Energy and Sustainability Report

Lanwades Woodland Park - Hybrid Application

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Revision History

Version	*Date Issued*	*Issued by*	*QA Check*
1	28/03/2025	*Robert Holbrook, BSc MSc* *Alex Dodson, BSc* *Matt Cooke, BSc*	*Tim James, C.Eng MCIBSE BSc MSc*
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About Environmental Economics

Our team of experienced consultants specialise in construction and building energy. We have qualifications in sustainability, energy, engineering, building physics and construction as well as environmental, quality management and auditing.

We develop flexible, practical, cost-effective specifications for our clients through identifying solutions and delivering design advice. This includes the following disciplines:

- *Energy Reports*
- *Sustainability Statements*
- *Compliance assessments and advice covering*
    - *Part L (SAP) & Future Homes Standard*
    - *Part F (ventilation)*
    - *Part G (water)*
    - *Part O (overheating)*
- *Overheating - TM59 dynamic modelling*
- *Overheating – simple method*
- *Life cycle carbon assessments*
- *Net zero carbon assessments*
- *BREEAM*
- *SBEM (existing and new build)*
- *Minimum Energy Efficiency Standards (MEES)*
- *Thermal Bridging (Psi value calculations)*

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1. Executive Summary

1.1.1. Environmental Economics Ltd has been commissioned by Lochailort Kentford Ltd to produce an energy and sustainability report for the mixed-use development at Lanwades Woodland Park. This document sets out how the development proposal presents a positive sustainable development and meets the policy requirements.

1.1.2. As part of the sustainable development strategy, the proposed development has been designed to consider sustainability in accordance with the National Planning Policy Framework (NPPF), the Joint Development Management Policies Document 2015 (JDMPD) and the emerging local plan.

1.1.3. Water efficiency has been reviewed as part of the design process and a Part G compliant specification will be adopted, resulting in the higher standard (lower water use) of 110 litres/person/day. This is in line with requirements laid out in Policy DM7 of the Joint Development Management Policies Document 2015 along with emerging policies SP1 and LP1.

1.1.4. The proposed development is designed to achieve low carbon emissions in line with the upcoming Future Homes Standard through the adoption of good fabric performance and employment of low and zero carbon technologies.

1.1.5. In accordance with JDMPD Policy DM8, the calculated carbon saving over the Part L 2021 baseline is 531 t/yr (see Appendix C). This is achieved through the adoption of good fabric performance and employment of low and zero carbon technologies including:

- Air Source Heat Pumps (ASHPs)
- Photovoltaic (PV) Panels
- Decentralised Mechanical Extract Ventilation (dMEV).

1.1.6. Conforming with emerging Local Plan Policies SP1 and LP1, the sample Standard Assessment Procedure calculations (SAPs) assessed achieve an average uplift of 60% over Part L 2021 (see Appendix C), surpassing the estimated 49% betterment expected from the Future Homes Standard (FHS).

1.1.7. PV is proposed to be installed to each plot in accordance with Policy LP1 of the emerging Local Plan.

1.1.8. The use of smart meters will provide occupiers with real time data which will allow occupiers to manage their energy consumption, save money and reduce carbon. This is particularly important as the UK migrates towards half-hourly pricing levels and the proposed smart grid system.

1.1.9. Electric vehicle charging points will be provided for all plots in line with Part S of the 2021 Building Regulations.

1.1.10. Potential overheating risk will be assessed for the plots being built to Part L 2021 in accordance with Approved Document O.

1.1.11. While the development is still at an early stage of the design process, it is considered that the proposal meets or exceeds the required level of sustainability across all given criteria.

2. Project Overview

2.1. Description of Site

2.1.1. The site proposal consists of the construction of 860 residential dwellings which include detached, semi-detached and terraced housing, apartments and maisonettes. Also included on the site is a retail unit, a 90-room care home, an employment hub and a school.

2.1.2. The proposed location plan is shown in Appendix A.

2.2. Planning Policy

2.2.1. The planning authority for this site is the West Suffolk Council. The documents containing the relevant planning policies are the Joint Development Management Policies Document 2015 (JDMPD) and the emerging local plan.

2.2.2. The relevant policies in the JDMPD are:

2.2.3. Policy DM6: Flooding and Sustainable Drainage

Proposals for all new development will be required to submit schemes appropriate to the scale of the proposal detailing how on-site drainage will be managed so as not to cause or exacerbate flooding elsewhere. Examples include: rainwater harvesting and greywater recycling, and run-off and water management such as Sustainable Urban Drainage Systems (SUDS) or other natural drainage systems.

2.2.4. Policy DM7: Sustainable Design and Construction

All proposals for new development including the re-use or conversion of existing buildings will be expected to adhere to broad principles of sustainable design and construction and optimise energy efficiency through the use of design, layout, orientation, materials, insulation and construction techniques.

In particular, proposals for new residential development will be required to demonstrate that appropriate water efficiency measures will be employed to ensure that either:

- *water consumption is no more than 110 litres per person per day (including external water use) as calculated using the government's (September 2009) Water Efficiency Calculator or such standard that replaces it, or*
- *no water fitting exceeds the values set out in Table 1 (or any other fittings specification that government issues to supersede this).*

All new non-residential developments over 1000 square metres will be required to achieve the BREEAM Excellent standard or equivalent unless it can be demonstrated that one or more of the following conditions apply:

- *it is not possible to meet one or more of the mandatory credits for an Excellent rating due to constraints inherent within the site. In this case development will be expected to accrue the equivalent number of credits by targeting other issues while achieving an overall Very Good rating.*
- *the cost of achieving an Excellent rating can be demonstrated to compromise the viability of the development. In this case applicants will be expected to agree with the Council whether the target should be relaxed, or whether cost savings could be achieved in another aspect of the development.*

All new developments will be expected to include details in the Design and Access statement (or separate energy statement) of how it is proposed that the site will meet the energy standards

set out within national Building Regulations. In particular, any areas in which the proposed energy strategy might conflict with other requirements set out in this Plan should be identified and proposals for resolving this conflict outlined.

2.2.5. Policy DM8: Low and Zero Carbon Energy Generation

All proposals for generation or recovery of low carbon or renewable energy, such as wind turbines, biomass, and combined heat and power, will be encouraged subject to the following criteria:

a. proposals will be required to demonstrate the new carbon saving benefit that they will create, taking into account both carbon dioxide savings from renewable energy generation and any additional carbon dioxide generation that results from the proposal;

b. proposals will be required to include a landscape and visual assessment which should, where appropriate:

i. show the impact of the proposal in the landscape or townscape. All development should be designed and sited to minimise intrusion and visual impact;

ii. include mitigation measures to address the visual impact of the scheme;

iii. include an appraisal of the impact on the environment of the proposal either in isolation or cumulatively with any other similar developments;

c. where appropriate the proposal includes provision for mitigation and compensation measures, such as habitat enhancement or relocation.

All proposals will need to demonstrate to the satisfaction of the Local Planning Authority that due regard has been given to the following:

d. the impact of off-site and on-site power generation infrastructure including achieving underground connections to the electricity grid system; and

e. in respect of proposals for wind turbines, current standards relating to noise emission, shadow flicker and other negative effects such as interference to television transmission and air traffic control systems and the effects on public health; and

f. soil quality is not affected adversely by either construction or the operation or decommissioning of the development.

In the case of proposals in nature conservation sites, or within or visible from Conservation Areas or other heritage assets, the developer or operator must be able to demonstrate to the satisfaction of the Local Planning Authority that the proposal represents the highest standards of siting and design appropriate to the location.

2.2.6. The relevant policies in the emerging local plan are:

2.2.7. Policy SP1 The climate and environment emergency and sustainable development

Proposals for all types of development must take account of the climate and environment emergency through good design and inclusion of measures to build in resilience and adapt to or mitigate the impact of climate change by:

- *Designing for accessible communities minimising the need to travel, creating active travel routes and maximising the potential for and delivering sustainable travel (including associated links and facilities).*
- *Minimising energy consumption.*
- *The use of low and zero carbon energy sources.*
- *The use of sustainably sourced and low carbon building materials.*
- *The use of sustainable drainage systems to help avoid and reduce the risk of flooding.*
- *Providing betterment over the existing situation in areas at risk of flooding and seeking to achieve integrated water management.*
- *Contributing to improving the water quality of rivers and groundwater in West Suffolk.*
- *Providing, integrating and connecting blue and green infrastructure.*
- *Climate resilient design including prevention of overheating in buildings and implementation of designs for urban cooling through the retention of landscape features and provision of green infrastructure, including appropriate tree-planting and increasing canopy cover.*
- *Identifying and developing nature-based solutions to contribute to reducing carbon emissions and mitigating and adapting to climate change.*
- *Conserving and enhancing biodiversity and protecting geodiversity of sites and surrounding areas through implementation of the mitigation hierarchy.*
- *The reduction and prevention of pollution.*
- *The use of higher water efficiency standards to ensure sustainable use of water resources across new developments including integrated water management measures.*
- *The application of measures from construction through to end user to reduce waste, promote recycling, and source materials locally.*

2.2.8. Policy LP1 Sustainable design and construction

All proposals for development, including the conversion of buildings and extensions, must submit evidence with each application demonstrating how the proposal will meet sustainable design and construction requirements commensurate with the scale and location of the proposal. Proposals should demonstrate:

Active travel

a. Measures have been taken to include active travel to provide access to local services and facilities, designing walking and wheeling routes within sites and connecting sites to existing routes, improving existing routes and creating new connections where appropriate to suit all users. This must include the elderly, less mobile people, women, and those with prams, buggies and young children.

b. Consideration of the location of future bus routes and stops with well-designed, safe and attractive pedestrian paths at reasonable walking distances from homes, and the provision of sustainable travel initiatives such as car clubs and e-bikes.

