reductions through action in the UK and abroad from the 60% target set out in the Energy White Paper, to 80% by 2050.

4.3 As required under Section 34 of the Climate Change Act, the Sixth Annual Carbon Budget was accepted by the Government in April 2021. This sets out a budget for UK emissions for the period 2033-2037.

4.4 Following a commitment in June 2019, the Climate Change Act has been amended to target net zero emissions by 2050.



Climate Change Act 2008

CHAPTER 27

CONTENTS

PART 1

CARBON TARGET AND BUDGETING

The target for 2050

1 The target for 2050
2 Amendment of 2050 target or baseline year
3 Consultation on order amending 2050 target or baseline year

Carbon budgeting

4 Carbon budgets
5 Content of carbon budgets
6 Amendment of target percentages
7 Consultation on order setting or amending target percentages
8 Setting carbon budgets for budgetary periods
9 Consultation on carbon budgets
10 Matters to be taken into account in connection with carbon budgets

Limit on use of carbon units

11 Limit on use of carbon units

Indicative annual ranges

12 Duty to provide indicative annual ranges for net UK carbon account

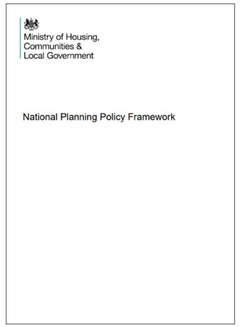
Proposals and policies for meeting carbon budgets

13 Duty to prepare proposals and policies for meeting carbon budgets
14 Duty to prepare proposals and policies for reducing the net carbon account
15 Duty to have regard to need for UK domestic action on climate change

National Planning Policy Framework (July 2021)

4.5 The Ministry of Housing, Communities & Local Government determines national policies on different aspects of planning and the rules that govern the operation of the system. Accordingly, the National Planning Policy Framework (NPPF), which came into force in March 2012 and was updated in February 2019, aims to strengthen local decision making. Additional updates have since been made through the latter half of 2020 and in January and July 2021 to reflect changes related to use classes, permitted development rights, the calculation of housing need, and requirements to achieve beauty alongside sustainability.

4.6 Paragraph 10 of the NPPF confirms that at the heart of this document is a ***"presumption in favour of sustainable development"***, and that development proposals that accord with an up-to-date development plan should be approved without delay.



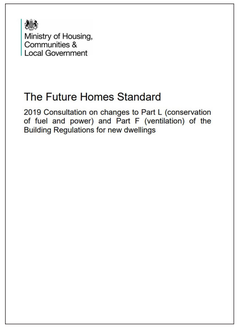
Ministry of Housing, Communities & Local Government

National Planning Policy Framework

Future Homes Standard 2025 (March 2019)

4.7 Within the Spring Statement 2019, The Chancellor announced the future introduction of the Future Homes Standard 2025. The Standard will mandate the end of fossil fuel heating systems in new homes from 2025 and target "world-leading levels of energy efficiency". In doing this, the Standard aims to utilise green technology to reduce environmental impacts, as well as reducing consumer energy bills.

4.8 This Standard is expected to build on the Prime Minister's Clean Growth Grand Challenge mission, which aims to at least halve the energy usage of new build properties by 2030. It also looks to halve the costs of renovating existing buildings to achieve a similar standard of energy efficiency as new buildings, whilst improving their quality and safety.



Ministry of Housing, Communities & Local Government

The Future Homes Standard

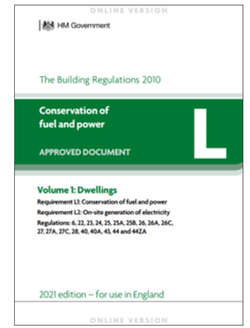
2019 Consultation on changes to Part L (conservation of fuel and power) and Part F (ventilation) of the Building Regulations for new dwellings

Part L:2021 of the Building Regulations

4.9 Part L of the Building Regulations relates to the conservation of fuel and power, and applies to both new and existing buildings. The current edition covers the energy efficiency requirements of the building regulations as set out in Part L of Schedule 1 to the Building Regulations. Technical guidance is contained in two Part L Approved Documents.

4.10 The documents of relevance to this scheme include:

- Approved Document L Volume 1: Dwellings. This provides the methodology for new build, domestic buildings to meet current energy efficiency standards, including backstop U-values, carbon dioxide emissions calculations and minimising the risk of overheating. Carbon dioxide emissions reductions are prescribed for 'regulated' emissions only, and relate to heating, hot water, lighting, auxiliary and cooling (where specified). Emissions from domestic appliances (cooking, for example) are considered to be unregulated emissions, and are excluded from the analysis.



ONLINE VERSION

HM Government

The Building Regulations 2010

Conservation of fuel and power

L

APPROVED DOCUMENT

Volume 1: Dwellings

Requirement L1: Conservation of fuel and power

Requirement L2: On-site generation of electricity

Regulations: 6, 22, 23, 24, 25, 25A, 25B, 26, 26A, 26C, 27, 27A, 27C, 28, 40, 40A, 43, 44 and 44ZA

2021 edition – for use in England

ONLINE VERSION

4 | Planning and Regulatory Context

REGIONAL

4.11 Within Greater London, key sustainable development principles for economic, environmental and social improvement are set out below.

The London Plan (March 2021)

4.12 The London Plan is the overall strategic plan for London and includes policies for sustainable development and energy within Chapter 9 (London's response to climate change). Key policies of relevance to this scheme are as follows:

- **Policy SI2 Minimising Greenhouse Gas Emissions.** This states that major development proposals should be net zero-carbon, by reducing greenhouse gas emissions in operation and minimising both annual and park energy demand in accordance with the following energy hierarchy:
  1. Be lean: use less energy
  2. Be clean: supply energy efficiently
  3. Be green: use renewable energy
  4. Be seen: monitor, verify and report on energy performance

4.13 **Policy SI3 Energy Infrastructure.** This policy recognises that combined heat and power installations can have negative effects on London's air quality and shifts the focus of decentralised energy networks to the use of waste or secondary heat sources, where available. The policy also recognises that, compared to increasingly decarbonised electricity generation, gas-fired heat will become comparatively more carbon intensive as the electricity grid is further decarbonised.

Energy Planning - GLA guidance on preparing energy assessments (June 2022)

4.14 The guidance note provides further detail on addressing the London Plan's energy hierarchy through the provision of an energy assessment to accompany planning applications. The document sets out the expected carbon dioxide emissions targets for different building types.

4.15 The guidance outlines the requirement for all major application within London to achieve a minimum 35% carbon dioxide emissions savings over the Part L:2021 baseline through on-site means alone. The guidance also sets out the requirement to report the Energy Use Intensity (EUI) and the space heating demand of the development using the GLA's carbon emissions reporting spreadsheet.

LOCAL

Camden Local Plan (2017)

4.16 The Camden Local Plan sets out the Council's planning policies to ensure that Camden continues to have robust, effective and up-to-date planning policies that respond to changing circumstances and the borough's unique characteristics and contribute to delivering the Camden Plan and other local priorities.

4.17 The overall vision of the Camden Plan, and the Local Plan, is as follows:

We want to make Camden a better borough - a place where everyone has a chance to succeed and nobody gets left behind. A place that works for everyone.

