



2 Gloucester Road, Luton

Energy and Sustainability Statement

Document Issue Record

This document has been revised and issued as below:

Issue	Date	Comments
1	05.07.2023	Original

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1.0 Executive Summary

EEABS (Elmstead Energy Assessments & Building Services) were instructed to produce an Energy and Sustainability Statement for the proposed development of 15 new Flats and non-domestic commercial spaces at 2 Gloucester Road, Luton.

This Energy and Sustainability statement can be used as a supporting document to the planning application to demonstrate that the overall energy and Sustainability strategy of the proposed development will meet the requirements set out by Building Regulations and local Luton Planning Policy.

Relevant Planning Policies

From inspection of the relevant policies and discussions with planning officers regarding the proposed development we consider that the following targets need to be met in order to comply with Part L Building Regulations and Luton Planning Policy.

- The domestic flats and non-domestic areas should improve upon the carbon emission requirements of Part L Building Regulations by at least 10%.
- The development will also consider other areas of sustainability within its design such as overheating, flood risk, waste, air quality, water usage, and materials to provide a low energy and sustainable design overall.

Assessment Methodology

To calculate the estimated carbon emissions of the development we have used Design SAP 10.2 software which is approved by Building Regulations. The baseline Target Emission Rate (TER) is calculated in accordance with Appendix R from the SAP 10.2 methodology.

To calculate the estimated carbon emission for the non-domestic areas of the development EDSL TAS Dynamic Simulation Modelling software has been used. The EDSL TAS software has been approved by the Department for Communities and Local Government (DCLG) for use as a Dynamic Simulation Model (DSM) software package.

The appraisals within this strategy are based on the Building Regulations Part L (2021) calculation methodology and should not be understood as a predictive assessment of likely future energy requirements or otherwise.

Carbon Emission Results

Savings have been made in the proposed design for both the domestic and non-domestic areas by following a Be Lean, Be Clean, Be Green Energy Hierarchy.

The results for the domestic areas show that under the proposed design the total carbon emissions would be 3.40 tonnes CO₂, compared to 15.65 tonnes CO₂ for the Baseline. This would be an overall improvement of 78.27% over the Part L 2021 Standard and therefore comfortably complies with the requirements of Part L 2021 Building Regulations and Luton Planning Policy.

The result for the non-domestic areas shows that under the proposed design the total carbon emissions would be 0.41 tonnes CO₂, compared to 0.51 tonnes CO₂ for the Baseline. This would be an overall improvement of 19.61% over the Part L 2021 Standard and therefore the non-domestic part of the development would also comply with the requirements of Part L 2021 Building Regulations and Luton Planning Policy.

Sustainability Measures

In collaboration with the Energy Assessment of the development, an initial analysis of the overheating within the domestic flats has also been carried out. (The non-domestic areas will have air conditioning cooling and therefore will not suffer from overheating). By following the overheating/cooling strategy the risk of overheating for the domestic units would be minimised. A full Part O CIBSE TM59 report can be submitted once planning permission has been granted.

Any demolition will be recycled where possible. A demolition audit will be carried out before any works progress on site to identify which materials can be recycled. The development will also consider the concept of the waste hierarchy in both the demolition of any structures and when constructing the proposed domestic units and non-domestic areas.

The building, wherever possible, will use environmentally friendly materials and manufacturers will be chosen that can demonstrate their products are sustainably sourced and produced.

The water usage for the domestic units will not exceed a maximum of 110 litres/person/day (including 5 litres for external water use) as required by the optional requirement of Part G Building Regulations. These calculations will be produced at later design stages once specific sanitaryware has been selected.

The flood map shows that the proposed development site is within Flood Zone 1. It is believed that a full flood risk assessment is therefore not required, but if it is then this will be carried out by others.

The surface water flood map service states that the proposed site sits within an area of low risk from surface water flooding. The final drainage (SuDS) design will be carried out by others, and should ensure that run off rates are no worse than before and that any relevant planning requirements have been achieved.

The Road Noise Map below shows that the site (red square on the image) is located close to high levels of road noise. For this reason, a whole house mechanical ventilation system has been proposed, this will be able to provide the flats with fresh air without the need to open windows.

The Railway Noise Map below shows that the site (red square on the image) is located far enough away from high levels of railway noise.

The proposed development will not adversely impact upon the air quality of the location. The proposed main heating system for the development is from air source heat pumps which have no harmful emissions.



Conclusion

This energy and sustainability statement has shown that the proposed development of 15 new Flats and non-domestic commercial spaces at 2 Gloucester Road, Luton would satisfy the energy and sustainability requirements of Building Regulations and Local Luton Planning Policy.

2.0 Introduction

EEABS (Elmstead Energy Assessments & Building Services) were instructed to produce an Energy and Sustainability Statement for the proposed development of 15 new Flats and non-domestic commercial spaces at 2 Gloucester Road, Luton.

This Energy and Sustainability statement can be used as a supporting document to the planning application to demonstrate that the overall energy and Sustainability strategy of the proposed development will meet the requirements set out by Building Regulations and local Luton Planning Policy.

2.1 Planning Policy Context

Numerous policies that relate to the energy efficiency and carbon emissions of the development have been considered in preparation of this energy assessment.

2.1.1 National Planning Policy Framework

The National Planning Policy Framework encourages local planning authorities to adopt proactive strategies to mitigate and adapt to climate change. They should plan for new development in ways which reduce greenhouse gas emissions; actively support energy efficiency improvements to existing buildings; and set local sustainability requirements which are consistent with the government's policies and standards.

2.1.2 Building Regulations Part L 2021

The assessment of the development against policy targets has been carried out using the very latest Part L 2021 benchmarks. The Part L 2021 targets represent approximately a 30% reduction in carbon emissions in comparison to the Part L 2013 target.

Part L 2021 is mandatory and requires that a dwelling does not exceed the CO₂ emission rate of that set by a Target Emission Rate (TER) calculated in accordance with Appendix R from the SAP 10.2 methodology. It also requires that a dwelling does not exceed the Target Fabric Energy Efficiency (TFEE) and Target Primary Energy Rate (TPER).

Part L 2021 also requires that any non-domestic parts of a building do not exceed the CO₂ emission and Primary Energy Rate of that set by a Target Emission Rate (TER) and Target Primary Energy Rate (TPER) to the approved 2021 National Calculation Methodology (NCM).

2.1.3 Luton Borough Council

The Luton Borough Council Local Plan (2011-2031) Policy LLP37 requires developments to contribute towards mitigation, and adaptation to climate change through energy use reduction, efficiency, and renewable energy. This is known as the energy hierarchy (Be Lean, Be Clean, Be Green). New developments should at least meet the latest Part L Building Regulations requirements but discussions with planning officers indicated that they would like to see a further 10% improvement.

Other areas of sustainability such as overheating, flood risk, waste, air quality, and materials will also be considered to provide a low energy and sustainable design overall.

3.0 Assessment Methodology

The following methodology has been used to calculate the CO2 emissions for the development.

3.1 Domestic Areas

To calculate the estimated carbon emissions of the developments domestic areas we have used Design SAP 10.2 software which is approved by Building Regulations. The baseline Target Emission Rate (TER) is calculated in accordance with Appendix R from the SAP 10.2 methodology.

3.2 Non-Domestic Areas

To calculate the estimated carbon emission for the non-domestic areas of the development EDSL TAS Dynamic Simulation Modelling software has been used. The EDSL TAS software has been approved by the Department for Communities and Local Government (DCLG) for use as a Dynamic Simulation Model (DSM) software package.

As part of its approval process, the TAS software had to demonstrate that it satisfies all of the tests and other requirements defined within sections 2 and 3 of the document "CIBSE TM33:2006, CIBSE standard tests for the assessment of building services design software". The thermal modelling has also been carried out in accordance with CIBSE AM11 Building Energy and Environmental Modelling.

3.3 Limitations

The appraisals within this strategy are based on the Building Regulations Part L (2021) calculation methodology and should not be understood as a predictive assessment of likely future energy requirements or otherwise.

Occupants may operate their systems differently, and/or the weather may be different from the assumptions made by Part L approved calculation methods, leading to differing energy requirements once the development is in operation.

4.0 Energy Assessment - Domestic Areas

The following sections describe how the baseline and proposed developments Carbon Emissions have been calculated for the residential units.

4.1 Baseline Target

The baseline Target Emission Rate (TER) is calculated in accordance with Appendix R from the SAP 10.2 methodology. This Baseline CO₂ emission rate is then used as the basis for the target CO₂ reductions required throughout the Energy Hierarchy.

Table 1 - Baseline Carbon Emission Results for Domestic Areas

Plots	Area (m ²)	CO ₂ Emission Rate (kgCO ₂ /m ²)	CO ₂ Emissions (Tonnes of CO ₂)
1	54	16.32	0.88
2	97	12.57	1.22
3	68	13.18	0.90
4	55	15.12	0.83
5	97	12.57	1.22
6	68	13.18	0.90
7	55	15.12	0.83
8	97	12.57	1.22
9	68	13.18	0.90
10	55	15.12	0.83
11	54	17.34	0.94
12	97	12.22	1.19
13	96	11.91	1.14
14	96	11.91	1.14
15	116	13.06	1.51
Total			15.65

The results show that the total Target CO₂ emissions for the developments residential areas is estimated to be 15.65 Tonnes of CO₂ per annum.

4.2 Proposed Design - Following the Energy Hierarchy

4.2.1 Be Lean

The Be Lean stage of the energy hierarchy focuses on passive design measures which are those which reduce the initial energy demand of the building through passive means, for example wall insulation once installed requires no other means of operation and its performance is also unlikely to deteriorate.

Where possible the development has taken a fabric first approach to reducing the initial energy demand by the following methods:

Glazing Performance

Windows and glazed doors are to be highly efficient glazing and will have a low U-value of 1.20 W/m².K, helping to reduce the amount of heat loss through the glazing.

Thermal Envelope

The inclusion of high levels of thermal insulation not only helps to reduce the buildings overall energy demand and therefore carbon emissions, but it also plays a vital role in securing the occupant's thermal comfort.

It also helps to reduce the buildings peak heating load required meaning that smaller plant equipment can be sized, helping to further improve not only carbon emissions but also the cost of the development.

The proposed walls, floor, and roofs will provide significant savings over the Part L limiting fabric parameters.

Thermal Bridging

Thermal bridges are junctions between parts of the build through which heat can escape, for example the junction where a roof and wall construction meet. To reduce heat loss through these areas we have assumed that Knauf thermal bridging details will be followed. (Individual Psi values assumed for each of the junctions can be found within the SAP calculation sheets within the appendices.)

Air Permeability

The air permeability of the development is a measure of how much volume of air can penetrate through its fabric. Therefore, a well built, highly sealed building would result in less unwanted heat loss, and therefore provide a more efficient building.

Part L 2021 Building Regulations have a maximum limit of 8 m³/h.m² that must be achieved, the proposed development will target a value of 3 m³/h.m².

Summary of Passive Design Measures

The table below shows a summary of the passive design measures included for within the development and how they compare against the Part L requirements.

Table 2 - Summary Table of Passive Design Measures for Domestic Areas

Parameter	Part L Limiting Values	Development Proposal	% Improvement
U-Values			
Walls	0.26 W/m ² .K	0.18 W/m ² .K	31%
Roofs	0.16 W/m ² .K	0.11 W/m ² .K	31%
Ground Floor	0.18 W/m ² .K	N/A	N/A
Glazing	1.60 W/m ² .K	1.20 W/m ² .K	25%
Air Permeability	8 m ³ /h.m ²	3.0 m ³ /h.m ²	63%

The summary of passive measures shows that the proposed development will be a considerable improvement over the Part L limiting fabric parameters.

4.2.2 Be Clean

The Be Clean Stage of the Energy Hierarchy focuses on energy efficiency measures which are those which seek to supply the remaining demand for energy, after the initial demand has been lowered through passive means, in the most efficient way.

The following energy efficiency measures have been incorporated within the proposed development:

Heating and Hot Water

The development is too small to consider connection to an area wide heat network or for a combined heat and power system to be installed (there is also issues with local air quality surrounding CHP systems) and therefore an air source heat pump system was deemed to be the most feasible system to install to serve the units heating and hot water requirements.

An air source heat pump is considered as a renewable and low carbon technology and therefore more information will be provided under the Be Green Stage.

Lighting

The lighting for the development will consist of low energy LED lighting throughout with a minimum light source efficacy of at least 80 lm/W.

Ventilation

The ventilation in each flat is assumed to be mechanical, served by a whole house heat recovery ventilation system. This is assumed to have a specific fan power of 0.73 W/l/s and a heat recovery efficiency of 90%.

4.2.3 Be Green

The Be Green stage of the energy hierarchy focuses on on-site low and zero carbon renewable technologies.

Air Source Heat Pumps

We have assumed that each Flat will have its heating and hot water served by an air source heat pump system with an assumed efficiency of at least 219.3%.

Photovoltaic Solar Panels

We have also assumed that each Flat would have 2No. 400W Solar Panels (800 Watts total) located on the roof of the development.

4.2.4 Proposed Design Results

The results below show total carbon emissions in kgCO₂/m² and tonnes CO₂ for the proposed design following the energy hierarchy as previously described.

Table 3 - Proposed Design Carbon Emission Results for Domestic Areas

Plots	Area (m ²)	CO ₂ Emission Rate (kgCO ₂ /m ²)	CO ₂ Emissions (Tonnes of CO ₂)
1	54	3.11	0.17
2	97	2.86	0.28
3	68	2.73	0.19
4	55	2.77	0.15
5	97	2.86	0.28
6	68	2.73	0.19
7	55	2.77	0.15
8	97	2.86	0.28
9	68	2.73	0.19
10	55	2.77	0.15
11	54	3.44	0.19
12	97	2.86	0.28
13	96	2.75	0.26
14	96	2.75	0.26
15	116	3.44	0.40
Total			3.40

The results for the domestic areas show that under the proposed design the total carbon emissions would be 3.40 tonnes CO₂, compared to 15.65 tonnes CO₂ for the Baseline. This would be an overall improvement of 78.27% over the Part L 2021 Standard and therefore comfortably complies with the requirements of Part L 2021 Building Regulations and Luton Planning Policy.

The SAP Calculation sheets for the proposed Flats can be found within Appendix A.

5.0 Energy Assessment - Non-Domestic Areas

The following sections describe how the baseline and proposed developments Carbon Emissions have been calculated for the non-domestic areas.