Environment

c. How green infrastructure, building design and landscaping proposals incorporate sustainability features that protect and enhance biodiversity such as nest boxes, hedgehog gaps, wildlife corridors (including providing routes under busy roads where appropriate), green roofs, green bus shelters, living walls on flats, community buildings and business premises.

d. The development is located and designed to be resilient, taking account of long-term climate change impacts such as rising temperatures, flooding, wind speeds, heavy rain and snowfall.

e. How integrated water management has been considered in the design process to increase water efficiency and reduce surface water flooding.

Design and building

f. Designs utilise the fabric first approach and achieve carbon standards primarily through energy efficient design and materials. This should specifically focus on how demands on heating and cooling have been considered in the design stage and reduced through orientation of the building, the location of windows, thermal mass and shading, and how orientation optimises opportunities for on-site photovoltaic or solar thermal heating. Designs should indicate how the balance between solar gain and solar shading is to be managed.

g. The choice of materials has considered the use of biogenic building materials (for example wood, hemp and lime mortar or plaster) as alternatives to high carbon materials.

All proposals for residential development are required to submit a sustainability statement that sets out what measures are proposed to address water efficiency and achieve energy efficiency above building regulations standards prior to the introduction and implementation of the Government's Future Homes Standards (intended 2025).

Sustainability statements should demonstrate how the design follows a fabric first approach. Applicants should consider renewable sources of energy (such as solar PV, solar thermal, air or ground source heat pumps, community or shared energy initiatives).

Applicants will be expected to include photovoltaic (PV) panels on roofs (unless it can be demonstrated that the orientation of the roof, lack of suitable roof area or other constraints makes this impractical).

Building Research Establishment Environmental Assessment Method (BREEAM)

Proposals for residential development of more than 100 homes will be required to complete a BREEAM pre-assessment (to be submitted with the application) and subsequently to complete a communities assessment excellent standard (evidenced by a certificate upon completion.)

All new buildings of 500 square metres or more for non-residential and residential institution proposals (for example care homes) will be required to meet the latest version of Building Research Establishment Environmental Assessment Method (BREEAM) New Construction Excellent standard, evidenced on completion by a BREEAM fully fitted certificate.

Passivhaus

Passivhaus principles and certification are encouraged and will be considered as an exemption from BREEAM requirements.

2.2.9. This report seeks to address the planning policies relevant for the proposed site and present a sustainable strategy.

2.2.10. This report should be read in conjunction with other reports prepared for this development.

2.3. Building Regulations

2.3.1. All new build development must comply with Building Regulations. This development is expected to fall under the upcoming Future Homes Standard, which is expected to be published in 2025 and represents an improvement on current (Part L 2021) building regulations by approximately 49%.

2.3.2. As software for the Future Homes Standard is not yet available, a sample of dwellings have been modelled in the SAP 10 software. There are two transitional periods proposed, but it's likely that all the units on site will fall under FHS regulations.

2.3.3. The former government minister Christopher Pincher is quoted as saying, "A new home built to Future Homes Standard in 2025 is to have 75-80% lower carbon emissions than Part L 2013."[1]

2.3.4. Based on the above statement and the 31% betterment from Part L1A 2013 to Part L1A 2021 regulations, it can be reasoned that the likely betterment over current regulations (Part L 2021) will be 49%.

2.3.5. Currently, there is no modelling software available to test whether the sample house types will pass the future regulations. Therefore, we have used SAP 10 methodology, but set a target of a 49% betterment in CO2 emissions over the current regulations as follows:

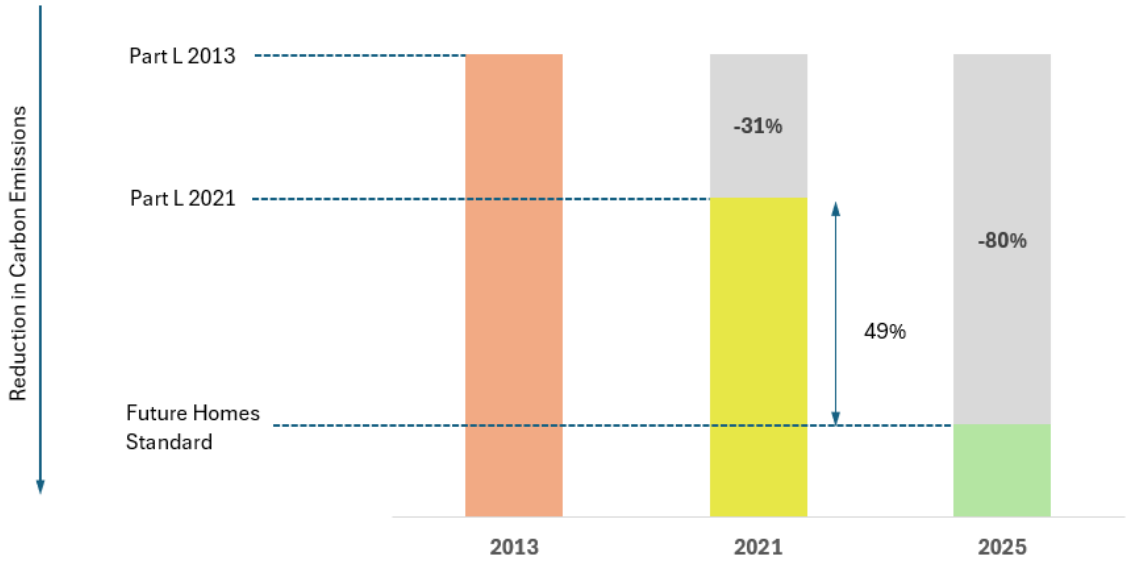


Figure 1: Regulatory targets for Carbon emissions. Percentage figures are reductions over Part L 2013 baseline.

[1] Christopher Pincher, "Housing Minister's Speech at HOMES UK Conference," GOV.UK, accessed November 6, 2024, https://www.gov.uk/government/speeches/housing-ministers-speech-at-homes-uk-conference.

3. Sustainability Appraisal

3.1. Green Guide Materials

3.1.1. The Green Guide is used to examine the environmental impact of the construction materials commonly used within dwellings.

3.1.2. The proposed development should be constructed using materials consisting of predominantly 'A' and 'A+' Green Guide rated elements. 'A+' rated construction elements include: pitched roof construction, internal upper floors, internal timber partitions and external cavity walls.

3.2. Responsible Sourcing

3.2.1. Materials used within construction of the proposed development are to be at a certified standard, proving the materials sourced have been done so with sustainability in mind.

3.2.2. Responsible sourcing of materials can come in a variety of certifications including: BES 6001, FSC, PEFC and EMS.

3.2.3. Additionally, the site aims to utilise timber that is procured sustainably and independently accredited by either the FSC or PEFC schemes.

3.2.4. Materials will be sourced sustainable and responsibly in line with emerging policy SP1.

3.3. Waste Management

3.3.1. The proposed development aims to use waste reduction procedures to enable waste reduction and diversion of waste from landfill. The goal is to minimise waste and maximise re-use of resources in response to climate change.

3.3.2. It is recommended that a waste management plan be utilised to divert maximum waste from landfill.

3.3.3. Adequate space will be provided for storage and sorting of operational waste and recycling. Collection will be designed to fit with the surrounding area.

3.3.4. Waste management will be in line with requirements laid out in emerging policy SP1.

3.4. Flood Risk

3.4.1. Appendix B shows the Environment Agency Flood Risk Map for the site location.

3.4.2. All residential development on site will be within Flood Zone 1, the lowest probability evaluated by the Environment Agency. Flood Zone 1 is defined as land with less than 1 in 1000 annual probability of river or sea flooding.

3.4.3. Zone 1 flood risk is considered best practice for a positive sustainable development and would be well located for a site that is resilient to climate change.

3.4.4. The development therefore complies with Policy DM6 of the Joint Development Management Policies Document 2015.

3.5. Sustainable Urban Drainage

3.5.1. A Drainage and Flood Risk Assessment has been carried out for this development.

3.5.2. This study included a SuDS Assessment. The assessments carried out consider any potential drainage and flood risk issues which could arise from the development and put forward recommendations to mitigate these impacts.

3.5.3. The site will benefit from a new attenuation pond to reduce the impact on drainage.

3.5.4. Full details of the recommendations put forward can be found in the associated report.

3.5.5. The development therefore complies with Policy DM6 of the Joint Development Management Policies Document 2015 along with emerging policy SP1.

3.6. Ecology

3.6.1. A full Ecology Assessment has been carried out for the site.

3.6.2. The Ecology Assessment takes into account any habitats and species which could be impacted by the proposed development and puts forth recommendations on how to minimise any potential impacts and protect or improve any habitats.

3.6.3. The proposed development will provide a 10% net biodiversity gain through the provision of targeted habitat enhancements.

3.6.4. Full details of the recommended approach to ecology can be found in the associated report.

3.6.5. The Ecology Assessment will detail how the development complies with emerging policy SP1.

3.7. Air Quality

3.7.1. A full Air Quality Assessment has been carried out for this development.

3.7.2. The Air Quality Assessment report includes information on potential mitigation measures which could be implemented for the site to reduce impacts on the quality of air in the vicinity of the development.

3.7.3. Full details of the Air Quality Assessment can be found in the associated report.

3.8. Accessibility

3.8.1. The site will provide good access to existing services and facilities in the local area including the existing Kennett train station that regularly runs between Cambridge and Ipswich, existing bus services, employment areas and amenities in Kentford. Also, the proposals will be within walking and cycling distance of the Kennett Garden Village site to the north of Kennett train station and the facilities which are currently under construction and comprise a new primary school, commercial floorspace, new village centre with shops, café and healthcare facilities.

3.8.2. Improvements will be made to local road networks, pedestrian routes and bridleways, benefiting both the proposed development and the surrounding area.

3.8.3. This will include the management and maintenance of the existing trees and tree belts across the site, opening up footpaths and bridleways within these areas and improving local accessibility through the site. This will allow users to avoid walking along the B1506 to The Gallops and School Lane, and travel through the site instead.