4.18 Policies of relevance to the proposed development include:

- **Policy D1 Design.** This states that, in order to secure high quality design, the Council will require that development:
  - respects local context and character;
  - is sustainable in design and construction, incorporating best practice in resource management and climate change mitigation and adaptation;
  - is of sustainable and durable construction and adaptable to different activities and land uses;
  - comprises details and materials that are of high quality and complement the local character;
  - responds to natural features and preserves gardens and other open space;
  - incorporates high quality landscape design and maximises opportunity for greening for example through planting of trees and soft landscaping; and
  - for housing, provides a high standard of accommodation.
- **Policy CC1 Climate change mitigation.** This states that 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 by:
  - requiring all development to reduce carbon dioxide emissions through following the steps in the Energy Hierarchy;
  - expecting all developments to optimise resource efficiency; and
  - requiring all new residential development to demonstrate a 19% CO_2 reduction below Part L:2013 Building Regulations.
- **Policy CC2 Adapting to Climate Change.** This states that, to ensure resilience to climate change, all development should adopt appropriate climate change adaptation measures such as:
  - not increasing, and wherever possible reducing, surface water runoff through increasing permeable surfaces and the use of Sustainable Drainage Systems;
  - incorporating biodiverse roofs, combination green and blue roofs, and green walls where appropriate; and
  - measures to reduce the impact of urban and dwelling overheating, including application of the Cooling Hierarchy.

Camden Planning Guidance (CPG): Energy Efficiency and Adaptation (March 2019)

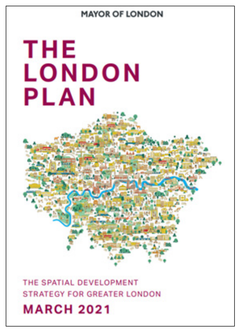
4.19 This document was published to support the policies set out within the Camden Local Plan (2017). It provides guidance on key energy and resource issues within the London Borough of Camden, and supports Local Plan Policies CC1Climate change and mitigation, and CC2 Adapting to climate change.

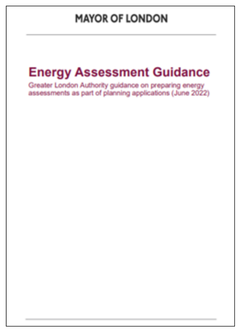
4.20 Other policies for which guidance is provided include: C1 Health and well-being; A1 Open space; A2 Biodiversity; D1 Design; D2 Heritage; CC3 Water and flooding; CC4 Air quality; and, CC5 Waste.

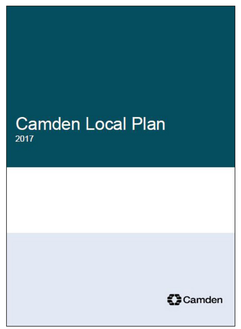
4.21 This CPG also outlines the requirements for producing Energy Assessments and Sustainability Statements.

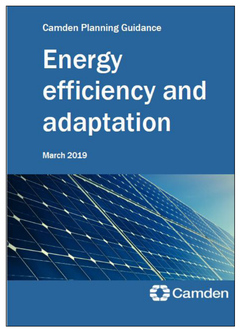
Declaration of a Climate Emergency (April 2019)

4.22 On 8th April 2019, the London Borough of Camden's Cabinet Member for Improving Camden's Environment, Councillor Harrison, declared a climate emergency. As part of this declaration, the following full Council debate was to be dedicated to climate change. It was also noted that the Council would be convening a Citizens' Assembly with a special focus on climate change, and involving young people as much as possible.









Section 5
Energy Strategy.

5.1 With reference to the policy requirements, guidance and industry best practice detailed in Section 4, a comprehensive energy and carbon dioxide (CO_2) emissions assessment has been carried out for the proposed development. The energy performance of the scheme has been analysed and evaluated against the most up-to-date iteration of Part L of the Building Regulations and pertinent London Borough of Camden policies, accounting for economic, technical and functional feasibility.

5.2 The following section includes a breakdown of potential measures proposed at each level of the Energy Hierarchy, including a renewable energy generation options study. The specifications for the retained building elements are also detailed, in addition to the proposed fixed building services.

5.3 The CO_2 emissions performance of three scenarios are set out within this section, as follows:

- The proposed replacement dwelling;
- The existing dwelling; and
- A potential retrofit and extension solution.

The Energy Hierarchy

5.17 With reference to the policy requirements, guidance and industry best practice detailed in Section 4, a comprehensive energy and carbon dioxide (CO_2) emissions assessment has been carried out for the proposed scheme. The energy performance of the scheme has been analysed and evaluated against the most up-to-date iteration of Part L of the Building Regulations and pertinent London Borough of Camden policies, accounting for economic, technical and functional feasibility.

5.18 The proposed energy strategy is based upon the principles of the Energy Hierarchy on the basis that it is preferable to reduce carbon dioxide emissions through reduced energy consumption above decarbonisation through alternative energy sources.

5.19 The tiers of the Energy Hierarchy are:

- Be Lean | Use less energy
- Be Clean | Supply energy efficiently
- Be Green | Use renewable energy

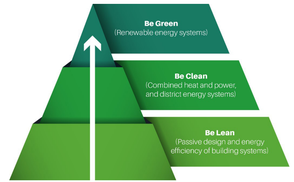


Figure 5.1 The Energy Hierarchy

5.20 Design recommendations were provided to Charlton Brown Architects, and preliminary design assessments were carried out to enable an energy strategy to develop from an early stage.

'Be Lean' | Use Less Energy

5.4 Within the first stage of the energy hierarchy, it is proposed to incorporate high levels of passive and energy efficient design measures in order to reduce the development's energy consumption and associated CO_2 emissions.

5.5 Details of the passive design and energy efficiency measures proposed are outlined below.

5.6 Passive design utilises daylight, solar energy, shading and stack or wind driven ventilation to illuminate, heat, shade where necessary and ventilate/cool the building, thus requiring less (mechanical) energy to achieve the performance standards for health and well-being of the residents.

5.7 Site characteristics relating to local climate, surroundings, scale and size of the development therefore passively influence the potential energy requirements and savings that can be achieved through the consideration of these aspects. The parameters that most influence the potential to utilise sunlight and solar gains are the orientation and layout of the buildings, however these are typically driven by various factors other than energy efficiency or bioclimatic design considerations (e.g. aesthetics, function, etc.).

5.8 As shown in Appendix A1, the orientation of the dwelling will be dictated by the plot orientation in order to give the overall scheme a cohesive design approach. The distance between the proposed dwelling and the surrounding residences has been optimised to ensure sufficient access to natural daylight and passive solar gains to the dwellings. Light and solar gain will also be influenced by the fenestration and the selection of glazing with a high degree of light transmittance.

5.9 The following U-values are proposed as a means of limiting heat loss through the dwelling's building fabric:

Building Fabric Element	Part L:2021 backstop U-values (W/m²K)	Proposed U-values (W/m²K)
Ground floor	0.18	0.10
External wall	0.26	0.15
Roof	0.18	0.12
Windows	1.60 (including frame)	0.80 (including frame)
Doors	1.60	1.00

5.10 The glazing will be triple glazed, argon filled with a low emissivity coating. Although this has yet to be formally specified, it is expected that window U-values will be 0.80 W/m²K or better (including frame), with a g-value of 0.60, and light transmission of ~70% to improve natural daylight penetration.

5.11 A high level of airtightness is proposed, where a level equal to or below 3 $m^3/h/m^3$ shall be targeted, meaning that air infiltration between the internal and the external environment will be largely controlled, and space heating/cooling demand further reduced.

