environmental economics

# Energy and Sustainability Report

## Old Town, Newbury

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## Revision History

| *Version* | *Date Issued* | *Issued by* | | | *QA Check* |
|---|---|---|---|---|---|
| **1** | 30/05/2024 | *Alex Dodson BSc* | *Matt Cooke BSc* | *Robert Holbrook BSc MSc* | *Tim James C.Eng MCIBSE BSc MSc* |
| **2** | 28/10/2024 | *Alex Dodson BSc* | *Matt Cooke BSc* | *Robert Holbrook BSc MSc* | *Tim James C.Eng MCIBSE BSc MSc* |

**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.

Over the last decade, we have provided assessments and consultancy for some of the largest UK house builders, including Barratt Developments, David Wilson Homes, Bellway Homes, Abbey New Homes and Davidsons. We develop flexible, practical, cost-effective specifications for our clients through identifying solutions and delivering design advice. This includes the following disciplines:

- *Overheating Analysis (dynamic thermal modelling)*
- *Daylighting / Sunlight Simulations*
- *Energy Reports*
- *Compliance assessments and advice covering*
    - *Part L (SAP)*
    - *Part F (ventilation)*
    - *Part G (water)*
- *BREEAM*
- *SBEM (existing and new build)*
- *Minimum Energy Efficiency Standards (MEES)*
- *Thermal Bridging (Psi value calculations)*

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# Contents

# 1. Executive Summary

1.1.1. This Energy and Sustainability report was prepared by Environmental Economics Ltd on behalf of Lochailort Newbury Ltd. The report assesses measures to reduce the carbon emissions across the site through the use of fabric efficiency and low/zero carbon technology including ground source heat pumps in a district heating network.

1.1.2. The proposed development is designed to incorporate insulation measures and low carbon district heating in order to comply with Policy CS15.

1.1.3. The development will incorporate a ground source heat pump district heating network, providing low carbon heat in accordance with local and national policies.

1.1.4. A representative sample of the residential element have been assessed using SAP 10.2 compliant software, which are shown to deliver circa 66% reduction in Part L 1 (2021) regulated emissions.

1.1.5. A representative sample of the proposed retail units has been assessed using SBEM calculation engine v6.1.e.0, and can be seen to deliver circa 29% reduction in regulated carbon emissions against Part L 2 (2021) regulations. This provides opportunity for BREEAM Excellent.

1.1.6. The domestic units achieve circa 54% reduction in total carbon emissions and the retail units achieve circa 20% reduction in total carbon emissions. This includes regulated and unregulated carbon emissions and therefore is compliant with policy CS15.

1.1.7. The proportional area chart (Figure 1 below) shows proposed site wide total carbon emissions per year is 164 tonnes (orange rectangle), a 95% improvement on the existing site of 3,040 tonnes/yr (blue rectangle). The 164 tonnes figure includes both regulated and unregulated carbon emissions for both the residential and retail units. Please refer to sections 4.3 for these figures and how they are calculated.

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

- *Material suppliers with responsible sourcing certification guided by a high-quality sustainable procurement policy;*
- *Effective waste management procedures to minimise construction waste and to divert any residual waste from landfill;*
- *The implementation of drainage, ecology and travel plans;*

- *Provision of electric vehicle charging points within residential parking areas and separately to the public car park facility;*
- *Provision of secure cycle storage;*
- *Improved pedestrian access routes;*
- *Efficient internal and external water use in line with building regulations;*
- *Opportunity to achieve BREEAM Excellent.*

1.1.10. Potential overheating risk will be assessed in accordance with Approved Document O.

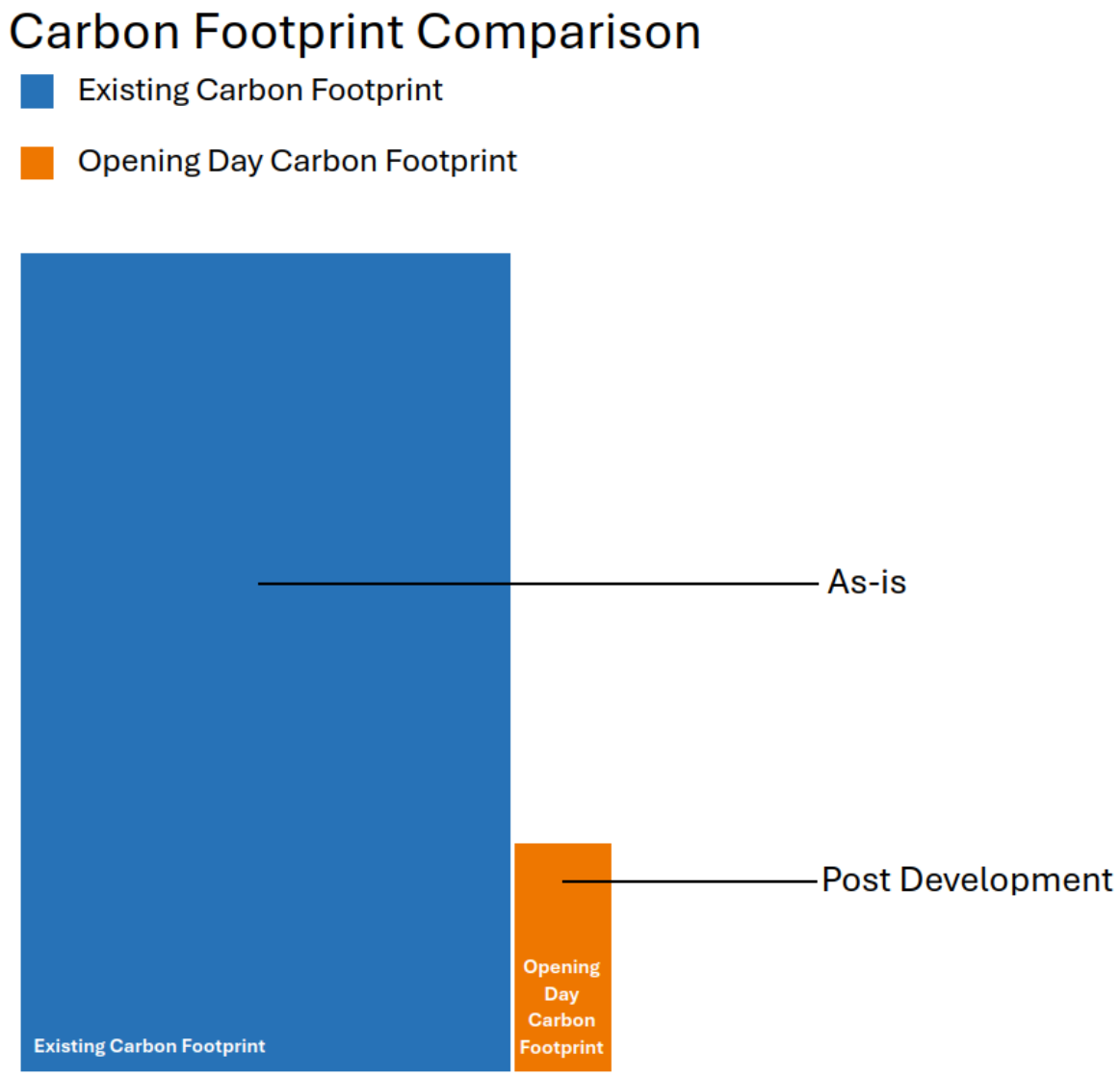


**Figure 1: Comparison of the carbon footprint between the proposed development and the existing site.**

# 2. Project Overview

## 2.1. Description of Site

2.1.1. The site consists of 317 residential dwellings, 5 shell retail units and a community hub for the residential units (including concierge, gym, meeting room and kitchen and postal room). The residential units comprise a range of terraced housing, duplex maisonettes, duplex flats and traditional flats.

2.1.2. The proposed site location/boundary for the whole site is shown in Appendix A.

2.1.3. This report addresses a development being undertaken by Lochailort Newbury Ltd, and does not include any further proposals for subsequent developments.

2.1.4. The retail units have been modelled with an assumed fit out specification.

## 2.2. Planning Policy

2.2.1. The planning authority for this site is West Berkshire Council.

2.2.2. Within the West Berkshire Local Plan, the relevant policy is the following:

2.2.3. Policy CS15:

***Sustainable Construction and Energy Efficiency***

***Residential Development***

*New residential development will meet the following minimum standards of construction:*

- *Minor development - Code for Sustainable Homes Level 3*
- *Major development[73] - Code for Sustainable Homes Level 4*
- *From 2013: All development - Code for Sustainable Homes Level 4*
- *From 2016: All development - Code for Sustainable Homes Level 6*

***Non-Residential Development***

*New non-residential development will meet the following minimum standards of construction:*

- *Minor development - BREEAM Very Good*
- *Major development - BREEAM Excellent*
- *From 2013: All development - BREEAM Excellent*

***Renewable energy***

*Major development shall achieve the following minimum reductions in total CO2 emissions (regulated and unregulated energy use) from renewable energy or low/zero carbon energy generation on site or in the locality of the development as long as a direct physical connection is used, unless it can be demonstrated that such provision is not technically or economically viable.*

*The percentage reductions in CO2 emissions should be based on the estimated CO2 emissions of the development after the installation of energy efficiency measures related to either the Code for Sustainable Homes, BREEAM or equivalent method has been applied.*

***Residential Development:***

- *A 10% reduction in CO2 emissions;*
- *from 2014: A 20% reduction in CO2 emissions;*
- *from 2016: Zero Carbon(74) .*

***Non-Residential Development:***

- *A 10% reduction in CO2 emissions;*
- *from 2014: A 20% reduction in CO2 emissions;*
- *from 2019: Zero Carbon (75) .*

*74 Requirements for zero carbon in line with stated Government aspirations, which may be subject to change.*

*75 Requirements for zero carbon in line with stated Government aspirations, which may be subject to change.*

2.2.4. West Berkshire's Policy CS15 refers to the Code for Sustainable Homes (CfSH) which was withdrawn via a Ministerial Statement in 2015. A more recent Ministerial Statement in 2023 reiterates this (refer to Appendix H). Therefore, the requirement to achieve a rating under the CfSH is not relevant to the application.

2.2.5. West Berkshire's Policy CS15 sets a zero carbon target from 2019, but footnotes (74) and (75) confirm that this is "in line with stated Government aspirations, which may be subject to change." The UK Government withdrew the aspiration for zero carbon homes and has replaced this with incremental reduction in carbon emissions via Building Regulations. The 2023 Ministerial statement (Appendix H) states that plan makers are not expected to set targets beyond building regulations. The next set of building regulations, called the Future Homes Standard (FHS), are due to be published in 2025 will improve standards on the current regulations by approximately 49%.

2.2.6. Therefore, the Zero carbon ambition given in Policy CS15 is not applicable, and the relevant requirement is a 49% reduction in regulated CO2 emissions from renewable energy or low/zero carbon energy generation from the residential units on site. Please refer to the following section for more details.

2.2.7. As the Zero carbon ambition is not applicable, this report addresses the previous requirement in policy CS15 of a 20% reduction in total carbon emissions for domestic and non-domestic units. This includes regulated and unregulated emissions. Refer to section 4 for the results.

## 2.3. Building Regulations

2.3.1. The 317 dwellings, 5 shell retail units and community hub comprising this development currently fall under Part L 2021 of the building regulations and will be required to follow SAP 10/SBEM methodology. Part L 2021 regulations have a higher standard in carbon requirements than Part L 2013. Specifically, any of the plots on site which are to be built to Part L 2021 (using SAP 10) will exceed current Part L1A 2013 building regulations by 31%.

2.3.2. In addition to the higher standards, some of the carbon content for different types of fuel has changed, meaning that the resultant carbon emissions will be calculated differently.

2.3.3. At present, the Future Homes Standard is in the consultation process headed by the UK Government. There are two transitional periods proposed, but it's likely that part, if not all the units on site will fall under FHS regulations.

2.3.4. 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."

2.3.5. Based on the above statement and the 31% betterment from Part L1A 2013 to Part L1A 2021 regulations (2.3.1), it can be reasoned that the likely betterment over current regulations (Part L 2021) will be 49%.

2.3.6. Currently, there is no modelling software available to test whether the sample housetypes 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:

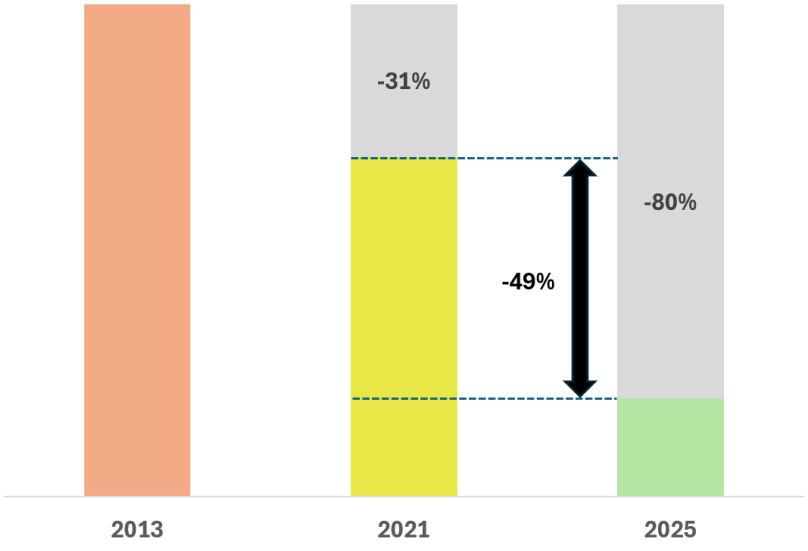


**Figure 2: Regulatory targets for Carbon emissions. Percentage figures are reductions over Part L 2013 baseline.**

# 3. Improvement Measures

## 3.1. Assessment Methodology

3.1.1. Environmental Economics has modelled the proposed development using Government approved software:

a. Dwellings are assessed using Design SAP 10 from Elmhurst Energy.

b. The retail units have been assessed using DesignBuilder v7.2.0, using the SBEM calculation engine v6.1.e.0.

3.1.2. These software tools provide a number of outputs which can be used to assess and compare the improvements from any number of build specifications in terms of:

- *Building regulations compliance*
- *Energy usage per year (kWh/annum)*
- *Carbon emissions as a measure of building regulations compliance (kg $CO_2$/m2/year)*
- *Energy costs per year (£/annum)*
- *More detailed breakdowns by end use (space heating, water heating, cooking, lighting, appliances)*
- *Code for Sustainable Homes compliance (SAP 10) and BREEAM Ene 01 compliance (Designbuilder v7.2.0)*
- *Effective air change rate*

3.1.3. 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 are based upon:

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

3.1.4. Two SAP models were created in order to calculate the domestic energy demand. The required data for the site is calculated for each of the models, and then the difference used to establish the level of improvement.