3.9. Electric Vehicle Charging

3.9.1. Providing EV charging points or the ability to retrofit EV charging points is an exemplary measure for sustainability and promotes sustainable lifestyles for residents.

3.9.2. With the provision of EV charging points, residents would have ready opportunity to purchase / lease EV's and have immediate secure charging infrastructure. This aligns with current government policy to stop the sale of new petrol and diesel cars by 2030 (GOV.UK, November 2020).

3.9.3. The BEAMA Guide to Electric Vehicle Infrastructure (BEAMA, 2015) illustrates the various "Modes" of electric car charging, with Mode 1 being the slowest, and Mode 4 the fastest. Mode 1 is not recommended and Mode 4 is only recommended for public and commercial use. Modes 2 to 3 are suitable for dedicated charging of EV's at domestic properties. Please refer to Figure 2 below which shows common infrastructure side connections for Mode 2 and 3.

CONNECTOR TYPE	BS 1363	BS EN 60309-2	BS EN 62196-2 TYPE 2	BS EN 62196-2 TYPE 3
				
MODE	2	2	3	3
MAX POWER (kW) (at mains voltage i.e. harmonised EU voltages)	Single phase - 3	Single phase - 28.8 Three phase - 86.6	Single phase - 16.1 Three phase - 43.7	Single phase - 7.4 Three phase - 43.7
NOTES	Standard UK household plug & socket-outlet system	Standard industrial plug & socket-outlet system	Specialist EV	Specialist EV

Figure 2 – Common infrastructure options for Mode 2 and 3 EV charging points (BEAMA, 2015)

3.9.4. It is currently proposed that EV charging points will be provided in accordance with Suffolk County Council Guidance for Parking (2023) along with Part S of the 2021 Building Regulations.

3.9.5. The number of parking spaces with EV charging points will be equal to the number of dwellings on the development and will have a minimum nominal rated output of 7kW. EV charging points will not be provided for covered car parking spaces, in line with Approved Document S of the 2021 Building Regulations.

3.10. Water Use

3.10.1. The design team will implement a specification which complies with the optional requirement of 110 litres/person/day as set out in Approved Document G 2015 with 2016 amendments (AD-G).

3.10.2. While the build specifications are not yet set, the table below provides an example of a compliant strategy, delivering reduced water consumption of 110litres/person/day.

		(1)	(2)	(3)	(4)
Installation type	**Unit of measure**	**Capacity / flow rate**	**Use factor**	**Fixed use (litres/ person/ day)**	**Litres/ person/day = [(1) × (2)] + (3)**
WC (dual flush)	Full flush volume (litres)	4	1.46	0.00	5.84
WC (dual flush)	Part flush volume (litres)	2.6	2.96	0.00	7.696
Taps (excluding kitchen/utility room taps)	Flow rate (litres/minute)	5	1.58	1.58	9.48
Bath (where shower also present)	Capacity to overflow (litres)	170	0.11	0.00	18.7
Shower (where bath also present)	Flow rate (litres/minute)	9	4.37	0.00	39.33
Kitchen/utility room sink taps	Flow rate (litres/minute)	5	0.44	10.36	12.56
Washing machine	Litres/kg dry load	8.17	2.1	0.00	17.157
Dishwasher	Litres/place setting	1.25	3.6	0.00	4.5
	(5)	**Total calculated use = (Sum column 4)**			115.3
	(6)	Contribution from greywater (litres/person/day) from Table 4.6			0
	(7)	Contribution from rainwater (litres/person/day) from Table 5.5			0
	(8)	Normalisation factor			0.91
	(9)	Total water consumption = [(5) – (6) – (7)] x (8)			104.9
	(10)	External water use			5.0
Approved Document G	**(11)**	**Total water consumption = (9) + (10) (litres/person/day)**			109.9

3.10.3. Alternative component consumption rates are available which can achieve the required water consumption. The rates provided are representative only.

3.10.4. The calculated results show that utilisation of the representative component's water consumption can achieve a maximum of 105 litres per person per day internally, and additional external water use of 5 litres per person per day.

3.10.5. The development therefore complies with requirements laid out in Policy DM7 of the Joint Development Management Policies Document 2015 along with emerging policies SP1 and LP1.

3.11. Overheating Risk

3.11.1. Extreme temperatures have an adverse effect on health and wellbeing. 'Overheating' occurs when the building temperature exceeds the limits of thermal comfort. Since UK weather data records began in 1884, the ten warmest years have all occurred since 2003, including 2020, 2022 and 2023. Future temperatures should be considered across a building's lifetime to ensure further thermal comfort. Furthermore, advances in air tightness and thermal insulation levels have exacerbated overheating risk.

3.11.2. The Building Regulations (Amendment) (England), 2021, requires all residential buildings limit overheating risk by limiting unwanted solar gains in summer and by providing an adequate means of removing excess heat from the indoor environment. This can be assessed either by using the simplified method, which is set out in Section 1 of Approved Document O (ADO), or by using the dynamic thermal modelling method, as set out in Section 2 of ADO, which is based on CIBSE TM59.

3.11.3. There are many factors to consider when assessing overheating risk, such as the building orientation, cross ventilation, glazing area, window openable area, total solar transmittance of glazing, building fabric efficiency, solar shading and ventilation provision.

3.11.4. Solutions to mitigate overheating risk include improving shading, which limits solar gains, and increasing ventilation, which can help purge habitable rooms of hot air. Shading solutions include low g-factor glazing, brise soleil, shutters and overhangs. Ventilation solutions include low-noise extract fans, mechanical ventilation (if heat recovery is specified, it must include a summer bypass), and ceiling fans. All ventilation systems must meet the noise requirements set out in Approved Document F.

3.11.5. The safety and reasonable enjoyment of the residence of all occupants must be considered when designing overheating solutions. If all strategies to passively cool the building are insufficient, then mechanical cooling may be used.

3.11.6. Whilst Approved Document O is only applicable to dwellings, it is recommended that overheating assessments are also conducted to inform the design of the care home and school. Children and elderly people are more vulnerable to the adverse effects of overheating and therefore careful limitation of summertime heat gains should be considered to optimise the comfort of occupants. BB 101 is an overheating assessment methodology designed for schools, and the CIBSE TM52 methodology could be used to assess the care home.

3.12. BREEAM

3.12.1. BREEAM is a sustainability assessment methodology for non-domestic developments that assesses the project on the issues of management, health and wellbeing, energy, transport, water, materials, waste, land use and ecology, and pollution.

3.12.2. The proposed shop unit has an internal area of 251 m^2, was falls below the 500 m^2 minimum floor area to qualify for the requirement for a BREEAM pre-assessment. The school and care home are targeting a BREEAM rating of Excellent, as detailed in the BREEAM pre-assessments.

3.12.3. Sustainability remains a key objective for this development despite a BREEAM assessment not being required. The shop unit will limit water consumption to levels achieving a least two Water 01 BREEAM credits (BREEAM UK New Construction V6.1).

4. Energy Performance

4.1. Assessment Methodology

4.1.1. It is expected that the proposed dwellings for this development will fall under the Future Homes Standard Building Regulations. Currently, there is no modelling software available to test whether the sample house types will pass the future regulations. Therefore, we have used the SAP 10 methodology. The software provides several outputs, and based on the provided specification for this proposed development, we are able to assess the following areas for our calculations:

- *Building regulations compliance, including:*
  - *Carbon emissions (kg CO2/m2/year)*
  - *Primary Energy Demand (kWh/m2/annum)*
  - *Fabric Energy Efficiency (kWh/m2/annum)*
- *Energy usage per year (kWh/annum)*
- *Energy costs per year (£/annum)*
- *More detailed breakdowns by end use (space heating, water heating, cooking, lighting, appliances)*

4.1.2. Each of these outputs can be used in different ways to analyse the performance of the dwelling. The total regulated carbon emissions for each property is based upon:

- *Space heating;*
- *Water heating;*
- *Electricity for pumps and fans;*
- *Electricity for lighting.*

4.1.3. Part L 2021 requires all newbuild properties to be designed to operate space heating at lower temperatures to ensure suitability for heat pumps (AD-L, section 5.10). It is therefore a natural decision to adopt heat pumps to deliver space heating and hot water on this development.

4.1.4. SAP software is issued by independent software suppliers, and checked and approved on behalf of government by the Building Research Establishment (BRE).

4.1.5. The specifications enclosed are provided in order to illustrate good design intent and indicate resultant performance. Data should therefore be taken as draft and has scope to be updated prior to construction stage.

4.1.6. The non-domestic buildings will be assessed using an approved SBEM software tool during detailed design.

4.2. Design Philosophy

4.2.1. Upgrades have been made to a number of elements from a standard build specification in order to improve energy efficiency across the development.

4.2.2. The proposed development adopts nationally recognised design and construction principles as the industry moves towards zero carbon. The principles are illustrated in Figure 3 below.