5.12 The other significant means of heat loss from dwellings is due to thermal (cold) bridging. This is typically a construction detail which has higher thermal conductivity than the surrounding materials, creating a path of least resistance for heat transfer. Thermal bridges result in an overall reduction in thermal resistance of the building elements and should be designed out where possible to minimise unwanted heat loss. In order to minimise heat loss through thermal bridges, accredited construction details have been assumed, with an equivalent y-value of 0.05.

5.13 High efficiency plant, equipment and controls are proposed to limit the energy consumed in order to provide the required level of indoor environmental performance and control. Performance efficiency values were tested and improved in energy models to benchmark the resulting predicted CO_2 reduction.

- Low energy LED lighting will be installed throughout the dwelling.
- In order to assess the CO_2 emissions reductions achieved through the 'Be Lean' stage, space and water heating demand is served by an individual gas-fired boiler with an efficiency of 90%.
- Although the dwelling will be provided with opening windows to mitigate against overheating,outside air will be provided via mechanical ventilation with heat recovery (MVHR), with a specific fan power (SFP) of 0.88 W/l/s. A heat exchanger with an efficiency of >90% has also been specified. These efficiencies are higher than those set out in the Building Regulations.

- Time and temperature zones, controlled by the suitable arrangement of plumbing and electrical services, will be employed to control heating consumption within the dwelling.

5.14 Energy modelling of the proposed dwelling has been undertaken using the Standard Assessment Procedure (SAP).

5.15 The carbon dioxide emissions for the dwelling under the 'Be Lean' tier of the Energy Hierarchy are shown to the right. A Building Regulations England Part L (BREL) Compliance Report showing the 'Be Lean' performance of the dwelling is provided in Appendix A2.

5.16 The analysis presented below shows that the proposed dwelling will achieve a carbon dioxide emissions saving of 11.8% through energy efficiency means alone, under the 'Be Lean' scenario.

TER: Baseline Part L:2021 Emissions (tonnes CO_2 per annum)	DER: Proposed 'Be Lean' Emissions (tonnes CO_2 per annum)	Emissions Savings (tonnes CO_2 per annum)	Emissions Savings (%)
3.4	3.0	0.4	11.8%

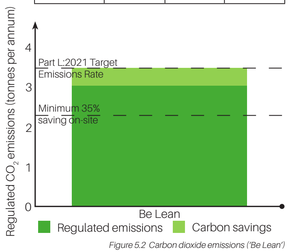


Figure 5.2 Carbon dioxide emissions ('Be Lean')

'Be Clean' | Supply Energy Efficiently

5.27 The potential for the proposed dwelling to incorporate a low carbon heating/cooling system has been reviewed, in line with the hierarchy presented in London Plan Policy 5.6:

1. Connection to existing heating or cooling networks;
2. Site-wide CHP network; and
3. Communal heating and cooling.

5.28 The London Heat Map is a tool provided by the Mayor of London to identify opportunities for decentralised energy projects in London. It builds on the 2005 London Community Heating Development Study.

5.29 The image displayed in Figure 6.3 is an extract from the London Heat Map, showing the area in the vicinity of the site. It illustrates;

- Heat demand (areas of higher heat demand are shown in red);
- Existing heat networks (shown as red lines);
- Proposed heat networks (shown as orange lines); and
- Heat network priority areas (white with black borders).

5.30 The extract displayed in Figure 6.3 indicates that the site of the proposed dwelling is located within an area of low heat demand, with no planned or existing heat networks within the vicinity. It is also located outside local heat network priority areas.

5.31 Given the scale and density of the proposed development, the establishment of a new heat network is unfeasible. Furthermore, the use of combined heat and power (CHP) is also considered to be unviable for the proposed site, based on the most up-to-date GLA energy guidance, which looks to move away from the use of natural gas to meet space and water heating demands. It is therefore recommended that an air source heat pump (ASHP) system is employed to service the space and water heat demand of the new dwelling. The incorporation of heat pump technology is discussed in greater detail in the 'Be Green' section.

5.32 The "Be Clean" carbon dioxide emissions are therefore identical to those set out in the "Be Lean" scenario.

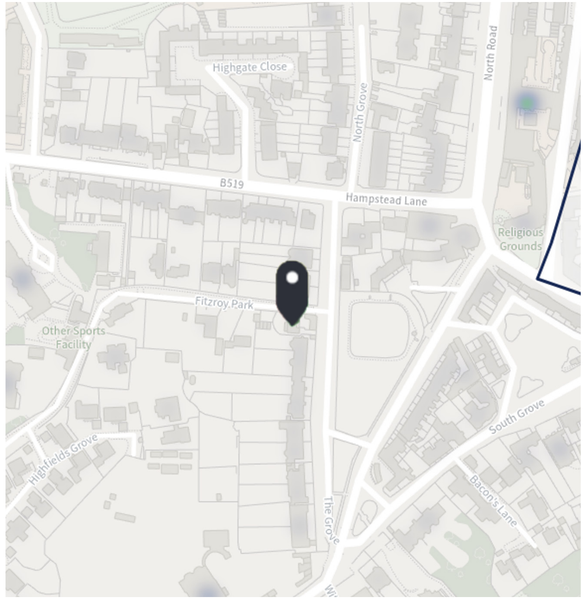


Figure 5.3 Extract from the London Heat Map

'Be Green' | Utilise Renewable Technologies

5.33 The proposed development has given consideration to renewable energy technologies that may be applicable to deliver the required level of carbon dioxide savings over the Part L:2021 baseline, and the likely local effects on the environment.

5.34 In determining the appropriate renewable technology for the site, a number of factors including carbon dioxide savings, site constraints, and potential visual impacts have been considered. Further details of each technology and its associated assessment in relation to the proposed new dwelling are provided below.

- **Biomass** - This technology is not considered a practical solution for reducing carbon dioxide, in the view of limited options for domestic scale installations, storage space requirements for the combustible material, and the transport related carbon dioxide emissions which are not normally accounted for within energy modelling. Furthermore, high levels of nitrous oxide (NOx) and particulate matter (PMx) emissions are associated with the use of biomass fuel. As the proposed dwelling is located within a dense, urban area, permitted emissions will be restricted.
- **Air Source Heat Pumps (ASHP)** - given the site location and lack of existing or proposed heat networks, it is proposed that air source heat pump (ASHP) technology is incorporated within the development. It is expected that a highly efficient system, such as the Nilan Compact P, will be employed to serve both the space and water heating demands of the proposed dwelling. This system also provides mechanical ventilation with heat recovery (MVHR) and includes a reversible cooling unit, allowing for the provision of comfort cooling. Typical manufacturer specifications for the proposed Nilan Compact P system quote a heating coefficient of performance of approximately 4.2. The specified system is quiet in operation, though it is recommended that measures to further mitigate the sound produced by the external component of the proposed system are considered during detailed design. In addition to this, the proposed system provides an element of cooling, which has been accounted for within the SAP calculations by assuming an Energy Efficiency Ration (EER) of 3.
- **Ground Source Heat Pumps (GSHP)** - Due to the nature of the proposed development, the site is not suitable for a horizontal ground collection loop. Furthermore, ground investigation and borehole drilling are likely to be cost prohibitive, and may not yield a suitable energy source. The use of ground source heat pumps for the proposed scheme is therefore not considered viable.
- **Photovoltaics (PV) and Solar Thermal Hot Water (STHW)** - It is intended that 14 photovoltaic (PV) and/or solar thermal hot water (STHW) panels will be incorporated to generate renewable energy and/or low carbon hot water for the proposed development. The panel array is to be located on the central portion of the roof, as shown in Figure 5.4 to the right, and will cover a total area of 28.3m². This area has been maximised based on the available roof space when accounting for the provision of the proposed sedum roof planting. It is intended that panels with dimensions of 1.6 x 1.0m will be employed. Panels will be oriented at 30° to the horizontal and face with 90° due south to maximise output per panel. The array of panels is to be incorporated within the proposed landscaping strategy, which will improve the performance of the panels through improvements to the rooftop microclimate brought about by the cooling effect of the proposed sedum roof planting. For the purposes of this Energy Strategy, it has been assumed that all panels will be provided as PV panels, with an assumed 15% efficiency, and approximate output of 250W per panel (peak output). This will be subject to change following further detailed design.
- **Wind Turbines** - This technology is rejected on the basis of its potential impact on visual amenity and relatively low efficiency from unpredictable, turbulent wind conditions associated with urban locations.