5.1 Baseline Target

The EDSL TAS modelling software automatically generates a notional building using the geometry for the proposed building, but allocating glazing coverage, U-values, and plant efficiency in accordance with the Elemental Method as defined in NCM modelling Guide 2021.

The software calculates an Emissions Rate for the Notional building which is the Target Emission Rate (TER) for the actual building. The TER is the emission rate which must be met in order to achieve Part L compliance.

5.2 Proposed Design - Following the Energy Hierarchy

5.2.1 Be Lean

Where possible the non-domestic development has also taken a fabric first approach to reducing the initial energy demand by the following methods:

Glazing Performance

Windows and glazed doors are to be highly efficient glazing and will have a low U-value of 1.2 W/m².K, helping to reduce the amount of heat loss through the glazing.

Thermal Envelope

The inclusion of high levels of thermal insulation not only helps to reduce the buildings overall energy demand and therefore carbon emissions, but it also plays a vital role in securing the occupant's thermal comfort.

It also helps to reduce the buildings peak heating load required meaning that smaller plant equipment can be sized, helping to further improve not only carbon emissions but also the cost of the development.

The proposed walls, floor, and roofs will provide significant savings over the Part L limiting fabric parameters.

Air Permeability

The air permeability of the development is a measure of how much volume of air can penetrate through its fabric. Therefore, a well built, highly sealed building would result in less unwanted heat loss, and therefore provide a more efficient building.

Part L 2021 Building Regulations have a maximum limit of 8 m³/h.m² that must be achieved, the proposed development will target a value of 3 m³/h.m².

Summary of Passive Design Measures

The table below shows a summary of the passive design measures included for within the development and how they compare against the Part L requirements.

Table 4 - Summary Table of Passive Design Measures for Non-Domestic Areas

Parameter	Part L Limiting Values	Development Proposal	% Improvement
U-Values			
Walls	0.26 W/m ² .K	0.18 W/m ² .K	31%
Roofs (Flat)	0.18 W/m ² .K	N/A	N/A
Floors	0.18 W/m ² .K	0.18 W/m ² .K	0%
Glazing	1.60 W/m ² .K	1.20 W/m ² .K	25%
Air Permeability	8 m ³ /h.m ²	3 m ³ /h.m ²	63%

The summary of passive measures shows that the proposed development will be an improvement over the Part L limiting fabric parameters.

5.2.2 Be Clean

The following energy efficiency measures have been incorporated within the proposed development. As with the residential areas, the commercial area is far too small to consider connection to a district heat network or installing a CHP system. It would be best to provide its heating and also cooling from an air source heat pump system, with toilets and circulation areas heated by direct electric panel heaters.

Hot Water

Hot water is assumed to be provided by point of use electric water heaters.

Lighting

The lighting for the development will consist of low energy LED lighting throughout with a minimum light source efficacy of at least 100 lm/W. Offices will have photocell daylight dimming control and circulation areas, toilets, and stores will also have auto on/off control.

Ventilation

The ventilation to the main office areas is assumed to be provided by a heat recovery mechanical ventilation system with an assumed specific fan power of 1.6 W/l/s and a heat recovery efficiency of 80%.

Toilets and kitchenettes have local mechanical extract with an assumed specific fan power of 0.3 W/l/s.

All other areas are assumed to be naturally ventilated.

5.2.3 Be Green

The Be Green stage of the energy hierarchy focuses on on-site low and zero carbon renewable technologies.

Air Source Heat Pumps

We have assumed that the main office areas will have heating and cooling provided by an air source heat pump air conditioning system with assumed seasonal efficiencies of 400% for heating and 600% for cooling.

Solar Photovoltaic Panels

We have assumed that the non-domestic area will have a solar Photovoltaic system on the roof of the development. This will feature 8 No. 400-Watt panels to provide a system of 3.2 kW peak. This is estimated to produce at least 3,200 kWh of green electricity per year.

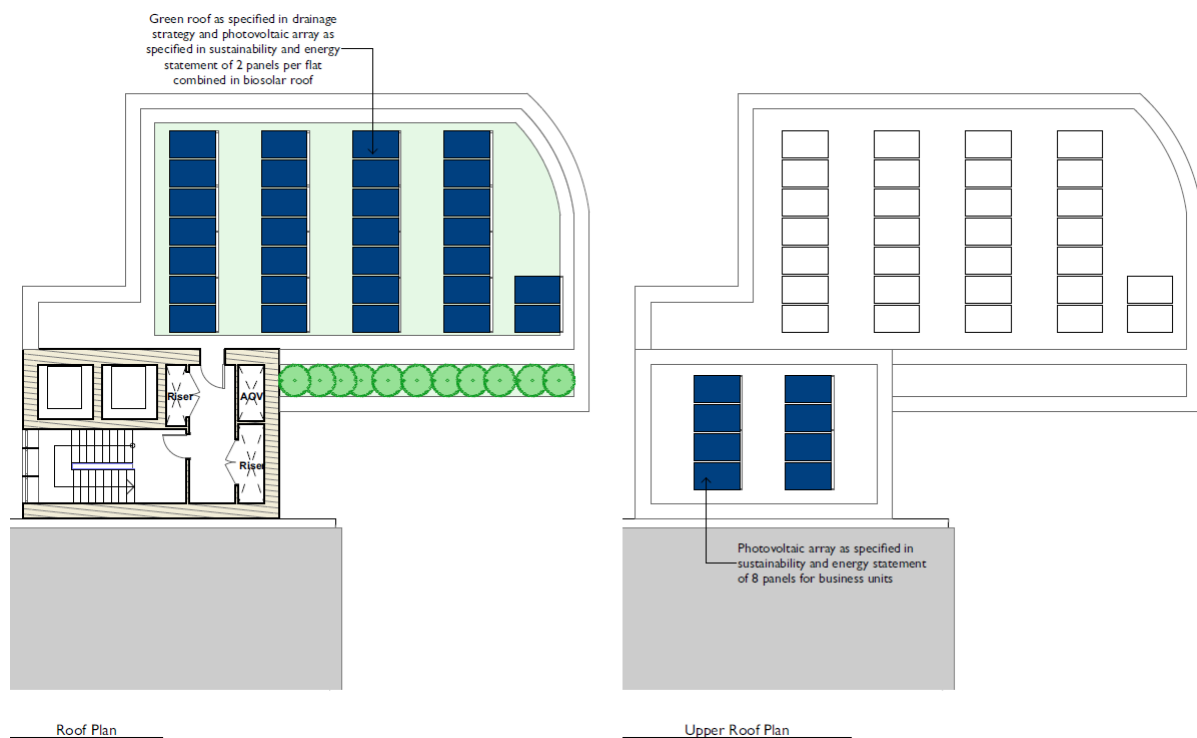


Figure 1 - Proposed Solar Panel Layout on the Roof

5.2.4 Proposed Design Results

The results below show total carbon emissions in kgCO₂/m² for the proposed non-domestic design following the energy hierarchy as previously described.

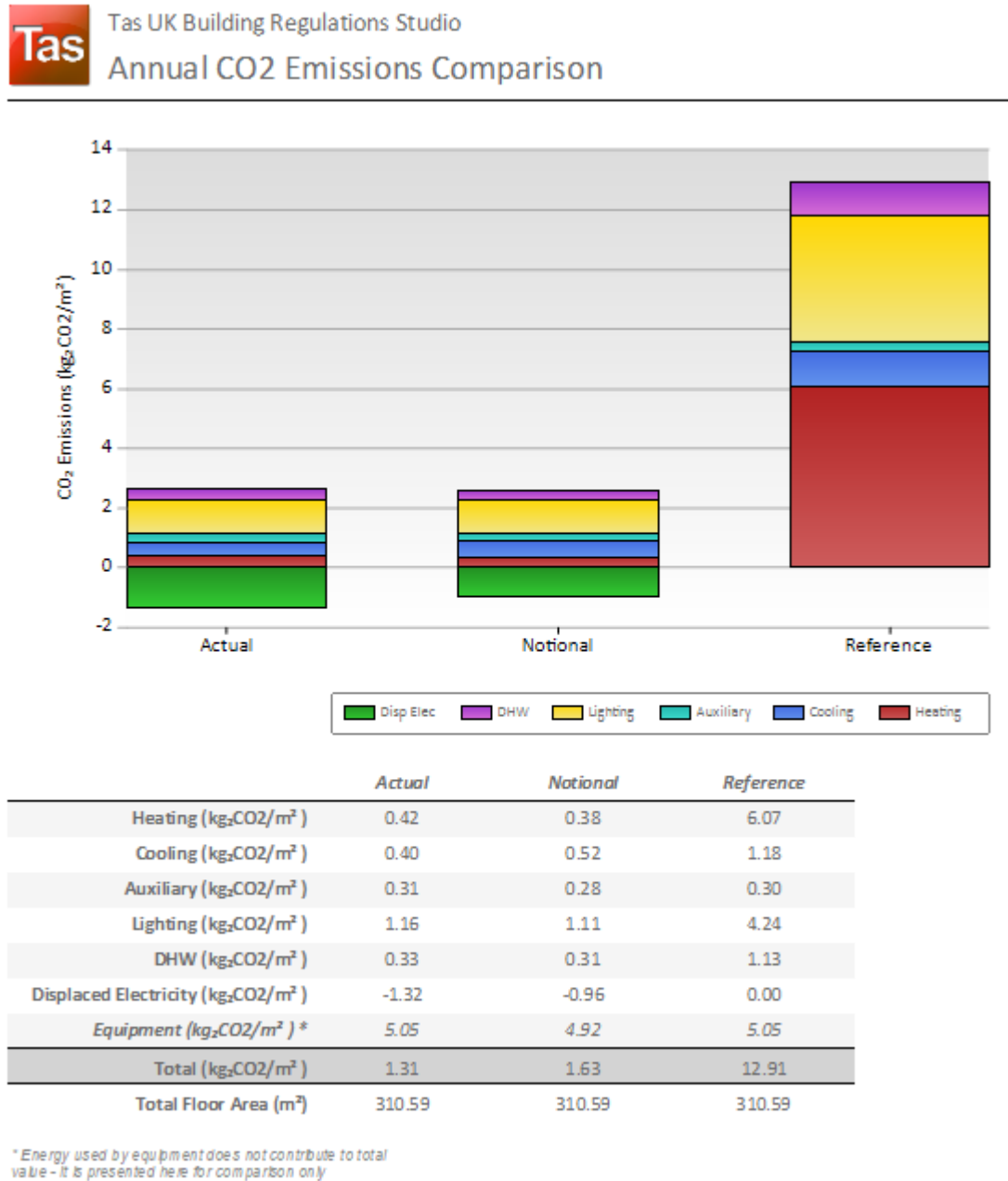


Figure 2 - Proposed Design Carbon Emission Results for Non-Domestic Area

The result for the non-domestic areas shows that under the proposed design the total carbon emissions would be 0.41 tonnes CO₂, compared to 0.51 tonnes CO₂ for the Baseline (Notional). This would be an overall improvement of 19.61% over the Part L 2021 Standard and therefore the non-domestic part of the development would also comply with the requirements of Part L 2021 Building Regulations and Luton Planning Policy.

The BRUKL Document for the proposed non-domestic areas can be found within Appendix B.

6.0 Sustainability

6.1 Overheating/Climate Change Adaptability

In collaboration with the Energy Assessment of the development, an initial analysis of the overheating within the domestic flats has also been carried out. (The non-domestic areas will have air conditioning cooling and therefore will not suffer from overheating).

1. Minimise Internal Heat Gains

To minimise internal heat gains low energy lighting will be used throughout the development. Any new heating pipework will also be well insulated, white goods and computer equipment should also be of the highest efficiency.

2. Reduce the Amount of Heat Entering the Building

Highly efficient windows will reduce the amount of solar gain entering the flats.

3. Use of Thermal Mass and High Ceilings to Manage Heat within the Building

The building will have a medium thermal mass and it will be well insulated with an improved air permeability value to stop heat from first entering the building.

4. Passive Ventilation

Windows should be openable to allow for additional fresh air when required. (Although not overly relied upon due to noise issues)

5. Mechanical Ventilation

A whole house Mechanical supply and extract ventilation system has also been proposed to provide fresh air into the flats continuously.

By following the above overheating/cooling strategy the risk of overheating for the domestic units would be minimised. A full Part O CIBSE TM59 report can be submitted once planning permission has been granted.

6.2 Land Use and Waste

Any demolition will be recycled where possible. A demolition audit will be carried out before any works progress on site to identify which materials can be recycled.

The development will also consider the concept of the waste hierarchy shown below in both the demolition of any structures and when constructing the proposed domestic units and non-domestic areas.

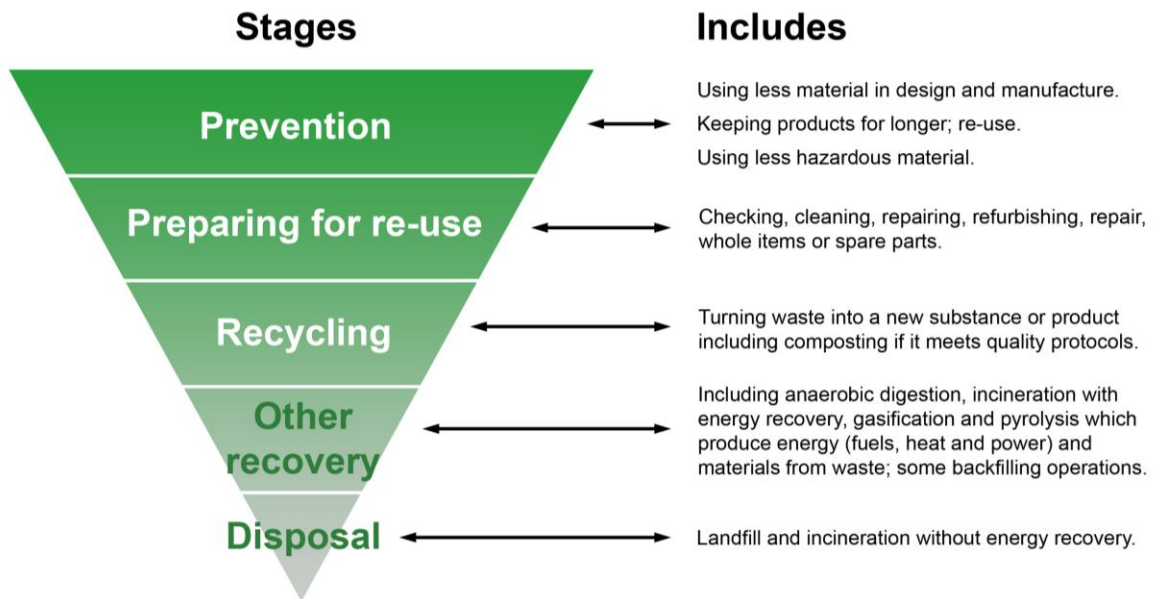


Figure 3 - Waste Hierarchy Diagram

6.3 Materials Use

It is the design team’s intention to minimise waste during the construction process through careful consideration of materials and construction methodology. The building, wherever possible, will use environmentally friendly materials and manufacturers will be chosen that can demonstrate their products are sustainably sourced and produced.