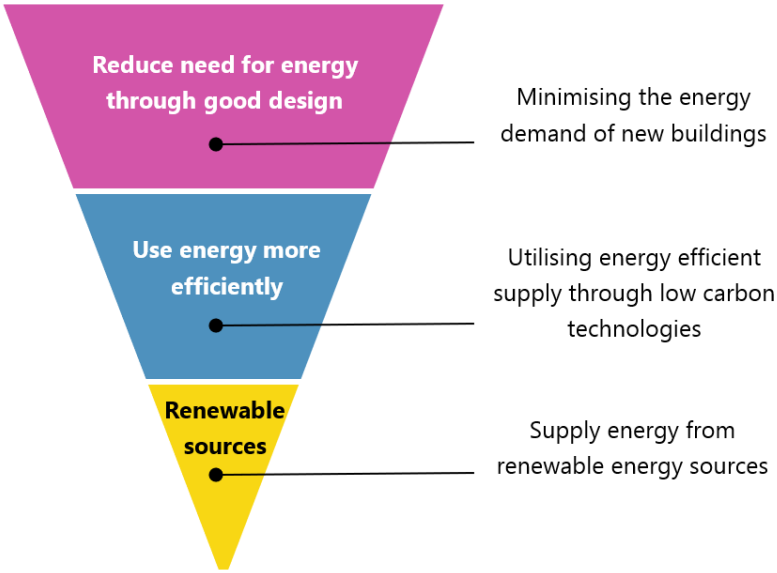


Figure 3 – The Energy Hierarchy

4.2.3. To reduce the residual carbon emissions a number of improvements will be made to the standard material and product specification. These improvements include:

- *Upgraded heating and hot water controls*
- *Improved insulation levels*
- *Design air permeability of 4m3/hr/m2*
- *Bespoke low heat loss thermal bridging details*

4.3. Building Fabric

4.3.1. The building fabric for all dwellings within the proposed development will be improved in comparison to ADL 2021 specifications. These fabric improvements reduce the space heating requirement upon a property. The improvements will be made through a combination of upgraded materials and increased insulation thicknesses. High performing double or triple glazing with a larger transmittance factor allowing for increased solar gains will also be used.

4.3.2. The current plans for this site do not propose specific materials to be used for building the new properties. Therefore, U-values used for the sample assessments are based on the notional specification in ADL 2021. When the materials have been confirmed for the building, they must be less than or equal to the notional U-Values listed in Table 1.

Table 1 – Part L 2021 Domestic Build Specification

Element	*Part L 2021 Backstop*	*Notional U-Value Performance*
-	***W/m²k***	***W/m²k***
Walls	0.26	0.18
Roof	0.16	0.11
Doors	1.60	1.20
Floors	0.18	0.13
Glazing	1.60	1.20

4.3.3. Please note that this specification is not finalised and is subject to change up until construction stage.

4.3.4. As improvements are made to the thermal conductivity of main elements, thermal bridging and air permeability becomes increasingly significant in the overall fabric performance.

4.3.5. The design is at an early stage, and so it is not feasible to accurately model psi values (thermal losses at junctions of building elements). Therefore, the design SAP assessments have included psi values as per the schedule used within the Notional Building (TER) calculation, set out in The Government's Standard Assessment Procedure for Energy Rating of Dwellings v10.2 Table R2. During detailed design process the actual psi values must be modelled and should achieve the Notional values.

4.3.6. A target air pressure rating of 4.00m3/hr/m2 has been set for all domestic units and the non-domestic unit on site, which is an improvement on the maximum allowable rating in the 2021 Building Regulations.

4.4. Building Services & Renewable Energy (LZCT)

4.4.1. The systems used in a property to supply hot water and heating, as well as to control it, are important to the overall energy demand of a property. Building Regulations include requirements for efficiency and controls of such equipment, including space heating, water heating, ventilation and lighting.

4.4.2. The design of building services which provide space heating and domestic hot water, ventilation, and lighting, must be considered in a holistic way in order to avoid unintended consequences and to maximise the benefits from such systems

4.4.3. After due consideration of the potential LZCT available (shown in Appendix E) the design team propose to adopt the following technologies for the residential units which provide benefits / compliance with national and local policies as listed:

- ***Air source heat pumps (ASHPs):***
  - No connection to the gas grid.
  - Uses grid electricity as the fuel.
  - Provides 100% space heating and domestic hot water.
  - Minimum co-efficient of performance over 2.5 (250% efficient)
  - ASHP are defined as LZCT. For every 1 kWh of grid electricity consumed they deliver approx. 3kWh into the dwelling (300% efficient). 2kWh is taken from ambient air.
  - Delivers very good performance within Building Regulations assessments.
  - Significant reduction in primary energy demand due to the Coefficient of Performance (COP).
- ***Photovoltaic (PV) Panels***
  - *Low noise and visual pollution.*
  - *Efficient low-carbon source of renewable energy.*
- ***Decentralised Mechanical Extract Ventilation (dMEV)***
  - *Quieter than standard extractor fans.*
  - *Technology that manages humidity that is significantly more energy efficient in comparison to standard extractor fans.*

4.4.4. It is currently proposed to provide heating and hot water via ASHPs for all dwellings. A product information sheet detailing the modelled ASHP can be found in Appendix F. An alternative manufacturer or product can be utilised subject to similar specification and performance being obtained.

4.4.5. PV is proposed to be installed to each plot. For the purpose of the report, the modelled housetypes match the notional dwellings PV. The amount of PV and location on roof per plot may change at detailed design stage.

4.4.6. dMEV is currently proposed to be used as the ventilation strategy for all dwellings. A product information sheet detailing the modelled dMEV can be found in Appendix G. An alternative manufacturer or product can be utilised subject to similar specification and performance being obtained.

4.4.7. As the proposed units will be built to comply with the Future Homes Standards, software for which is currently not available, these proposals will be revised accordingly at a later date.

4.4.8. A full breakdown of the LZC technologies considered for the proposed development is shown in Appendix E.

4.4.9. Where installed, hot water cylinders can lose a significant amount of energy. To minimise this energy loss and corresponding carbon emissions, cylinders which have higher levels of insulation in comparison to typical hot water cylinders will be used.

4.4.10. Hot water distribution pipework will be fully insulated.

4.4.11. Lighting provision will be from LED low energy fittings achieving a minimum efficacy of 100 lamp lumens per circuit watt, an improvement of over 50% from AD-L 2013 performance levels.

4.4.12. Smart meters will be installed on all properties, providing:

- Real time information on energy use both in terms of consumption and cost
- Occupier can manage their energy, save money and reduce carbon emissions
- Smart meters will also allow for easier switching between suppliers
- Facilitate a more reactive, price driven, demand-response
- End estimated billing and eliminate the need for meter readers to visit premises

4.5. Non-Domestic Specification

4.5.1. The school and care home are targeting an 'Excellent' BREEAM rating. Five credits are targeted in the 'Ene 01 Reduction of energy use and carbon emissions' issue, which means the school and care home will need to be constructed with a high level of thermal insulation and air tightness to reduce the heating demand and therefore the carbon emissions. Although not assessed for BREEAM, these same design principles should be applied to the shop. The proposed buildings will meet or improve on the target efficiencies as per Table 2 below:

Table 2 – Part L 2021 Non-Domestic Build Specification

Element	*Part L 2021 Backstop*	*Target U-Value Performance*
-	***W/m²k***	***W/m²k***
Walls	0.26	0.16
Roof (pitched)	0.16	0.11
Roof (flat)	0.18	0.15
Pedestrian doors	1.60	1.60
Floors	0.18	0.18
Glazing	1.60	1.50
Air tightness	8 $m^3/(h.m^2)$	4 $m^3/(h.m^2)$

4.5.2. During detailed design, the project team will work with an accredited non-domestic energy assessor to ensure the specification and design of the shop, school and care home are compliant with Part L of the Building Regulations and are on track to achieve the minimum BREEAM excellent standard of four Ene 01 credits.

4.5.3. The building services supplying the school and care home will be confirmed during detailed design and tested for compliance with Part L and BREEAM Ene 01 using an approved SBEM software tool. Whilst not offering specific recommendations for care homes, CIBSE Guide B0: HVAC strategies for common building types, 2016, recommends similar building services to a typical dwelling.

4.5.4. Schools should be carefully designed to consider acoustics, daylighting, and ventilation. CIBSE Guide B0 recommends that the heating system provides good control of heat output to ensure fast response to change in load, avoidance of draughts for natural ventilation inlets in winter and tamper-proof heating controls. A building management system should be provided, offering the following heating system controls as a minimum: optimum start/stop; automatic frost protection; zoning, allowing out of hours use; simple overrides for occasional extended hours or for holidays mode; local thermostatic control with limited adjustment offered to building users; weather compensation should be used where boiler plant capacity exceeds 100 kW and may also be useful applies to smaller heating zones.

4.5.5. To meet the high standards stipulated in Policy DM7 of the JDMPD, careful consideration will be given to the lighting strategy. Highly efficient LEDs will be used. Presence detection and photosensors may be utilised if shown to reduce the carbon emissions in the SBEM model.

4.5.6. During detailed design, the construction of the glazing will be reviewed as part of the SBEM assessment to balance the beneficial solar gain in the winter with potential overheating risk in the summer. Overheating reduces occupant comfort which has an adverse effect on health, and also increases the cooling demand, which in turn increases the energy consumption

5. Conclusion

5.1.1. This energy and sustainability report has been prepared for the mixed-use development Lanwades Woodland Park.

5.1.2. The development strategy sets a high standard of overall sustainability with measures that include:

- Building elements with highest standard 'A+' Green Guide ratings including upper floors, external cavity walls, internal partitions, insulation and pitched roof;
- Material suppliers with responsible sourcing certification guided by a high-quality sustainable procurement policy;
- Effective waste management procedures to minimise waste;
- The implementation of drainage, ecology and air quality assessments;
- The provision of EV charging points to all plots;
- Efficient internal and external water use in line with building regulations.

5.1.3. In accordance with JDMPD Policy DM8, the calculated carbon saving over the Part L 2021 baseline is 531 t/yr (see Appendix C). This is achieved through the adoption of good fabric performance and employment of low and zero carbon technologies including:

- Air Source Heat Pumps (ASHPs)
- Photovoltaic (PV) Panels
- Decentralised Mechanical Extract Ventilation (dMEV).

5.1.4. Conforming with emerging Local Plan Policies SP1 and LP1, the sample Standard Assessment Procedure calculations (SAPs) assessed achieve an average uplift of 60% over Part L 2021 (see Appendix C), surpassing the estimated 49% betterment expected from the Future Homes Standard (FHS).