5.35 As for the 'Be Lean' stage, 'Be Green' energy analysis has been carried out for the proposed development using the Standard Assessment Procedure (SAP).

5.36 The carbon dioxide emissions for the proposed development, under each tier of the Energy Hierarchy, are shown in Figure 5.5. A BREL Compliace Report showing the 'Be Green' performance of the proposed dwelling is provided in Appendix A2.

5.37 The energy analysis carried out shows that the proposed development achieves a carbon dioxide emissions saving of 79.4% through energy efficiency measures and renewable technologies. This exceeds the 19% target necessary to meet the requirements of the London Borough of Camden, and the 35% target required to meet the requirements.of the Greater London Authority.

TER: Baseline Part L:2021 Emissions (tonnes CO_2 per annum)	DER: Proposed 'Be Green' Emissions (tonnes CO_2 per annum)	Emissions Savings (tonnes CO_2 per annum)	Emissions Savings (%)
3.4	0.7	2.7	79.4%

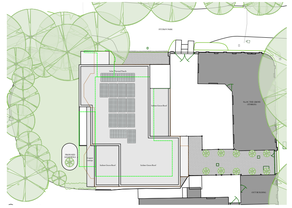


Figure 5.4 Proposed location of PV / STHW panels

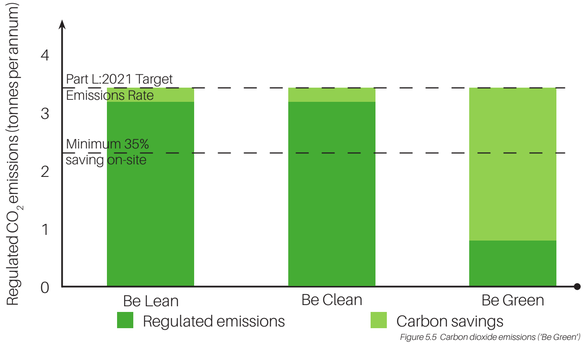


Figure 5.5 Carbon dioxide emissions ('Be Green')

5 | Energy Strategy

The Existing Dwelling

5.21 Based on information and plans provided by Charlton Brown Architects in November 2022, the energy performance and associated CO_2 emissions of the existing dwelling have been calculated.

5.22 The following U-values and make-ups have been assumed for the existing building elements:

Building Fabric Element	Existing U-values (W/m^2K)	Building Fabric Element Make-up
Ground floor	1.03	Suspended timber ground floor
External wall	1.40	Assumed 50mm empty cavity
Roof	1.50	Uninsulated pitched roof
Windows	5.90(including frame)	Single-glazed windows
Doors	1.00	-

5.23 The following has also been accounted for within the SAP modelling undertaken for the existing dwelling:

- An approximate y-value of 0.141 has been applied to account for thermal bridging.
- The level of air tightness is not known, and has therefore been inputted to the model as "Assumed".
- A natural ventilation strategy has been modelled, with fresh air delivered to the existing dwelling through opening windows.
- Standard lighting has been assumed to have been installed throughout the dwelling.
- Space and heating demand has been assumed to be served by an existing gas boiler, with an efficiency of approximately 89%.
- Time and temperature zones, controlled by the suitable arrangement of plumbing and electrical services, has been assumed to be installed to control heating consumption within the dwelling.

5.24 As for the proposed replacement dwelling, energy modelling of the exsiting dwelling has been undertaken using the Standard Assessment Procedure (SAP).

5.25 The carbon dioxide emissions for the existing dwelling compared to the Part L:2021 baseline are shown below. A BREL Compliance Report showing the performance of the existing dwelling is provided in Appendix A3.

5.26 The analysis presented below shows that the existing dwelling currently produces levels of carbon dioxide emissions that are 318.8% higher than those produced by an equivalent dwelling built to the Part L:2021 standard.

TER: Baseline Part L:2021 Emissions (tonnes CO_2 per annum)	DER: Existing Dwelling Emissions (tonnes CO_2 per annum)	Emissions Savings (tonnes CO_2 per annum)	Emissions Savings (%)
1.6	6.7	-5.1	-318.8%

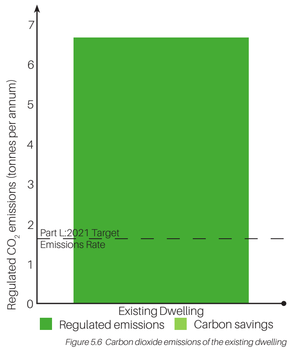


Figure 5.6 Carbon dioxide emissions of the existing dwelling

Potential Retrofit Scenario

5.38 A potential retrofit scenario has also been prepared, again based on information and plans provided by Charlton Brown Architects in November 2022. As for the existing dwelling, the predicted energy performance and associated CO_2 emissions of the potential retrofit scenario have been calculated.

5.39 Under this scenario, the following U-values have been applied for the retained building elements:

Retained Building Fabric Element	Existing U-values (W/m^2K)	Improved U-values (W/m^2K)
Ground floor	1.03	0.20
External wall	1.40	0.55
Roof	1.50	0.32
Windows	5.90	1.40
Doors	1.00	1.00

5.40 The improvements to the existing U-values would, in theory, be achieved as follows:

- Incorporation of 75mm thick insulation above the existing concrete slab across the total ground floor area.
- Injection of granulated rockwool insulation into the assumed 50mm cavity present within the existing walls.
- Installation of 100mm thick polyisocyanurate (PIR) insulation boards have been provided across the total roof area.
- Replacement of existing single glazed windows with double glazed windows.

5.41 The following has also been accounted for within the SAP modelling undertaken for the potential retrofit scenario:

- An approximate y-value of 0.141 has been applied to account for thermal bridging associated with the retained elements of the building. Thermal bridges would be present at wall and floor junctions due to the inability to form contiunous insulation layers without significant structural implications.
- An air tightness level of 10 $m^3/h/m^3$ has been applied.
- A natural ventilation strategy has been modelled, with fresh air delivered to the dwelling through opening windows.
- Low energy LED lighting has been assumed to have been installed throughout the dwelling.
- Space and heating demand has been assumed to be served by an air source heat pump (ASHP) system for which the typical manufacturer specifications quote a heating coefficient of performance of approximately 3.0 and and a minimum hot water coefficient of performance of 2.0.
- The incorporation of photovoltaic (PV) and/or solar thermal hot water (STHW) panels, in line with the proposed replacement dwelling, has also be included for as part of the potential retrofit scenario.
- Time and temperature zones, controlled by the suitable arrangement of plumbing and electrical services, has been assumed to be installed to control heating consumption within the dwelling.