6.4 Water Efficiency

All taps, toilets, and showers will be specified that are considered to be low water use.

The water usage for the domestic units will not exceed a maximum of 110 litres/person/day (including 5 litres for external water use) as required by the optional requirement of Part G Building Regulations.

Calculations to prove how this can be achieved can be seen below. These calculations will be updated at later design stages once specific sanitaryware has been selected.

Table 5 - Water Efficiency Calculator

Installation Type	Unit of Measure	Capacity / Flow Rate	Use Factor	Fixed Use (litres/person/day)	Litres / person / day
WC (dual flush)	Full Flush Volume (litres)	4	1.46	0	5.84
	Part Flush Volume (litres)	2.6	2.96	0	7.70
Taps (excluding kitchen / utility room taps)	Flow Rate (litres / minute)	5	1.58	1.58	9.48
Bath (where shower also present)	Capacity to Overflow (litres)	170	0.11	0	18.70
Shower (where bath also present)	Flow Rate (litres / minute)	8	4.37	0	34.96
Kitchen / Utility Room Sink Taps	Flow Rate (litres / minute)	6	0.44	10.36	13.00
Washing Machine	Litres / kg Dry Load	8.17	2.10	0	17.16
Dishwasher	Litres / Place Setting	1.25	3.60	0	4.50
	Total Calculated Use (litres / person / day)				111.33
	Contribution from Greywater (litres / person / day)				0.00
	Contribution from Rainwater (litres / person / day)				0.00
	Normalisation Factor				0.91
	Total Internal Water Consumption (litres / person / day)				101.31
	External Water Use (litres / person / day)				5.00
	Overall Total Water Consumption (litres / person / day)				106.31

6.5 Flood Risk

The extent of possible flooding on the site has also been analysed using data from the government flood warning information service.



Figure 4 - Flood Risk Map for the Site

The flood map shows that the proposed development site is within Flood Zone 1. It is believed that a full flood risk assessment is therefore not required, but if it is then this will be carried out by others.



Extent of flooding from surface water

● High
 ● Medium
 ● Low
 Very low
 ⊕ Location you selected

Figure 5 - Surface Water Map for the Site

The surface water flood map service states that the proposed site sits within an area of low risk from surface water flooding. The final drainage (SuDS) design will be carried out by others, and should ensure that run off rates are no worse than before and that any relevant planning requirements have been achieved.

6.6 Noise

The Road Noise Map below shows that the site (red square on the image) is located close to high levels of road noise. For this reason, a whole house mechanical ventilation system has been proposed, this will be able to provide the flats with fresh air without the need to open windows.

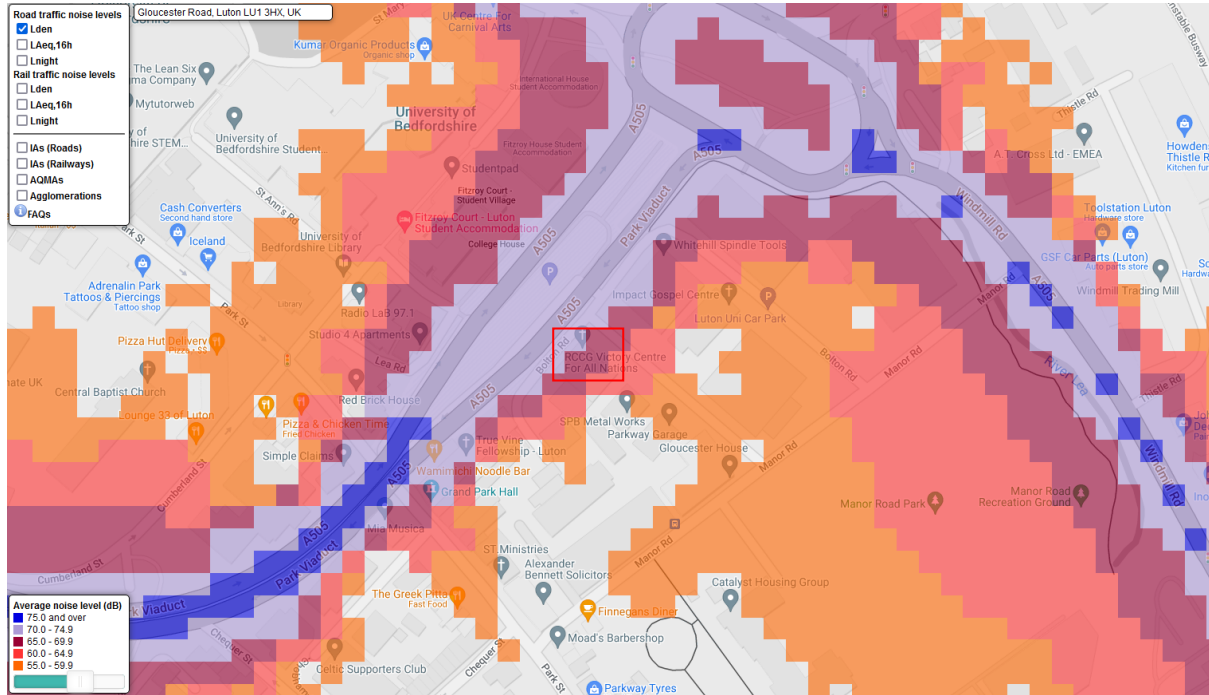


Figure 6 - Road Noise Map for the Site

The Railway Noise Map below shows that the site (red square on the image) is located far enough away from high levels of railway noise.

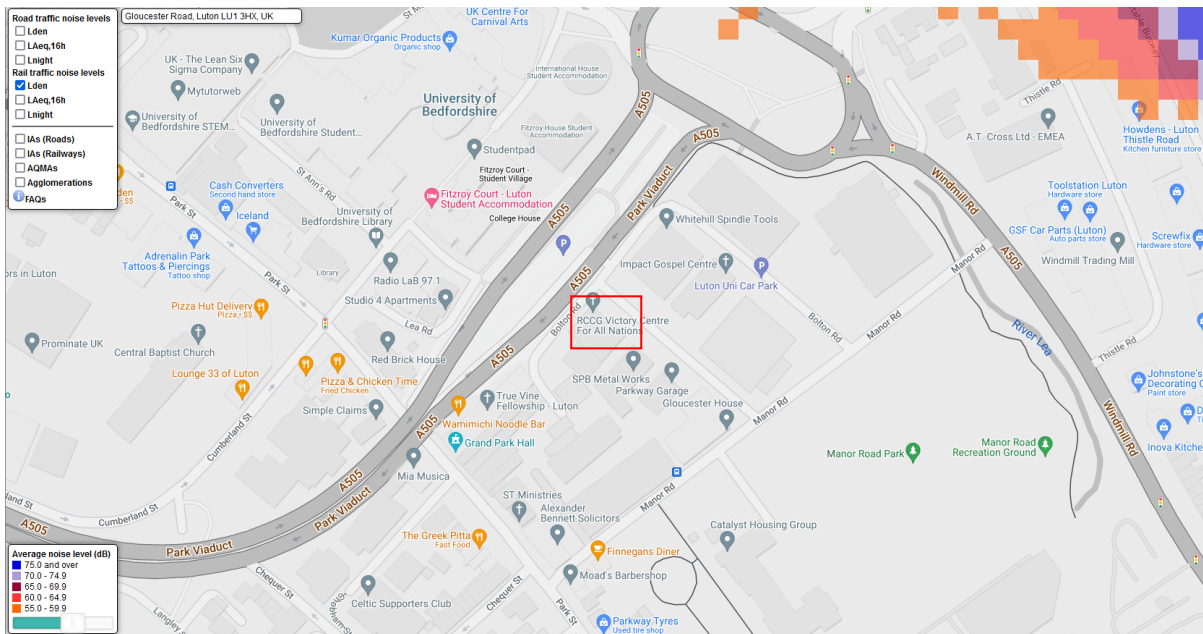


Figure 7 - Railway Noise Map for the Site

6.7 Air Quality

The proposed development will not adversely impact upon the air quality of the location. The proposed main heating system for the development is from air source heat pumps which have no harmful emissions.



Appendix A - Part L 2021 SAP 10.2 Calculation Sheets for Domestic Flats

Building Regulations England Part L (BREL) Compliance Report

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

Date: Wed 05 Jul 2023 11:45:14

Project Information			
Assessed By	Darren Coham	Building Type	Flat, Semi-detached
OCDEA Registration	EES/022007	Assessment Date	2023-07-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	54 m ²
Site Reference	Flat 1	Plot Reference	00001
Address	Flat 1, Luton, LU1 3HX		

Client Details	
Name	-
Company	-
Address	-, -, -, -

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	16.32 kgCO ₂ /m ²	
Dwelling carbon dioxide emission rate	3.11 kgCO ₂ /m ²	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	88.27 kWh _{PE} /m ²	
Dwelling primary energy	36.82 kWh _{PE} /m ²	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	38.9 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 ² K]	Dwelling average U-Value [W/m ² K]	Element with highest individual U-Value	
External walls	0.26	0.18	Walls (1) (0.18)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	N/A	N/A	N/A
Roofs	0.16	N/A	N/A	N/A
Windows, doors, and roof windows	1.6	1.17	pd1 (1.2)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	48.12	0.18
Sheltered wall: Walls (2)	23.9049	0.18
Party wall: Party Wall (1)	15.07	0 (!)

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]
pd1, Windows	5.4	North West	0.75	1.2
w1, Windows	3.24	North West	0.75	1.2
w2, Windows	5.04	South East	0.75	1.2
ed1, Entrance Doors	2.0951	North East	N/A	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	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.068	Thermally Broken
External wall	E4: Jamb	Calculated by person with suitable expertise	0.018 (!)	Knauf

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.065	Knauf
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.048	Knauf
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.069	Knauf
External wall	E25: Staggered party wall between dwellings	Calculated by person with suitable expertise	0.088	Knauf
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	Default
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.09	Knauf
External wall	E8: Balcony within a dwelling - wall insulation continuous	SAP table default	0.1	Default

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	3 m ³ /hm ² , Design value (!)	OK
Air permeability test certificate reference		

4 Space heating

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

Efficiency	219.3%
Emitter type	Radiators
Flow temperature	45°C
System type	Air source heat pump
Manufacturer	
Model	
Commissioning	

Secondary heating system: N/A

Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water

Cylinder/store - type: Cylinder

Capacity	150 litres
Declared heat loss	1.7 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	

Waste water heat recovery system 1 - type: N/A

Efficiency	
Manufacturer	
Model	

6 Controls

Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services

Function	
Ecodesign class	
Manufacturer	
Model	

Water heating - type: Cylinder thermostat and HW separately timed

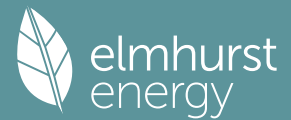
Manufacturer	
Model	

7 Lighting

Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	1.5 W/(l/s)	
Specific fan power	0.73 W/(l/s)	OK
Minimum permitted heat recovery efficiency	73%	
Heat recovery efficiency	90%	OK
Manufacturer/Model	HRV1 Q Plus	
Commissioning		
9 Local generation		
Technology type: Photovoltaic system (1)		
Peak power	0.8 kWp	
Orientation	South	
Pitch	30°	
Overshading	None or very little	
Manufacturer		
MCS certificate		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	
b. Client Declaration		
N/A		

Summary for Input Data



Property Reference	Flat 1	Issued on Date	05/07/2023
Assessment Reference	00001	Prop Type Ref	Flat
Property	Flat 1, Luton, Bedfordshire, LU1 3HX		

SAP Rating	88 B	DER	3.11	TER	16.32
Environmental	98 A	% DER < TER			80.94
CO ₂ Emissions (t/year)	0.15	DFEE	36.38	TFEE	38.88
Compliance Check	See BREL	% DFEE < TFEE			6.42
% DPER < TPER	58.28	DPER	36.82	TPER	88.27

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Northeast	
Property Tenure	ND	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, Semi-Detached	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m ² K

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m ²	0.00 m
Ground floor:	32.52 m	53.70 m ²	2.70 m
1st Storey:	0.00 m	0.00 m ²	0.00 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	25.93	m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	61.80	48.12	0.00	None	13.68	Calculate Wall Area
	Sheltered Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	26.00	23.90	0.90	Stairwell Access Corridor 4	2.10	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	15.07	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	86.67

10.1 Party Ceilings

Summary for Input Data



Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	53.70

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Floor 1	Lowest occupied	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	53.70

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
Entrance Doors	Manufacturer	Solid Door			Air Filled	0.00	Wood	0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05		Air Filled	0.63	Wood	0.75	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
pd1	Windows	External Wall 1	North West	5.40	0
w1	Windows	External Wall 1	North West	3.24	0
w2	Windows	External Wall 1	South East	5.04	0
ed1	Entrance Doors	Sheltered Wall	North East	2.10	0

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	6.72	0.07	0.07 Thermally Broken	Yes
E4 Jamb	Independently assessed	18.50	0.02	0.02 Knauf	Yes
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	65.04	0.07	0.07 Knauf	No
E16 Corner (normal)	Independently assessed	10.80	0.05	0.05 Knauf	No
E18 Party wall between dwellings	Independently assessed	2.70	0.07	0.07 Knauf	No
E25 Staggered party wall between dwellings	Independently assessed	2.70	0.09	0.09 Knauf	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	11.16	0.00	0.00 Default	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	2.70	-0.09	-0.09 Knauf	No
E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	2.40	0.10	0.10 Default	No

Y-value W/m²K

18.0 Pressure Testing

Yes

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Property Tested?

Test Method

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

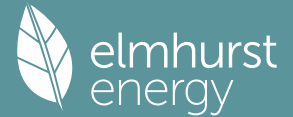
SFP from Installer Commissioning Certificate

MVHR System Location

Duct Installation Specification

20.0 Fans, Open Fireplaces, Flues

Summary for Input Data



21.0 Fixed Cooling System

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	6	480	10

24.0 Main Heating 1

SAP table

Percentage of Heat %

Database Ref. No.