5.1.5. PV is proposed to be installed to each plot in accordance with Policy LP1 of the emerging Local Plan.

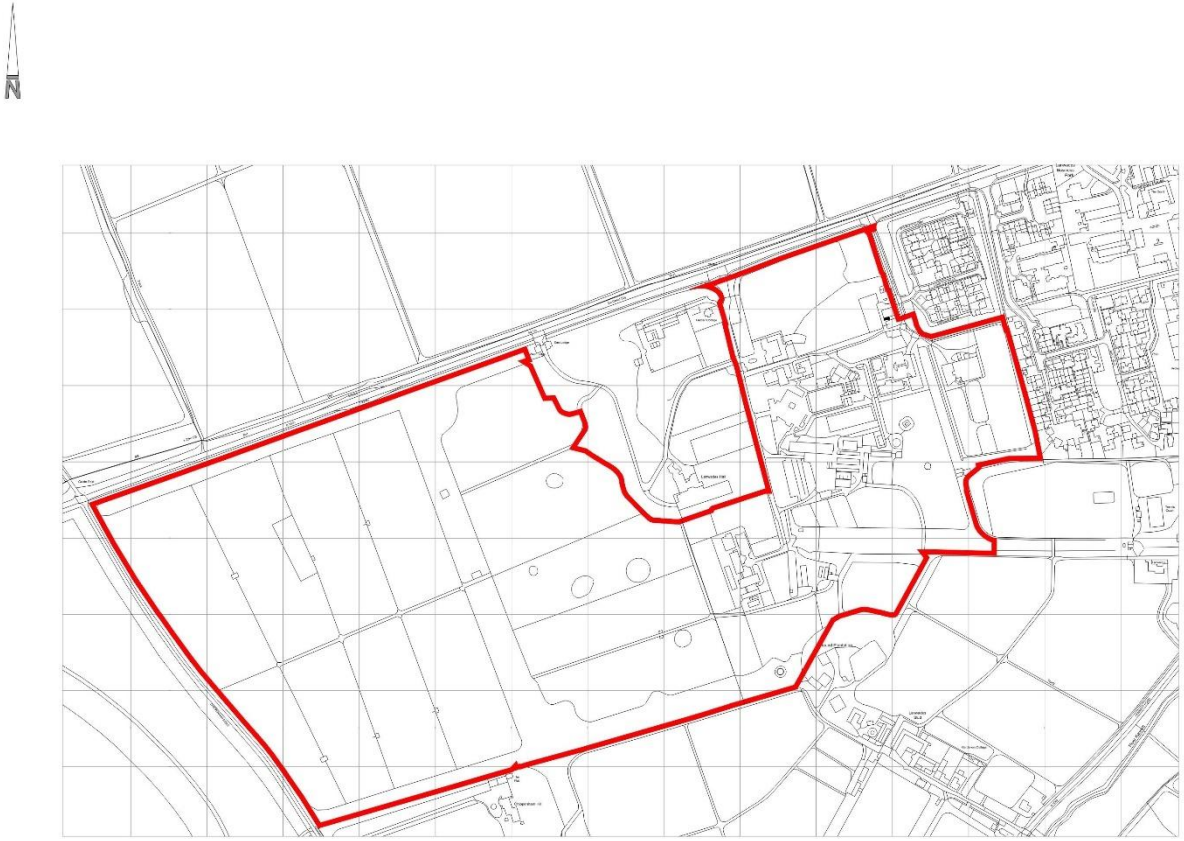
5.1.6. It should be noted that future policies and building regulations may require an update to the sustainability measures within this report.

5.1.7. The proposed site is found to present a positive sustainable development based on the assessed sustainability criteria and exceeds current standards with an exemplary strategy.

5.1.8. It can therefore be seen that the proposed development:

- *Is Part L 2021 compliant ☑*
- *Has Low / zero carbon energy sources ☑*
- *Delivers significant reduction in total carbon reductions ☑*
- *Meets likely Future Homes Standard ☑*

Appendix A – Location Plan



NOTES

1. Contractors must check all dimensions on site. Only figured dimensions are to be worked from. Discrepancies must be reported to the Architect or Engineer before proceeding. © This drawing is copyright.
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3. Direct scaling off the drawing is permissible for planning purposes only.

REV	DESCRIPTION	DRN	CHD	DATE
■	PRELIMINARY ☐ INFORMATION ☐ TENDER			
☐	CONSTRUCTION ☐ AS BUILT			

SCALE	1/2500 @ A1	DATE	Feb. 2025
DRAWN	JAL	CHK	-
DRAWING NO.	19400/1021	REV	-

TITLE: Redevelopment of Former Animal Testing Research Facility, Kentford.

DETAILS: Location Plan. Hybrid Application.

Woods Hardwick
Architecture | Engineering | Planning | Surveying

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PLEASE CONSIDER THE ENVIRONMENT BEFORE PRINTING THIS DRAWING

Appendix B – Flood Risk Map (Zone 1)

Environment Agency

Flood map for planning

Your reference	Location (easting/northing)	Created
Lanwades	**569375/266085**	**27 March 2025 17:00**

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- in an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2025 AC0000807064. https://flood-map-for-planning.service.gov.uk/os-terms

Page 1 of 2

Appendix C – Carbon Reduction Calculations

Domestic Units

Proposed Development incorporating ASHPs

Unit type	Floor Area (m^2)	SAP 10.2 Calculated Occupancy (N)	Number of units	Regulated Carbon Emissions (TER)			Regulated Carbon Emissions (DER)			
				A	B	C	D	E	F	G
				TER (kgCO2/m2/yr)	Total Carbon (Kg/year/unit)	Regulated Carbon emissions (t/yr)	DER (kgCO2/m2/yr)	DER<TER (%)	Total Carbon (Kg/year/unit)	Regulated Carbon emissions (t/yr)
1 Bed Dwelling	55.02	1.84	24	12.60	693.25	**16.64**	4.16	66.98	228.88	**5.49**
2 Bed Dwelling	70.58	2.26	178	11.97	844.84	**150.38**	4.26	64.41	300.67	**53.52**
3 Bed Dwelling	101.08	2.75	472	10.05	1015.85	**479.48**	4.00	60.20	404.32	**190.84**
4 Bed Dwelling	134.96	2.91	161	9.19	1240.28	**199.69**	3.95	57.02	533.09	**85.83**
5 Bed Dwelling	173.08	2.97	25	8.51	1472.91	**36.82**	3.86	54.64	668.09	**16.70**
Totals			**860**			**883.01**				**352.38**

Regulated Carbon Emissions from actual dwellings (t/yr):	352.38
Regulated carbon emissions from notional dwellings (t/yr):	883.01
Reduction in CO2 Emissions across site over 2021 regs:	**60.09%**

Assumptions:
0.136 = Emission Factor Electricity SAP10.2

Appendix D – Low and Zero Carbon Technologies

	Description	Advantages	Disadvantages	Adopted?
Photovoltaic (PV) Cells	Generates electricity from solar energy from the sun.	• Provides carbon savings • Excess electricity can be exported to the grid • Low maintenance	• Additional capital cost	✓
Air Source Heat Pumps (ASHP)	ASHP provide heating and hot water to a home through thermal energy gathered from air outside the dwelling.	• Net zero ready complying with UK Government policy to reach net zero carbon by 2050. • This is achieved by utilizing low carbon grid electricity. • Typical CoP of 3.5 leading to large energy and carbon savings.	• Requires professional commissioning to ensure optimal performance. This ensures cost parity with gas systems.	✓
Ground Source Heat Pumps (GSHP)	GSHP provide heating and hot water to a dwelling through geothermal effects.	• CoP can be greater than that of ASHPs	• Rely on having appropriate ground conditions • Expensive to install	
Solar Hot Water (SHW)	SHW systems generate energy which is used to heat stored water (in a special solar hot water cylinder) which offsets the energy required for the boiler, thereby reducing fuel use and reducing carbon emissions.	• Meets approximately 50% hot water demand for a dwelling	• PV cells provide more efficient use of roof area compared to SHW	
Biomass Heating Systems	Biomass heating systems burn fuels, considered carbon neutral, to heat the water required for a dwelling.	• Large variety of systems available • Good carbon savings when replacing electrical hot water system	• High maintenance	
Wind Turbines	Wind turbines provide electricity directly to a dwelling. They can be added to a property in two ways: pole mounted or building mounted.	• Large-scale pole mounted turbines provide great financial return	• Pole mounted require a lot of space • Building mounted have lower power output	

Subject to final SAP calculations, the following technologies could be considered for the scheme:

	Description	Advantages	Disadvantages	Adopted?
Waste Water Heat Recovery (WWHR)	Recovers the energy that is lost from the waste water that is generated from showers.	• Reduces load on the main DHW system, leading to greater energy/carbon savings • Passive design requiring very low maintenance	• Additional capital cost	

Appendix E – Modelled ASHP Product Information

Heating | Product Information

MITSUBISHI ELECTRIC

PUZ-WM50VHA(-BS)

Ecodan R32

Monobloc Air Source Heat Pump

R32

Key Features:	Key Benefits:
A+++ high efficiency system	Ultra low running cost
Ultra quiet noise levels	Flexible product placement
Maintains full heating capacity at low temperatures	Confident and quick product selection
Zero carbon solution	Help to tackle the climate crisis
MELCloud enabled	Remote control, monitoring, maintenance and technical support