3.1.5. Sample SAP 10 reports for residential units are shown in Appendix K.

3.1.6. A sample retail unit was modelled using Designbuilder.

3.1.7. The sample SBEM output (BRUKL) is found in Appendix I.

3.1.8. For non-domestic buildings (shell retail units), the iSBEM User Guide v6.1.d confirms the following:

***SBEM is a compliance and energy certification procedure and not a design tool. If the performance of a particular feature is critical to the design, even if it can be represented in SBEM, it is prudent to use the most appropriate modelling tool for design purposes. In any case, SBEM should not be used for system sizing.***

3.1.9. While the SAP and SBEM assessments provided within this report represent potential opportunities for the proposed development to comply with AD-L 2021 and the West Berkshire Policy CS15, it is incumbent on the appointed design engineers to review the performance requirements for the final design and adopt suitable systems.

## 3.2. Design Philosophy

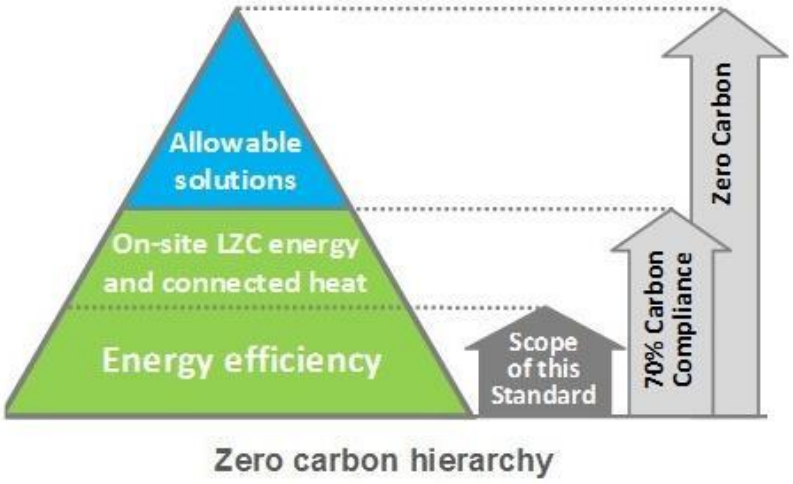


**Figure 3**

3.2.1. Upgrades have been made to a number of elements from a standard build specification in order to improve energy efficiency across the development. The site adopts the good design principles endorsed and promoted by The Zero Carbon Hub, the construction industries' key advisors and partners with the Governments Communities and Local Government Department. This guidance follows the general good principles of energy efficiency as the industry moves towards zero carbon. The principles are illustrated in Figure 3 above.

3.2.2. In order to reduce the residual carbon emissions a number of improvements were made to the standard material and product specification. These improvements include:

- *Upgraded heating and hot water controls.*
- *Delayed start thermostat.*
- *Design air permeability of 4.00 and 3.00$m^3/hr/m^2$ for the residential and retail units respectively.*
- *Bespoke thermal bridging details.*

## 3.3. Fabric Improvements Part L 2021

3.3.1. The building fabric for all dwellings within the proposed development will be improved in comparison to ADL 2013 specifications, and in relation to the ADL 2021 backstop notional specification. 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. Enhanced glazing with a larger transmittance factor allowing for increased solar gains will also be used in dwellings.

3.3.2. Proposed fabric designs and U-Values used in the domestic energy calculations can be found in Table 1 below.

**Table 1 – Draft Build Specification**

| ***Element*** | ***Minimum Standard*** | ***Improved Specification*** | |
|---|---|---|---|
| **-** | ***W/m²k*** | ***Description*** | ***W/m²k*** |
| **Walls** | 0.26 | Full Fill Insulation in 100mm cavity | 0.20 |
| | | Full Fill Insulation in 100mm cavity (plots above 11m from GF) | 0.25 |
| **Roof** | 0.16 | Loft Space – 500mm Mineral Wool | 0.09 |
| | | Sloping Ceiling to have 150mm PUR between joists, and 38mm PIR Board underlaid | 0.15 |
| **Floors** | 0.18 | To be confirmed | ~0.11 |
| **Doors** | 1.60 | Double glazed Low-E, Wood frame | 1.1 |
| **Glazing** | 1.60 | Double glazed Low-E, Wood frame, G factor = 0.73, Frame Factor = 0.70 | 1.1 |

3.3.3. Proposed fabric designs and U-Values used in the non-domestic energy calculations can be found in Table 2 below:

**Table 2 – Draft Build Specification for Retail Units**

| ***Element*** | ***Minimum Standard*** | ***Improved Specification*** | |
|---|---|---|---|
| **-** | ***W/m²k*** | ***Description*** | ***W/m²k*** |
| **Walls** | 0.26 | Full Fill Insulation in 100mm cavity | 0.18 |
| **Ground Floor** | 0.18 | To be confirmed | ~0.11 |
| **Doors** | 1.60 | External door | 1.4 |
| **Glazing** | 1.60 | T Solar – 0.72<br>L Solar – 0.76 | 1.0 |

3.3.4. Please note that this specification is not finalised and is subject to change up until detailed design stage.

3.3.5. As improvements are made to the thermal conductivity of main elements, thermal bridging and air permeability becomes increasingly significant in the overall fabric performance. Bespoke thermal bridging designs have been utilised, which achieve much lower heat loss levels in comparison with standard practice. These can be found in Appendix B

3.3.6. As a result of following these junction details and focusing on build quality air permeability will also decrease. A target air pressure rating of 4.00$m^3$/hr.$m^2$ and 3.00$m^3$/hr.$m^2$ has been set for all houses and retail units respectively, which is an improvement on the maximum allowable rating in the 2021 Building Regulations.

## 3.4. Building Services & Renewable Energy (LZCT) in Domestic Units

3.4.1. 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. AD-L 2021 includes requirements for efficiency and controls of such equipment, including space heating, water heating, ventilation, and lighting.

3.4.2. 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.

3.4.3. A district heating network utilising ground source heat pump bore holes from multiple plant rooms is proposed to provide heating and hot water across the site. The scheme is to be designed by ERDA/BMD who have provided an estimation of the main performance figures:

- ***Coefficient of performance (CoP) of 3.5***
- ***Distribution loss factor (DLF) over the network of 1.5.*** *This is in accordance with the CIBSE/ADE 'Heat Networks: Code of Practice for the UK'.*

We have used these figures for the sample SAP calculations in Appendix D, Table 3. Please note, these figures are an estimation and may change at detailed design stage. More information on the district heating system can be found in Appendix C.

3.4.4. Heat Interface Units (HIU) are proposed to be installed to all dwellings connected to the heat network. HIU's utilise one or two plate heat exchangers to provide instantaneous heating and hot water. See Appendix C

3.4.5. Decentralised Mechanical Extract Ventilation (dMEV) is proposed to be installed to all residential dwellings as the ventilation strategy. dMEVs manage humidity and are significantly more energy efficient and quieter in comparison to standard extractor fans.

3.4.6. Shower type is assumed to be a thermostatic mixer shower with a flow rate of 8L/min connected to an unvented hot water system.

3.4.7. 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.

3.4.8. 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.

## 3.5. Building Services & Renewable Energy (LZCT) in Non-Domestic Units

3.5.1. It was assumed that the shell retail units would not be connected to the heat network, and instead a typical fit out had been assumed in line with the recommendations of CIBSE Guide B0 (2016).

3.5.2. A split system has been modelled in a sample retail unit, utilising two Mitsubishi PLA-ZM50 internal cassettes and a PUZ-ZM100 outdoor unit, providing space heating and cooling with optimum start/stop control, local time control and temperature control.

3.5.3. This system used air source heat pumps, with an efficiency of 480%. Air source heat pumps are a low or zero carbon technology.

3.5.4. Electric instantaneous hot water was modelled as the commercial hot water system.

3.5.5. Lighting provision was assumed to be from LED low energy fittings achieving a minimum efficacy of 130 lamp lumens per circuit Watt.

3.5.6. A detailed summary of the fabric and services used in the SBEM model is provided in Appendix M.

# 4. Results

## 4.1. Regulated Carbon Reduction

4.1.1. DLF (Distribution loss factor) and Coefficient of Performance (entered as efficiency in SAP 10 software) are two critical data points that influence the Emissions for the residential units.

4.1.2. We have modelled sample SAPs for end and mid terrace houses, duplex maisonettes, and GF, MF and TF flats. The average reduction in regulated CO2 emissions across site for the residential units was 66.3%. For the full dataset, see Appendix D, Table 3.

4.1.3. This would meet predicted FHS requirements of a 49% betterment in carbon reduction over 2021 regulations.

4.1.4. By assessing a sample retail unit and extrapolating across the retail units on site, the commercial units achieved a 29.4% betterment over the current regulations. For the full dataset, see Appendix D, Table 4.

4.1.5. This exceeds the requirement stipulated in policy CS15 for the Ene 01 BREEAM minimum standard. Full calculation is found in the BREEAM preassessment report.

## 4.2. Unregulated Carbon Emissions

4.2.1. The GHA (Good Homes Alliance) provides a method for calculating unregulated energy demand for residential dwellings (see Appendix G).

4.2.2. Appendix E sets out the calculation for domestic unregulated energy and carbon emissions.

4.2.3. Using figures calculated from the GHA, we can deduce total unregulated carbon emissions for all the residential units on site. This is calculated to be 65.23 tonnes$CO_2$/annum for the residential units.

4.2.4. Appendix E also provides a calculation for the total unregulated carbon emissions for the retail units, which is based on the equipment energy usage provided in the SBEM BRUKL report.

4.2.5. Unregulated carbon emissions are estimated to be 0.96 tonnes$CO_2$/annum for the retail units.

## 4.3. Summary

4.3.1. To comply with policy CS15, the total carbon emissions reduction was calculated. It is necessary to consider both regulated and unregulated carbon emissions for this calculation. For results tables, see Appendix F.

4.3.2. For the residential units, the baseline total carbon is 351.01 tonnes$CO_2$/annum. The proposed scheme total carbon is 161.48 tonnes$CO_2$/annum. This results in a 54.0% reduction in total caron for the residential units. See Figure 4 below.

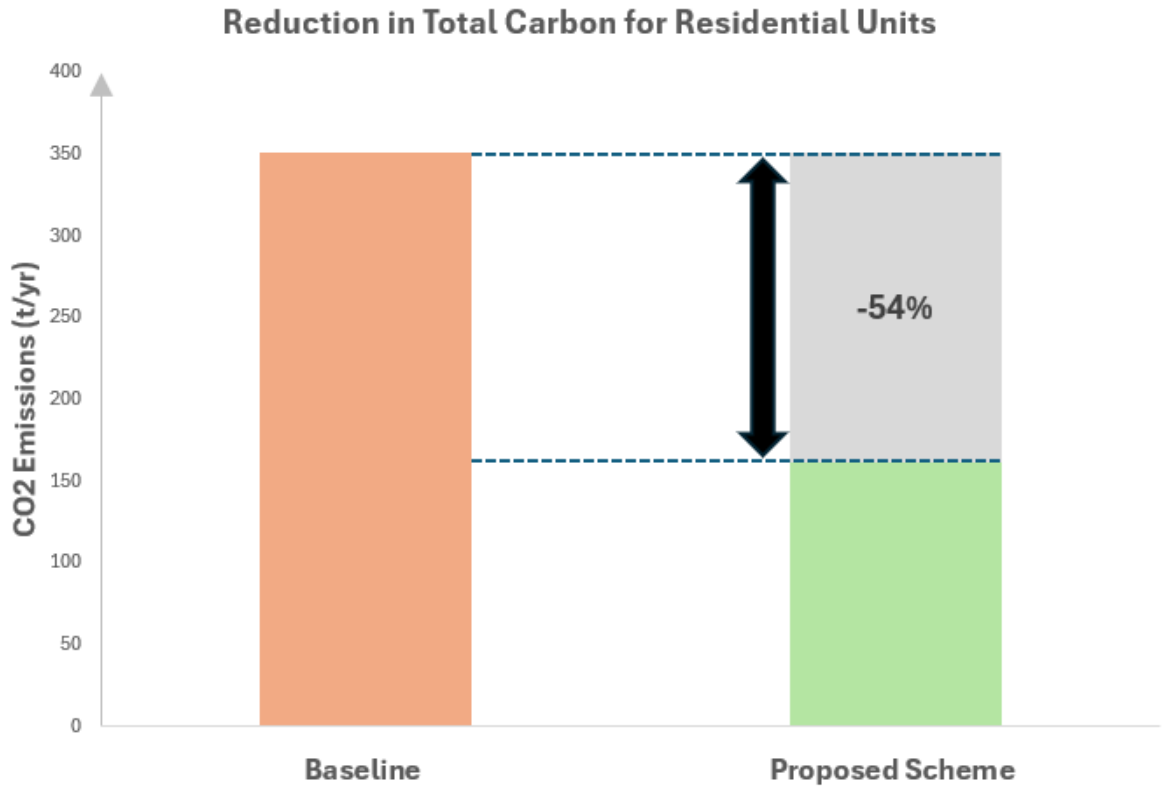


**Figure 4**

4.3.3. For the retail units, the baseline total carbon is 3.12 tonnes$CO_2$/annum. The proposed scheme total carbon is 2.48 tonnes$CO_2$/annum. This results in a 20.3% reduction in total carbon emissions for the retail units. See Figure 5 Below.