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Delayed Start Stat

HETAS approved System

Oil Pump Inside

Fan Assisted Flue

Is MHS Pumped

Heating Pump Age

Heat Emitter

Flow Temperature

Flow Temperature Value

Boiler Interlock

25.0 Main Heating 2

26.0 Heat Networks

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Summer Immersion

Cold Water Source

Bath Count

Supplementary Immersion

Immersion Only Heating Hot Water

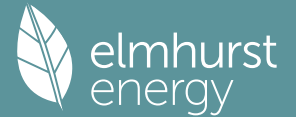
28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Cylinder Stat

Cylinder In Heated Space

Summary for Input Data



Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.70	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

32.0 Photovoltaic Unit

Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.80	South	30°	None Or Little	No	No	1.00		

34.0 Small-scale Hydro

Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Recommendations

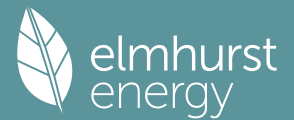
Lower cost measures

None

Further measures to achieve even higher standards

None

Predicted Energy Assessment



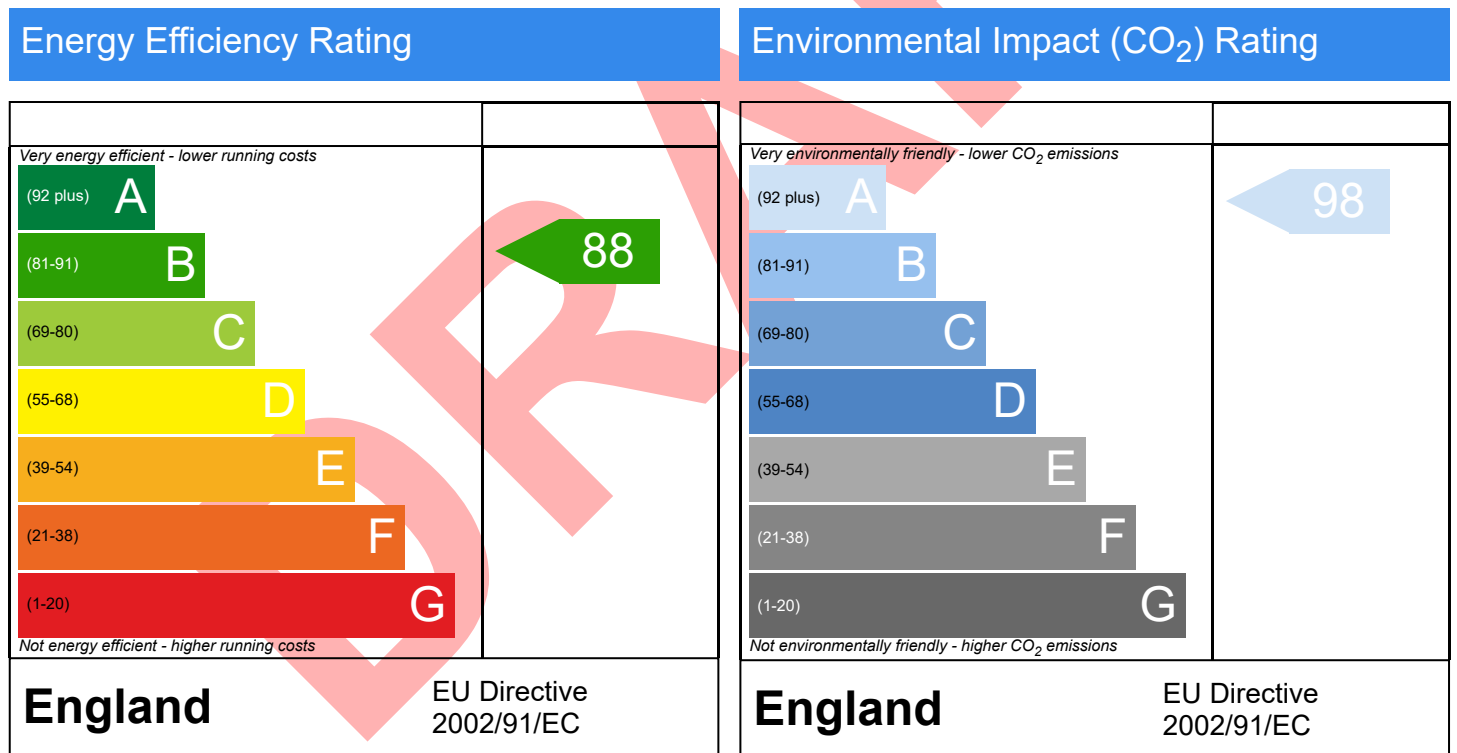
Flat 1, Luton, Bedfordshire, LU1 3HX

Dwelling type:
Date of assessment:
Produced by:
Total floor area:
DRRN:

Flat, Semi-Detached
05/07/2023
Darren Coham
53.7 m²

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

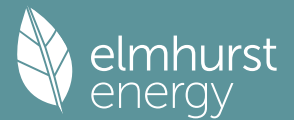
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Thermal Bridging



Property Reference	Flat 1	Issued on Date	05/07/2023
Assessment Reference	00001	Prop Type Ref	Semi-Detached Flat
Property	Flat 1, Luton, Bedfordshire, LU1 3HX		

SAP Rating	88 B	DER	3.11	TER	16.32
Environmental	98 A	% DER < TER			80.94
CO ₂ Emissions (t/year)	0.15	DFEE	36.38	TFEE	38.88
Compliance Check	See BREL	% DFEE < TFEE			6.42
% DPER < TPER	58.28	DPER	36.82	TPER	88.27

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

	Junction details	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.068	6.72	0.46	Thermally Broken
External wall	E4 Jamb	Independently assessed	0.018	18.50	0.33	Knauf
External wall	E7 Party floor between dwellings (in blocks of flats)	Independently assessed	0.065	65.04	4.23	Knauf
External wall	E16 Corner (normal)	Independently assessed	0.048	10.80	0.52	Knauf
External wall	E18 Party wall between dwellings	Independently assessed	0.069	2.70	0.19	Knauf
External wall	E25 Staggered party wall between dwellings	Independently assessed	0.088	2.70	0.24	Knauf
Party wall	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	0.000	11.16	0.00	Default
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.090	2.70	-0.24	Knauf
External wall	E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	0.100	2.40	0.24	Default

Total: W/mK:
 Y-Value: W/m²K:

Building Regulations England Part L (BREL) Compliance Report

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

Date: Wed 05 Jul 2023 11:45:14

Project Information			
Assessed By	Darren Coham	Building Type	Flat, End-terrace
OCDEA Registration	EES/022007	Assessment Date	2023-07-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	97 m ²
Site Reference	Flat 2	Plot Reference	00002
Address	Flat 2, Luton, LU1 3HX		

Client Details	
Name	-
Company	-
Address	-, -, -, -

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

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	12.57 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	2.86 kgCO ₂ /m ²		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	67.46 kWh _{PE} /m ²		
Dwelling primary energy	31.89 kWh _{PE} /m ²		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	35.4 kWh/m ²		
Dwelling fabric energy efficiency	33.7 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	0.18	Walls (1) (0.18)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	N/A	N/A	N/A
Roofs	0.16	N/A	N/A	N/A
Windows, doors, and roof windows	1.6	1.18	pd1 (1.2)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	59.48	0.18
Sheltered wall: Walls (2)	26.6649	0.18
Party wall: Party Wall (1)	20.52	0 (!)

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]
pd1, Windows	5.4	North West	0.75	1.2
pd1, Windows	5.4	North West	0.75	1.2
w1, Windows	3.24	North West	0.75	1.2
w2, Windows	6.48	North West	0.75	1.2
ed1, Entrance Doors	2.0951	South East	N/A	1 (!)
w3, Windows	5.04	South East	0.75	1.2

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	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.068	Thermally Broken
External wall	E4: Jamb	Calculated by person with suitable	0.018 (!)	Knauf

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
		expertise		
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.065	Knauf
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.048	Knauf
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.069	Knauf
External wall	E8: Balcony within a dwelling - wall insulation continuous	SAP table default	0.1	
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.09	Knauf

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	3 m ³ /hm ² , Design value (!)	OK
Air permeability test certificate reference		

4 Space heating

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

Efficiency	219.3%
Emitter type	Radiators
Flow temperature	45°C
System type	Air source heat pump
Manufacturer	
Model	
Commissioning	

Secondary heating system: N/A

Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water

Cylinder/store - type: Cylinder

Capacity	150 litres
Declared heat loss	1.7 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	

Waste water heat recovery system 1 - type: N/A

Efficiency	
Manufacturer	
Model	

6 Controls

Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services

Function	
Ecodesign class	
Manufacturer	
Model	

Water heating - type: Cylinder thermostat and HW separately timed

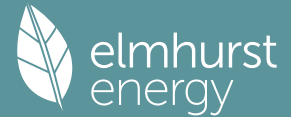
Manufacturer	
Model	

7 Lighting

Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	1.5 W/(l/s)	
Specific fan power	0.73 W/(l/s)	OK
Minimum permitted heat recovery efficiency	73%	
Heat recovery efficiency	90%	OK
Manufacturer/Model	HRV1 Q Plus	
Commissioning		
9 Local generation		
Technology type: Photovoltaic system (1)		
Peak power	0.8 kWp	
Orientation	South	
Pitch	30°	
Overshading	None or very little	
Manufacturer		
MCS certificate		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	
b. Client Declaration		
N/A		

Summary for Input Data



Property Reference	Flat 2		Issued on Date	05/07/2023	
Assessment Reference	00002	Prop Type Ref	Flat		
Property	Flat 2, Luton, Bedfordshire, LU1 3HX				
SAP Rating	87 B	DER	2.86	TER	12.57
Environmental	98 A	% DER < TER			77.25
CO ₂ Emissions (t/year)	0.25	DFEE	33.67	TFEE	35.44
Compliance Check	See BREL	% DFEE < TFEE			4.98
% DPER < TPER	52.73	DPER	31.89	TPER	67.46
Assessor Details	Mr. Darren Coham			Assessor ID	R789-0001
Client					

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Southeast	
Property Tenure	ND	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m ² K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m ²	0.00 m
Ground floor:	42.15 m	97.20 m ²	2.70 m
1st Storey:	0.00 m	0.00 m ²	0.00 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	37.01	m ²
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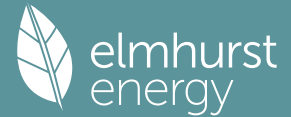
9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	85.05	59.49	0.00	None	25.56	Calculate Wall Area
	Sheltered Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	28.76	26.66	0.90	Stairwell Access Corridor 4	2.10	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	20.52	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	153.40

10.1 Party Ceilings	
---------------------	--

Summary for Input Data



Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	97.20

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	97.20

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Entrance Doors	Manufacturer	Solid Door			Air Filled	0.00	Wood	0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05		Air Filled	0.63	Wood	0.75	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
pd1	Windows	External Wall 1	North West	10.80	0
w1	Windows	External Wall 1	North West	3.24	0
w2	Windows	External Wall 1	North West	6.48	0
ed1	Entrance Doors	Sheltered Wall	South East	2.10	0
w3	Windows	External Wall 1	South East	5.04	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	11.67	0.07	0.07 Thermally Broken	Yes
E4 Jamb	Independently assessed	28.10	0.02	0.02 Knauf	Yes
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	84.30	0.07	0.07 Knauf	No
E16 Corner (normal)	Independently assessed	13.50	0.05	0.05 Knauf	No
E18 Party wall between dwellings	Independently assessed	5.40	0.07	0.07 Knauf	Yes
E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	4.70	0.10	0.10	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	15.20	0.00	0.00	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	10.80	-0.09	-0.09 Knauf	No

Y-value W/m²K

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Property Tested?

Test Method

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

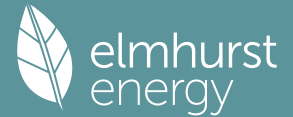
SFP from Installer Commissioning Certificate

MVHR System Location

Duct Installation Specification

20.0 Fans, Open Fireplaces, Flues

Summary for Input Data



21.0 Fixed Cooling System

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	6	480	10

24.0 Main Heating 1

SAP table

Percentage of Heat %

Database Ref. No.

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Delayed Start Stat

HETAS approved System

Oil Pump Inside

Fan Assisted Flue

Is MHS Pumped

Heating Pump Age

Heat Emitter

Flow Temperature

Flow Temperature Value

Boiler Interlock

25.0 Main Heating 2

26.0 Heat Networks

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Summer Immersion

Cold Water Source

Bath Count

Supplementary Immersion

Immersion Only Heating Hot Water

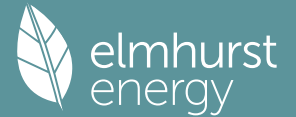
28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Cylinder Stat

Cylinder In Heated Space

Summary for Input Data



Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.70	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

32.0 Photovoltaic Unit

Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.80	South	30°	None Or Little	No	No	1.00		