MELCloud

Manufactured in the UK

037-0032-20-01

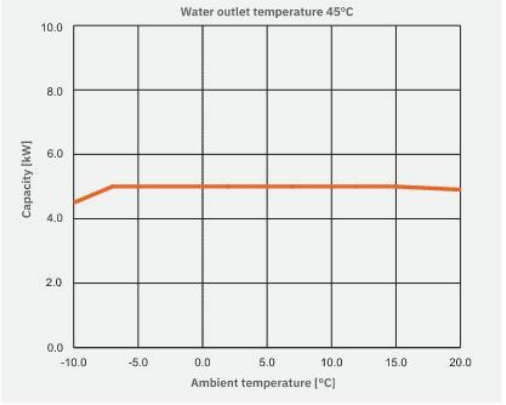
ecodan.co.uk

Heating | **Product Information**

PUZ-WM50VHA(-BS)
Ecodan R32
Monobloc Air Source Heat Pump

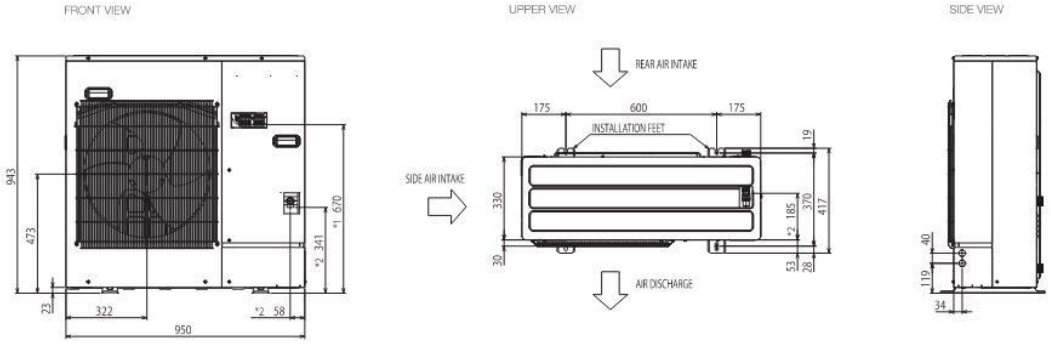
OUTDOOR UNIT		PUZ-WM50VHA(-BS)
HEAT PUMP SPACE HEATER - 55°C	ErP Rating	A++
	η_s	129%
	SCOP (MCS)	3.24
HEAT PUMP SPACE HEATER - 35°C	ErP Rating	A+++
	η_s	183%
	SCOP (MCS)	4.62
HEAT PUMP COMBINATION HEATER - Large Profile*1	ErP Rating	A+
	η_{wh}	135%
HEATING*2 (A-7/W35)	Capacity (kW)	5.0
	Power Input (kW)	1.67
	COP	3.00
OPERATING AMBIENT TEMPERATURE (°C DB)		-20 ~ +35
SOUND DATA*3	Pressure Level at 1m (dBA)	52
	Power Level (dBA)*4	61
WATER DATA	Pipework Size (mm)	22
	Flow Rate (l/min)	14
	Water Pressure Drop (kPa)	12.0
DIMENSIONS (mm)	Width	950
	Depth	330+30*7
	Height	943
WEIGHT (kg)		71
ELECTRICAL DATA	Electrical Supply	220-240V, 50Hz
	Phase	Single
	Nominal Running Current (MAX) (A)*5	4.64 [13]
	Fuse Rating - MCB Sizes (A)*6	16
REFRIGERANT CHARGE (kg) / CO_2 EQUIVALENT (t)	R32 (GWP 675)	2.0 / 1.35

NOMINAL HEATING CAPACITY



Notes:
*1 Combination with E*PT20X Cylinder
*2 Under normal heating conditions at outdoor temp: -7°CDB / -8°CWB, outlet water temp 35°C, inlet water temp 30°C.
*3 Under normal heating conditions at outdoor temp: 7°CDB / 6°CWB, outlet water temp 55°C, inlet water temp 47°C as tested to BS EN14511.
*4 Sound power level tested to BS EN12102.
*5 Under nominal heating conditions at outdoor temp: 7 C, outlet water temp: 35 C.
*6 MCB Sizes BS EN60898-2 & BS EN6094 / -2.
*7 Grille.
η_s is the seasonal space heating energy efficiency (SSHEE). η_{wh} is the water heating energy efficiency

PUZ-WM50VHA(-BS) DIMENSIONS



All dimensions (mm)

*1:- INDICATION OF TERMINAL CONNECTION LOCATION.
*2:- INDICATION OF PRESSURE RELIEF VALVE DRAIN PORT.

MITSUBISHI ELECTRIC
Changes for the Better

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@meuk_les @green_gateway | Mitsubishi Electric Living Environmental Systems UK | Mitsubishi Electric Cooling and Heating UK | mitsubishielectricuk_les | Mitsubishi Electric Living Environmental Systems UK | BLOG thehub.mitsubishielectric.co.uk

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IRELAND Mitsubishi Electric Europe, Westgate Business Park, Ballymount, Dublin 24, Ireland. Telephone: (01) 419 8800 Fax: (01) 419 8890 International code: (003531)

Note: Refer to 'Installation Manual' and 'Instruction Book' for further 'Technical Information'. The fuse rating is for guidance only and please refer to the relevant databook for detailed specification. It is the responsibility of a qualified electrician/ electrical engineer to select the correct cable size and fuse rating based on current regulation and site specific conditions. Mitsubishi Electric's air conditioning equipment and heat pump systems contain a fluorinated greenhouse gas, R410A (GWP:2088), R32 (GWP:675), R407C (GWP:1774), R134a (GWP:1430), R513A (GWP:631), R454B (GWP:466), R1234ze (GWP:7) or R1234yf (GWP:4). *These GWP values are based on Regulation (EU) No 517/2014 from IPCC 4th edition. In case of Regulation (EU) No.626/2011 from IPCC 3rd edition, these are as follows: R410A (GWP:1975), R32 (GWP:550), R407C (GWP:1650) or R134a (GWP:1300).

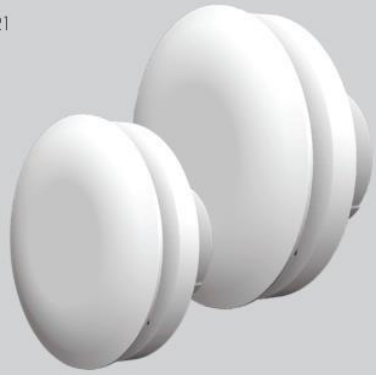
Effective as of August 2020

Green Gateway greengateway.mitsubishielectric.co.uk

Appendix F – Modelled dMEV Product Information

Lo-Carbon NBR dMEV C

- Continuously running 100mm and 125mm dMEV with sleek circular design
- Designed to comply with the latest Building Regulations Parts L1A and F 2021
- SAP PCDB listed with SFP's down to 0.08 W/l/s
- Near silent operation independently tested
- IPX5 rated, wall and ceiling mounted Zones 1, 2 and 3
- Low ceiling void - 56mm (100mm spigot) and 66mm (125mm spigot)
- Easy to commission, fully adjustable variable control platform
- Intelligent humidistat model option with proportional increase and timer
- Comfort control option
- 7- year warranty



Lo-Carbon NBR dMEV C

Increased whole ventilation rates, should not mean increased noise levels. The Vent-Axia Lo-Carbon NBR dMEV C fan, available in 100mm and 125mm, provides adequate ventilation whilst minimising noise.

The fan is designed in line with the Approved Document F 2021 Building Regulations, meeting the increased whole house ventilation rates.

Table 1.3 - Minimum whole dwelling ventilation rates determined by the numbers of bedrooms.

No. of bedrooms	2013 Edition	2021 Edition	Increase
1	13l/s	19l/s	46%
2	17l/s	25l/s	47%
3	21l/s	31l/s	47%
4	25l/s	37l/s	48%
5	43l/s	43l/s	48%

The minimum whole dwelling ventilation rate for the supply air should meet the higher of the two following result:

- A minimum rate of 0.3l/s per m^2 of internal floors area
- A minimum rate determined by the number of bedroom, as per Table 1.3

Nuisance tripping has also been minimised within the fan logic. The integral humidity sensor versions have functionality that allows for proportional speed increase up to 85% relative humidity (RH) before enabling Boost.

The Lo-Carbon NBR dMEV C is complete with IPX5 rating, allowing flexible installation within Zone 1, 2 and 3.

A back pressure detection system option is available, to Boost if the system pressure increase momentarily due to external wind conditions. A silent mixed flow impeller means the Lo-Carbon NBR dMEV C can meet the requirements of many domestic installations without the need to use a traditional centrifugal fan.

A brand new control platform also provides fully adjustable airflow, meaning wholehouse rates can be achieved easily using fewer fans.

Comfort Control Option

Designed to offer a more relaxing environment to the homeowner, the Lo-Carbon NBR dMEV C features a delayed start. This patented comfort control option allows the homeowner to enjoy a quiet, peaceful bathroom for up to 20 minutes before the Boost activates. Furthermore, if the light switch turns On and Off within three minutes, the Boost will not activate. No more disturbing the family if the bathroom light is turned on during the night.

Near Silent Operation

The fan has been designed to be as discreet as possible for homeowners, with independently tested sound levels as low as 7.4dB(A).

Vent-Axia

Model

Lo-Carbon NBR dMEV C

For kitchen, utility and bathroom/toilet applications, the continuous running dMEV C fan is available as standard or as a humidistat model which incorporates an ambient response humidistat. The fan will increase the extract rate if the humidity rises above the point set at installation. Both fans will have optional Comfort Control, which includes a timer function.

Variable speed setting

Model	Stock Ref
Lo-Carbon NBR dMEV C 100	498095
Lo-Carbon NBR dMEV C 100 HT	498096

Variable speed setting

Model	Stock Ref
Lo-Carbon NBR dMEV C 125	498097
Lo-Carbon NBR dMEV C 125 HT	498098

Accessories

Model Stock Ref	
Wall Kit White 100mm	254102
Wall Kit Brown 100mm	254100
Wall Kit White 125mm	455226
Wall Kit Brown 125mm	497434
Wall Kit Terracotta 125mm	497432

Consultant Specification

The de-centralised mechanical extract ventilation unit shall be the Lo-Carbon NBR dMEV C as manufactured by Vent-Axia, exact unit sizing and specification shall be in accordance with the particular specification.

The range should consist of IPX5 rated 100mm and 125mm sizes to meet the Building Regulations compliant design, extracting air from wet rooms (including kitchen and utility) via rigid, flexible ducting or through-wall applications with the fewest fans possible, supplied with a 7 - year warranty.