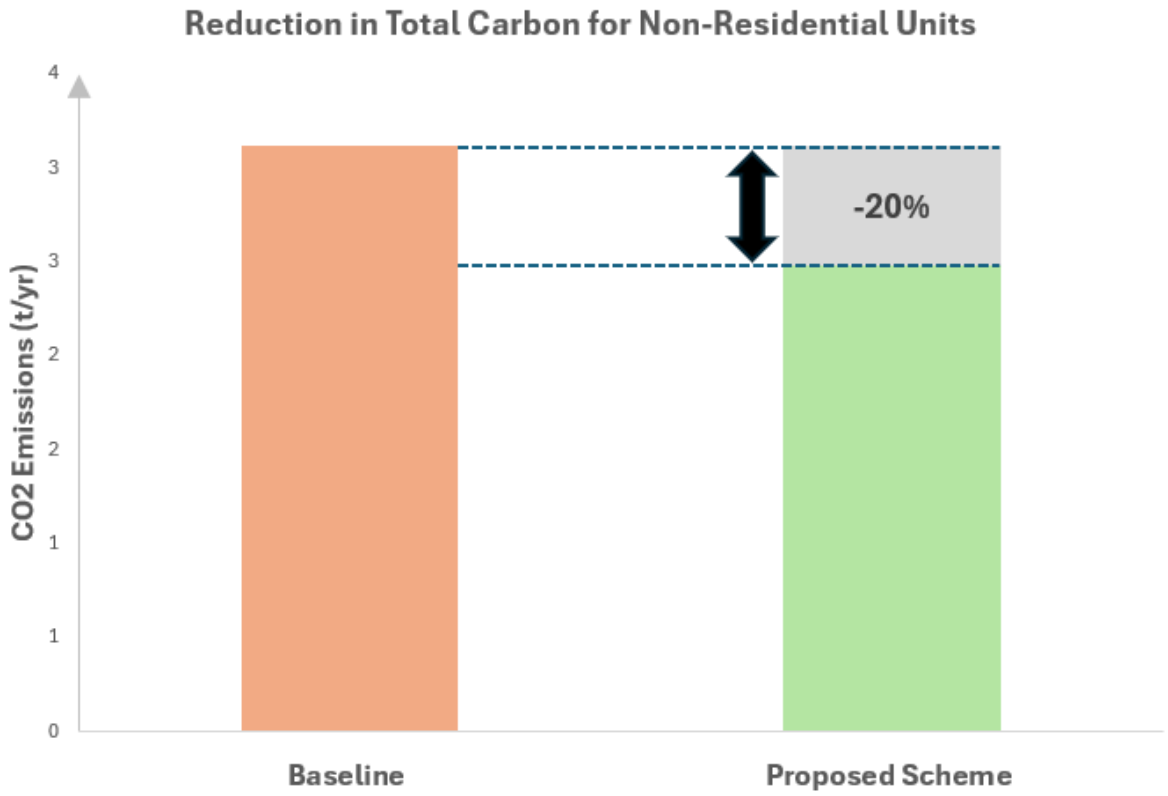


**Figure 5**

4.3.4. The proposed scheme:

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

# 5. Sustainability Appraisal

## 5.1. Waste Management

5.1.1. 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.

5.1.2. It is recommended that a waste management plan and a system of recording waste transfer (for example BRE Smartwaste) should be utilised in order to maximise diversion of waste from landfill.

5.1.3. Appropriate facilities to separate residual waste and recycling will be provided on site.

## 5.2. Flood Risk

5.2.1. The simple check provided by the environment agency illustrates the site has areas which are categorised as being in flood zone 2, with medium risk of flooding from rivers and sea.

5.2.2. In response, a professional flood risk assessment has been prepared and submitted within the application.

5.2.3. It is understood that the designs contained therein provide measures to alleviate the risk to acceptable levels.

5.2.4. Full details of the Flood Risk Assessment and any recommendations to be implemented within the development can be found in the associated report.

5.2.5. Appendix I shows the Flood Risk map for this development.

## 5.3. Sustainable Urban Drainage

5.3.1. A full SuDS Report has been completed for the proposed development along with the aforementioned Flood Risk Assessment.

5.3.2. Full details of the strategy including permeable paving, rainwater harvesting, attenuation tanks and blue roofs can be found in the associated report.

## 5.4. Ecology and Biodiversity

5.4.1. A full Ecological Impact Assessment has been produced for the proposed development including both an Ecological Appraisal and Preliminary Roost Assessment for bats.

5.4.2. These reports outline the approaches which will be implemented within the development to support protected species and deliver a net gain for biodiversity.

5.4.3. Approaches will include bat bricks and bat boxes to protect and enhance bat species habitats.

5.4.4. Full details can be found in the associated reports.

## 5.5. Planting and Greening

5.5.1. A comprehensive landscaping scheme is proposed with new planting and this will introduce rich and diverse new species on site.

## 5.6. Electric Vehicle Charging

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

5.6.2. It is proposed to provide policy compliant Electric Vehicle charging points across the site. In addition, it is proposed to provide 14 charging points within the multi-storey car park. This ensures open access to EV charging for visitors to the shopping centre and other local amenities.

5.6.3. This aligns with current government policy to stop the sale of new petrol and diesel cars by 2030 (GOV.UK, November 2020).

## 5.7. Public Transport

5.7.1. The site of the proposed development is in an ideal area for walking, cycling and public transport connectivity, making sustainable transport highly appealing to potential residents.

5.7.2. The development is roughly a 1-minute walk from Market Street bus stop and a 2-minute walk from Cheap Street bus stop, whilst the development is only a 4-minute walk from Newbury train station.

5.7.3. Market Street and Cheap Street bus stops provide access to number 2, 2A, 2c, 3, 3a, 4, 4a, 4b, 4c, 5, 6, 7, 7A, 103a, 103b, Link and V1 buses.

5.7.4. This amount of bus routes available in such close proximity to the development site allows for sustainable transport to a range of locations including:

- *Access to the rest of Newbury;*
- *Hungerford;*
- *Eastbury;*
- *Lambourn;*
- *East and West Ilsley;*
- *Andover;*
- *Greenham;*
- *Basingstoke;*
- *Vodafone Campus;*
- *Newbury train station.*

5.7.5. Newbury train station provides easy access to London and provides a direct link to the major national rail infrastructure. Access to Newbury train station is available through walking, cycling or the V1 bus.

5.7.6. Appendix J shows the walking routes to public transport from this development.

5.7.7. A full Transport Assessment has also been carried out for this development which goes into greater detail on how the proposal meets local policy requirements for sustainable transport.

5.7.8. Full details can be found in the associated report.

## 5.8. Car Club

5.8.1. Car clubs are a highly effective method in reducing car ownership and directly work towards air pollution reduction targets. Residents will have access to a car club with hybrid and electric vehicles.

5.8.2. A total of 3 new car club cars are proposed that will provide flexible transport options to complement the scheme's close proximity to Newbury's railway station and bus station.

5.8.3. The implementation of these car club schemes will reduce the need for 22 private cars across the development.

## 5.9. Cycle Parking

5.9.1. A total of 495 cycle parking spaces will be proposed across the site in secure storage areas.

5.9.2. 4 cycle repair stations will be provided around the site (including 3 for public use) to encourage the use of bicycles.

## 5.10. Permeability

5.10.1. The proposals repair the connectivity and pedestrian links that were lost when the Kennet Centre was constructed which will in turn promote walking.

## 5.11. Local Amenities

5.11.1. The proposed development is located in the town of Newbury.

5.11.2. The location of the development within Newbury provides the proposed development with a large range of amenities in extremely close proximity, as the development is within Newbury Town Centre.

5.11.3. Whilst the Kennet Centre is being demolished as part of the development works, several of the amenities are remaining with additional amenities being constructed in the area including:

- *The existing Vue Cinema;*
- *Restaurants;*
- *Cafes;*
- *Several newly constructed shops.*

5.11.4. Outside of the Kennet Centre but within walking distance of the development in Newbury are further amenities, including but not limited to:

- *Sainsbury's supermarket, which itself also contains a Sainsbury's Pharmacy and an Argos;*
- *West Berkshire Museum;*
- *Eateries and restaurants;*
- *Pubs and bars;*
- *Newbury Canoe Club;*
- *Several churches.*
- *Northbrook Street, which is the main shopping street in Newbury providing access to:*
    - *Several clothing shops;*
    - *Boots and Superdrug;*
    - *Cafes.*

5.11.5. There are also several other supermarkets including a Tesco Superstore, Waitrose and Aldi between half a mile and a mile from the proposed development.

5.11.6. There is also a large range of schools within a short distance from the proposed development site, including up to 8 different primary/junior schools within a 5-minute drive and 2 secondary schools in the same range.

5.11.7. This number of shops, schools and attractions within a close range means that the development site is ideally located to provide for all needs in a sustainable manner, without the need for travelling large distances to access them.

## 5.12. Water Use

5.12.1. The criteria for measuring potable water usage are set out in Approved Document G of the Building Regulations.

5.12.2. All dwellings on site can be designed to achieve the maximum of 105 litres per person per day internal potable water, with an additional allowance for external water use of 5 litres per person per day. The total internal water consumption estimate is 101.6 litres per person per day for dwellings with a bath and shower; and 90.6 litres per person per day for any dwellings with only a shower. An additional 5L is specified for external use. The specification of water fittings will be identified at the detailed design stage.

5.12.3. Representative data has been input into the BRE's Water Efficiency Calculator for New Dwellings for relevant domestic water consuming components; dual flush WC, taps and kitchen sink taps, bath and shower. Washing machine and dishwater specification have been set to default rates as standard practice.

5.12.4. The following representative rates have been utilised:

- *Duel Flush WC – 4L & 2.6L flush volumes;*
- *Taps – 4L per minute flow rate;*
- *Bath – 195L overflow capacity;*
- *Shower – 8L per minute flow rate;*
- *Kitchen sink taps – 4L per minute flow rate.*

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

5.12.6. The calculator can be found in Appendix K.

5.12.7. 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.

## 5.13. Air Quality

5.13.1. The scheme will comprise of suitable mitigation measures for air quality.

5.13.2. An Air Quality Assessment has been prepared by Stuart Michael Associates Limited and is submitted with the planning application. Impacts from development generated traffic and the constraints on the development and during the construction process have been assessed.

5.13.3. The Assessment concludes that taking into account the proposed development's negligible increase in air pollution during the operational stage, and the "not significant" impact arising from dust during the construction stage, it can be concluded that air quality should not be a determining factor in refusing planning consent.

## 5.14. Noise

5.14.1. The scheme will comprise of suitable mitigation measures for noise. A noise impact assessment has been prepared and submitted with the application.

5.14.2. The report concludes that the proposed development is in accordance with WHO Guidelines, British Standards, and WBC local policy.

5.14.3. 100% of heating and hot water will come from ground source heat pumps, extracting heat from boreholes.

## 5.15. BREEAM

5.15.1. A BREEAM New Construction Version 6.1 pre-assessment has been completed for the retail units, targeting a rating of Excellent. It has been assumed that these units will be completed as shell only.

5.15.2. The BREEAM pre-assessment for this development illustrates a potential credit mix which can achieve 73.98%.

5.15.3. For more details, please refer to the BREEAM pre-assessment report.

# 6. Conclusion

6.1.1. This Energy and Sustainability report has been produced to accompany the planning application for the proposed site, consisting of 317 residential dwellings, 5 shell retail units and a community hub at Old Town, Newbury.

6.1.2. The development will incorporate a ground source heat pump district heating network, providing low carbon heat in accordance with local and national policies.

6.1.3. The average regulated carbon reductions achieved across the sample units can be seen in the results section.

6.1.4. The results for the residential units achieve an average regulated carbon reduction of 66% over Part L1A 2021 regulations.

6.1.5. It can be concluded that the provision of fabric and service improvements across site can reduce carbon emissions by over 49% against Part L1A 2021 regulations. Therefore, the proposed development is predicted to comply with the requirements of the Future Homes Standard.

6.1.6. A representative sample of the proposed retail units has been assessed using SBEM calculation engine v6.1.e.0, and can be seen to deliver circa 29% reduction in regulated carbon emissions against Part L 2 (2021) regulations.

6.1.7. The domestic units achieve circa 54% reduction in total carbon emissions and the retail units achieve circa 20% reduction in total carbon emissions. This includes regulated and unregulated carbon emissions and therefore is compliant with policy CS15.

6.1.8. Proposed site wide total carbon emissions per year is 164 tonnes, a 95% Improvement on the existing site which produces 3,040 tonnes/yr.

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

- *Enhanced building fabric specification with a Fabric-First approach including high efficiency insulation and provision of efficient appliances;*
- *Effective waste management procedures to minimise construction waste and to divert any residual waste from landfill;*
- *The implementation of drainage, ecology and travel plans;*
- *Provision of electric vehicle charging points within residential parking areas and separately to the public car park facility;*
- *Implementation of 3 car club cars to reduce the need for 22 personal vehicles;*
- *Provision of 495 secure cycle stores and cycle repair stations;*
- *Improved pedestrian access routes;*
- *Efficient internal and external water use in line with building regulations;*

- *Opportunity to achieve BREEAM Excellent with a potential credit yield of 73.98%.*

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

- *Achieves Part L 2021 compliance ☑*
- *Has Low / zero carbon energy source ☑*
- *Delivers significant reduction in total carbon reductions ☑*
- *Meets likely Future Homes Standard ☑*

# Appendix A – Site Layout


THE ARCADE
The Globe Inn
MARKET PLACE
William Hill
BARTHOLOMEW STREET
The Newbury
The Catherine Wheel
CHEAP STREET
MARKET STREET
WEAVERS YARD
Old Town Newbury
LOCHAILORT
Woods Hardwick


THE ARCADE
The Globe Inn
MARKET PLACE
William Hill
BARTHOLOMEW STREET
The Newbury
The Catherine Wheel
CHEAP STREET
MARKET STREET
WEAVERS YARD
Old Town Newbury
Old Town, Newbury.
First Floor Plans, Site Layout.
LOCHAILORT
Woods Hardwick


THE ARCADE
The Globe Inn
MARKET PLACE
William Hill
BARTHOLOMEW STREET
The Newbury
The Catherine Wheel
CHEAP STREET
Vue Cinema
Vue Cinema & 4 Commercial Units
MARKET STREET
WEAVERS YARD
Old Town Newbury
LOCHAILORT
Woods Hardwick


THE ARCADE
The Globe Inn
MARKET PLACE
William Hill
BARTHOLOMEW STREET
The Newbury
The Catherine Wheel
CHEAP STREET
Vue Cinema
Vue Cinema & 4 Commercial Units
MARKET STREET
WEAVERS YARD
Old Town Newbury
LOCHAILORT
Woods Hardwick


THE ARCADE
The Globe Inn
MARKET PLACE
William Hill
BARTHOLOMEW STREET
The Newbury
The Catherine Wheel
CHEAP STREET
Vue Cinema
Vue Cinema & 4 Commercial Units
MARKET STREET
WEAVERS YARD
Old Town Newbury
LOCHAILORT
Woods Hardwick


THE ARCADE
The Globe Inn
MARKET PLACE
William Hill
BARTHOLOMEW STREET
The Newbury
The Catherine Wheel
CHEAP STREET
Car Park
Total Spaces: 477
Vue Cinema
Vue Cinema & 4 Commercial Units
MARKET STREET
WEAVERS YARD
Old Town
Newbury
LOCHAILORT
Woods Hardwick


THE ARCADE
The Globe Inn
MARKET PLACE
William Hill
BARTHOLOMEW STREET
The Newbury
The Catherine Wheel
CHEAP STREET
Car Park
Total Spaces: 477
Vue Cinema
Vue Cinema & 4 Commercial Units
MARKET STREET
WEAVERS YARD
Old Town Newbury
Old Town, Newbury.
Sixth Floor Plans, Site Layout
LOCHAILORT
Woods Hardwick