34.0 Small-scale Hydro

Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Recommendations

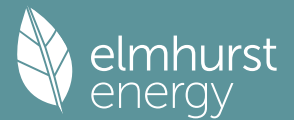
Lower cost measures

None

Further measures to achieve even higher standards

None

Predicted Energy Assessment



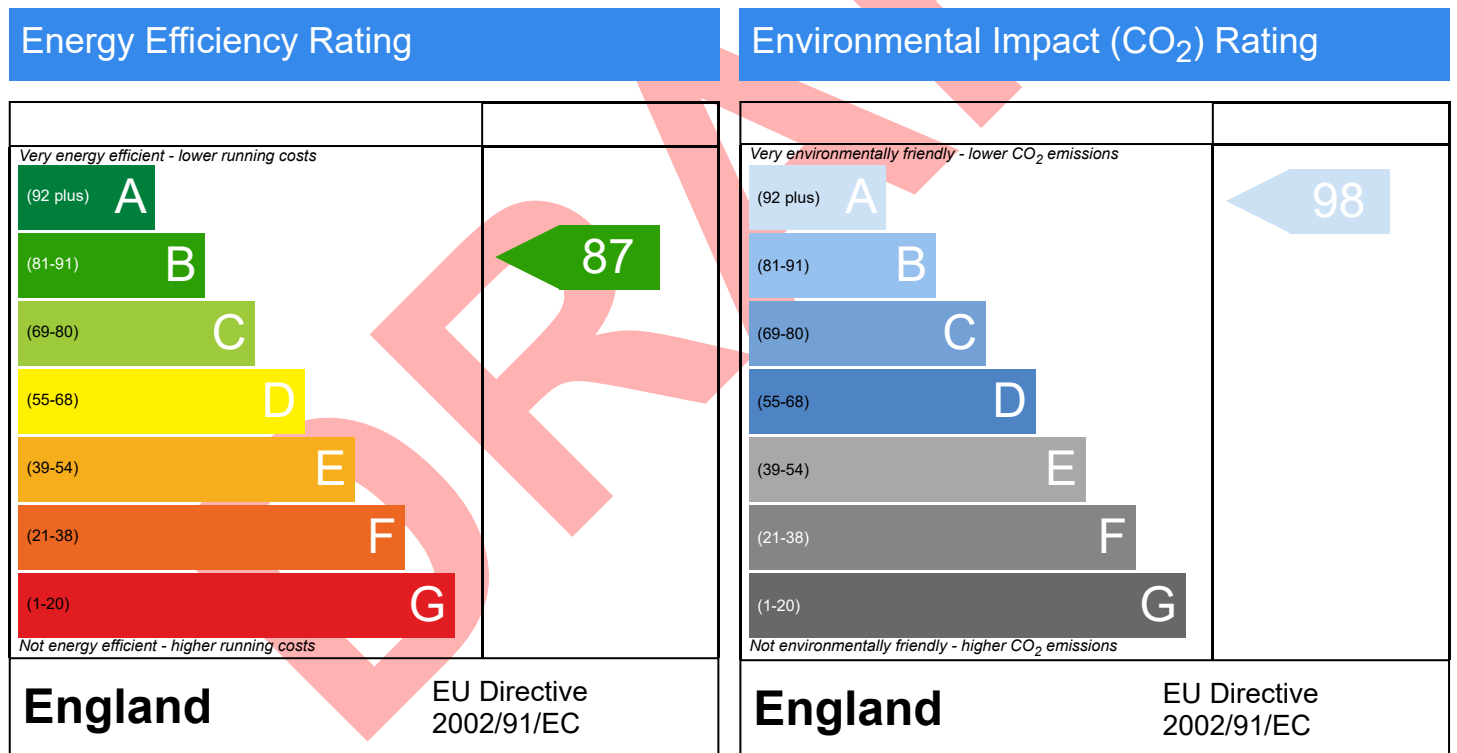
Flat 2, Luton, Bedfordshire, LU1 3HX

Dwelling type:
Date of assessment:
Produced by:
Total floor area:
DRRN:

Flat, End-Terrace
05/07/2023
Darren Coham
97.2 m²

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

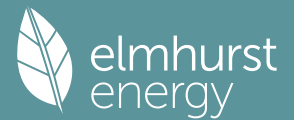
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Thermal Bridging



Property Reference	Flat 2	Issued on Date	05/07/2023
Assessment Reference	00002	Prop Type Ref	End-Terrace Flat
Property	Flat 2, Luton, Bedfordshire, LU1 3HX		

SAP Rating	87 B	DER	2.86	TER	12.57
Environmental	98 A	% DER < TER			77.25
CO ₂ Emissions (t/year)	0.25	DFEE	33.67	TFEE	35.44
Compliance Check	See BREL	% DFEE < TFEE			4.98
% DPER < TPER	52.73	DPER	31.89	TPER	67.46

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

	Junction details	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.068	11.67	0.79	Thermally Broken
External wall	E4 Jamb	Independently assessed	0.018	28.10	0.51	Knauf
External wall	E7 Party floor between dwellings (in blocks of flats)	Independently assessed	0.065	84.30	5.48	Knauf
External wall	E16 Corner (normal)	Independently assessed	0.048	13.50	0.65	Knauf
External wall	E18 Party wall between dwellings	Independently assessed	0.069	5.40	0.37	Knauf
External wall	E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	0.100	4.70	0.47	
Party wall	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	0.000	15.20	0.00	
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.090	10.80	-0.97	Knauf

Total: 173.67 W/mK:
 Y-Value: 0.06 W/m²K:

Building Regulations England Part L (BREL) Compliance Report

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

Date: Wed 05 Jul 2023 11:45:14

Project Information			
Assessed By	Darren Coham	Building Type	Flat, Mid-terrace
OCDEA Registration	EES/022007	Assessment Date	2023-07-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	68 m ²
Site Reference	Flat 3	Plot Reference	00003
Address	Flat 3, Luton, LU1 3HX		

Client Details	
Name	-
Company	-
Address	-, -, -, -

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

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	13.18 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	2.73 kgCO ₂ /m ²		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	71.09 kWh _{PE} /m ²		
Dwelling primary energy	31.86 kWh _{PE} /m ²		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	30.2 kWh/m ²		
Dwelling fabric energy efficiency	29.5 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	0.18	Walls (1) (0.18)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	N/A	N/A	N/A
Roofs	0.16	N/A	N/A	N/A
Windows, doors, and roof windows	1.6	1.18	pd1 (1.2)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	28.87	0.18
Sheltered wall: Walls (2)	2.6349	0.18
Party wall: Party Wall (1)	23.9	0 (!)

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]
pd1, Windows	5.4	North West	0.75	1.2
w1, Windows	6.48	North West	0.75	1.2
w2, Windows	5.04	North East	0.75	1.2
ed1, Entrance Doors	2.0951	South East	N/A	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	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.068	Thermally Broken
External wall	E4: Jamb	Calculated by person with suitable expertise	0.018 (!)	Knauf

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.065	Knauf
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.069	Knauf
External wall	E8: Balcony within a dwelling - wall insulation continuous	SAP table default	0.1	
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.09	Knauf
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.048	Knauf

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	3 m ³ /hm ² , Design value (!)	OK
Air permeability test certificate reference		

4 Space heating

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

Efficiency	219.3%
Emitter type	Underfloor
Flow temperature	45°C
System type	Air source heat pump
Manufacturer	
Model	
Commissioning	

Secondary heating system: N/A

Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water

Cylinder/store - type: Cylinder

Capacity	150 litres
Declared heat loss	1.7 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	

Waste water heat recovery system 1 - type: N/A

Efficiency	
Manufacturer	
Model	

6 Controls

Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services

Function	
Ecodesign class	
Manufacturer	
Model	

Water heating - type: Cylinder thermostat and HW separately timed

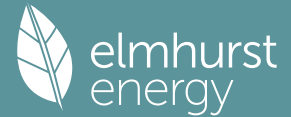
Manufacturer	
Model	

7 Lighting

Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	1.5 W/(l/s)	
Specific fan power	0.73 W/(l/s)	OK
Minimum permitted heat recovery efficiency	73%	
Heat recovery efficiency	90%	OK
Manufacturer/Model	HRV1 Q Plus	
Commissioning		
9 Local generation		
Technology type: Photovoltaic system (1)		
Peak power	0.8 kWp	
Orientation	South	
Pitch	30°	
Overshading	None or very little	
Manufacturer		
MCS certificate		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	
b. Client Declaration		
N/A		

Summary for Input Data



Property Reference	Flat 3		Issued on Date	05/07/2023	
Assessment Reference	00003	Prop Type Ref	Flat		
Property	Flat 3, Luton, Bedfordshire, LU1 3HX				
SAP Rating	89 B	DER	2.73	TER	13.18
Environmental	98 A	% DER < TER			79.29
CO ₂ Emissions (t/year)	0.17	DFEE	29.52	TFEE	30.20
Compliance Check	See BREL	% DFEE < TFEE			2.26
% DPER < TPER	55.19	DPER	31.86	TPER	71.09
Assessor Details	Mr. Darren Coham			Assessor ID	R789-0001
Client					

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Southeast	
Property Tenure	ND	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m ² K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m ²	0.00 m
Ground floor:	18.71 m	68.21 m ²	2.70 m
1st Storey:	0.00 m	0.00 m ²	0.00 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	29.20	m ²
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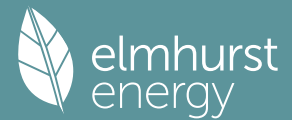
9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	45.79	28.87	0.00	None	16.92	Calculate Wall Area
	Sheltered Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	4.73	2.63	0.90	Stairwell Access Corridor 4	2.10	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	23.90	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	130.00

10.1 Party Ceilings	
---------------------	--

Summary for Input Data



Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	68.21

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Floor 1	Lowest occupied	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	68.21

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
Entrance Doors	Manufacturer	Solid Door			Air Filled	0.00	Wood	0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05		Air Filled	0.63	Wood	0.75	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
pd1	Windows	External Wall 1	North West	5.40	0
w1	Windows	External Wall 1	North West	6.48	0
w2	Windows	External Wall 1	North East	5.04	0
ed1	Entrance Doors	Sheltered Wall	South East	2.10	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	8.07	0.07	0.07 Thermally Broken	Yes
E4 Jamb	Independently assessed	18.50	0.02	0.02 Knauf	Yes
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	37.42	0.07	0.07 Knauf	No
E18 Party wall between dwellings	Independently assessed	10.80	0.07	0.07 Knauf	Yes
E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	4.50	0.10	0.10	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	32.90	0.00	0.00	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	2.70	-0.09	-0.09 Knauf	No
E16 Corner (normal)	Independently assessed	2.70	0.05	0.05 Knauf	No

Y-value W/m²K

Description

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Property Tested?

Test Method

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

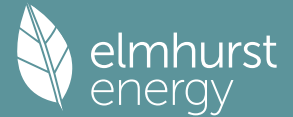
SFP from Installer Commissioning Certificate

MVHR System Location

Duct Installation Specification

20.0 Fans, Open Fireplaces, Flues

Summary for Input Data



21.0 Fixed Cooling System

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	6	480	10

24.0 Main Heating 1

SAP table

Percentage of Heat %

Database Ref. No.

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Delayed Start Stat

HETAS approved System

Oil Pump Inside

Fan Assisted Flue

Is MHS Pumped

Heating Pump Age

Heat Emitter

Underfloor Heating

Flow Temperature

Flow Temperature Value

Boiler Interlock

25.0 Main Heating 2

26.0 Heat Networks

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Summer Immersion

Cold Water Source

Bath Count

Supplementary Immersion

Immersion Only Heating Hot Water

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Cylinder Stat

Summary for Input Data



Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.70	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

32.0 Photovoltaic Unit

Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.80	South	30°	None Or Little	No	No	1.00		

34.0 Small-scale Hydro

Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Recommendations

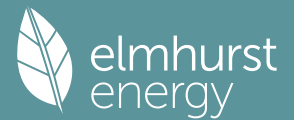
Lower cost measures

None

Further measures to achieve even higher standards

None

Predicted Energy Assessment



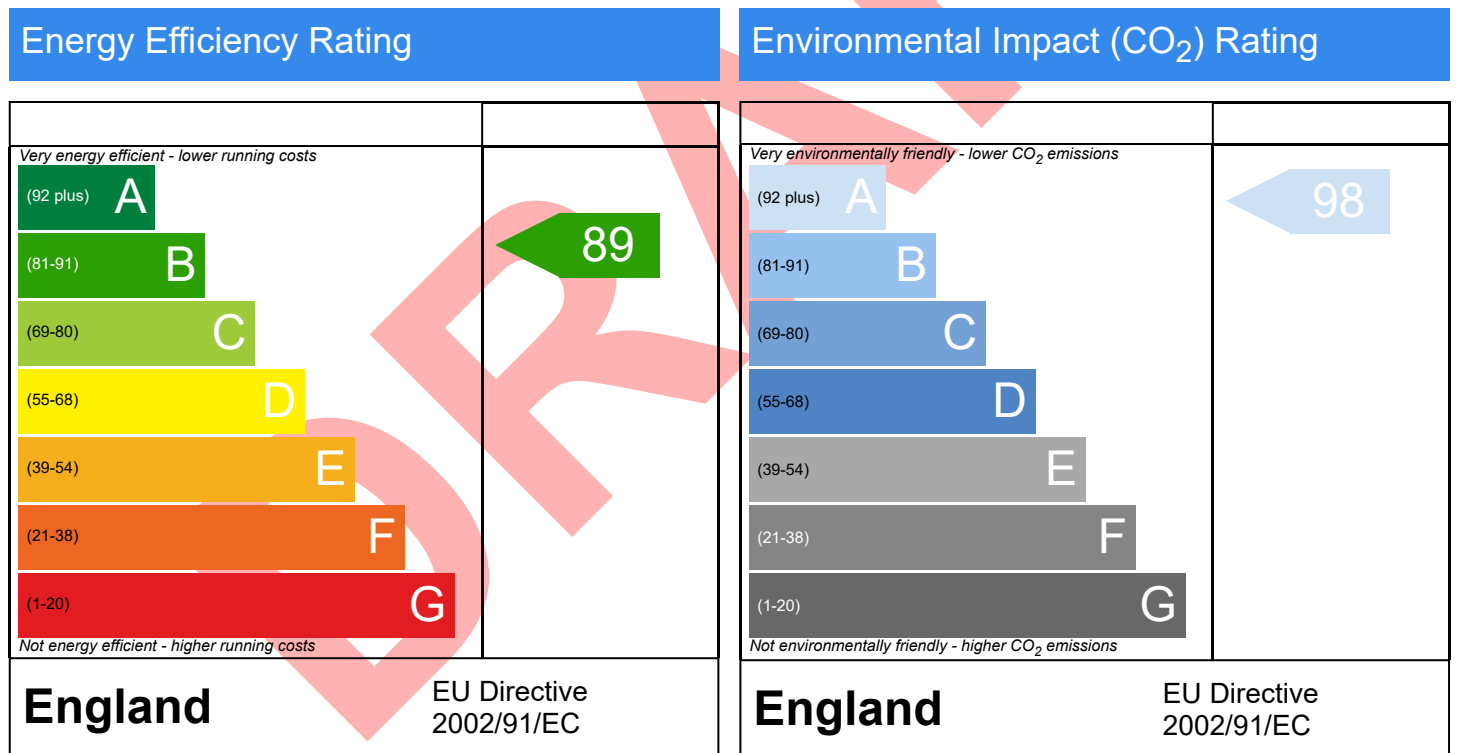
Flat 3, Luton, Bedfordshire, LU1 3HX

Dwelling type:
Date of assessment:
Produced by:
Total floor area:
DRRN:

Flat, Mid-Terrace
05/07/2023
Darren Coham
68.21 m²

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

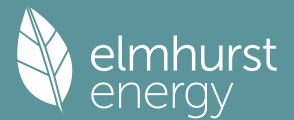
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Thermal Bridging



Property Reference	Flat 3	Issued on Date	05/07/2023
Assessment Reference	00003	Prop Type Ref	Mid-Terrace Flat
Property	Flat 3, Luton, Bedfordshire, LU1 3HX		

SAP Rating	89 B	DER	2.73	TER	13.18
Environmental	98 A	% DER < TER			79.29
CO ₂ Emissions (t/year)	0.17	DFEE	29.52	TFEE	30.20
Compliance Check	See BREL	% DFEE < TFEE			2.26
% DPER < TPER	55.19	DPER	31.86	TPER	71.09

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

	Junction details	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.068	8.07	0.55	Thermally Broken
External wall	E4 Jamb	Independently assessed	0.018	18.50	0.33	Knauf
External wall	E7 Party floor between dwellings (in blocks of flats)	Independently assessed	0.065	37.42	2.43	Knauf
External wall	E18 Party wall between dwellings	Independently assessed	0.069	10.80	0.75	Knauf
External wall	E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	0.100	4.50	0.45	
Party wall	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	0.000	32.90	0.00	
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.090	2.70	-0.24	Knauf
External wall	E16 Corner (normal)	Independently assessed	0.048	2.70	0.13	Knauf

Total: 117.59 W/mK:
 Y-Value: 0.09 W/m²K:

Building Regulations England Part L (BREL) Compliance Report

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

Date: Wed 05 Jul 2023 11:45:14

Project Information			
Assessed By	Darren Coham	Building Type	Flat, End-terrace
OCDEA Registration	EES/022007	Assessment Date	2023-07-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	55 m ²
Site Reference	Flat 4	Plot Reference	00004
Address	Flat 4, Luton, LU1 3HX		

Client Details	
Name	-
Company	-
Address	-, -, -, -

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

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	15.12 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	2.77 kgCO ₂ /m ²		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	81.86 kWh _{PE} /m ²		
Dwelling primary energy	33.25 kWh _{PE} /m ²		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	33.5 kWh/m ²		
Dwelling fabric energy efficiency	30.5 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	0.18	Walls (1) (0.18)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	N/A	N/A	N/A
Roofs	0.16	N/A	N/A	N/A
Windows, doors, and roof windows	1.6	1.16	pd1 (1.2)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	35.78	0.18
Sheltered wall: Walls (2)	19.2349	0.18
Party wall: Party Wall (1)	23.08	0 (!)