The 100mm Lo-Carbon NBR dMEV C should have variable speed settings of 5-26 l/s achieving a minimum noise level of 7.4dB(A) at 3 metres. The 125mm Lo-Carbon NBR dMEV C should have variable speed settings of 5-35 l/s achieving a minimum noise level of 8.5dB(A) at 3 metres. All sound pressure levels are quoted at hemispherical measurements. All units shall be and independently third-party tested at the Sound Research Laboratory (SRL), tested to BS EN 13141-6.

The unit shall comprise a single high efficiency EC/DC motor to deliver specific fan powers as low as 0.08 W/l/s, as measured in accordance with the SAP PCDB test method and listed on the PCDB database.

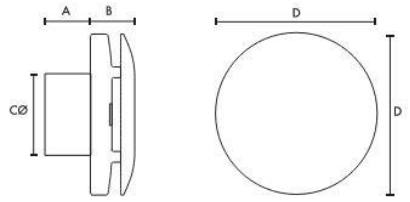
The controls for the Lo-Carbon NBR dMEV C unit shall provide fully adjustable, continuous whole house ventilation rates. The Boost speed shall be activated via an integral humidistat or via LS Input.

The fan shall be compatible with low ceiling voids and have a spigot length of 56mm (100mm) and 66mm (125mm).

The fan shall have the nuisance tripping prevention option called Comfort Control, which stops the fan from engaging Boost when the LS input is engaged for less than three minutes.

The unit shall be able to be commissioned as a continuous running fan according to the Building Regulations compliant design.

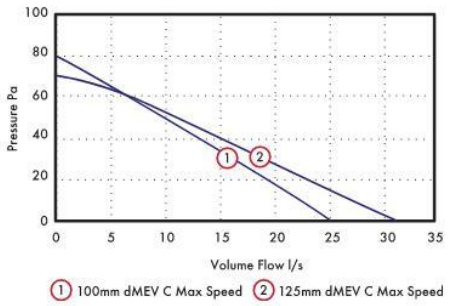
Dimensions (mm)



Model	A	B	CØ	D
100	56	54	99	195
125	66	57	120	228

1. Rear cable entry
2. Side cable entry (cut plastic side wall to access)
3. 100% variable speed adjustment
4. Installation mode (SW1) Back pressure detection system (SW2)

Performance Guide



1 100mm dMEV C Max Speed 2 125mm dMEV C Max Speed

Sound

Model	Speed	dB(A)
100	Min	7.4
	Max	34.3
125	Min	8.5
	Max	37.9

SAP PCDB Performance 2021

Unit configuration	Location	100 Model	125 Model
In room (Rigid duct)	Kitchen (13l/s)	0.14	0.14
	Kitchen/wet room (8l/s)	0.11	0.12
Through wall	Kitchen (13l/s)	0.08	0.09
	Kitchen/wet room (8l/s)	0.08	0.10

Vent-Axia

Appendix G – SAP Reports

SAP reports from SAP 10
can be found within the following pages

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 14 Mar 2025 12:33:37

Project Information			
Assessed By	Alex Dodson	Building Type	House, Semi-detached
OCDEA Registration	EES/032708	Assessment Date	2025-03-14

Dwelling Details			
Assessment Type	As designed	Total Floor Area	71 m^2
Site Reference	2 Bed Dwelling	Plot Reference	PV
Address			

Client Details	
Name	Lochailort Investments Ltd
Company	Lochailort Investments Ltd
Address	Eagle House, London, SW1Y 6EE

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	*11.97 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	4.26 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*62.61 kWh_{PE}/m^2*	
Dwelling primary energy	46.93 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*36.6 kWh/m^2*	
Dwelling fabric energy efficiency	35.9 kWh/m^2	OK

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*	0.18	Walls (1) (0.18)	OK
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	0.13	Heatloss Floor 1 (0.13)	OK
Roofs	*0.16*	0.11	Roof (1) (0.11)	OK
Windows, doors, and roof windows	*1.6*	1.2	D1 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Walls (1)	69.6022	0.18
Party wall: Party Wall (1)	40.91	0 **(!)**
Ground floor: Heatloss Floor 1, Heatloss Floor 1	35.29	0.13
Exposed roof: Roof (1)	35.29	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
D1, FD	2.079	West	N/A	1.2
Windows Elev. 2, Windows	1.6688	West	0.7	1.2
Windows Elev. 2, Windows	1.1656	West	0.7	1.2
Windows Elev. 2, Windows	0.4004	West	0.7	1.2
Windows Elev. 1, Windows	1.5892	East	0.7	1.2
Windows Elev. 1, Windows	1.666	East	0.7	1.2
D2, Windows	2.6712	East	0.7	1.2
Windows Elev. 3, Windows	0.4888	North	0.7	1.2
Windows Elev. 3, Windows	0.4888	North	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.05	Ref
External wall	E3: Sill	Calculated by person with suitable expertise	0.05	Ref
External wall	E4: Jamb	Calculated by person with suitable expertise	0.05	Ref
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.16	Ref
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 **(!)**	Ref
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.08	Ref
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 **(!)**	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.12	Ref
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.06	Ref
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.09	Ref
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.06	Ref
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.06	Ref

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	4 m^3/hm^2, Design value	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	193.5%
Emitter type	
Flow temperature	
System type	Heat Pump
Manufacturer	Mitsubishi Electric Europe B.V.
Model	Ecodan 5.0 kW
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	1.86 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 device in PCDB	
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	100 lm/W	**OK**
External lights control	N/A	

8 Mechanical ventilation		
System type: Decentralised mechanical extract		
Maximum permitted specific fan power	*0.7 W/(l/s)*	
Specific fan power	0.18 W/(l/s)	**OK**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model	Lo-Carbon NBR dMEV C 100, 498095	
Commissioning		

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.8 kWp
Orientation	South East
Pitch	45°
Overshading	None or very little
Manufacturer	2 x 0.4kwp
MCS certificate	

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 14 Mar 2025 12:33:37

Project Information			
Assessed By	Alex Dodson	Building Type	House, Semi-detached
OCDEA Registration	EES/032708	Assessment Date	2025-03-14

Dwelling Details			
Assessment Type	As designed	Total Floor Area	101 m^2
Site Reference	3 Bed Dwelling	Plot Reference	PV
Address			

Client Details	
Name	Lochailort Investments Ltd
Company	Lochailort Investments Ltd
Address	Eagle House, London, SW1Y 6EE

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	*10.05 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	4.0 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*52.42 kWh_{PE}/m^2*	
Dwelling primary energy	43.16 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*35.5 kWh/m^2*	
Dwelling fabric energy efficiency	34.7 kWh/m^2	OK

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*	0.18	Walls (1) (0.18)	OK
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	0.13	Heatloss Floor 1 (0.13)	OK
Roofs	*0.16*	0.11	Roof (1) (0.11)	OK
Windows, doors, and roof windows	*1.6*	1.2	D1 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Walls (1)	85.2886	0.18
Party wall: Party Wall (1)	45.29	0 **(!)**
Ground floor: Heatloss Floor 1, Heatloss Floor 1	52.08	0.13
Exposed roof: Roof (1)	50.54	0.11
Exposed roof: Roof (2)	1.54	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
D1, FD	2.079	West	N/A	1.2
Windows Elev. 2, Windows	1.7214	West	0.7	1.2
Windows Elev. 2, Windows	1.089	West	0.7	1.2
Windows Elev. 2, Windows	1.089	West	0.7	1.2
Windows Elev. 1, Windows	1.8632	East	0.7	1.2
Windows Elev. 1, Windows	0.4992	East	0.7	1.2
Windows Elev. 1, Windows	1.6422	East	0.7	1.2
D2, Windows	2.646	East	0.7	1.2
Windows Elev. 3, Windows	0.42	North	0.7	1.2
Windows Elev. 3, Windows	0.42	North	0.7	1.2
Side Bay Window 1, Windows	0.9362	South West	0.7	1.2
Side Bay Window 2, Windows	0.9362	North West	0.7	1.2

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.05	Ref
External wall	E3: Sill	Calculated by person with suitable expertise	0.05	Ref
External wall	E4: Jamb	Calculated by person with suitable expertise	0.05	Ref
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.16	Ref
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 **(!)**	Ref
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.08	Ref
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 **(!)**	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.12	Ref
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.06	Ref
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.09	Ref
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.06	Ref
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.06	Ref
External wall	E24: Eaves (insulation at ceiling level - inverted)	Calculated by person with suitable expertise	0.24	Ref
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.06	Ref over bay

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	4 m^3/hm^2, Design value	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	190.9%
Emitter type	
Flow temperature	
System type	Heat Pump
Manufacturer	Mitsubishi Electric Europe B.V.
Model	Ecodan 5.0 kW
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	1.86 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 device in PCDB		
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	100 lm/W	**OK**
External lights control	N/A	

8 Mechanical ventilation		
System type: Decentralised mechanical extract		
Maximum permitted specific fan power	*0.7 W/(l/s)*	
Specific fan power	0.17 W/(l/s)	**OK**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model	Lo-Carbon NBR dMEV C 100, 498095	
Commissioning		

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.8 kWp
Orientation	South East
Pitch	45°
Overshading	None or very little
Manufacturer	2 x 0.4kwp
MCS certificate	

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 14 Mar 2025 12:33:37

Project Information			
Assessed By	Alex Dodson	Building Type	House, Detached
OCDEA Registration	EES/032708	Assessment Date	2025-03-14

Dwelling Details			
Assessment Type	As designed	Total Floor Area	135 m^2
Site Reference	4 Bed Dwelling	Plot Reference	PV
Address			

Client Details	
Name	Lochailort Investments Ltd
Company	Lochailort Investments Ltd
Address	Eagle House, London, SW1Y 6EE