THE ARCADE
The Globe Inn
MARKET PLACE
William Hill
BARTHOLOMEW STREET
The Newbury
The Catherine Wheel
CHEAP STREET
Car Park
Total Spaces: 477
Vue Cinema
Vue Cinema & 4 Commercial Units
MARKET STREET
WEAVERS YARD
Old Town Newbury
Old Town, Newbury.
Roof Plan, Site Layout.
LOCHAILORT
Woods Hardwick

# Appendix B – Schedule of Psi Values Used

## Housing Thermal Bridging

| Thermal Bridge (with external wall) | SAP Ref. | Reference | Part L 2021 value | Part L 2021 backstop |
|---|---|---|---|---|
| Lintels | E2 | HTP-100F-0.034-0.11 (+10%) | 0.063 | 1 |
| Sill | E3 | KI_PSI_E3_SF34_0001 (+10%) | 0.023 | 0.1 |
| Jambs | E4 | KI_PSI_E4_SF34_0001 (+10%) | 0.018 | 0.1 |
| **Ground Floors** | | | | |
| Heatloss Floor | E5 | Reference for Notional Dwelling (+10%) | 0.176 | 0.32 |
| **Intermediate Floors** | | | | |
| Intermediate floor within a dwelling to external wall | E6 | KI_PSI_E6_SF34_0001 (+10%) | 0.004 | 0.14 |
| Balcony within or between dwellings, balcony support penetrates wall insulation | E23 | Reference for Notional Dwelling (+10%) | 0.022 | 1 |
| **Roof** | | | | |
| Eaves (insulation at ceiling) | E10 | Est for 500mm (+10%) | 0.073 | 0.12 |
| **Corner** | | | | |
| Corner (normal) | E16 | KI_PSI_E16_SF34_0001 (+10%) | 0.061 | 0.18 |
| **Party Corners** | | | | |
| Party wall between dwellings | E18 | KI_PSI_E18b_SF34_0001 (+10%) | 0.047 | 0.24 |
| **Thermal Bridge (with party wall)** | | | | |
| Ground Floor | P1 | Reference for Notional Dwelling (+10%) | 0.088 | 0.32 |
| Intermediate Floor to Party Wall | P2 | Default | 0 | 0 |
| Gable (insulation at ceiling level) | P4 | KI_PSI_P4_SFPW_0001 (+10%) | 0.099 | 0.48 |

## Flats Thermal Bridging

| Thermal Bridge (with external wall) | SAP Ref. | Reference | Part L 2021 value | Part L 2021 backstop |
|---|---|---|---|---|
| Lintels | E2 | HTP-150F-0.033-0.19 (+10%) | 0.072 | 1 |
| Lintels above 11m | E2 | Reference for Notional Dwelling (+10%) | 0.055 | 1 |
| Sill | E3 | H+H EW235/SL001 (+10%) | 0.035 | 0.1 |
| Jambs | E4 | H+H EW235RV001 (+10%) | 0.039 | 0.1 |
| **Ground Floors** | | | | |
| Heatloss Floor | E5 | Reference for Notional Dwelling (+10%) | 0.176 | 0.32 |
| **Intermediate Floors** | | | | |
| Intermediate floor within a dwelling to external wall | E6 | IF001 (+10%) | 0.002 | 0.14 |
| Party floor between dwellings (in blocks of flats) | E7 | H+H EW235/IF004 (+10%) | 0.041 | 0.28 |
| Balcony within or between dwellings, balcony support penetrates wall insulation | E23 | Reference for Notional Dwelling (+10%) | 0.022 | 1 |
| **Roof** | | | | |
| Eaves (insulation at ceiling) | E10 | Reference for Notional Dwelling (+10%) | 0.066 | 0.12 |
| Flat roof | E14 | Reference for Notional Dwelling (+10%) | 0.088 | 0.16 |
| **Corner** | | | | |
| Corner (normal) | E16 | CBA-316 (+10%) | 0.056 | 0.18 |
| **Party Corners** | | | | |
| Party wall between dwellings | E18 | PW300 (+10%) | 0.046 | 0.24 |
| Staggered Party wall | E25 | CBA-E25-338-A (+10%) | 0.057 | 0.24 |
| **Thermal Bridge (with party wall)** | | | | |
| Intermediate Floor to Party Wall | P2 | Default | 0 | 0 |
| Party Wall - Intermediate floor between dwellings | P3 | Default | 0 | 0 |
| Gable (insulation at ceiling level) | P4 | H+H RG001 (+10%) | 0.216 | 0.48 |

## Maisonettes Thermal Bridging

| Thermal Bridge (with external wall) | SAP Ref. | Reference | Part L 2021 value | Part L 2021 backstop |
|---|---|---|---|---|
| Lintels | E2 | HTP-150F-0.033-0.11 (+10%) | 0.074 | 1 |
| Sill | E3 | KI_PSI_E3_SF34_0001 (+10%) | 0.028 | 0.1 |
| Jambs | E4 | KI_PSI_E4_SF34_0001 (+10%) | 0.021 | 0.1 |
| **Ground Floors** | | | | |
| Heatloss Floor | E5 | Reference for Notional Dwelling (+10%) | 0.176 | 0.32 |
| **Intermediate Floors** | | | | |
| Intermediate floor within a dwelling to external wall | E6 | KI_PSI_E6_SF34_0001 (+10%) | 0.004 | 0.14 |
| Intermediate floor between dwellings to external wall | E7 | KI_PSI_E7_SF34_0001 (+10%) | 0.036 | 0.28 |
| **Roof** | | | | |
| Eaves (insulation at ceiling) | E10 | KI_PSI_E10_SF34_0001 (+10%) | 0.087 | 0.12 |
| Gable (insulation at ceiling) | E12 | E12-EE-230707 (+10%) | 0.044 | 0.25 |
| **Corner** | | | | |
| Corner (normal) | E16 | KI_PSI_E16_SF34_0001 (+10%) | 0.04 | 0.18 |
| Party wall between dwellings | E18 | KI_PSI_E18b_SF34_0001 (+10%) | 0.033 | 0.24 |
| Staggered Party wall | E25 | KI_PSI_E25b_SF34_0001 (+10%) | 0.052 | 0.24 |
| **Thermal Bridge (with party wall)** | | | | |
| Ground Floor to Party Wall | P1 | Reference for Notional Dwelling (+10%) | 0.088 | 0.32 |
| Intermediate Floor to Party Wall | P2 | Default | 0 | 0 |
| Party Wall - Intermediate floor between dwellings | P3 | Default | 0 | 0 |
| Gable (insulation at ceiling level) | P4 | Reference for Notional Dwelling (+10%) | 0.132 | 0.48 |

# Appendix C – District Heating Information

## Heat network key information

- ***Distribution loss factors and estimated efficiency (COP) sourced from district heating installer ERDA:***

Alex,

Many thanks for the update. Based on the attached our "target" COP was in the 3 to 3.5 range given the temperatures (65C) at which LTHW must be distributed to satisfy the HUI / DHW service. For now, we will complete our current advice based on a CoP of 3.5

Given the worse / best case range it seems necessary to base our design on 3.5 target. To achieve this – through detailed design – the LTHW flow temp will need to be reduced as far as possible through good design / specification of the HIU and distribution network. I note you have followed guidance on the DLF for now and would confirm that – should BMD/EEL be responsible for that aspect – then we would follow CP1 as a minimum. I am not sure at this stage is there is a client spec on this, but there is ***the potential*** to target 1.2 as a figure on the next calculation iteration if flow temps can be reduced?

I assume at 3.5 and 1.5 then the scheme would achieve a (narrow...) pass.

@'Hugo Haig' we will complete our appraisal of this scheme on this basis unless we hear otherwise.

Regards,

Kevin

Mobile Phone: +44 (0)7983 646560


Check out Erda's dashboard... #ShowYourStripes #ErdaStripes



- ***COP of 3.5***
- ***DLF of 1.5***

## Heat Interface Units (HIU's)

- ***Specification of HIU currently unconfirmed. Default SAP data gives losses of 1.44kwh/day.***
- ***Figure (right) shows an example HIU. Photograph courtesy of SAV systems.***

# Appendix D – Regulated Carbon Emissions

## Table 3 – Carbon reduction across sample domestic units

| Unit type | Floor Area ($m^2$) | SAP 10.2 Calculated Occupancy (N) | Number of units | Regulated Carbon Emissions (DER) | | | | Regulated Carbon Emissions (TER) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D | E | F | G |
| | | | | DER<TER (%) | DER (kgCO2/m2/yr) | Total Carbon (Kg/year/unit) | Regulated Carbon emissions (kg/yr) | TER (kgCO2/m2/yr) | Total Carbon (Kg/year/unit) | Regulated Carbon emissions (kg/yr) |
| House MT | 71.52 | 2.28 | 74 | 64.09 | 4.22 | 301.81 | **22,334** | 11.75 | 840.36 | **62,187** |
| House ET | 72.68 | 2.31 | 37 | 63.21 | 4.54 | 329.97 | **12,209** | 12.34 | 896.87 | **33,184** |
| Maisonette Duplex TF | 79.98 | 2.46 | 24 | 68.20 | 3.95 | 315.92 | **7,582** | 12.42 | 993.35 | **23,840** |
| Maisonette Duplex GF | 79.98 | 2.46 | 24 | 67.95 | 4.41 | 352.71 | **8,465** | 13.76 | 1100.52 | **26,413** |
| Flat Duplex TF (Rockwool) | 86.7 | 2.58 | 15 | 66.70 | 3.79 | 328.59 | **4,929** | 11.38 | 986.65 | **14,800** |
| Flat Duplex MF (Rockwool) | 86.7 | 2.58 | 14 | 66.86 | 3.44 | 298.25 | **4,175** | 10.38 | 899.95 | **12,599** |
| Flat TF | 57.07 | 1.90 | 43 | 67.13 | 4.54 | 259.10 | **11,141** | 13.81 | 788.14 | **33,890** |
| Flat MF | 59.45 | 1.97 | 43 | 67.59 | 4.22 | 250.88 | **10,788** | 13.02 | 774.04 | **33,284** |
| Flat GF | 59.45 | 1.97 | 43 | 67.92 | 5.72 | 340.05 | **14,622** | 17.83 | 1059.99 | **45,580** |
| **Totals** | | | **317** | | | | **96,246** | | | **285,776** |
| | Regulated Carbon Emissions from actual dwellings (t/yr): | | 96.25 | | | | | | | |
| | Regulated carbon emissions from notional dwellings (t/yr): | | 285.78 | | | | | | | |
| | **Reduction in CO2 Emissions across site over 2021 regs:** | | **66.32%** | | | | | | | |

## Table 4 – Carbon reduction based on sample non domestic retail unit

| Unit type | Modelled Floor Area ($m^2$) | Total Floor Area of relevant zone | Regulated Carbon Emissions (BER) | | Regulated Carbon Emissions (TER) | |
|---|---|---|---|---|---|---|
| | | | BER Carbon emission (kg/$m^2$/year) | Regulated Carbon (Kg/year) | TER Carbon emission (kg/$m^2$/year) | Regulated Carbon (Kg/year) |
| Sample Retail Unit | 75 | 350 | 4.34 | 1519 | 6.15 | 2153 |
| **Totals** | | | | **1,519** | | **2,153** |
| | Regulated Carbon Emissions, TER (t/yr) | | **2.15** | | | |
| | Regulated Carbon Emissions, BER (t/yr) | | **1.52** | | | |
| | **Reductions in CO2 Emissions over 2021 Regs** | | **29.4%** | | | |

# Appendix E – Unregulated Carbon Emissions

**SAP 10.2 Electricity Carbon Emission Factor = 0.136 kgCO2/kwh**

## Table 5 - Domestic Units

| Unit type | Floor Area ($m^2$) | SAP 10.2 Calculated Occupancy (N) | Number of units | Unregulated Carbon Emissions (From GHA Building standard figures) | | | |
|---|---|---|---|---|---|---|---|
| | | | | A | B | C | D |
| | | | | Total Unregulated Energy (kwh/m2/yr) | Energy (kwh/yr) | Total Carbon (Kg/year/unit) | Non-Regulated Carbon Emissions (Kg/year) |
| House MT | 71.52 | 2.28 | 74 | 21.90 | 1566.29 | 213.02 | **15,763** |
| House ET | 72.68 | 2.31 | 37 | 21.90 | 1591.69 | 216.47 | **8,009** |
| Maisonette Duplex TF | 79.98 | 2.46 | 24 | 21.90 | 1751.56 | 238.21 | **5,717** |
| Maisonette Duplex GF | 79.98 | 2.46 | 24 | 21.90 | 1751.56 | 238.21 | **5,717** |
| Flat Duplex TF (Rockw | 86.7 | 2.58 | 15 | 21.90 | 1898.73 | 258.23 | **3,873** |
| Flat Duplex MF (Rockv | 86.7 | 2.58 | 14 | 21.90 | 1898.73 | 258.23 | **3,615** |
| Flat TF | 57.07 | 1.90 | 43 | 21.90 | 1249.83 | 169.98 | **7,309** |
| Flat MF | 59.45 | 1.97 | 43 | 21.90 | 1301.96 | 177.07 | **7,614** |
| Flat GF | 59.45 | 1.97 | 43 | 21.90 | 1301.96 | 177.07 | **7,614** |
| **Totals** | | | **317** | | | | **65,232** |

## Table 6 - Non-Domestic Units

| Unit type | Modelled Floor Area ($m^2$) | Total Floor Area of relevant zone | Unregulated Carbon Emissions | | |
|---|---|---|---|---|---|
| | | | Equipment Energy ($kWh/m^2$) | Equipment Energy (kWh) | Equipment Carbon Emission ($kgCO_2$) |
| Sample Retail Unit | 75 | 350 | 20.26 | 7091.0 | 964 |