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]
pd1, Windows	5.4	North East	0.75	1.2
w1, Windows	3.24	North East	0.75	1.2
ed1, Entrance Doors	2.0951	North West	N/A	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	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.068	Thermally Broken
External wall	E4: Jamb	Calculated by person with suitable expertise	0.018 (!)	Knauf
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.065	Knauf

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.048	Knauf
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.069	Knauf
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.09	Knauf
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	Default
External wall	E8: Balcony within a dwelling - wall insulation continuous	SAP table default	0.1	Default

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		3 m ³ /hm ² , Design value (!)		OK
Air permeability test certificate reference				

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	219.3%
Emitter type	Underfloor
Flow temperature	45°C
System type	Air source heat pump
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

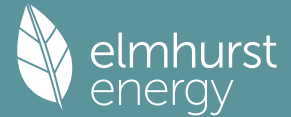
5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	150 litres
Declared heat loss	1.7 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

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

7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	1.5 W/(l/s)	
Specific fan power	0.73 W/(l/s)	OK
Minimum permitted heat recovery efficiency	73%	
Heat recovery efficiency	90%	OK
Manufacturer/Model	HRV1 Q Plus	
Commissioning		
9 Local generation		
Technology type: Photovoltaic system (1)		
Peak power	0.8 kWp	
Orientation	South	
Pitch	30°	
Overshading	None or very little	
Manufacturer		
MCS certificate		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	
b. Client Declaration		
N/A		

Summary for Input Data



Property Reference	Flat 4	Issued on Date	05/07/2023
Assessment Reference	00004	Prop Type Ref	Flat
Property	Flat 4, Luton, Bedfordshire, LU1 3HX		

SAP Rating	89 B	DER	2.77	TER	15.12
Environmental	98 A	% DER < TER			81.68
CO ₂ Emissions (t/year)	0.14	DFEE	30.50	TFEE	33.51
Compliance Check	See BREL	% DFEE < TFEE			8.99
% DPER < TPER	59.38	DPER	33.25	TPER	81.86

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Northwest	
Property Tenure	ND	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m ² K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m ²	0.00 m
Ground floor:	24.35 m	55.23 m ²	2.70 m
1st Storey:	0.00 m	0.00 m ²	0.00 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	26.61	m ²
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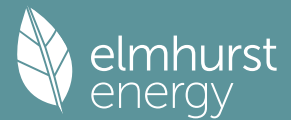
9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	44.42	35.78	0.00	None	8.64	Calculate Wall Area
	Sheltered Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	21.33	19.23	0.90	Stairwell Access Corridor 4	2.10	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	23.08	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	90.00

10.1 Party Ceilings	
---------------------	--

Summary for Input Data



Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	55.23

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	55.23

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Entrance Doors	Manufacturer	Solid Door			Air Filled	0.00	Wood	0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05		Air Filled	0.63	Wood	0.75	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
pd1	Windows	External Wall 1	North East	5.40	0
w1	Windows	External Wall 1	North East	3.24	0
ed1	Entrance Doors	Sheltered Wall	North West	2.10	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	4.62	0.07	0.07 Thermally Broken	Yes
E4 Jamb	Independently assessed	13.70	0.02	0.02 Knauf	Yes
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	48.70	0.07	0.07 Knauf	No
E16 Corner (normal)	Independently assessed	10.80	0.05	0.05 Knauf	No
E18 Party wall between dwellings	Independently assessed	5.40	0.07	0.07 Knauf	Yes
E17 Corner (inverted – internal area greater than external area)	Independently assessed	2.70	-0.09	-0.09 Knauf	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	17.10	0.00	0.00 Default	No
E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	3.00	0.10	0.10 Default	No

Y-value W/m²K

Description

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Property Tested?

Test Method

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

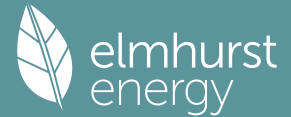
SFP from Installer Commissioning Certificate

MVHR System Location

Duct Installation Specification

20.0 Fans, Open Fireplaces, Flues

Summary for Input Data



21.0 Fixed Cooling System

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	6	480	10

24.0 Main Heating 1

SAP table

Percentage of Heat %

Database Ref. No.

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Delayed Start Stat

HETAS approved System

Oil Pump Inside

Fan Assisted Flue

Is MHS Pumped

Heating Pump Age

Heat Emitter

Underfloor Heating

Flow Temperature

Flow Temperature Value

Boiler Interlock

25.0 Main Heating 2

26.0 Heat Networks

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Summer Immersion

Cold Water Source

Bath Count

Supplementary Immersion

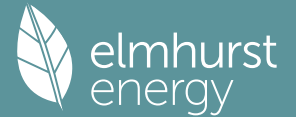
Immersion Only Heating Hot Water

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Cylinder Stat

Summary for Input Data



Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.70	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

32.0 Photovoltaic Unit

Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.80	South	30°	None Or Little	No	No	1.00		

34.0 Small-scale Hydro

Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Recommendations

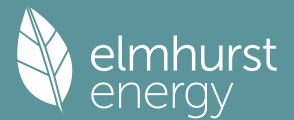
Lower cost measures

None

Further measures to achieve even higher standards

None

Predicted Energy Assessment



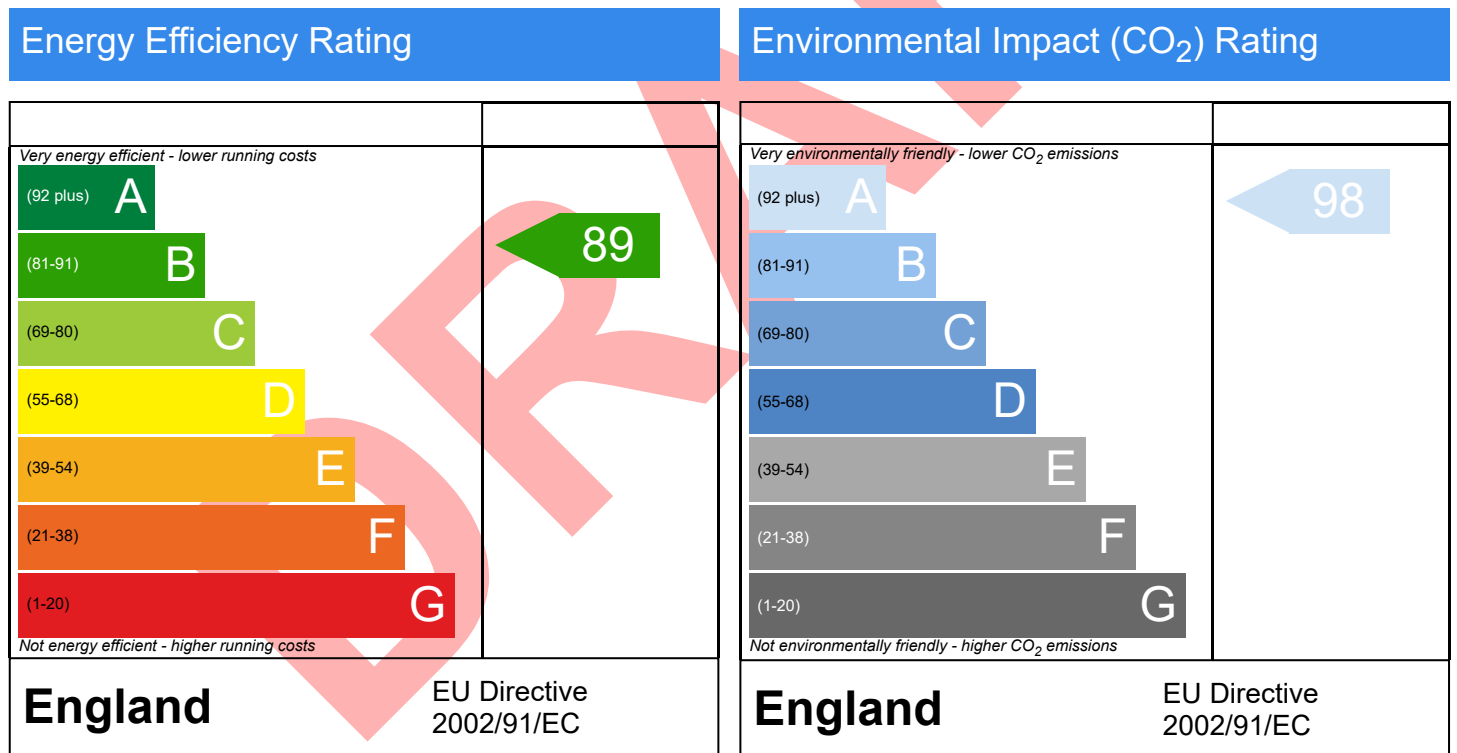
Flat 4, Luton, Bedfordshire, LU1 3HX

Dwelling type:
Date of assessment:
Produced by:
Total floor area:
DRRN:

Flat, End-Terrace
05/07/2023
Darren Coham
55.23 m²

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

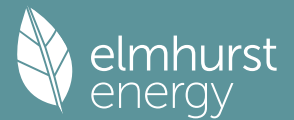
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Thermal Bridging



Property Reference	Flat 4	Issued on Date	05/07/2023
Assessment Reference	00004	Prop Type Ref	End-Terrace Flat
Property	Flat 4, Luton, Bedfordshire, LU1 3HX		

SAP Rating	89 B	DER	2.77	TER	15.12
Environmental	98 A	% DER < TER			81.68
CO ₂ Emissions (t/year)	0.14	DFEE	30.50	TFEE	33.51
Compliance Check	See BREL	% DFEE < TFEE			8.99
% DPER < TPER	59.38	DPER	33.25	TPER	81.86

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

	Junction details	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.068	4.62	0.31	Thermally Broken
External wall	E4 Jamb	Independently assessed	0.018	13.70	0.25	Knauf
External wall	E7 Party floor between dwellings (in blocks of flats)	Independently assessed	0.065	48.70	3.17	Knauf
External wall	E16 Corner (normal)	Independently assessed	0.048	10.80	0.52	Knauf
External wall	E18 Party wall between dwellings	Independently assessed	0.069	5.40	0.37	Knauf
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.090	2.70	-0.24	Knauf
Party wall	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	0.000	17.10	0.00	Default
External wall	E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	0.100	3.00	0.30	Default

Total: 106.02 W/mK:
 Y-Value: 0.07 W/m²K:

Building Regulations England Part L (BREL) Compliance Report

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

Date: Wed 05 Jul 2023 11:45:14

Project Information			
Assessed By	Darren Coham	Building Type	Flat, End-terrace
OCDEA Registration	EES/022007	Assessment Date	2023-07-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	97 m ²
Site Reference	Flat 5	Plot Reference	00005
Address	Flat 5, Luton, LU1 3HX		

Client Details	
Name	-
Company	-
Address	-, -, -, -

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

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	12.57 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	2.86 kgCO ₂ /m ²		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	67.46 kWh _{PE} /m ²		
Dwelling primary energy	31.89 kWh _{PE} /m ²		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	35.4 kWh/m ²		
Dwelling fabric energy efficiency	33.7 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	0.18	Walls (1) (0.18)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	N/A	N/A	N/A
Roofs	0.16	N/A	N/A	N/A
Windows, doors, and roof windows	1.6	1.18	pd1 (1.2)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	59.48	0.18
Sheltered wall: Walls (2)	26.6649	0.18
Party wall: Party Wall (1)	20.52	0 (!)