5.42 As for the proposed replacement and existing dwellings, energy modelling of the potential retrofit scenario has been undertaken using the Standard Assessment Procedure (SAP).

5.43 The carbon dioxide emissions for the potential retrofit scenario compared to the Part L:2021 baseline are shown to the right. A BREL Compliance Report showing the performance of the potential retrofit and extension scenario is provided in Appendix A4.

5.44 The analysis presented below shows that the potential retrofit scenario could achieve a carbon dioxide emissions saving of 46.2% through energy efficiency measures and renewable technologies.

TER: Baseline Part L:2021 Emissions (tonnes CO_2 per annum)	DER: Retrofit and Extension Emissions (tonnes CO_2 per annum)	Emissions Savings (tonnes CO_2 per annum)	Emissions Savings (%)
1.3	0.7	0.6	46.2%

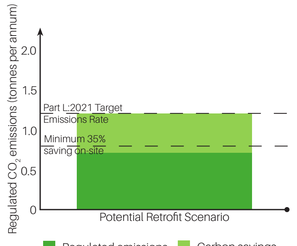


Figure 5.7 Carbon dioxide emissions of the potential retrofit scenario

Potential Retrofit and Extension Scenario

5.45 A potential retrofit and extension scenario has also been prepared, and the predicted energy performance and associated CO_2 emissions calculated.

5.46 Sample plans of the potential retrofit and extension scenario are shown in the images below.

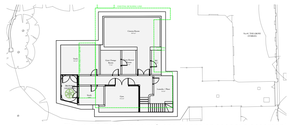


Figure 5.8 Potential retrofit and extension scenario basement

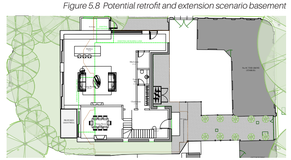


Figure 5.9 Potential retrofit and extension scenario ground floor

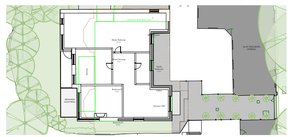


Figure 5.10 Potential retrofit and extension scenario first floor

5.47 For the potential retrofit and extension scenario, it has been assumed that new building elements would achieve the U-values proposed for the replacement dwelling detailed above, and that the retained elements would be improved in line with the retrofit scenario detailed to the left. The same systems as those prescribed for the retrofit scenario have also been applied here.

5.48 Energy modelling of the potential retrofit and extension scenario has been undertaken using the Standard Assessment Procedure (SAP).

5.49 The carbon dioxide emissions for the potential retrofit and extension scenario compared to the Part L:2021 baseline are shown tbelow. A BREL Compliance Report showing the performance of the potential retrofit and extension scenario is provided in Appendix A5.

5.50 The analysis presented below shows that the potential retrofit and extension scenario could achieve a carbon dioxide emissions saving of 54.3% through energy efficiency measures and renewable technologies.

TER: Baseline Part L:2021 Emissions (tonnes CO_2 per annum)	DER: Retrofit and Extension Emissions (tonnes CO_2 per annum)	Emissions Savings (tonnes CO_2 per annum)	Emissions Savings (%)
3.5	1.6	1.9	54.3%

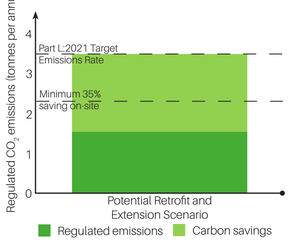


Figure 5.11 Carbon dioxide emissions of the potential retrofit and extension scenario

Comparison of the Three Scenarios

5.51 The. graph below and the table to the right show the calculated carbon emissions for each of the existing dwelling, the potential retrofit and extension scenario, and the proposed replacement dwelling. This demonstrates that proposed replacement dwelling will have the lowest associated carbon dioxide emissions during its operation when compared to the existing dwelling, the potential retrofit and the potential retrofit and extension scenario.

Existing Dwelling Emissions (tonnes CO_2 per annum)	Potential Retrofit Emissions (tonnes CO_2 per annum)	Potential Retrofit and Extension Emissions (tonnes CO_2 per annum)	Proposed Replacement Dwelling Emissions (tonnes CO_2 per annum)
6.7	0.7	1.6	0.7

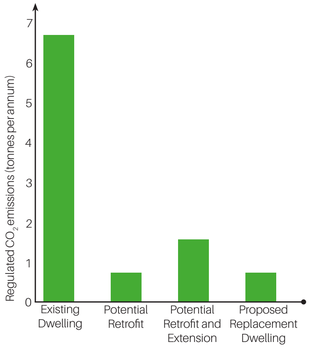


Figure 5.12 Comparison of the carbon dioxide emissions of the exsting dwelling, the potential retrofit and extension scenario and the proposed replacement dwelling

Section 6

Conclusion.

6 | Conclusion

6.1 This Energy Statement provides an overview as to how the proposed redevelopment of 9D The Grove, Highgate contributes to sustainable development in the context of strategic, design and construction considerations.

6.2 Consideration has been given to the London Borough of Camden's Local Plan and associated documents in the formulation of this outline energy strategy., which represents best practice in meeting the required standards of energy efficiency and carbon dioxide (CO_2) emissions.

6.3 The proposed energy strategy is based upon the principles of the Energy Hierarchy, on the basis that it is preferable to reduce carbon dioxide emissions through reduced energy consumption above decarbonisation through alternative energy sources.

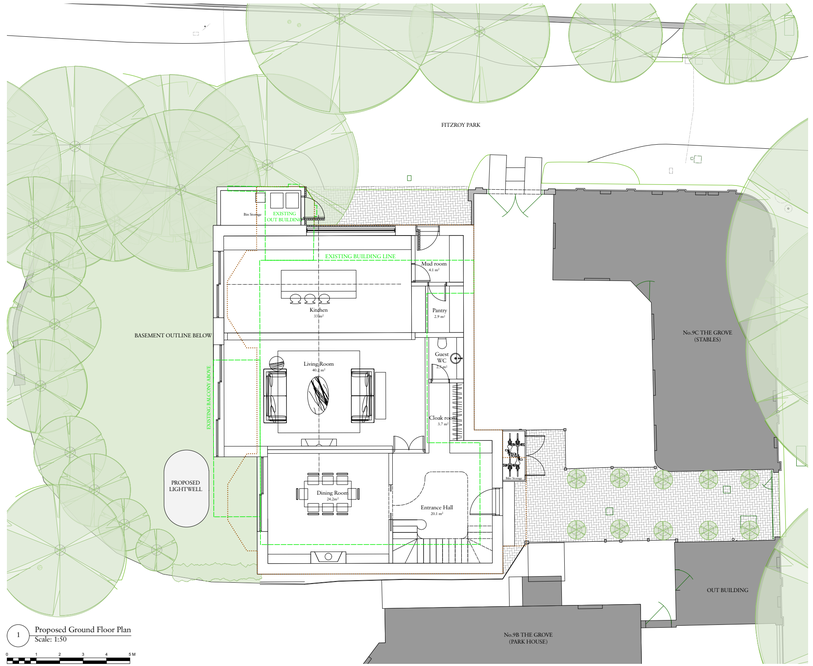
6.4 The key measures proposed to minimise carbon dioxide emissions from the proposed development are set out below:

- Specification of a high level of building fabric performance to minimise heat loss, whilst still providing effective ventilation to minimise the risk of overheating;
- A balanced proportion of façade glazing to ensure natural daylight provision without increasing overheating risk;
- Low energy LED lighting to minimise artificial lighting energy consumption;
- Openable windows provided on multiple aspects to enable a natural ventilation strategy, with mechanical ventilation with heat recovery also to be provided to deliver fresh air without the needto open windows;
- A high specification of heating controls to ensure operational efficiency;
- Employment of a highly efficient air source heat pump (ASHP) system to serve the space and heating demands of the proposed dwelling; and
- Provision of rooftop photovoltaic (PV) panels to generate renewable electricity on-site.

