ELMSTEAD ENERGY ASSESSMENTS AND BUILDING SERVICES

39 Oak Avenue

Ickenham

Energy and Sustainability Statement

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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 at 39 Oak Avenue, Ickenham.

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 Hillingdon Local Planning Policy.

Relevant Planning Policies

From inspection of the relevant policies for the proposed development we consider that the following target needs to be met in order to comply with Part L Building Regulations and Hillingdon Local Planning Polices.

- The new development should achieve a minimum of at least a 10% on-site carbon emission reduction beyond Part L 2013 of the Building Regulations. (As this assessment has been carried out under the latest Part L 2021 Building Regulations standard, which is approximately a 30% improvement over the Part L 2013 targets, it will only need to achieve a pass under the latest 2021 Building Regulations in order to also satisfy the planning requirement.)

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.

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 by following the Be Lean, Be Clean, Be Green Energy Hierarchy of the London Plan.

The results show that under the proposed design the carbon emissions would be 0.90 tonnes CO2, compared to 2.09 tonnes CO2 for the Baseline. This would be an overall improvement of 57% therefore comfortably satisfy the requirement of a minimum 10% reduction over Part L 2013 targets set by Policy DMEI 2 of the Hillingdon Local Plan.

The SAP Calculation sheet for the proposed design can be found within Appendix A.

Sustainability Measures

In collaboration with the Energy Assessment of the development, an analysis of the overheating within the dwelling has also been carried out following the cooling hierarchy of the London Plan.

The SAP calculation carried out for the proposed development shows that it has a 'Not Significant' chance of overheating, this is considered as a pass under the SAP 2012 methodology.

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 building.

The building, wherever possible, will use BRE Green Guide 'A' rated materials and manufacturers will be chosen that can demonstrate their products are sustainably sourced and manufactured.

The water usage will not exceed a maximum of 105 litres/person/day as required by Policy DMEI 10 of the Hillingdon Local Plan. Calculations to prove this can be carried out at later design stages once specific sanitaryware has been selected.

The extent of possible flooding on the site has also been analysed using data from the government flood warning information service. The flood map shows that the proposed development site is within Flood Zone 1.

The surface water flood map service states that the proposed site sits within an area of medium risk from surface water flooding. The final drainage design must reduce surface water run-off rates to no higher than the pre-development greenfield run-off rate in a 1:100 year storm scenario, plus an appropriate allowance for climate change.

The road noise map below shows that the site is located far away from high levels of road noise.

Conclusion

This energy and sustainability statement has shown that the proposed new dwelling located at 39 Oak Avenue, Ickenham would satisfy the energy and sustainability requirements of Building Regulations and Hillingdon Local Planning Policies.

2.0 Introduction

EEABS (Elmstead Energy Assessments & Building Services) were instructed to produce an Energy and Sustainability Statement for the proposed development at 39 Oak Avenue, Ickenham.

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 Hillingdon Local 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 L1 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).

2.1.3 The London Plan

The latest London Plan guidance on the preparation of Energy Assessments is from April 2020 and has been used to structure this energy statement.

As this development is not more than 10 units it is not considered as a major development and therefore the requirements of the London Plan should not strictly apply, however the guidance will still be followed, and every effort will be made to ensure the most energy efficient and carbon minimal design possible.

Policy SI 2 of the London Plan requires development proposals to make the fullest contribution to minimising carbon dioxide emissions through on site methods in accordance with the following energy hierarchy:

- Be lean: use less energy
- Be clean: supply energy efficiently
- Be green: use renewable energy

2.1.4 London Borough of Hillingdon

The London Borough of Hillingdon Local Plan Part 2 - Development Management Policies (Adopted Version January 2020) Policy DMEI 2 states that all developments are required to make the fullest contribution to minimising carbon dioxide emissions in accordance with the London Plan targets.

Following early discussions with the planners they have stated that the proposed dwelling would need to achieve an energy efficiency standard of 10% CO2 improvement over Building Regulations requirements Part L 2013 (TER Baseline), in accordance with Policy DMEI 2 of the Hillingdon Local Plan: Part 2 - Development Management Policies (2020) and Policy SI 2 of the London Plan (2021).

As this assessment has been carried out under the Part L 2021 Building Regulations standard, which is approximately a 30% improvement over the Part L 2013 targets, it will only need to achieve a pass under the latest 2021 Building Regulations in order to also satisfy the planning requirement.

3.0 Assessment Methodology

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

3.1 SAP 10.2

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.

3.2 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

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

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

Unit	Area (m2)	CO2 Emission Rate (kgCO2/m2)	Total CO2 Emissions (Tonnes of CO2)
39 Oak Avenue	260	3.36	0.87

The results show that the total Target CO2 emissions for the development is estimated to be 0.87 Tonnes of CO2 per annum.

4.2 Proposed Design

4.2.1 Passive Design Measures

Passive design measures 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 be highly efficient glazing and will have a low U-value of 1.2 $W/m^2.K$, 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 L1 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 the overall Thermal Bridging Y-Value will be 0.046. (Individual Psi values assumed for each of the junctions can be found within the SAP calculation sheet 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 $m^3/h.m^2$ that must be achieved, the proposed development will target a value of 5.0 $m^3/h.m^2$.