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]
pd1, Windows	5.4	North West	0.75	1.2
pd1, Windows	5.4	North West	0.75	1.2
w1, Windows	3.24	North West	0.75	1.2
w2, Windows	6.48	North West	0.75	1.2
ed1, Entrance Doors	2.0951	South East	N/A	1 (!)
w3, Windows	5.04	South East	0.75	1.2

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	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.068	Thermally Broken
External wall	E4: Jamb	Calculated by person with suitable	0.018 (!)	Knauf

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
		expertise		
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.065	Knauf
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.048	Knauf
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.069	Knauf
External wall	E8: Balcony within a dwelling - wall insulation continuous	SAP table default	0.1	
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.09	Knauf

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	3 m ³ /hm ² , Design value (!)	OK
Air permeability test certificate reference		

4 Space heating

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

Efficiency	219.3%
Emitter type	Radiators
Flow temperature	45°C
System type	Air source heat pump
Manufacturer	
Model	
Commissioning	

Secondary heating system: N/A

Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water

Cylinder/store - type: Cylinder

Capacity	150 litres
Declared heat loss	1.7 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	

Waste water heat recovery system 1 - type: N/A

Efficiency	
Manufacturer	
Model	

6 Controls

Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services

Function	
Ecodesign class	
Manufacturer	
Model	

Water heating - type: Cylinder thermostat and HW separately timed

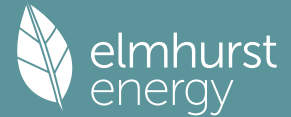
Manufacturer	
Model	

7 Lighting

Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	1.5 W/(l/s)	
Specific fan power	0.73 W/(l/s)	OK
Minimum permitted heat recovery efficiency	73%	
Heat recovery efficiency	90%	OK
Manufacturer/Model	HRV1 Q Plus	
Commissioning		
9 Local generation		
Technology type: Photovoltaic system (1)		
Peak power	0.8 kWp	
Orientation	South	
Pitch	30°	
Overshading	None or very little	
Manufacturer		
MCS certificate		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	
b. Client Declaration		
N/A		

Summary for Input Data



Property Reference	Flat 5		Issued on Date	05/07/2023	
Assessment Reference	00005	Prop Type Ref	Flat		
Property	Flat 5, Luton, Bedfordshire, LU1 3HX				
SAP Rating	87 B	DER	2.86	TER	12.57
Environmental	98 A	% DER < TER			77.25
CO ₂ Emissions (t/year)	0.25	DFEE	33.67	TFEE	35.44
Compliance Check	See BREL	% DFEE < TFEE			4.98
% DPER < TPER	52.73	DPER	31.89	TPER	67.46
Assessor Details	Mr. Darren Coham			Assessor ID	R789-0001
Client					

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Southeast	
Property Tenure	ND	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	3	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m ² K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m ²	0.00 m
Ground floor:	42.15 m	97.20 m ²	2.70 m
1st Storey:	0.00 m	0.00 m ²	0.00 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	37.01	m ²
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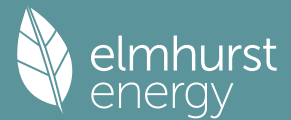
9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	85.05	59.49	0.00	None	25.56	Calculate Wall Area
	Sheltered Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	28.76	26.66	0.90	Stairwell Access Corridor 4	2.10	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	20.52	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	153.40

10.1 Party Ceilings	
---------------------	--

Summary for Input Data



Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	97.20

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Floor 1	Lowest occupied	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	97.20

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
Entrance Doors	Manufacturer	Solid Door			Air Filled	0.00	Wood	0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05		Air Filled	0.63	Wood	0.75	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
pd1	Windows	External Wall 1	North West	10.80	0
w1	Windows	External Wall 1	North West	3.24	0
w2	Windows	External Wall 1	North West	6.48	0
ed1	Entrance Doors	Sheltered Wall	South East	2.10	0
w3	Windows	External Wall 1	South East	5.04	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	11.67	0.07	0.07 Thermally Broken	Yes
E4 Jamb	Independently assessed	28.10	0.02	0.02 Knauf	Yes
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	84.30	0.07	0.07 Knauf	No
E16 Corner (normal)	Independently assessed	13.50	0.05	0.05 Knauf	No
E18 Party wall between dwellings	Independently assessed	5.40	0.07	0.07 Knauf	Yes
E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	4.70	0.10	0.10	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	15.20	0.00	0.00	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	10.80	-0.09	-0.09 Knauf	No

Y-value W/m²K

18.0 Pressure Testing

Designed AP ₅₀	<input type="text" value="Yes"/>	
Designed AP ₅₀	<input type="text" value="3.00"/>	m ³ /(h.m ²) @ 50 Pa
Property Tested?	<input type="text" value="Yes"/>	
Test Method	<input type="text" value="Blower Door"/>	
As Built AP ₅₀	<input type="text" value="0.10"/>	m ³ /(h.m ²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation	
Mechanical Ventilation System Present	<input type="text" value="Yes"/>
Approved Installation	<input type="text" value="No"/>
Mechanical Ventilation data Type	<input type="text" value="Database"/>
Type	<input type="text" value="Balanced mechanical ventilation with heat recovery"/>
MV Reference Number	<input type="text" value="500082"/>
Configuration	<input type="text" value="1"/>
Manufacturer SFP	<input type="text" value="0.73"/>
Duct Type	<input type="text" value="Rigid"/>
MVHR Efficiency	<input type="text" value="90.00"/>
Wet Rooms	<input type="text" value="1"/>
SFP from Installer Commissioning Certificate	<input type="text" value="No"/>
MVHR System Location	<input type="text" value="Inside heated envelope (installed exclusively)"/>
Duct Installation Specification	<input type="text" value="Level 1"/>

20.0 Fans, Open Fireplaces, Flues

Summary for Input Data



21.0 Fixed Cooling System

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	6	480	10

24.0 Main Heating 1

SAP table

Percentage of Heat %

Database Ref. No.

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Delayed Start Stat

HETAS approved System

Oil Pump Inside

Fan Assisted Flue

Is MHS Pumped

Heating Pump Age

Heat Emitter

Flow Temperature

Flow Temperature Value

Boiler Interlock

25.0 Main Heating 2

26.0 Heat Networks

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Summer Immersion

Cold Water Source

Bath Count

Supplementary Immersion

Immersion Only Heating Hot Water

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Cylinder Stat

Cylinder In Heated Space

Summary for Input Data



Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.70	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

32.0 Photovoltaic Unit

Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.80	South	30°	None Or Little	No	No	1.00		

34.0 Small-scale Hydro

Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Recommendations

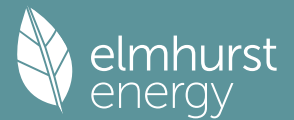
Lower cost measures

None

Further measures to achieve even higher standards

None

Predicted Energy Assessment



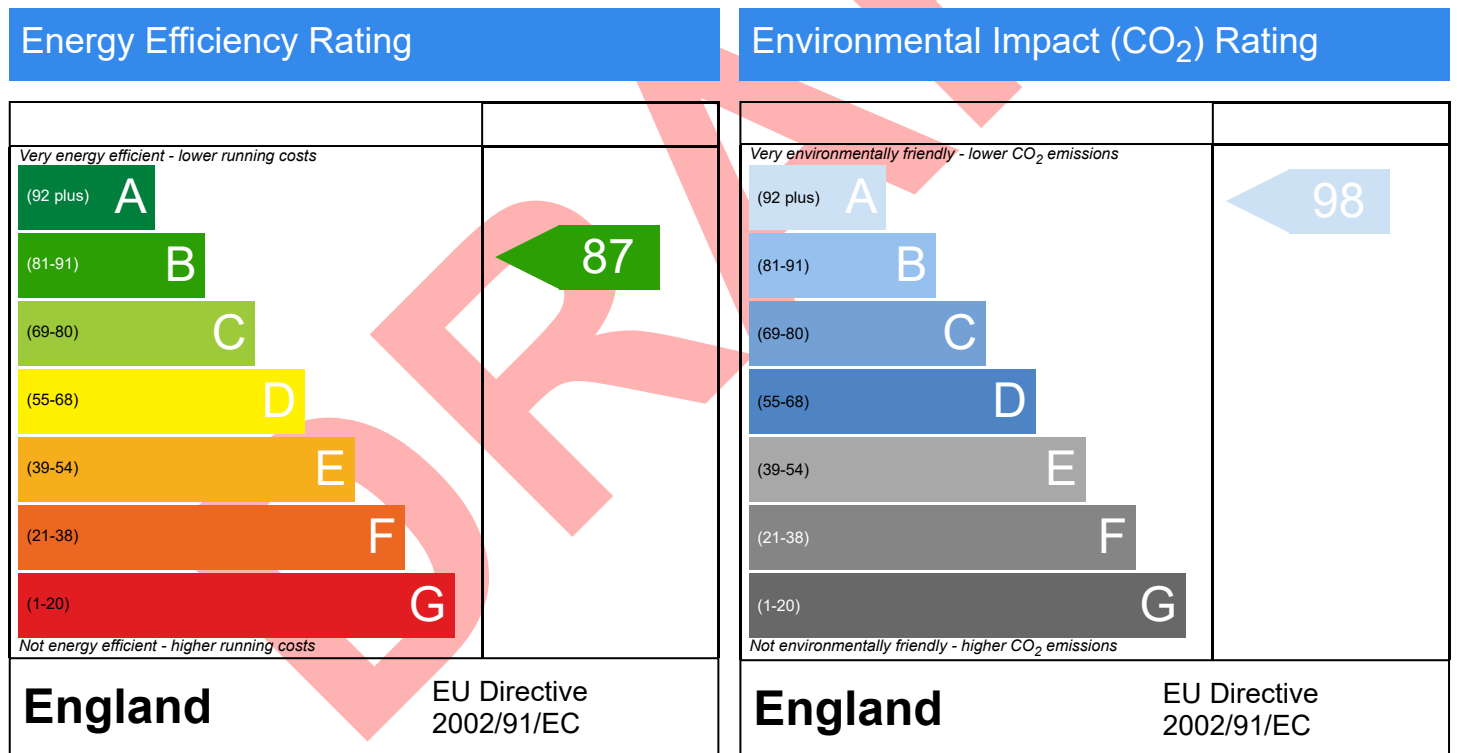
Flat 5, Luton, Bedfordshire, LU1 3HX

Dwelling type:
Date of assessment:
Produced by:
Total floor area:
DRRN:

Flat, End-Terrace
05/07/2023
Darren Coham
97.2 m²

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

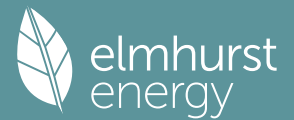
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Thermal Bridging



Property Reference	Flat 5	Issued on Date	05/07/2023
Assessment Reference	00005	Prop Type Ref	End-Terrace Flat
Property	Flat 5, Luton, Bedfordshire, LU1 3HX		

SAP Rating	87 B	DER	2.86	TER	12.57
Environmental	98 A	% DER < TER			77.25
CO ₂ Emissions (t/year)	0.25	DFEE	33.67	TFEE	35.44
Compliance Check	See BREL	% DFEE < TFEE			4.98
% DPER < TPER	52.73	DPER	31.89	TPER	67.46

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

	Junction details	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.068	11.67	0.79	Thermally Broken
External wall	E4 Jamb	Independently assessed	0.018	28.10	0.51	Knauf
External wall	E7 Party floor between dwellings (in blocks of flats)	Independently assessed	0.065	84.30	5.48	Knauf
External wall	E16 Corner (normal)	Independently assessed	0.048	13.50	0.65	Knauf
External wall	E18 Party wall between dwellings	Independently assessed	0.069	5.40	0.37	Knauf
External wall	E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	0.100	4.70	0.47	
Party wall	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	0.000	15.20	0.00	
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.090	10.80	-0.97	Knauf

Total: 173.67 W/mK:
 Y-Value: 0.06 W/m²K:

Building Regulations England Part L (BREL) Compliance Report

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

Date: Wed 05 Jul 2023 11:45:15

Project Information			
Assessed By	Darren Coham	Building Type	Flat, Mid-terrace
OCDEA Registration	EES/022007	Assessment Date	2023-07-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	68 m ²
Site Reference	Flat 6	Plot Reference	00006
Address	Flat 6, Luton, LU1 3HX		

Client Details	
Name	-
Company	-
Address	-, -, -, -

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

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	13.18 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	2.73 kgCO ₂ /m ²	OK	
1b Target primary energy rate and dwelling primary energy			
Target primary energy	71.09 kWh _{PE} /m ²		
Dwelling primary energy	31.86 kWh _{PE} /m ²	OK	
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	30.2 kWh/m ²		
Dwelling fabric energy efficiency	29.5 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	0.18	Walls (1) (0.18)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	N/A	N/A	N/A
Roofs	0.16	N/A	N/A	N/A
Windows, doors, and roof windows	1.6	1.18	pd1 (1.2)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	28.87	0.18
Sheltered wall: Walls (2)	2.6349	0.18
Party wall: Party Wall (1)	23.9	0 (!)

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]
pd1, Windows	5.4	North West	0.75	1.2
w1, Windows	6.48	North West	0.75	1.2
w2, Windows	5.04	North East	0.75	1.2
ed1, Entrance Doors	2.0951	South East	N/A	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	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.068	Thermally Broken
External wall	E4: Jamb	Calculated by person with suitable expertise	0.018 (!)	Knauf

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.065	Knauf
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.069	Knauf
External wall	E8: Balcony within a dwelling - wall insulation continuous	SAP table default	0.1	
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.09	Knauf
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.048	Knauf

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	3 m ³ /hm ² , Design value (!)	OK
Air permeability test certificate reference		

4 Space heating

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

Efficiency	219.3%
Emitter type	Underfloor
Flow temperature	45°C
System type	Air source heat pump
Manufacturer	
Model	
Commissioning	

Secondary heating system: N/A

Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water

Cylinder/store - type: Cylinder

Capacity	150 litres
Declared heat loss	1.7 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	

Waste water heat recovery system 1 - type: N/A

Efficiency	
Manufacturer	
Model	

6 Controls

Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services

Function	
Ecodesign class	
Manufacturer	
Model	

Water heating - type: Cylinder thermostat and HW separately timed

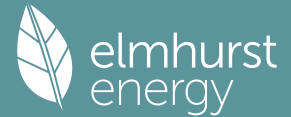
Manufacturer	
Model	

7 Lighting

Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	1.5 W/(l/s)	
Specific fan power	0.73 W/(l/s)	OK
Minimum permitted heat recovery efficiency	73%	
Heat recovery efficiency	90%	OK
Manufacturer/Model	HRV1 Q Plus	
Commissioning		
9 Local generation		
Technology type: Photovoltaic system (1)		
Peak power	0.8 kWp	
Orientation	South	
Pitch	30°	
Overshading	None or very little	
Manufacturer		
MCS certificate		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	
b. Client Declaration		
N/A		

Summary for Input Data



Property Reference	Flat 6	Issued on Date	05/07/2023
Assessment Reference	00006	Prop Type Ref	Flat
Property	Flat 6, Luton, Bedfordshire, LU1 3HX		
SAP Rating	89 B	DER	2.73
Environmental	98 A	TER	13.18
CO ₂ Emissions (t/year)	0.17	% DER < TER	79.29
Compliance Check	See BREL	DFEE	29.52
% DPER < TPER	55.19	TFEE	30.20
		% DFEE < TFEE	2.26
		DPER	31.86
		TPER	71.09
Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Southeast	
Property Tenure	ND	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	3	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m ² K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m ²	0.00 m
Ground floor:	18.71 m	68.21 m ²	2.70 m
1st Storey:	0.00 m	0.00 m ²	0.00 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	29.20	m ²
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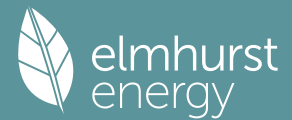
9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	45.79	28.87	0.00	None	16.92	Calculate Wall Area
	Sheltered Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	4.73	2.63	0.90	Stairwell Access Corridor 4	2.10	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	23.90	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	130.00

10.1 Party Ceilings	
---------------------	--

Summary for Input Data



Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	68.21

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Floor 1	Lowest occupied	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	68.21

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
Entrance Doors	Manufacturer	Solid Door			Air Filled	0.00	Wood	0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05		Air Filled	0.63	Wood	0.75	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
pd1	Windows	External Wall 1	North West	5.40	0
w1	Windows	External Wall 1	North West	6.48	0
w2	Windows	External Wall 1	North East	5.04	0
ed1	Entrance Doors	Sheltered Wall	South East	2.10	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	8.07	0.07	0.07 Thermally Broken	Yes
E4 Jamb	Independently assessed	18.50	0.02	0.02 Knauf	Yes
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	37.42	0.07	0.07 Knauf	No
E18 Party wall between dwellings	Independently assessed	10.80	0.07	0.07 Knauf	Yes
E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	4.50	0.10	0.10	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	32.90	0.00	0.00	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	2.70	-0.09	-0.09 Knauf	No
E16 Corner (normal)	Independently assessed	2.70	0.05	0.05 Knauf	No

Y-value W/m²K

Description

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Property Tested?