6.5 By designing to rigorous energy standards, and omitting the use of fossil fuels for space and water heating through the employment of an air source heat pump system (ASHP), the application will respond directly to the Climate Emergency declared by the Council in April 2019. These measures combine to provide a carbon dioxide emissions saving of 79.4%, compared to the Part L:2021 baseline, meeting and exceeding the requirements of the London Borough of Camden's policies through on-site means alone.

6.6 Overall, the proposals constitute sustainable development in accordance with national, regional and local policy requirements, and will provide a new dwelling seeking to promote these principles in operation.

Appendix A1
Site Layout.



1 Proposed Ground Floor Plan
Scale: 1:50

0 1 2 3 4 5 10

The outcome of pre-app was that an acceptable massing scheme was established. The outline of this is shown in Brown dotted line.

Rev	Date	Details	By

Charlton Brown
Architecture & Interiors

The Belvedere, 2 Rock Lane, Hampstead, London, NW3 1HL
Telephone +44(0)20 7794 1234
Email office@charltonbrown.com
Website www.charltonbrown.com

Client
Mr N Cohen

Project
9D The Grove, Highgate, London, N6 6JU

Drawing Title
Proposed Ground Floor Plan

Date	Drawn	Checked
01/08/2021	NL	JM

Scale
1:50

Issue Status
Planning

Project Number	Drawing Number	Revision
1912	PL-00-100	

Appendix A2

BREL Reports - Proposed Replacement Dwelling.

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Thu 24 Nov 2022 15:26:37

Project Information			
Assessed by	Test User	Building Type	House, Detached
DCDEA Registration	STR0000006	Assessment Date	2022-11-09

Dwelling Details			
Assessment Type	As designed	Total Floor Area	339 m²
Site Reference	9D The Grove • Proposed • Be Lean	Plot Reference	9DTG_Proposed_Be Lean
Address	9d The Grove, LONDON, N6 6JU		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Mains gas	
Target carbon dioxide emission rate	8.64 kgCO$_2$/m²	
Dwelling carbon dioxide emission rate	9.64 kgCO$_2$/m²	FAIL

1b Target primary energy rate and dwelling primary energy rate		
Target primary energy	46.62 kWh$_{PE}$/m²	
Dwelling primary energy	53.21 kWh$_{PE}$/m²	FAIL

2a Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	42 kWh/m²	
Dwelling fabric energy efficiency	35.7 kWh/m²	OK

2c Fabric Uvalues

Element	*Maximum permitted* average U-Value (W/m²K)	Dwelling average U-Value (W/m²K)	Element with highest individual U-Value	
External walls	0.26	0.15	Basement Wall (0.15)	OK
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	0.12	Basement Floor (0.1)	OK
Roofs	0.16	0.12	Roof (0.12)	OK
Windows, doors, and roof windows	1.6	0.81	1.11	OK
Rooflights	2.2	N/A	N/A	N/A

2d Exchange Elements (Other than typically expected values are flagged with a subsequent (!))

Name	Net area (m²)	U-Value (W/m²K)
Basement wall: Basement Wall	150.3	0.15
Exposed wall: External Wall	191.87	0.15
Basement floor: Basement Floor	125	0.1 (!)
Ground floor: Ground Floor	17	0.1 (!)
Exposed roof: Roof	145	0.12

2e Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area (m²)	Orientation	Frame factor	U-Value (W/m²K)
1, Doors	2.5	North	N/A	1 (!)
2, Doors	1.08	East	N/A	1 (!)
3, Windows (1)	2.75	North	0.7	0.8 (!)
4, Windows (1)	9.45	East	0.7	0.8 (!)
5, Windows (1)	12.25	South	0.7	0.8 (!)
6, Windows (1)	49.14	West	0.7	0.8 (!)

2f Thermal bridging (Better than typically expected values are flagged with a subsequent (!))

Building part 1 • **Main Dwelling**: SAP default y-value (0.2 W/m²K) used for thermal bridging.

2 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	8 m³/hm²	
Dwelling air permeability at 50Pa	3 m³/hm², Design value: (!)	OK
Air permeability test certificate reference	Not Provided	

4 Space heating		
Main heating system 1: Boiler with radiators or underfloor heating • Mains gas		
Efficiency	90.8%	
Emitter type	Radiators	
Flow temperature	35°C	
System type		
Manufacturer		
Model		
Commissioning		
Secondary heating system: N/A		
Fuel	N/A	
Efficiency	N/A	
Commissioning		

5 Hot water		
Cylinder/Store • type: Cylinder		
Capacity	150 litres	
Declared heat loss	1.95 kWh/day	
Primary pipework insulated	Yes	
Manufacturer		
Model		
Commissioning		
Waste water heat recovery system 1 • type: N/A		
Manufacturer		
Model		

6 Controls		
Main heating 1 • type: Time and temperature zone control by arrangement of plumbing and electrical services		
Function		
Ecodesign class		
Manufacturer		
Model		
Water heating • type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		

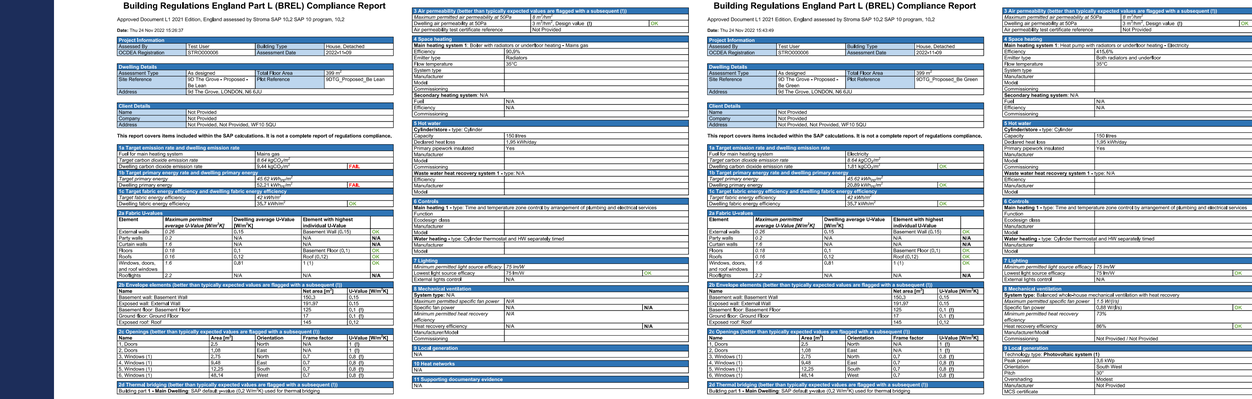
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	79 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	N/A	
Specific fan power	N/A	N/A
Minimum permitted heat recovery efficiency	N/A	
Heat recovery efficiency	N/A	N/A
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A



Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Thu 24 Nov 2022 15:43:49

Project Information			
Assessed by	Test User	Building Type	House, Detached
DCDEA Registration	STR0000006	Assessment Date	2022-11-09

Dwelling Details			
Assessment Type	As designed	Total Floor Area	339 m²
Site Reference	9D The Grove • Proposed • Be Green	Plot Reference	9DTG_Proposed_Be Green
Address	9d The Grove, LONDON, N6 6JU		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	8.64 kgCO$_2$/m²	
Dwelling carbon dioxide emission rate	8.61 kgCO$_2$/m²	OK

1b Target primary energy rate and dwelling primary energy rate		
Target primary energy	46.62 kWh$_{PE}$/m²	
Dwelling primary energy	20.89 kWh$_{PE}$/m²	OK

2a Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	42 kWh/m²	
Dwelling fabric energy efficiency	15.7 kWh/m²	OK

2c Fabric Uvalues

Element	*Maximum permitted* average U-Value (W/m²K)	Dwelling average U-Value (W/m²K)	Element with highest individual U-Value	
External walls	0.26	0.15	Basement Wall (0.15)	OK
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	0.12	Basement Floor (0.1)	OK
Roofs	0.16	0.12	Roof (0.12)	OK
Windows, doors, and roof windows	1.6	0.81	1.11	OK
Rooflights	2.2	N/A	N/A	N/A

2d Exchange Elements (Other than typically expected values are flagged with a subsequent (!))

Name	Net area (m²)	U-Value (W/m²K)
Basement wall: Basement Wall	150.3	0.15
Exposed wall: External Wall	191.87	0.15
Basement floor: Basement Floor	125	0.1 (!)
Ground floor: Ground Floor	17	0.1 (!)
Exposed roof: Roof	145	0.12

2e Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area (m²)	Orientation	Frame factor	U-Value (W/m²K)
1, Doors	2.5	North	N/A	1 (!)
2, Doors	1.08	East	N/A	1 (!)
3, Windows (1)	2.75	North	0.7	0.8 (!)
4, Windows (1)	9.45	East	0.7	0.8 (!)
5, Windows (1)	12.25	South	0.7	0.8 (!)
6, Windows (1)	49.14	West	0.7	0.8 (!)

2f Thermal bridging (Better than typically expected values are flagged with a subsequent (!))

Building part 1 • **Main Dwelling**: SAP default y-value (0.2 W/m²K) used for thermal bridging.

2 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	8 m³/hm²	
Dwelling air permeability at 50Pa	3 m³/hm², Design value: (!)	OK
Air permeability test certificate reference	Not Provided	

4 Space heating		
Main heating system 1: Heat pump with radiators or underfloor heating • Electricity		
Efficiency	415.6%	
Emitter type	Both radiators and underfloor	
Flow temperature	35°C	
System type		
Manufacturer		
Model		
Commissioning		
Secondary heating system: N/A		
Fuel	N/A	
Efficiency	N/A	
Commissioning		

5 Hot water		
Cylinder/Store • type: Cylinder		
Capacity	150 litres	
Declared heat loss	1.95 kWh/day	
Primary pipework insulated	Yes	
Manufacturer		
Model		
Commissioning		
Waste water heat recovery system 1 • type: N/A		
Manufacturer		
Model		

6 Controls		
Main heating 1 • type: Time and temperature zone control by arrangement of plumbing and electrical services		
Function		
Ecodesign class		
Manufacturer		
Model		
Water heating • type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		

7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	79 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	1.5 W/l/s)	
Specific fan power	0.89 W/l/s)	OK
Minimum permitted heat recovery efficiency	73%	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation		
Technology type: **Photovoltaic system (1)**		
Peak power	3.6 kWp	
Orientation	South West	
Pitch	30°	
Overshading	Modest	
Manufacturer	Not Provided	
MCS certificate		

Appendix A3
BREL Reports - Existing Dwelling.

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Thu 24 Nov 2022 14:34:58

Project Information			
Assessed By	Test User	Building Type	House, Detached
DCDEA Registration	STR0000008	Assessment Date	2022-01-08

Dwelling Details			
Assessment Type	As designed	Total Floor Area	165 m^2
Site Reference	9D The Grove - Existing	Plot Reference:	9DTG_Existing
Address	9d The Grove, LONDON, N6 6JJ,		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Mains gas	
Target carbon dioxide emission rate	8.38 $kgCO_2/m^2$	
Dwelling carbon dioxide emission rate	43.19 $kgCO_2/m^2$	FAIL
1b Target primary energy rate and dwelling primary energy		
Target primary energy	46.22 kWh_{PE}/m^2	
Dwelling primary energy	232.6 kWh_{PE}/m^2	FAIL
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	42.2 kWh/m^2	
Dwelling fabric energy efficiency	186.9 kWh/m^2	FAIL

2a Fabric U-values

Element	Maximum permitted average U-Value [W/m^2K]	Dwelling average U-Value [W/m^2K]	Element with highest individual U-Value	
External walls	0.26	1.3	External Wall (1,4)	FAIL
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	1.02	Ground Floor (1,02)	FAIL
Roofs	0.16	1.45	Roof (4,5)	FAIL
Windows, doors and roof windows	0.6	4.89	4 (5,9)	FAIL
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))

Item	Net area [m^2]	U-Value [W/m^2K]
Exposed wall: External Wall	142,369	1,4
Exposed wall: Wall to Garage	23,874	(1,7) !
Ground floor: Ground Floor	84	1,02
Exposed roof: Roof	84,5	1,5

2c Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
1, Doors	2,14	North	N/A	1 (!)
2, Doors	1,936	West	N/A	1 (!)
3, Doors	3,918	West	N/A	1 (!)
4, Windows (1)	6,936	East	0,7	5,9
5, Windows (1)	8,248	South	0,7	5,9
6, Windows (1)	16,502	West	0,7	5,9

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))

Building part 1 • **Main Dwelling**. SAP default y-value (0,2 W/m^2K) used for thermal bridging.

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/m^2*	
Dwelling air permeability at 50Pa	15 m^3/hm^2 Assumed value	FAIL
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Boiler with radiators or underfloor heating • Mains gas	
Efficiency	90,8%
Emitter type	Radiators
Flow temperature	35°C
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store • type: Cylinder	
Capacity	150 litres
Declared heat loss	1,95 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 • type: N/A	
Manufacturer	
Model	

6 Control	
Main heating 1 • type: Time and temperature zone control by arrangement of plumbing and electrical services	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating • type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	78 lm/W	
Lowest light source efficacy	79 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	N/A	
Specific fan power	N/A	N/A
Minimum permitted heat recovery efficiency	N/A	
Heat recovery efficiency	N/A	N/A
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

Appendix A4

BREL Reports - Potential Retrofit Scenario.