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	*9.19 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	3.95 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*47.94 kWh_{PE}/m^2*	
Dwelling primary energy	42.01 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*38.2 kWh/m^2*	
Dwelling fabric energy efficiency	37.5 kWh/m^2	OK

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*	0.18	Walls (1) (0.18)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	0.13	Heatloss Floor 1 (0.13)	OK
Roofs	*0.16*	0.11	Roof (1) (0.11)	OK
Windows, doors, and roof windows	*1.6*	1.2	D1 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Walls (1)	135.2412	0.18
Ground floor: Heatloss Floor 1, Heatloss Floor 1	67.48	0.13
Exposed roof: Roof (1)	67.48	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
D1, FD	2.079	West	N/A	1.2
Windows Elev. 2, Windows	2.88	West	0.7	1.2
Windows Elev. 2, Windows	2.1783	West	0.7	1.2
Windows Elev. 2, Windows	1.2512	West	0.7	1.2
Windows Elev. 2, Windows	1.2512	West	0.7	1.2
Windows Elev. 2, Windows	1.2512	West	0.7	1.2
Windows Elev. 1, Windows	2.0769	East	0.7	1.2
Windows Elev. 1, Windows	1.8769	East	0.7	1.2
Windows Elev. 1, Windows	1.8769	East	0.7	1.2
Windows Elev. 1, Windows	1.2328	East	0.7	1.2
D2, Windows	3.9008	East	0.7	1.2
Windows Elev. 3, Windows	1.4204	North	0.7	1.2
D3, Windows	1.836	East	0.7	1.2
Windows Elev. 4, Windows	0.6325	South	0.7	1.2

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
Windows Elev. 4, Windows	0.5047	South	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.05	Ref
External wall	E3: Sill	Calculated by person with suitable expertise	0.05	Ref
External wall	E4: Jamb	Calculated by person with suitable expertise	0.05	Ref
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.16	Ref
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 **(!)**	Ref
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.06	Ref
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.09	Ref
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.06	Ref

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	4 m^3/hm^2, Design value	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	193.9%
Emitter type	
Flow temperature	
System type	Heat Pump
Manufacturer	Mitsubishi Electric Europe B.V.
Model	Ecodan 5.0 kW
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	1.86 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 device in PCDB	
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	100 lm/W	**OK**
External lights control	N/A	

8 Mechanical ventilation		
System type: Decentralised mechanical extract		
Maximum permitted specific fan power	*0.7 W/(l/s)*	
Specific fan power	0.17 W/(l/s)	**OK**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model	Lo-Carbon NBR dMEV C 100, 498095	
Commissioning		

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.8 kWp
Orientation	South East
Pitch	45°
Overshading	None or very little
Manufacturer	2 x 0.4kwp
MCS certificate	

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 14 Mar 2025 12:33:37

Project Information			
Assessed By	Alex Dodson	Building Type	House, Detached
OCDEA Registration	EES/032708	Assessment Date	2025-03-14

Dwelling Details			
Assessment Type	As designed	Total Floor Area	173 m^2
Site Reference	5 Bed Dwelling	Plot Reference	PV
Address			

Client Details	
Name	Lochailort Investments Ltd
Company	Lochailort Investments Ltd
Address	Eagle House, London, SW1Y 6EE

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	*8.51 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	3.86 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*44.58 kWh_{PE}/m^2*	
Dwelling primary energy	40.66 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*39.0 kWh/m^2*	
Dwelling fabric energy efficiency	38.3 kWh/m^2	OK

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*	0.18	Walls (1) (0.18)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	0.13	Heatloss Floor 1 (0.13)	OK
Roofs	*0.16*	0.11	Roof (1) (0.11)	OK
Windows, doors, and roof windows	*1.6*	1.2	D1 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Walls (1)	154.0164	0.18
Ground floor: Heatloss Floor 1, Heatloss Floor 1	89.65	0.13
Exposed roof: Roof (1)	86.54	0.11
Exposed roof: Roof (2)	3.11	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
D1, FD	2.079	West	N/A	1.2
Windows Elev. 2, Windows	0.693	West	0.7	1.2
Windows Elev. 2, Windows	0.693	West	0.7	1.2
Windows Elev. 2, Windows	1.748	West	0.7	1.2
Windows Elev. 2, Windows	1.748	West	0.7	1.2
Windows Elev. 2, Windows	1.539	West	0.7	1.2
Windows Elev. 2, Windows	1.539	West	0.7	1.2
Windows Elev. 2, Windows	1.539	West	0.7	1.2
Windows Elev. 1, Windows	1.2644	East	0.7	1.2
Windows Elev. 1, Windows	1.2644	East	0.7	1.2
Windows Elev. 1, Windows	1.6008	East	0.7	1.2
Windows Elev. 1, Windows	1.6008	East	0.7	1.2
Windows Elev. 1, Windows	0.8296	East	0.7	1.2

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
D2, Windows	5.136	East	0.7	1.2
Windows Elev. 3, Windows	0.642	North	0.7	1.2
Windows Elev. 3, Windows	0.642	North	0.7	1.2
D3, Windows	2.11	North	0.7	1.2
Windows Elev. 4, Windows	0.828	South	0.7	1.2
Windows Elev. 4, Windows	0.828	South	0.7	1.2
Bay Side windows 1, Windows	0.9424	South West	0.7	1.2
Bay Side windows 1, Windows	0.9424	South West	0.7	1.2
Bay Side windows 2, Windows	0.9424	North West	0.7	1.2
Bay Side windows 2, Windows	0.9424	North West	0.7	1.2

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

Building part **1**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.05	Ref
External wall	E3: Sill	Calculated by person with suitable expertise	0.05	Ref
External wall	E4: Jamb	Calculated by person with suitable expertise	0.05	Ref
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.16	Ref
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 **(!)**	Ref
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.06	Ref
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.09	Ref
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.06	Ref
External wall	E24: Eaves (insulation at ceiling level - inverted)	Calculated by person with suitable expertise	0.24	Ref
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.06	Ref. Bay Window Ceiling
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.09	Ref

3 Air permeability (better than typically expected values are flagged with a subsequent (!))

Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	4 m^3/hm^2, Design value	OK
Air permeability test certificate reference		

4 Space heating

Main heating system 1: Heat pump with radiators or underfloor heating - Electricity

Efficiency	198.4%
Emitter type	
Flow temperature	
System type	Heat Pump
Manufacturer	Mitsubishi Electric Europe B.V.
Model	Ecodan 5.0 kW
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	1.86 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 device in PCDB		
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	100 lm/W	**OK**
External lights control	N/A	

8 Mechanical ventilation		
System type: Decentralised mechanical extract		
Maximum permitted specific fan power	*0.7 W/(l/s)*	
Specific fan power	0.17 W/(l/s)	**OK**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model	Lo-Carbon NBR dMEV C 100, 498095	
Commissioning		

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.8 kWp
Orientation	South East
Pitch	45°
Overshading	None or very little
Manufacturer	2 x 0.4kwp
MCS certificate	

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 14 Mar 2025 12:33:37

Project Information			
Assessed By	Alex Dodson	Building Type	Maisonette, Mid-terrace
OCDEA Registration	EES/032708	Assessment Date	2025-03-14

Dwelling Details			
Assessment Type	As designed	Total Floor Area	55 m^2
Site Reference	1 Bed Dwelling	Plot Reference	PV
Address			

Client Details	
Name	Lochailort Investments Ltd
Company	Lochailort Investments Ltd
Address	Eagle House, London, SW1Y 6EE

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	*12.6 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	4.16 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*66.28 kWh_{PE}/m^2*	
Dwelling primary energy	47.06 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*33.3 kWh/m^2*	
Dwelling fabric energy efficiency	32.8 kWh/m^2	OK

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*	0.18	Walls (1) (0.18)	OK
Party walls	*0.2*	0	Party Wall (1) (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	0.13	Heatloss Floor 1 (0.13)	OK
Roofs	*0.16*	0.11	Roof (1) (0.11)	OK
Windows, doors, and roof windows	*1.6*	1.2	D1 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Walls (1)	43.7238	0.18
Party wall: Party Wall (1)	51.18	0 **(!)**
Ground floor: Heatloss Floor 1, Heatloss Floor 1	27.51	0.13
Exposed roof: Roof (1)	27.51	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
D1, FD	2.079	North East	N/A	1.2
Windows Elev. 2, Windows	2.0002	North East	0.7	1.2
Windows Elev. 2, Windows	1.0716	North East	0.7	1.2
Windows Elev. 2, Windows	1.2996	North East	0.7	1.2
Windows Elev. 1, Windows	0.5029	North West	0.7	1.2
Windows Elev. 1, Windows	0.5029	North West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Calculated by person with suitable expertise	0.05	Ref

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E3: Sill	Calculated by person with suitable expertise	0.05	Ref
External wall	E4: Jamb	Calculated by person with suitable expertise	0.05	Ref
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.16	Ref
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 **(!)**	Ref
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.08	Ref
Party wall	P2: Intermediate floor within a dwelling	SAP table default	0 **(!)**	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.12	Ref
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.06	Ref
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.09	Ref
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.06	Ref
External wall	E25: Staggered party wall between dwellings	Calculated by person with suitable expertise	0.06	Ref

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	4 m^3/hm^2, Design value	OK
Air permeability test certificate reference		

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	191.7%
Emitter type	
Flow temperature	
System type	Heat Pump
Manufacturer	Mitsubishi Electric Europe B.V.
Model	Ecodan 5.0 kW
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	1.86 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 device in PCDB	
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	100 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Decentralised mechanical extract		
Maximum permitted specific fan power	*0.7 W/(l/s)*	
Specific fan power	0.18 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model	Lo-Carbon NBR dMEV C 100, 498095	
Commissioning		

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.8 kWp
Orientation	South East
Pitch	45°
Overshading	None or very little
Manufacturer	2 x 0.4kwp
MCS certificate	

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	