Test Method

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

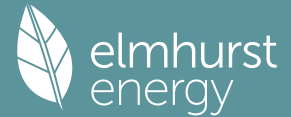
SFP from Installer Commissioning Certificate

MVHR System Location

Duct Installation Specification

20.0 Fans, Open Fireplaces, Flues

Summary for Input Data



21.0 Fixed Cooling System

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	6	480	10

24.0 Main Heating 1

Percentage of Heat %

Database Ref. No.

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Delayed Start Stat

HETAS approved System

Oil Pump Inside

Fan Assisted Flue

Is MHS Pumped

Heating Pump Age

Heat Emitter

Underfloor Heating

Flow Temperature

Flow Temperature Value

Boiler Interlock

25.0 Main Heating 2

26.0 Heat Networks

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Summer Immersion

Cold Water Source

Bath Count

Supplementary Immersion

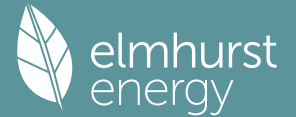
Immersion Only Heating Hot Water

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Cylinder Stat

Summary for Input Data



Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.70	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

32.0 Photovoltaic Unit

Export Capable Meter?	Yes
Connected To Dwelling	Yes
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.80	South	30°	None Or Little	No	No	1.00		

34.0 Small-scale Hydro

Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Recommendations

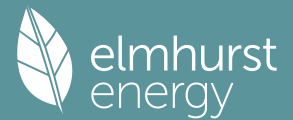
Lower cost measures

None

Further measures to achieve even higher standards

None

Predicted Energy Assessment



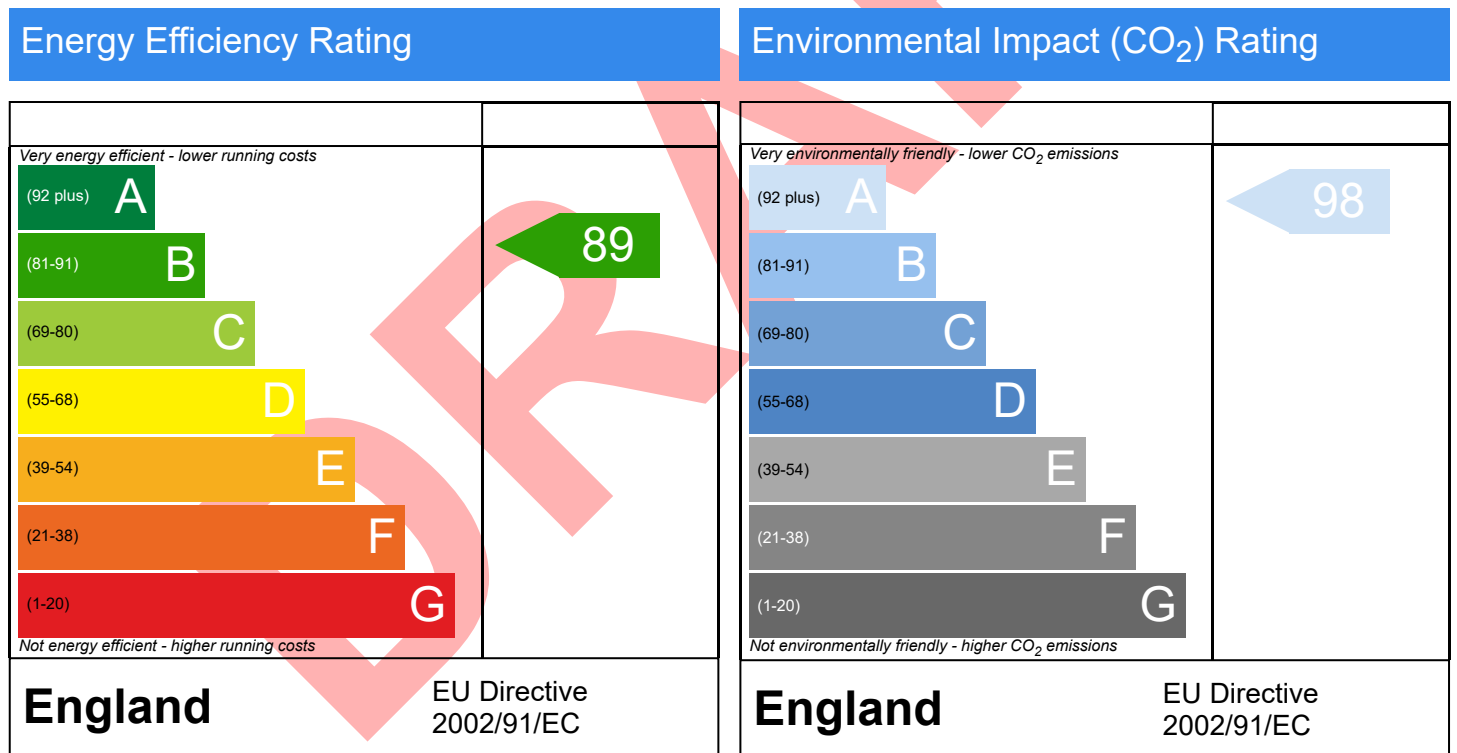
Flat 6, Luton, Bedfordshire, LU1 3HX

Dwelling type:
Date of assessment:
Produced by:
Total floor area:
DRRN:

Flat, Mid-Terrace
05/07/2023
Darren Coham
68.21 m²

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

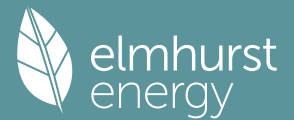
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Thermal Bridging



Property Reference	Flat 6	Issued on Date	05/07/2023
Assessment Reference	00006	Prop Type Ref	Mid-Terrace Flat
Property	Flat 6, Luton, Bedfordshire, LU1 3HX		

SAP Rating	89 B	DER	2.73	TER	13.18
Environmental	98 A	% DER < TER			79.29
CO ₂ Emissions (t/year)	0.17	DFEE	29.52	TFEE	30.20
Compliance Check	See BREL	% DFEE < TFEE			2.26
% DPER < TPER	55.19	DPER	31.86	TPER	71.09

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

	Junction details	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.068	8.07	0.55	Thermally Broken
External wall	E4 Jamb	Independently assessed	0.018	18.50	0.33	Knauf
External wall	E7 Party floor between dwellings (in blocks of flats)	Independently assessed	0.065	37.42	2.43	Knauf
External wall	E18 Party wall between dwellings	Independently assessed	0.069	10.80	0.75	Knauf
External wall	E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	0.100	4.50	0.45	
Party wall	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	0.000	32.90	0.00	
External wall	E17 Corner (inverted – internal area greater than external area)	Independently assessed	-0.090	2.70	-0.24	Knauf
External wall	E16 Corner (normal)	Independently assessed	0.048	2.70	0.13	Knauf

Total: 117.59 W/mK:
 Y-Value: 0.09 W/m²K:

Building Regulations England Part L (BREL) Compliance Report

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

Date: Wed 05 Jul 2023 11:45:15

Project Information			
Assessed By	Darren Coham	Building Type	Flat, End-terrace
OCDEA Registration	EES/022007	Assessment Date	2023-07-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	55 m ²
Site Reference	Flat 7	Plot Reference	00007
Address	Flat 7, Luton, LU1 3HX		

Client Details	
Name	-
Company	-
Address	-, -, -, -

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	15.12 kgCO ₂ /m ²	
Dwelling carbon dioxide emission rate	2.77 kgCO ₂ /m ²	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	81.86 kWh _{PE} /m ²	
Dwelling primary energy	33.25 kWh _{PE} /m ²	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	33.5 kWh/m ²	
Dwelling fabric energy efficiency	30.5 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	0.18	Walls (1) (0.18)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	N/A	N/A	N/A
Roofs	0.16	N/A	N/A	N/A
Windows, doors, and roof windows	1.6	1.16	pd1 (1.2)	OK
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	35.78	0.18
Sheltered wall: Walls (2)	19.2349	0.18
Party wall: Party Wall (1)	23.08	0 (!)

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]
pd1, Windows	5.4	North East	0.75	1.2
w1, Windows	3.24	North East	0.75	1.2
ed1, Entrance Doors	2.0951	North West	N/A	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	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.068	Thermally Broken
External wall	E4: Jamb	Calculated by person with suitable expertise	0.018 (!)	Knauf
External wall	E7: Party floor between dwellings (in blocks of flats)	Calculated by person with suitable expertise	0.065	Knauf

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.048	Knauf
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.069	Knauf
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.09	Knauf
Party wall	P3: Intermediate floor between dwellings (in blocks of flats)	SAP table default	0 (!)	Default
External wall	E8: Balcony within a dwelling - wall insulation continuous	SAP table default	0.1	Default

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		3 m ³ /hm ² , Design value (!)		OK
Air permeability test certificate reference				

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	219.3%
Emitter type	Underfloor
Flow temperature	45°C
System type	Air source heat pump
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

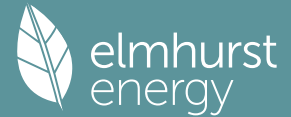
5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	150 litres
Declared heat loss	1.7 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

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

7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	1.5 W/(l/s)	
Specific fan power	0.73 W/(l/s)	OK
Minimum permitted heat recovery efficiency	73%	
Heat recovery efficiency	90%	OK
Manufacturer/Model	HRV1 Q Plus	
Commissioning		
9 Local generation		
Technology type: Photovoltaic system (1)		
Peak power	0.8 kWp	
Orientation	South	
Pitch	30°	
Overshading	None or very little	
Manufacturer		
MCS certificate		
10 Heat networks		
N/A		
11 Supporting documentary evidence		
N/A		
12 Declarations		
a. Assessor Declaration		
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.		
Signed:	Assessor ID:	
Name:	Date:	
b. Client Declaration		
N/A		

Summary for Input Data



Property Reference	Flat 7	Issued on Date	05/07/2023
Assessment Reference	00007	Prop Type Ref	Flat
Property	Flat 7, Luton, Bedfordshire, LU1 3HX		

SAP Rating	89 B	DER	2.77	TER	15.12
Environmental	98 A	% DER < TER			81.68
CO ₂ Emissions (t/year)	0.14	DFEE	30.50	TFEE	33.51
Compliance Check	See BREL	% DFEE < TFEE			8.99
% DPER < TPER	59.38	DPER	33.25	TPER	81.86

Assessor Details	Mr. Darren Coham	Assessor ID	R789-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Northwest	
Property Tenure	ND	
Transaction Type	6	
Terrain Type	Urban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	3	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m ² K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m ²	0.00 m
Ground floor:	24.35 m	55.23 m ²	2.70 m
1st Storey:	0.00 m	0.00 m ²	0.00 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	26.61	m ²
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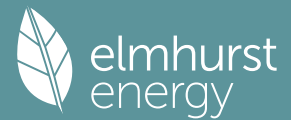
9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	44.42	35.78	0.00	None	8.64	Calculate Wall Area
	Sheltered Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	21.33	19.23	0.90	Stairwell Access Corridor 4	2.10	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	23.08	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	90.00

10.1 Party Ceilings	
---------------------	--

Summary for Input Data



Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	55.23

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	55.23

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Entrance Doors	Manufacturer	Solid Door			Air Filled	0.00	Wood	0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05		Air Filled	0.63	Wood	0.75	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
pd1	Windows	External Wall 1	North East	5.40	0
w1	Windows	External Wall 1	North East	3.24	0
ed1	Entrance Doors	Sheltered Wall	North West	2.10	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	4.62	0.07	0.07 Thermally Broken	Yes
E4 Jamb	Independently assessed	13.70	0.02	0.02 Knauf	Yes
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	48.70	0.07	0.07 Knauf	No
E16 Corner (normal)	Independently assessed	10.80	0.05	0.05 Knauf	No
E18 Party wall between dwellings	Independently assessed	5.40	0.07	0.07 Knauf	Yes
E17 Corner (inverted – internal area greater than external area)	Independently assessed	2.70	-0.09	-0.09 Knauf	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	17.10	0.00	0.00 Default	No
E8 Balcony within a dwelling, wall insulation continuous	Table K1 - Default	3.00	0.10	0.10 Default	No

Y-value W/m²K

Description

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Property Tested?

Test Method

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

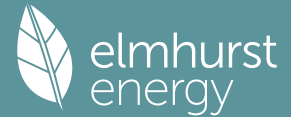
SFP from Installer Commissioning Certificate

MVHR System Location

Duct Installation Specification

20.0 Fans, Open Fireplaces, Flues

Summary for Input Data



21.0 Fixed Cooling System

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	6	480	10

24.0 Main Heating 1

SAP table

Percentage of Heat %

Database Ref. No.

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Delayed Start Stat

HETAS approved System

Oil Pump Inside

Fan Assisted Flue

Is MHS Pumped

Heating Pump Age

Heat Emitter

Underfloor Heating

Flow Temperature

Flow Temperature Value

Boiler Interlock

25.0 Main Heating 2

26.0 Heat Networks

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Summer Immersion

Cold Water Source

Bath Count

Supplementary Immersion

Immersion Only Heating Hot Water

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Cylinder Stat