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Thu 24 Nov 2022 15:04:53

Project Information			
Assessment ID	Test User	Building Type	House, Detached
DCOEA Registration	STRO000008	Assessment Date	2022-01-08

Dwelling Details			
Assessment Type	As designed	Total Floor Area	165 m²
Site Reference	9D The Grove + Retrofit	Plot Reference	9DTG_Retrofit
Address	9d The Grove, LONDON, N6 4JJ		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	8.38 kgCO₂/m²	
Dwelling carbon dioxide emission rate	4.86 kgCO₂/m²	OK

1b Target primary energy rate and dwelling primary energy		
Target primary energy	72.23 kWh$_{PE}$/m²	
Dwelling primary energy	55.45 kWh$_{PE}$/m²	FAIL

1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	42.2 kWh/m²	
Dwelling fabric energy efficiency	80.9 kWh/m²	FAIL

2a Fabric U-values

Element	Maximum permitted average U-Value [W/m²K]	Dwelling average U-Value [W/m²K]	Element with highest individual U-Value	
External walls	0.26	0.53	External Wall (0.55)	FAIL
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	0.2	Ground Floor (0.2)	FAIL
Roofs	0.16	0.32	Roof (0.32)	FAIL
Windows, doors and roof windows	0.6	1.32	4 (1.4)	N/A
Rooflights	0.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))

Name	Net area [m²]	U-value [W/m²K]
Exposed wall: External Wall	142.369	0.55
Exposed wall: Wall to Garage	23.874	0.4
Ground floor: Ground Floor	84	0.2
Exposed roof: Roof	84.5	0.32

2c Openings (better than typically expected values are flagged with a subsequent (!))

Name	Area [m²]	Orientation	Frame factor	U-value [W/m²K]
1, Doors	2.14	North	N/A	1 (!)
2, Doors	1.836	West	N/A	1 (!)
3, Doors	3.918	West	N/A	1 (!)
4, Windows (1)	6.936	East	0.7	1.4
5, Windows (1)	8.248	South	0.7	1.4
6, Windows (1)	16.502	West	0.7	1.4

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))	
Building part 1 • **Main Dwelling**. SAP default y-value (0.2 W/m²K) used for thermal bridging	

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	8 m³/m²	
Dwelling air permeability at 50Pa	15 m³/m² Assumed value	! FAIL
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating • Electricity	
Efficiency	396.2%
Emitter type	Underfloor
Flow temperature	35°C
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store • type: Cylinder	
Capacity	150 litres
Declared heat loss	1.95 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 • type: N/A	
Manufacturer	
Model	

6 Controls	
Main heating 1 • type: Time and temperature zone control by arrangement of plumbing and electrical services	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating • type: Cylinder thermostat and HIU separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	79 lm/W	
Lowest light source efficacy	79 lm/W	OK
External lights control	N/A	

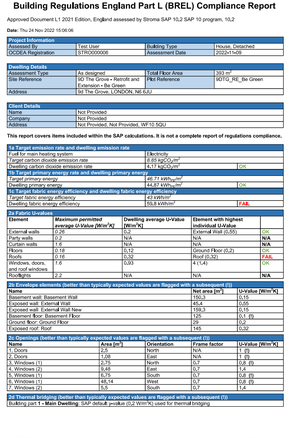
8 Mechanical ventilation		
System type: N/A		
Maximum permitted specific fan power	N/A	
Specific fan power	N/A	N/A
Minimum permitted heat recovery efficiency	N/A	
Heat recovery efficiency	N/A	N/A
Manufacturer/Model		
Commissioning		

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	3.6 kWp
Orientation	South West
Pitch	30°
Overshading	Modest
Manufacturer	Not Provided
MCS certificate	

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

Appendix A5
BREL Reports - Potential Retrofit and Extension Scenario.



Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Thu 24 Nov 2022 15:06:06

Project Information			
Assessor's ID	Test User	Building Type	House, Detached
DCDEA Registration	STR0000008	Assessment Date	2022-11-09

Dwelling Details			
Assessment Type	As designed	Total Floor Area	303 m^2
Site Reference	9D The Grove + Retrofit and Extension + Be Green	Plot Reference	9DTG_RE_Be Green
Address	9d The Grove, LONDON, N6 6JU		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	8.49 kgCO$_2$/m^2	
Dwelling carbon dioxide emission rate	4.51 kgCO$_2$/m^2	OK
1b Target primary energy rate and dwelling primary energy rate		
Target primary energy	46.71 kWh$_{PE}$/m^2	
Dwelling primary energy	44.87 kWh$_{PE}$/m^2	OK
2a Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	43 kWh/m^2	
Dwelling fabric energy efficiency	59.8 kWh/m^2	FAIL

2b Fabric Uvalues				
Element	Maximum permitted average U-Value [W/m^{2}K]	Dwelling average U-Value [W/m^{2}K]	Element with highest individual U-Value	
External walls	0.26	0.2	External Wall (0.55)	OK
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Roofs	0.16	0.12	Ground Floor (0.2)	OK
Floors	0.18	0.32	Roof (0.32)	FAIL
Windows, doors, and roof windows	1.6	0.83	4 (1.4)	OK
Rooflights	2.2	N/A	N/A	N/A

2c Linear e-bridging - value when typically expected values are flagged with a subsequent (1)		
Name	Net area [m^2]	U-Value [W/m^2K]
Basement wall: Basement Wall	150.3	0.15
Exposed wall: External Wall	45.4	0.55
Exposed wall: External Wall New	199.3	0.15
Basement floor: Basement Floor	125	0.1 (I)
Ground floor: Ground Floor	29	0.2
Exposed roof: Roof	145	0.32

2d Openings (better than typically expected values are flagged with a subsequent (1))				
Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
1, Doors	2.5	North	N/A	1 (I)
2, Doors	1.08	East	N/A	1 (I)
3, Windows (1)	2.73	North	0.7	0.8 (I)
4, Windows (1)	6.75	East	0.7	0.8 (I)
5, Windows (1)	6.75	South	0.7	0.8 (I)
6, Windows (1)	46.14	West	0.7	0.8 (I)
7, Windows (2)	1.5	South	0.7	1.4

2e Thermal envelope (where they typically expected values are flagged with a subsequent (1))
Building part 1 • **Main Dwelling**: SAP default y-value (0.2 W/m^{2}K) used for thermal bridging

3 Air permeability (better than typically expected values are flagged with a subsequent (1))		
Maximum permitted air permeability at 50Pa	8 m^3/hm^2	
Dwelling air permeability at 50Pa	10 m^3/hm^2, Design value	FAIL
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating • Electricity	
Efficiency	356.5%
Emitter type	Both radiators and underfloor
Flow temperature	35°C
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store • type: Cylinder	
Capacity	150 litres
Declared heat loss	1.95 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 • type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 • type: Time and temperature zone control by arrangement of plumbing and electrical services	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating • type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	79 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	1.5 W/(l/s)	
Specific fan power	0.68 W/(l/s)	OK
Minimum permitted heat recovery efficiency	73%	
Heat recovery efficiency	86%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	3.6 kWp
Orientation	South West
Pitch	30°
Overshading	Modest
Manufacturer	Not Provided
MCS certificate	

Appendix A6
General Notes.

A6 | General Notes

A4.1 The report is based on information available at the time of the writing and discussions with the client during any project meetings. Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by Iceni Projects Ltd for inaccuracies in the data supplied by any other party.

A4.2 The review of planning policy and other requirements does not constitute a detailed review. Its purpose is as a guide to provide the context for the development and to determine the likely requirements of the Local Authority.

A4.3 No site visits have been carried out, unless otherwise specified.

A4.4 This report is prepared and written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in guidance may necessitate a re-interpretation of the report in whole or in part after its original submission.

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