# Appendix F – Total Carbon Emissions

## Table 7 – Domestic Units

| Unit type | Unregulated Carbon Emissions (From GHA Building standard figures) | | | Regulated Carbon Emissions (DER) | | | Regulated Carbon Emissions (Baseline, TER) | | |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | I |
| | Total Unregulated Energy (kwh/m2/yr) | Total Carbon (Kg/year/unit) | Non-Regulated Carbon Emissions (Kg/year) | DER (kgCO2/m2/yr) | Total Carbon (Kg/year/unit) | Regulated Carbon emissions (kg/yr) | TER (kgCO2/m2/yr) | Total Carbon (Kg/year/unit) | Regulated Carbon emissions (kg/yr) |
| House MT | 21.90 | 213.02 | **15,763** | 4.22 | 301.81 | **22,334** | 11.75 | 840.36 | **62,187** |
| House ET | 21.90 | 216.47 | **8,009** | 4.54 | 329.97 | **12,209** | 12.34 | 896.87 | **33,184** |
| Maisonette Duplex TF | 21.90 | 238.21 | **5,717** | 3.95 | 315.92 | **7,582** | 12.42 | 993.35 | **23,840** |
| Maisonette Duplex GF | 21.90 | 238.21 | **5,717** | 4.41 | 352.71 | **8,465** | 13.76 | 1100.52 | **26,413** |
| Flat Duplex TF (Rockwoo | 21.90 | 258.23 | **3,873** | 3.79 | 328.59 | **4,929** | 11.38 | 986.65 | **14,800** |
| Flat Duplex MF (Rockwo | 21.90 | 258.23 | **3,615** | 3.44 | 298.25 | **4,175** | 10.38 | 899.95 | **12,599** |
| Flat TF | 21.90 | 169.98 | **7,309** | 4.54 | 259.10 | **11,141** | 13.81 | 788.14 | **33,890** |
| Flat MF | 21.90 | 177.07 | **7,614** | 4.22 | 250.88 | **10,788** | 13.02 | 774.04 | **33,284** |
| Flat GF | 21.90 | 177.07 | **7,614** | 5.72 | 340.05 | **14,622** | 17.83 | 1059.99 | **45,580** |
| **Totals** | | | **65,232** | | | **96,246** | | | **285,776** |
| | | | | | | | | | |
| **Baseline Total Carbon (t/yr)** | | **351.01** | | | | | | | |
| **Proposed scheme total carbon (t/yr)** | | **161.48** | | | | | | | |
| **% Reduction** | | **54.00** | | | | | | | |

## Table 8 – Non Domestic Units

| Unit type | Unregulated Carbon Emissions | | | Regulated Carbon Emissions (BER) | | Regulated Carbon Emissions (Baseline, TER) | |
|---|---|---|---|---|---|---|---|
| | Equipment Energy ($kWh/m^2$) | Equipment Energy (kWh) | Equipment Carbon Emission ($kgCO_2$) | BER Carbon emission ($kg/m^2$/year) | Regulated Carbon (Kg/year) | TER Carbon emission ($kg/m^2$/year) | Regulated Carbon (Kg/year) |
| Sample Retail Unit | 20.26 | 7091.0 | **964** | 4.34 | **1519** | 6.15 | 2153 |
| **Totals** | | | **964** | | **1,519** | | **2,153** |
| | | | | | | | |
| **Baseline Total Carbon (t/yr)** | | **3.12** | | | | | |
| **roposed scheme total carbon (t/yr** | | **2.48** | | | | | |
| **% Reduction** | | **20.32** | | | | | |

# Appendix G – Unregulated Energy Demand (Good Homes Alliance)

- ***Unregulated energy is the energy consumed by a building resulting from appliances and cooking.***
- ***SAP 10 does not calculate or set targets for unregulated energy demand.***
- ***In the 'Building Standards Compared' document (linked below) Passivhaus PHPP model has been used by the GLA to calculate unregulated energy demand for each archetype (1 bed 50m² flat, 2 bed 61m² flat, 3 bed 84m² semi house, 3 bed 84m² terraced house, and 5 bed 110m² detached house)***
- ***The GHA adopted an unregulated energy factor of 21.9kWh/m²/yr as being representative for use when reviewing varying architypes.***
- ***21.9kWh/m²/yr is at the higher end of the calculated figures and can be seen to be a reasonable estimation for the proposed development, where the average floor area is 72m². See Table 9 below.***

**Table 9 – Unregulated energy demand used in calculations seen in red.**

| Archetype | Gross Internal Floor Area (m²) | Calculated Occupancy (SAP) | Given Occupancy | Unregulated Energy (Calculated Occupancy) kWh/m².year | Unregulated Energy (Given Occupancy) kWh/m².year |
|---|---|---|---|---|---|
| 1 | 50 | 1.69 | 2 | 24.4 | 30.1 |
| 2 | 61 | 2.01 | 3 | 21.9 | 34 |
| 3 | 84 | 2.53 | 4 | 19.3 | 31.5 |
| 4 | 84 | 2.53 | 4 | 19.3 | 31.5 |
| 5 | 110 | 2.81 | 6 | 16.3 | 34.4 |

***https://goodhomes.org.uk/resource/building-standards-compared***

# Appendix H – Written Ministerial Statements

## Withdrawing CfSH, Sir Eric Pickles MP, 25th March 2015:

"The government has stated that, from then, the energy performance requirements in Building Regulations will be set at a level equivalent to the (outgoing) Code for Sustainable Homes Level 4. Until the amendment is commenced, we would expect local planning authorities to take this statement of the government's intention into account in applying existing policies and not set conditions with requirements above a Code level 4 equivalent. This statement does not modify the National Planning Policy Framework policy allowing the connection of new housing development to low carbon infrastructure such as district heating networks."

## Baroness Penn, 13th December 2023:

"In 2015, in reference to an uncommenced provision in the Deregulation Act 2015 which amended the Planning and Energy Act 2008, a written ministerial statement (WMS) (HC Deb, 25 March 2015, vol 584, cols 131-138WS) stated that until that amendment was commenced, local plan policies exceeding minimum energy efficiency standards should not go beyond level 4 of the Code for Sustainable Homes. Since then, the introduction of the 2021 Part L uplift to the Building Regulations set national minimum energy efficiency standards that are higher than those referenced in the 2015 WMS rendering it effectively moot.

"The improvement in standards already in force, alongside the ones which are due in 2025, demonstrates the Government's commitment to ensuring new properties have a much lower impact on the environment in the future. In this context, the Government does not expect plan-makers to set local energy efficiency standards for buildings that go beyond current or planned buildings regulations. The proliferation of multiple, local standards by local authority area can add further costs to building new homes by adding complexity and undermining economies of scale. Any planning policies that propose local energy efficiency standards for buildings that go beyond current or planned buildings regulation should be rejected at examination if they do not have a well-reasoned and robustly costed rationale."

# Appendix I – Flood Risk Map (Zone 2)

Environment Agency

## Flood map for planning

| Your reference | Location (easting/northing) | Created |
|---|---|---|
| **Newbury** | **447123/167008** | **11 Jul 2024 11:16** |

**Your selected location is in flood zone 2, an area with a medium probability of flooding.**

### This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

**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 2022 OS 100024198. https://flood-map-for-planning.service.gov.uk/os-terms

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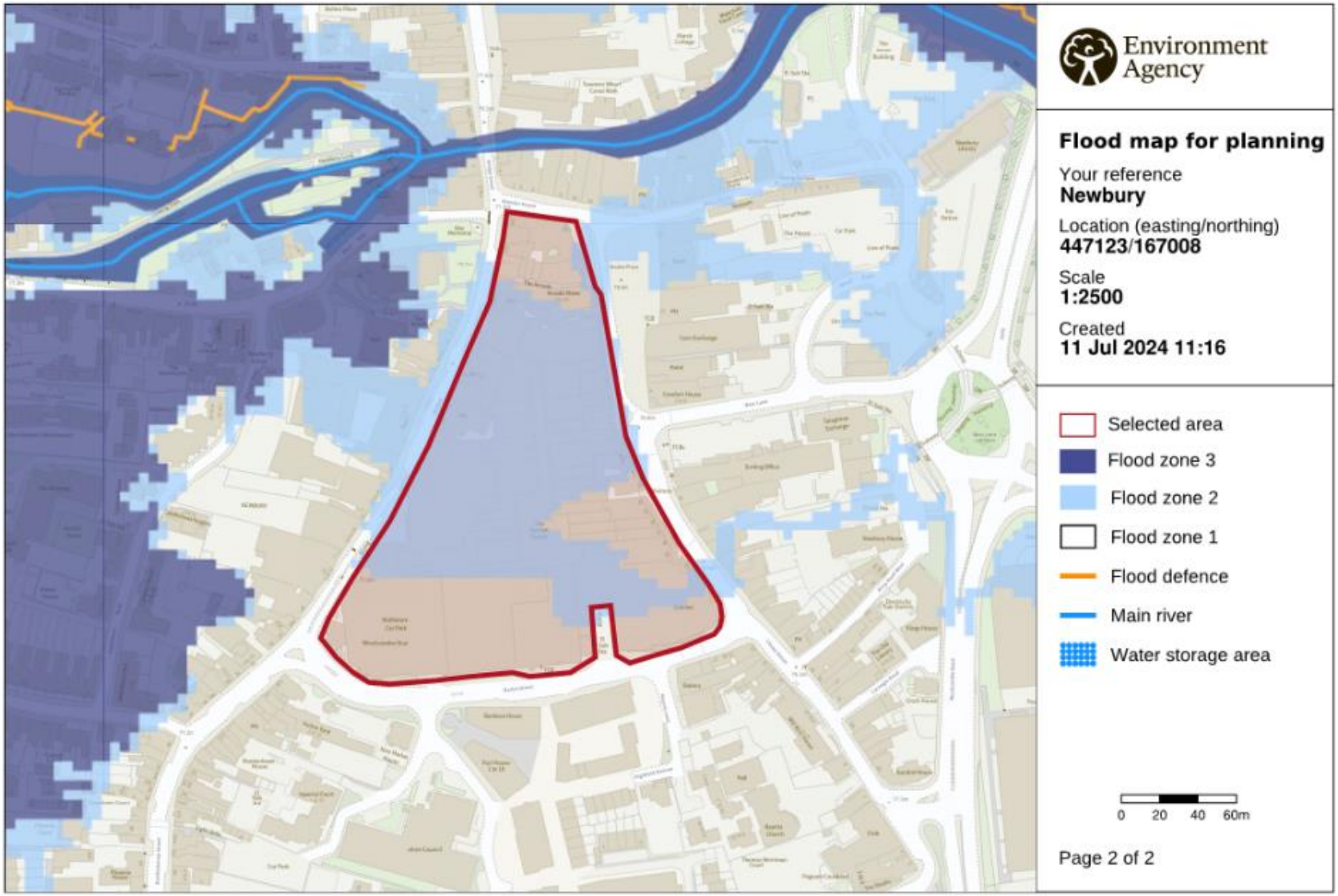
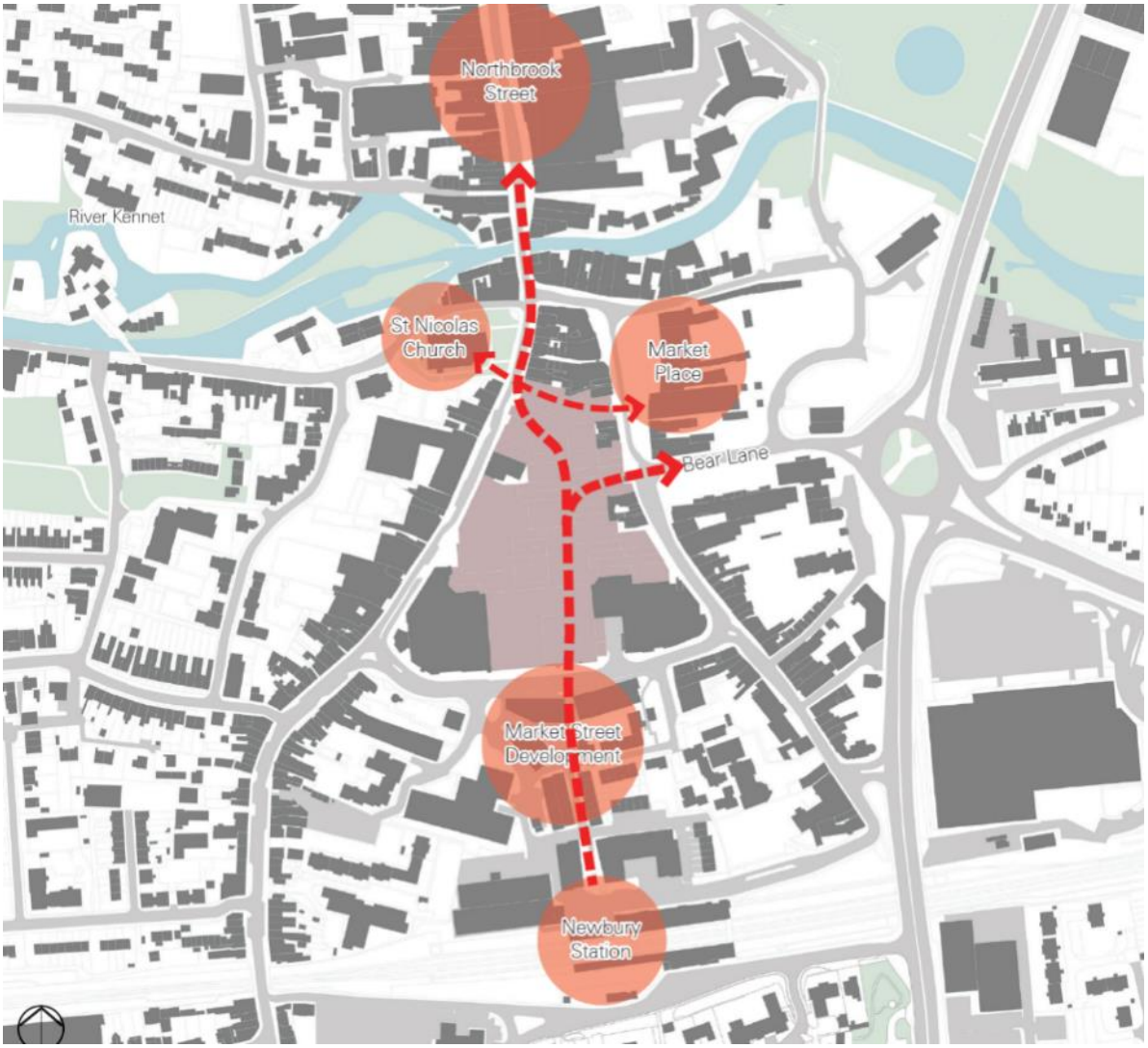


# Appendix J – Walking Routes to Public Transport



# Appendix K – Water Efficiency Calculator

| WATER EFFICIENCY CALCULATOR FOR NEW DWELLINGS - (BASIC CALCULATOR) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | House Type: | Type 1 | | Type 2 | | Type 3 | | Type 4 | |
| | Description: | Bath and Shower | | Shower only | | | | | |
| Installation Type | Unit of measure | Capacity/ flow rate | Litres/ person/ day | Capacity/ flow rate | Litres/ person/ day | Capacity/ flow rate | Litres/ person/ day | Capacity/ flow rate | Litres/ person/ day |
| Is a dual or single flush WC specified? | | Dual | | Dual | | Select option: | | Select option: | |
| WC | Full flush volume | 4 | 5.84 | 4 | 5.84 | | 0.00 | | 0.00 |
| | Part flush volume | 2.6 | 7.70 | 2.5 | 7.40 | | 0.00 | | 0.00 |
| Taps (excluding kitchen and external taps) | Flow rate (litres / minute) | 4 | 7.90 | 4 | 7.90 | | 0.00 | | 0.00 |
| Are both a Bath & Shower Present? | | Bath & Shower | | Shower only | | | | | |
| Bath | Capacity to overflow | 195 | 21.45 | | 0.00 | | 0.00 | | 0.00 |
| Shower | Flow rate (litres / minute) | 8 | 34.96 | 8 | 44.80 | | 0.00 | | 0.00 |
| Kitchen sink taps | Flow rate (litres / minute) | 4 | 12.12 | 4 | 12.12 | | 0.00 | | 0.00 |
| Has a washing machine been specified? | | No | | Yes | | | | | |
| Washing Machine | Litres / kg | | 17.16 | 8.1 | 17.01 | | 0.00 | | 0.00 |
| Has a dishwasher been specified? | | No | | No | | | | | |
| Dishwasher | Litres / place setting | | 4.50 | | 4.50 | | 0.00 | | 0.00 |
| Has a waste disposal unit been specified? | | No | 0.00 | No | 0.00 | | 0.00 | | 0.00 |
| Water Softener | Litres / person / day | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| | Calculated Use | | 111.6 | | 99.6 | | 0.0 | | 0.0 |
| | Normalisation factor | | 0.91 | | 0.91 | | 0.91 | | 0.91 |
| Code for Sustainable Homes | Total Consumption | | 101.6 | | 90.6 | | 0.0 | | 0.0 |
| | Mandatory level | | Level 3/4 | | Level 3/4 | | - | | - |
| Building Regulations 17.K | External use | | 5.0 | | 5.0 | | 5.0 | | 5.0 |
| | Total Consumption | | 106.6 | | 95.6 | | 0.0 | | 0.0 |
| | 17.K Compliance? | | Yes | | Yes | | - | | - |

# Appendix L – Sample SBEM BRUKL

*Sample SBEM output (BRUKL) can be found on the following pages.*

## BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

**Project name** **Shell and Core**

**Old Town Sample Retail Unit** As designed

**Date:** Thu May 16 17:23:55 2024

### Administrative information

**Building Details**

**Address:** Old Town, Newbury,

**Certifier details**

**Name:** Matthew Cooke

**Telephone number:** 01582 544250

**Address:** 8 Cardiff Road, Luton, LU1 1PP

**Certification tool**

**Calculation engine:** SBEM

**Calculation engine version:** v6.1.e.0

**Interface to calculation engine:** DesignBuilder SBEM

**Interface to calculation engine version:** v7.2.0

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

**Foundation area [m²]:** 74.76

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

| | | |
|---|---|---|
| Target $CO_2$ emission rate (TER), $kgCO_2/m^2.annum$ | 6.15 | |
| Building $CO_2$ emission rate (BER), $kgCO_2/m^2.annum$ | 4.34 | |
| Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$ | 66.2 | |
| Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$ | 46.82 | |
| Do the building's emission and primary energy rates exceed the targets? | BER =< TER | BPER =< TPER |

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

| Fabric element | $U_{a\text{-}Limit}$ | $U_{a\text{-}Calc}$ | $U_{i\text{-}Calc}$ | First surface with maximum value |
|---|---|---|---|---|
| Walls* | 0.26 | 0.2 | 0.2 | Retail Unit Sample - Sales area_P_5 |
| Floors | 0.18 | 0.09 | 0.09 | Retail Unit Sample - Sales area_S_3 |
| Pitched roofs | 0.16 | - | - | No heat loss pitched roofs |
| Flat roofs | 0.18 | - | - | No heat loss flat roofs |
| Windows** and roof windows | 1.6 | 1.2 | 1.2 | Retail Unit Sample - Sales area_G_10 |
| Rooflights*** | 2.2 | - | - | No external rooflights |
| Personnel doors^ | 1.6 | 1.2 | 1.2 | Retail Unit Sample - Sales area_D_9 |
| Vehicle access & similar large doors | 1.3 | - | - | No external vehicle access doors |
| High usage entrance doors | 3 | - | - | No external high usage entrance doors |

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

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

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

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

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

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

| Air permeability | Limiting standard | This building |
|---|---|---|
| m³/(h.m²) at 50 Pa | 8 | 3 |

Page 1 of 4

**Building services**

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

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

1- Example fitout Mitsubishi 2x PLA-ZM50 1xPUZ-ZM100

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 4.8 | 7.7 | - | - | - |
| **Standard value** | 2.5* | 5 | N/A | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |

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

1- Instantaneous HW only

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

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

**Shell and core configuration**

| Zone | Assumed shell? |
|---|---|
| Retail Unit Sample - Sales area | NO |

| General lighting and display lighting | General luminaire | Display light source | |
|---|---|---|---|
| **Zone name** | **Efficacy [lm/W]** | **Efficacy [lm/W]** | **Power density [W/m²]** |
| **Standard value** | 95 | 80 | 0.3 |
| Retail Unit Sample - Sales area | 130 | 130 | 1.154 |

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

| Zone | Solar gain limit exceeded? (%) | Internal blinds used? |
|---|---|---|
| Retail Unit Sample - Sales area | NO (-55.6%) | NO |

## Regulation 25A: Consideration of high efficiency alternative energy systems

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

Page 2 of 4

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

| | Actual | Notional |
|---|---|---|
| Floor area [$m^2$] | 74.8 | 74.8 |
| External area [$m^2$] | 222.6 | 222.6 |
| Weather | SWI | SWI |
| Infiltration [$m^3/hm^2$@ 50Pa] | 3 | 3 |
| Average conductance [W/K] | 51.57 | 109.97 |
| Average U-value [$W/m^2K$] | 0.23 | 0.49 |
| Alpha value* [%] | 37.08 | 21.12 |

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

## Building Use

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

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

| | Actual | Notional |
|---|---|---|
| Heating | 8.81 | 18.32 |
| Cooling | 4.76 | 10.17 |
| Auxiliary | 0 | 0 |
| Lighting | 15.51 | 14.4 |
| Hot water | 1.7 | 1.7 |
| Equipment* | 20.26 | 20.26 |
| **TOTAL**** | **30.78** | **44.59** |

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

## Energy Production by Technology [$kWh/m^2$]

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

## Energy & $CO_2$ Emissions Summary

| | Actual | Notional |
|---|---|---|
| Heating + cooling demand [$MJ/m^2$] | 247.94 | 335.23 |
| Primary energy [$kWh_{PE}/m^2$] | 46.82 | 66.2 |
| Total emissions [$kg/m^2$] | 4.34 | 6.15 |

Page 3 of 4

| HVAC Systems Performance | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| System Type | | Heat dem MJ/m2 | Cool dem MJ/m2 | Heat con kWh/m2 | Cool con kWh/m2 | Aux con kWh/m2 | Heat SSEEF | Cool SSEER | Heat gen SEFF | Cool gen SEER |
| [ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity | | | | | | | | | | |
| | Actual | 149.3 | 98.7 | 8.8 | 4.8 | 0 | 4.71 | 5.76 | 4.8 | 7.7 |
| | Notional | 174.1 | 161.1 | 18.3 | 10.2 | 0 | 2.64 | 4.4 | ---- | ---- |

**Key to terms**

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

# Appendix M – SBEM Specification Sheet

## SBEM Assessment Specifications Sheet

| | |
|---|---|
| Site : | Old Town Newbury |
| Client: | Lochailort Newbury Ltd |
| Date : | 16.05.2024 |
| Revision: | 1 |

| **Fabric Specifications** | | | |
|---|---|---|---|
| Walls | Description | U-Value | Thermal Mass |
| External Wall Type 1 | Insulated cavity wall, includes partition to residential zones | 0.18W/m$^2$K | 134.8kJ/m$^2$K |
| Floors | Description | U-Value | Thermal Mass |
| Ground Floor 1 | Assumed | 0.11W/m$^2$K | 94.0kJ/m$^2$K |
| Doors | Description | U-Value | Thermal Mass |
| Door 1 | External door | 1.2W/m$^2$K | 29.3kJ/m$^2$K |
| Windows | Description | U-value | Solar Factors |
| Glazing | Display windows | 1.3W/m$^2$K | T-Solar: 0.72 L-Solar: 0.76 |
| Window above door | Double glazing | 1.0W/m$^2$K | T-Solar: 0.72 L-Solar: 0.76 |

## Building Services

*PLEASE NOTE: Shell only projects will have assumed services*

| HVAC Specification | | | |
|---|---|---|---|
| **System** | **Serving** | **Description/Product** | **Performance** |
| Split/multi-split system | All | Example product: Mitsubishi 2x PLA-ZM50 1xPUZ-ZM100 | Seasonal heating energy efficiency ratio = 4.80<br>Seasonal cooling energy efficiency ratio = 7.70 |
| Central heating using water: radiators<br>Variable speed pumps with different sensor across pump<br>Does the system have provision for metering?: Yes<br>Is there an alarm for 'out of range' values: Yes<br>Central time control: No<br>Optimum start/stop control: Yes<br>Local time control (i.e. room by room): Yes<br>Local temperature control (i.e. room by room): Yes<br>Weather compensation control: No | | | |

| Water Heating Specification | | | |
|---|---|---|---|
| **System** | **Serving Zones** | **Description/Product** | **Performance** |
| Instantaneous electric hot water | All zones | Instantaneous electric hot water | Seasonal Efficiency= 100% |

| Ventilation Specification | | | |
|---|---|---|---|
| **System** | **Serving Zones** | **Performance** | **Value** |
| Natural | All | N/A | N/A |

| Lighting Specification | | | |
|---|---|---|---|
| **Product** | **Performance** | **Assigned zones** | **Lamp type** |
| LED lighting | Lumens/Watt: 130<br>Light Output Ratio=1 | All zones | LED |
| Local Manual switching | No | | |
| PIR Sensor | No | | |
| PIR with photocell | No | | |
| All lighting sub-metered: No<br>M&T alarm for “out of range” values: No | | | |
| **Display Lighting*** | | | |
| Time control of display lighting: Yes<br><br>Does display lighting use efficient lamps: Yes<br><br>Lumens per circuit wattage: 130<br>**For areas where display items are exhibited, e.g. display windows, reception* | | | |

*Electric Power Factor:* >0.95

| Renewable Option 1 | | |
|---|---|---|
| Solar Thermal Provision | N/A | |
| PV Array | Peak Power: N/A | Orientation (or location): N/A |

| Other | |
|---|---|
| Air Pressure Target | 3.00 Pa $m^3/hm^{-2}$ |

# Appendix N – Sample SAP 10 Calculations

*Sample SAP 10 Calculations can be found on 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 17 May 2024 13:57:44

| Project Information | | | |
|---|---|---|---|
| Assessed By | Hazel Black | Building Type | Flat, Mid-terrace |
| OCDEA Registration | EES/022587 | Assessment Date | 2024-05-17 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 59 $m^2$ |
| Site Reference | Flat MF | Plot Reference | GSHP ERDA 1.5 DLF |
| Address | Plot X Kennet Old Town, Newbury, RG14 | | |

| 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 | Heat network | |
| *Target carbon dioxide emission rate* | *13.02 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 4.22 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *69.7 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 44.71 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *28.1 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 26.2 $kWh/m^2$ | 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* | 0.22 | Walls (2) (0.24) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | N/A | N/A | **N/A** |
| Roofs | *0.16* | N/A | N/A | **N/A** |
| Windows, doors, and roof windows | *1.6* | 1.02 | Windows East (1.1) | 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) | 28.394 | 0.2 |
| Sheltered wall: Walls (2) | 27.5 | 0.24 |
| Party wall: Party Wall (1) | 16.75 | 0 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Door, FD Shelt. | 1.84 | South | N/A | 0.71 **(!)** |
| Windows East, Windows | 1.3515 | North | 0.7 | 1.1 **(!)** |
| Windows East, Windows | 1.3515 | North | 0.7 | 1.1 **(!)** |
| Windows East, Windows | 1.3515 | North | 0.7 | 1.1 **(!)** |
| Windows East, Windows | 1.3515 | North | 0.7 | 1.1 **(!)** |
| Window South, Windows | 1.08 | East | 0.7 | 1.1 **(!)** |
| Window North, Windows | 1.08 | West | 0.7 | 1.1 **(!)** |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: 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 | 0.072 | HTP-150F-0.03 3-0.19 (+10%) |
| | | | | |

| Main element | Junction detail | Source | Psi value [W/mK] | Drawing / reference |
|---|---|---|---|---|
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.035 **(!)** | H+H EW235/SL001 (+10%) |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.039 **(!)** | H+H EW235RV001 (+10%) |
| External wall | E7: Party floor between dwellings (in blocks of flats) | Calculated by person with suitable expertise | 0.041 | H+H EW235/IF004 (+10%) |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.056 | CBA-316 (+10%) |
| Party wall | P3: Intermediate floor between dwellings (in blocks of flats) | SAP table default | 0 **(!)** | |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.046 | PW300 (+10%) |
| External wall | E25: Staggered party wall between dwellings | Calculated by person with suitable expertise | 0.057 | CBA-E25-338-A (+10%) |

| 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 network - Heat network | |
| Efficiency | |
| Emitter type | |
| Flow temperature | |
| System type | |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | |
|---|---|
| **Cylinder/store** - type: N/A | |
| Capacity | N/A |
| Declared heat loss | N/A |
| Primary pipework insulated | N/A |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | |
|---|---|
| **Main heating 1** - type: Charging system linked to use of heating, programmer, and TRVs | |
| Function | |
| Ecodesign class | |
| Manufacturer | |
| Model | |
| **Water heating** - type: Cylinder thermostat | |
| Manufacturer | |
| Model | HIU |

| 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 | 0.09 W/(l/s) | **OK** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks | |
|---|---|
| **Network name**: GSHP | |
| Service provision | Space and water heating |
| Status | New heat network |
| Carbon dioxide emission factor for delivered heat | 0.043 $kgCO_2/kWh$ |
| Primary energy factor for delivered heat | 0.454 $kWh_{PE}/kWh$ |

| 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:<br><br>Name: | Assessor ID:<br><br>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 17 May 2024 13:57:42

| Project Information | | | |
|---|---|---|---|
| Assessed By | Hazel Black | Building Type | Flat, Mid-terrace |
| OCDEA Registration | EES/022587 | Assessment Date | 2024-05-17 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 57 $m^2$ |
| Site Reference | Flat TF | Plot Reference | GSHP ERDA 1.5 DLF |
| Address | Plot X Kennet Old Town, Newbury, RG14 | | |

| 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 | Heat network | |
| *Target carbon dioxide emission rate* | *13.81 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 4.54 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *73.62 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 48.04 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *32.0 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 30.0 $kWh/m^2$ | 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* | 0.2 | Walls (2) (0.24) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | N/A | N/A | **N/A** |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.02 | Windows (1.1) | 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) | 34.1876 | 0.2 |
| Sheltered wall: Walls (2) | 1.44 | 0.24 |
| Party wall: Party Wall (1) | 31.48 | 0 **(!)** |
| Exposed roof: Roof (1) | 57.07 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Door, Door Shelt. | 1.84 | South | N/A | 0.71 **(!)** |
| Windows, Windows | 1.6781 | North | 0.7 | 1.1 **(!)** |
| Windows, Windows | 1.6781 | North | 0.7 | 1.1 **(!)** |
| Windows, Windows | 1.6781 | North | 0.7 | 1.1 **(!)** |
| Windows, Windows | 1.6781 | North | 0.7 | 1.1 **(!)** |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: 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 | 0.072 | HTP-150F-0.03 3-0.19 (+10%) |
| External wall | E3: Sill | Calculated by person with suitable | 0.035 **(!)** | H+H |

| Main element | Junction detail | Source | Psi value [W/mK] | Drawing / reference |
|---|---|---|---|---|
| | | expertise | | EW235/SL001 (+10%) |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.039 **(!)** | H+H EW235RV001 (+10%) |
| External wall | E7: Party floor between dwellings (in blocks of flats) | Calculated by person with suitable expertise | 0.041 | H+H EW235/IF004 (+10%) |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.056 | CBA-316 (+10%) |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.046 | PW300 (+10%) |
| Party wall | P3: Intermediate floor between dwellings (in blocks of flats) | SAP table default | 0 **(!)** | |
| External wall | E14: Flat roof | Calculated by person with suitable expertise | 0.088 | Ref for Notional Dwelling +10% |
| Party wall | P4: Roof (insulation at ceiling level) | Calculated by person with suitable expertise | 0.216 | H+H RG001 (+10%) |
| External wall | E25: Staggered party wall between dwellings | Calculated by person with suitable expertise | 0.057 | CBA-E25-338-A (+10%) |

| 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 network - Heat network | |
| Efficiency | |
| Emitter type | |
| Flow temperature | |
| System type | |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | |
|---|---|
| **Cylinder/store** - type: N/A | |
| Capacity | N/A |
| Declared heat loss | N/A |
| Primary pipework insulated | N/A |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | |
|---|---|
| **Main heating 1** - type: Charging system linked to use of heating, programmer, and TRVs | |
| Function | |
| Ecodesign class | |
| Manufacturer | |
| Model | |
| **Water heating** - type: Cylinder thermostat | |
| Manufacturer | |
| Model | HIU |

| 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 | 0.12 W/(l/s) | **OK** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks | |
|---|---|
| **Network name**: GSHP | |
| Service provision | Space and water heating |
| Status | New heat network |
| Carbon dioxide emission factor for delivered heat | 0.043 $kgCO_2/kWh$ |
| Primary energy factor for delivered heat | 0.455 $kWh_{PE}/kWh$ |

| 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:<br><br>Name: | Assessor ID:<br><br>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 17 May 2024 13:57:42

| Project Information | | | |
|---|---|---|---|
| Assessed By | Hazel Black | Building Type | House, End-terrace |
| OCDEA Registration | EES/022587 | Assessment Date | 2024-05-17 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 73 $m^2$ |
| Site Reference | House End Terrace | Plot Reference | GSHP ERDA 1.5 DLF |
| Address | Plot 012 Old Town, Newbury, RG14 | | |

| 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 | Heat network | |
| *Target carbon dioxide emission rate* | *12.34 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 4.54 $kgCO_2/m^2$ | **OK** |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *64.76 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 47.76 $kWh_{PE}/m^2$ | **OK** |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *38.1 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 36.4 $kWh/m^2$ | **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* | 0.2 | Walls (1) (0.2) | **OK** |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | 0.11 | Heatloss floor (0.11) | **OK** |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | **OK** |
| Windows, doors, and roof windows | *1.6* | 1.1 | W1 (1.1) | **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) | 88.023 | 0.2 |
| Party wall: Party Wall (1) | 28.6 | 0 **(!)** |
| Ground floor: Heatloss floor, Heatloss floor | 36.34 | 0.11 |
| Exposed roof: Roof (1) | 36.34 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| W1, Window | 1.21 | North | 0.7 | 1.1 **(!)** |
| D1, FD | 2.037 | North | N/A | 1.1 **(!)** |
| W2, Window | 1.21 | North | 0.7 | 1.1 **(!)** |
| W3, Window | 0.61 | South | 0.7 | 1.1 **(!)** |
| W4, Window | 0.61 | East | 0.7 | 1.1 **(!)** |
| W5, Window | 1.21 | North | 0.7 | 1.1 **(!)** |
| W6, Window | 1.21 | North | 0.7 | 1.1 **(!)** |
| W7, Window | 0.61 | South | 0.7 | 1.1 **(!)** |
| W8, Window | 0.61 | East | 0.7 | 1.1 **(!)** |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) |
|---|
| Building part **1 - Main Dwelling**: 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 | 0.063 | HTP-100F-0.034-0.11 (+10%) |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.023 **(!)** | KI_PSI_E3_SF34_0001 (+10%) |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.018 **(!)** | KI_PSI_E4_SF34_0001 (+10%) |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.176 | Ref for Notional Dwelling +10% |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.004 **(!)** | KI_PSI_E6_SF34_0001 (+10%) |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.073 | Est for 500mm (+10%) |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.061 | KI_PSI_E16_SF34_0001 (+10%) |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.047 | KI_PSI_E18b_SF34_0001 (+10%) |
| Party wall | P1: Ground floor | Calculated by person with suitable expertise | 0.088 | Ref for Notional Dwelling +10% |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | Default value |
| Party wall | P4: Roof (insulation at ceiling level) | Calculated by person with suitable expertise | 0.099 | KI_PSI_P4_SFPW_0001 (+10%) |

| 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 network - Heat network | |
| Efficiency | |
| Emitter type | |
| Flow temperature | |
| System type | |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | |
|---|---|
| **Cylinder/store** - type: N/A | |
| Capacity | N/A |
| Declared heat loss | N/A |
| Primary pipework insulated | N/A |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Charging system linked to use of heating, programmer, and TRVs | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: N/A | | |
| Manufacturer | | |
| Model | HIU | |

| 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 | 0.09 W/(l/s) | **OK** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks | |
|---|---|
| **Network name**: GSHP | |
| Service provision | Space and water heating |
| Status | New heat network |
| Carbon dioxide emission factor for delivered heat | 0.043 $kgCO_2/kWh$ |
| Primary energy factor for delivered heat | 0.456 $kWh_{PE}/kWh$ |

| 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:<br><br>Name: | Assessor ID:<br><br>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 17 May 2024 13:57:42

| Project Information | | | |
|---|---|---|---|
| Assessed By | Hazel Black | Building Type | House, Mid-terrace |
| OCDEA Registration | EES/022587 | Assessment Date | 2024-05-17 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 72 $m^2$ |
| Site Reference | House Mid Terrace | Plot Reference | GSHP ERDA 1.5 DLF |
| Address | Plot 012 Old Town, Newbury, RG14 | | |

| 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 | Heat network | |
| *Target carbon dioxide emission rate* | *11.75 kg$CO_2$/$m^2$* | |
| Dwelling carbon dioxide emission rate | 4.22 kg$CO_2$/$m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *61.39 kWh$_{PE}$/$m^2$* | |
| Dwelling primary energy | 44.41 kWh$_{PE}$/$m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *35.9 kWh/$m^2$* | |
| Dwelling fabric energy efficiency | 32.7 kWh/$m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [W/$m^2$K]*** | **Dwelling average U-Value [W/$m^2$K]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.2 | Walls (1) (0.2) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | 0.11 | Heatloss floor (0.11) | OK |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.1 | W1 (1.1) | 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/$m^2$K]** |
| Exposed wall: Walls (1) | 37.766 | 0.2 |
| Party wall: Party Wall (1) | 74.14 | 0 **(!)** |
| Ground floor: Heatloss floor, Heatloss floor | 35.76 | 0.11 |
| Exposed roof: Roof (1) | 35.76 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [W/$m^2$K]** |
| W1, Window | 5.54 | North East | 0.7 | 1.1 **(!)** |
| D1, FD | 2.037 | North East | N/A | 1.1 **(!)** |
| W2 , Window | 1.45 | North East | 0.7 | 1.1 **(!)** |
| W3, Window | 1.45 | North East | 0.7 | 1.1 **(!)** |
| W4, Window | 1.45 | North East | 0.7 | 1.1 **(!)** |
| D2, Balcony Door | 2.037 | North East | 0.7 | 1.1 **(!)** |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: 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 | 0.063 | HTP-100F-0.03 4-0.11 (+10%) |
| | | | | |

| Main element | Junction detail | Source | Psi value [W/mK] | Drawing / reference |
|---|---|---|---|---|
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.023 **(!)** | KI_PSI_E3_SF 34_0001 (+10%) |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.018 **(!)** | KI_PSI_E4_SF 34_0001 (+10%) |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.176 | Ref for Notional Dwelling +10% |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.004 **(!)** | KI_PSI_E6_SF 34_0001 (+10%) |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.073 | Est for 500mm (+10%) |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.061 | KI_PSI_E16_S F34_0001 (+10%) |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.047 | KI_PSI_E18b_S F34_0001 (+10%) |
| Party wall | P1: Ground floor | Calculated by person with suitable expertise | 0.088 | Ref for Notional Dwelling +10% |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | Default value |
| Party wall | P4: Roof (insulation at ceiling level) | Calculated by person with suitable expertise | 0.099 | KI_PSI_P4_SF PW_0001 (+10%) |
| External wall | E23: Balcony within or between dwellings - balcony support penetrates wall insulation | Calculated by person with suitable expertise | 0.022 **(!)** | Ref for Notional Dwelling +10% |

| **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 network - Heat network | |
| Efficiency | |
| Emitter type | |
| Flow temperature | |
| System type | |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| **5 Hot water** | |
|---|---|
| **Cylinder/store** - type: N/A | |
| Capacity | N/A |
| Declared heat loss | N/A |
| Primary pipework insulated | N/A |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Charging system linked to use of heating, programmer, and TRVs | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: N/A | | |
| Manufacturer | | |
| Model | HIU | |

| 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 | 0.09 W/(l/s) | **OK** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks | |
|---|---|
| **Network name**: GSHP | |
| Service provision | Space and water heating |
| Status | New heat network |
| Carbon dioxide emission factor for delivered heat | 0.043 $kgCO_2/kWh$ |
| Primary energy factor for delivered heat | 0.456 $kWh_{PE}/kWh$ |

| 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:<br><br>Name: | Assessor ID:<br><br>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 17 May 2024 13:57:44

| Project Information | | | |
|---|---|---|---|
| Assessed By | Hazel Black | Building Type | Maisonette, Mid-terrace |
| OCDEA Registration | EES/022587 | Assessment Date | 2024-05-17 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 80 $m^2$ |
| Site Reference | Maisonette Duplex GF | Plot Reference | GSHP ERDA 1.5 DLF |
| Address | Plot 012 Old Town, Newbury, RG14 | | |

| 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 | Heat network | |
| *Target carbon dioxide emission rate* | *13.76 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 4.41 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *73.01 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 46.25 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *39.8 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 36.6 $kWh/m^2$ | 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) (0.2) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | 0.11 | Heatloss Floor (0.11) | OK |
| Roofs | *0.16* | N/A | N/A | **N/A** |
| Windows, doors, and roof windows | *1.6* | 1.1 | W1 (1.1) | 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) | 49.26 | 0.2 |
| Exposed wall: Walls (2) | 35.38 | 0.16 |
| Party wall: Party Wall (1) | 50.44 | 0 **(!)** |
| Ground floor: Heatloss Floor, Heatloss Floor | 39.99 | 0.11 |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| W1, Window | 0.24 | North | 0.7 | 1.1 **(!)** |
| D1 (Front Door), Doors | 1.79 | North | N/A | 1.1 **(!)** |
| W2 , Window | 2.92 | North | 0.7 | 1.1 **(!)** |
| W3, Window | 2.92 | North | 0.7 | 1.1 **(!)** |
| W4, Window | 2.26 | North | 0.7 | 1.1 **(!)** |
| D2 (Rear Door), Doors | 1.79 | South | N/A | 1.1 **(!)** |
| W5, Window | 1.54 | North | 0.7 | 1.1 **(!)** |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) |
|---|
| Building part **1 - Main Dwelling**: 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 | 0.074 | HTP-150F-0.033-0.11 (+10%) |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.028 **(!)** | KI_PSI_E3_SF34_0001 (+10%) |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.021 **(!)** | KI_PSI_E4_SF34_0001 (+10%) |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.004 **(!)** | KI_PSI_E6_SF34_0001 (+10%) |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.033 **(!)** | KI_PSI_E18b_SF34_0001 (+10%) |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | Default value |
| Party wall | P3: Intermediate floor between dwellings (in blocks of flats) | SAP table default | 0 **(!)** | |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.176 | Ref for Notional Dwelling +10% |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.04 | KI_PSI_E16_SF34_0001 (+10%) |
| External wall | E25: Staggered party wall between dwellings | Calculated by person with suitable expertise | 0.052 | KI_PSI_E25b_SF34_0001 (+10%) |
| Party wall | P1: Ground floor | Calculated by person with suitable expertise | 0.088 | Ref for Notional Dwelling +10% |
| External wall | E7: Party floor between dwellings (in blocks of flats) | Calculated by person with suitable expertise | 0.036 **(!)** | KI_PSI_E7_SF34_0001 (+10%) |

| **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 network - Heat network | |
| Efficiency | |
| Emitter type | |
| Flow temperature | |
| System type | |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| **5 Hot water** | |
|---|---|
| **Cylinder/store** - type: N/A | |
| Capacity | N/A |
| Declared heat loss | N/A |
| Primary pipework insulated | N/A |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Charging system linked to use of heating, programmer, and TRVs | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: N/A | | |
| Manufacturer | | |
| Model | HIU | |

| 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 | 0.09 W/(l/s) | **OK** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks | |
|---|---|
| **Network name**: GSHP | |
| Service provision | Space and water heating |
| Status | New heat network |
| Carbon dioxide emission factor for delivered heat | 0.044 $kgCO_2/kWh$ |
| Primary energy factor for delivered heat | 0.457 $kWh_{PE}/kWh$ |

| 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:<br><br>Name: | Assessor ID:<br><br>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 17 May 2024 13:57:44

| Project Information | | | |
|---|---|---|---|
| Assessed By | Hazel Black | Building Type | Maisonette, Mid-terrace |
| OCDEA Registration | EES/022587 | Assessment Date | 2024-05-17 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 80 $m^2$ |
| Site Reference | Maisonette Duplex TF | Plot Reference | GSHP ERDA 1.5 DLF |
| Address | Plot 012 Old Town, Newbury, RG14 | | |

| 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 | Heat network | |
| *Target carbon dioxide emission rate* | *12.42 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 3.95 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *65.95 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 41.64 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *33.4 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 29.3 $kWh/m^2$ | 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) (0.2) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | N/A | N/A | **N/A** |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 0.95 | W1 (1.1) | 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) | 37.53 | 0.2 |
| Exposed wall: Walls (2) | 35.38 | 0.16 |
| Party wall: Party Wall (1) | 66.64 | 0 **(!)** |
| Exposed roof: Roof (1) | 39.99 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| W1, Window | 2.26 | North | 0.7 | 1.1 **(!)** |
| D1 (To Stairwell), Door to Stairwell Shelt. | 1.79 | East | N/A | 0.29 **(!)** |
| W2 , Window | 1.54 | North | 0.7 | 1.1 **(!)** |
| W4, Window | 2.26 | North | 0.7 | 1.1 **(!)** |
| W5, Window | 1.54 | North | 0.7 | 1.1 **(!)** |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: 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 | 0.074 | HTP-150F-0.03 3-0.11 (+10%) |
| | | | | |

| Main element | Junction detail | Source | Psi value [W/mK] | Drawing / reference |
|---|---|---|---|---|
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.028 **(!)** | KI_PSI_E3_SF34_0001 (+10%) |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.021 **(!)** | KI_PSI_E4_SF34_0001 (+10%) |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.004 **(!)** | KI_PSI_E6_SF34_0001 (+10%) |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.033 **(!)** | KI_PSI_E18b_SF34_0001 (+10%) |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | Default value |
| Party wall | P3: Intermediate floor between dwellings (in blocks of flats) | SAP table default | 0 **(!)** | |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.04 | KI_PSI_E16_SF34_0001 (+10%) |
| External wall | E25: Staggered party wall between dwellings | Calculated by person with suitable expertise | 0.052 | KI_PSI_E25b_SF34_0001 (+10%) |
| External wall | E7: Party floor between dwellings (in blocks of flats) | Calculated by person with suitable expertise | 0.036 **(!)** | KI_PSI_E7_SF34_0001 (+10%) |
| Party wall | P4: Roof (insulation at ceiling level) | Calculated by person with suitable expertise | 0.132 | Ref for Notional Dwelling +10% |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.087 | KI_PSI_E10_SF34_0001 (+10%) |
| External wall | E12: Gable (insulation at ceiling level) | Calculated by person with suitable expertise | 0.044 | E12-EE-230707 (+10%) |

| 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 network - Heat network | |
| Efficiency | |
| Emitter type | |
| Flow temperature | |
| System type | |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | |
|---|---|
| **Cylinder/store** - type: N/A | |
| Capacity | N/A |
| Declared heat loss | N/A |
| Primary pipework insulated | N/A |
| Manufacturer | |
| Model | |
| Commissioning | |

| **Waste water heat recovery system 1** - type: N/A | |
|---|---|
| Efficiency | |
| Manufacturer | |
| Model | |

| **6 Controls** | | |
|---|---|---|
| **Main heating 1** - type: Charging system linked to use of heating, programmer, and TRVs | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: N/A | | |
| Manufacturer | | |
| Model | HIU | |

| **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 | 0.09 W/(l/s) | **OK** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| **9 Local generation** |
|---|
| N/A |

| **10 Heat networks** | |
|---|---|
| **Network name**: GSHP | |
| Service provision | Space and water heating |
| Status | New heat network |
| Carbon dioxide emission factor for delivered heat | 0.043 $kgCO_2/kWh$ |
| Primary energy factor for delivered heat | 0.456 $kWh_{PE}/kWh$ |

| **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:<br><br>Name: | Assessor ID:<br><br>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 17 May 2024 13:57:44

| Project Information | | | |
|---|---|---|---|
| Assessed By | Hazel Black | Building Type | Maisonette, Mid-terrace |
| OCDEA Registration | EES/022587 | Assessment Date | 2024-05-17 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 87 $m^2$ |
| Site Reference | Flat Duplex MF (Rockwool) | Plot Reference | GSHP ERDA 1.5 DLF |
| Address | Plot 012 Old Town, Newbury, RG14 | | |

| 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 | Heat network | |
| *Target carbon dioxide emission rate* | *10.38 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 3.44 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *55.24 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 36.32 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *24.2 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 23.0 $kWh/m^2$ | 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* | 0.24 | Walls (1) (0.25) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | N/A | N/A | **N/A** |
| Roofs | *0.16* | N/A | N/A | **N/A** |
| Windows, doors, and roof windows | *1.6* | 1 | W1 (1.1) | 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) | 26.03 | 0.25 |
| Exposed wall: Walls (2) | 18.28 | 0.22 |
| Party wall: Party Wall (1) | 89.41 | 0 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| W1, Window | 1.18 | North | 0.7 | 1.1 **(!)** |
| D1, FD Shelt. | 1.97 | South | N/A | 0.55 **(!)** |
| W2 , Window | 1.26 | North | 0.7 | 1.1 **(!)** |
| W3, Window | 4.02 | North | 0.7 | 1.1 **(!)** |
| W4, Window | 1.02 | North | 0.7 | 1.1 **(!)** |
| D2, Balcony Door | 1.76 | North | 0.7 | 1.1 **(!)** |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: 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 | 0.055 | Ref for Notional Dwelling +10% |
| External wall | E3: Sill | Calculated by person with suitable | 0.035 **(!)** | H+H |

| Main element | Junction detail | Source | Psi value [W/mK] | Drawing / reference |
|---|---|---|---|---|
| | | expertise | | EW235/SL001 (+10%) |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.039 **(!)** | H+H EW235RV001 (+10%) |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.002 **(!)** | IF001 (+10%) |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.046 | PW300 (+10%) |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | Default value |
| External wall | E23: Balcony within or between dwellings - balcony support penetrates wall insulation | Calculated by person with suitable expertise | 0.022 **(!)** | Ref for Notional Dwelling +10% |
| External wall | E7: Party floor between dwellings (in blocks of flats) | Calculated by person with suitable expertise | 0.041 | H+H EW235/IF004 (+10%) |
| Party wall | P3: Intermediate floor between dwellings (in blocks of flats) | SAP table default | 0 **(!)** | |

| 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 network - Heat network | |
| Efficiency | |
| Emitter type | |
| Flow temperature | |
| System type | |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | |
|---|---|
| **Cylinder/store** - type: N/A | |
| Capacity | N/A |
| Declared heat loss | N/A |
| Primary pipework insulated | N/A |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | |
|---|---|
| **Main heating 1** - type: Charging system linked to use of heating, programmer, and TRVs | |
| Function | |
| Ecodesign class | |
| Manufacturer | |
| Model | |
| **Water heating** - type: N/A | |
| Manufacturer | |
| Model | HIU |

| 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 | 0.13 W/(l/s) | **OK** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks | |
|---|---|
| **Network name**: GSHP | |
| Service provision | Space and water heating |
| Status | New heat network |
| Carbon dioxide emission factor for delivered heat | 0.043 $kgCO_2/kWh$ |
| Primary energy factor for delivered heat | 0.455 $kWh_{PE}/kWh$ |

| 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:<br><br>Name: | Assessor ID:<br><br>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 17 May 2024 13:57:42

| Project Information | | | |
|---|---|---|---|
| Assessed By | Hazel Black | Building Type | Maisonette, Mid-terrace |
| OCDEA Registration | EES/022587 | Assessment Date | 2024-05-17 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 87 $m^2$ |
| Site Reference | Flat Duplex TF (Rockwool) | Plot Reference | GSHP ERDA 1.5 DLF |
| Address | Plot 012 Old Town, Newbury, RG14 | | |

| 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 | Heat network | |
| *Target carbon dioxide emission rate* | *11.38 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 3.79 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *60.61 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 39.97 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *28.8 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 28.4 $kWh/m^2$ | 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* | 0.24 | Walls (1) (0.25) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | N/A | N/A | **N/A** |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1 | W1 (1.1) | 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) | 26.03 | 0.25 |
| Exposed wall: Walls (2) | 18.28 | 0.22 |
| Party wall: Party Wall (1) | 89.41 | 0 **(!)** |
| Exposed roof: Roof (1) | 43.35 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| W1, Window | 1.18 | North | 0.7 | 1.1 **(!)** |
| D1, FD Shelt. | 1.97 | South | N/A | 0.55 **(!)** |
| W2 , Window | 1.26 | North | 0.7 | 1.1 **(!)** |
| W3, Window | 4.02 | North | 0.7 | 1.1 **(!)** |
| W4, Window | 1.02 | North | 0.7 | 1.1 **(!)** |
| D2, Balcony Door | 1.76 | North | 0.7 | 1.1 **(!)** |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: 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 | 0.055 | Ref for Notional Dwelling +10% |
| | | | | |

| Main element | Junction detail | Source | Psi value [W/mK] | Drawing / reference |
|---|---|---|---|---|
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.035 **(!)** | H+H EW235/SL001 (+10%) |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.039 **(!)** | H+H EW235RV001 (+10%) |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.002 **(!)** | IF001 (+10%) |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.066 | Ref for Notional Dwelling +10% |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.046 | PW300 (+10%) |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | Default value |
| Party wall | P4: Roof (insulation at ceiling level) | Calculated by person with suitable expertise | 0.216 | H+H RG001 (+10%) |
| External wall | E23: Balcony within or between dwellings - balcony support penetrates wall insulation | Calculated by person with suitable expertise | 0.022 **(!)** | Ref for Notional Dwelling +10% |
| External wall | E7: Party floor between dwellings (in blocks of flats) | Calculated by person with suitable expertise | 0.041 | H+H EW235/IF004 (+10%) |
| Party wall | P3: Intermediate floor between dwellings (in blocks of flats) | SAP table default | 0 **(!)** | |

| 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 network - Heat network | |
| Efficiency | |
| Emitter type | |
| Flow temperature | |
| System type | |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | |
|---|---|
| **Cylinder/store** - type: N/A | |
| Capacity | N/A |
| Declared heat loss | N/A |
| Primary pipework insulated | N/A |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | |
|---|---|
| **Main heating 1** - type: Charging system linked to use of heating, programmer, and TRVs | |
| Function | |
| Ecodesign class | |
| Manufacturer | |
| Model | |

| **Water heating** - type: N/A | |
|---|---|
| Manufacturer | |
| Model | HIU |

| **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 | 0.13 W/(l/s) | **OK** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| **9 Local generation** |
|---|
| N/A |

| **10 Heat networks** | |
|---|---|
| **Network name**: GSHP | |
| Service provision | Space and water heating |
| Status | New heat network |
| Carbon dioxide emission factor for delivered heat | 0.043 $kgCO_2/kWh$ |
| Primary energy factor for delivered heat | 0.456 $kWh_{PE}/kWh$ |

| **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:<br><br>Name: | Assessor ID:<br><br>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 17 May 2024 13:57:42

| Project Information | | | |
|---|---|---|---|
| Assessed By | Hazel Black | Building Type | Flat, Mid-terrace |
| OCDEA Registration | EES/022587 | Assessment Date | 2024-05-17 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 59 $m^2$ |
| Site Reference | Flat GF | Plot Reference | GSHP ERDA 1.5 DLF |
| Address | Plot X Kennet Old Town, Newbury, RG14 | | |

| 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 | Heat network | |
| *Target carbon dioxide emission rate* | *17.83 kg$CO_2$/$m^2$* | |
| Dwelling carbon dioxide emission rate | 5.72 kg$CO_2$/$m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *95.48 kWh$_{PE}$/$m^2$* | |
| Dwelling primary energy | 59.92 kWh$_{PE}$/$m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *50.9 kWh/$m^2$* | |
| Dwelling fabric energy efficiency | 49.5 kWh/$m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [W/$m^2$K]*** | **Dwelling average U-Value [W/$m^2$K]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.22 | Walls (2) (0.24) | OK |
| Party walls | *0.2* | N/A | N/A | **N/A** |
| Curtain walls | *1.6* | N/A | N/A | **N/A** |
| Floors | *0.18* | 0.11 | Heat Loss Floor 1 (0.11) | OK |
| Roofs | *0.16* | N/A | N/A | **N/A** |
| Windows, doors, and roof windows | *1.6* | 1.1 | Door (1.1) | 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/$m^2$K]** |
| Exposed wall: Walls (1) | 53.874 | 0.2 |
| Sheltered wall: Walls (2) | 33 | 0.24 |
| Ground floor: Heat Loss Floor 1, Heat Loss Floor 1 | 59.45 | 0.11 |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [W/$m^2$K]** |
| Door, FD | 1.84 | North | N/A | 1.1 **(!)** |
| Windows East, Windows | 1.734 | North | 0.7 | 1.1 **(!)** |
| Windows East, Windows | 1.734 | North | 0.7 | 1.1 **(!)** |
| Windows East, Windows | 1.734 | North | 0.7 | 1.1 **(!)** |
| Windows East, Windows | 1.734 | North | 0.7 | 1.1 **(!)** |
| Window South, Windows | 1.39 | East | 0.7 | 1.1 **(!)** |
| Window North, Windows | 1.39 | West | 0.7 | 1.1 **(!)** |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: 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 | 0.072 | HTP-150F-0.03 3-0.19 (+10%) |
| | | | | |

| Main element | Junction detail | Source | Psi value [W/mK] | Drawing / reference |
|---|---|---|---|---|
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.035 **(!)** | H+H EW235/SL001 (+10%) |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.039 **(!)** | H+H EW235RV001 (+10%) |
| External wall | E7: Party floor between dwellings (in blocks of flats) | Calculated by person with suitable expertise | 0.041 | H+H EW235/IF004 (+10%) |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.056 | CBA-316 (+10%) |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.176 | Ref for Notional Dwelling +10% |

| 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 network - Heat network | |
| Efficiency | |
| Emitter type | |
| Flow temperature | |
| System type | |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | |
|---|---|
| **Cylinder/store** - type: N/A | |
| Capacity | N/A |
| Declared heat loss | N/A |
| Primary pipework insulated | N/A |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | |
|---|---|
| **Main heating 1** - type: Charging system linked to use of heating, programmer, and TRVs | |
| Function | |
| Ecodesign class | |
| Manufacturer | |
| Model | |
| **Water heating** - type: Cylinder thermostat | |
| Manufacturer | |
| Model | HIU |

| 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 | 0.09 W/(l/s) | **OK** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks | |
|---|---|
| **Network name**: GSHP | |
| Service provision | Space and water heating |
| Status | New heat network |
| Carbon dioxide emission factor for delivered heat | 0.044 $kgCO_2/kWh$ |
| Primary energy factor for delivered heat | 0.457 $kWh_{PE}/kWh$ |

| 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:<br><br>Name: | Assessor ID:<br><br>Date: |
| **b. Client Declaration** | |
| N/A | |