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 L1 requirements.

Table 2 - Summary Table of Passive Design Measures

Parameter	Part L1a Limiting Values	Development Proposal	% Improvement
U-Values			
Walls	0.26 $W/m^2.K$	0.16 $W/m^2.K$	38%
Floors	0.18 $W/m^2.K$	0.18 $W/m^2.K$	0%
Roofs	0.16 $W/m^2.K$	0.16 $W/m^2.K$	0%
Glazing	1.6 $W/m^2.K$	1.20 $W/m^2.K$	25%
Air Permeability	8 $m^3/h.m^2$	5.0 $m^3/h.m^2$	38%

The summary of passive measures shows that the proposed development will be a considerable improvement over the Part L1 limiting fabric parameters.

4.2.2 Energy Efficiency Measures

Energy efficiency measures are those which seek to supply to 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 heating and hot water is assumed to be provided by an Air Source Heat Pump with a seasonal efficiency of 250%. The hot water cylinder is 200 litres with a measured loss of 1.5 kWh/day.

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 is assumed to be natural through the use of opening windows, this reduces energy costs and carbon emissions associated with whole house mechanical ventilation systems. Wet rooms and kitchen areas will have local intermittent mechanical extract ventilation.

4.2.3 Renewable Technologies

No renewables have been assumed for this application, apart from the air source heat pump already discussed.

4.2.4 Proposed Design Results

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

Table 3 - Proposed Design Carbon Emission Results

Unit	Area (m2)	CO2 Emission Rate (kgCO2/m2)	Total CO2 Emissions (Tonnes of CO2)
39 Oak Avenue	260	3.36	0.87

The results show that under the proposed design the carbon emissions would be 0.87 tonnes CO2, compared to 2.63 tonnes CO2 for the Baseline. This would be an overall improvement of 67% therefore comfortably satisfy the requirement of a minimum 10% reduction over Part L 2013 targets set by Policy DMEI 2 of the Hillingdon Local Plan.

The SAP Calculation sheet for the proposed design can be found within Appendix A.

5.0 Sustainability

5.1 Overheating/Climate Change Adaptability

In collaboration with the Energy Assessment of the development, an analysis of the overheating within the building has also been carried out.

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 dwelling.

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 will be openable to allow for fresh air when required.

5. Mechanical Ventilation

A whole house Mechanical supply and extract ventilation system has not been proposed at this stage in order to keep energy consumption to as low as possible. One could be considered further into the detailed design stage if required.

The SAP calculation carried out for the proposed development shows that it has a 'Not Significant' chance of overheating, this is considered as a pass under the SAP 2012 methodology.

5.2 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 building.

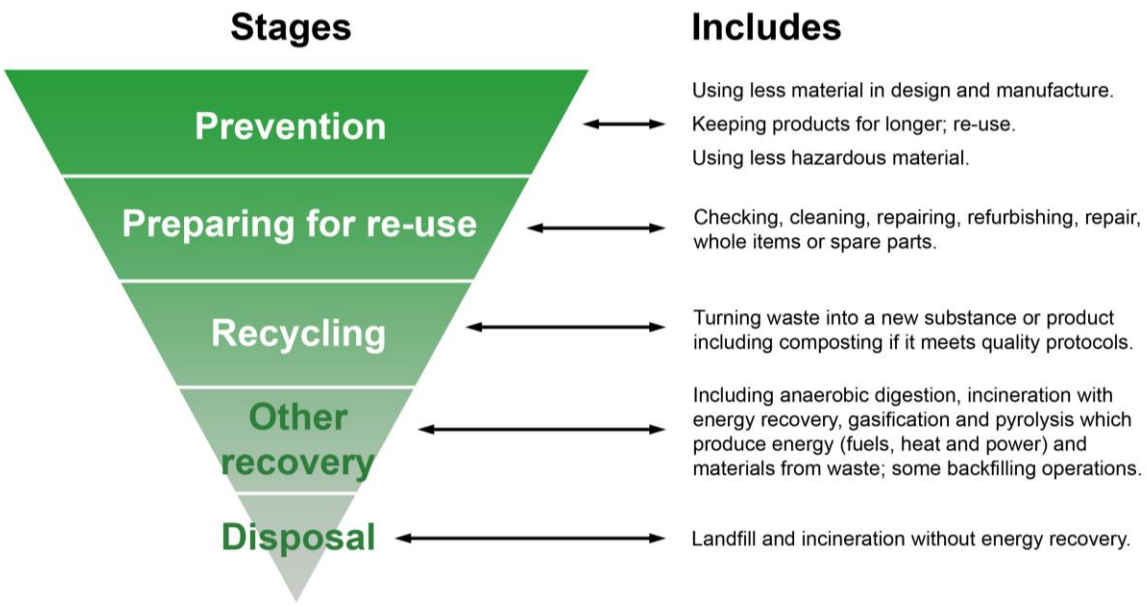

Figure 1 - Waste Hierarchy Diagram

5.3 Materials Use

As mentioned above 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 BRE Green Guide 'A' rated materials and manufacturers will be chosen that can demonstrate their products are sustainably sourced and manufactured.

5.4 Water Efficiency

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

The water usage for the dwelling will not exceed a maximum of 105 litres/person/day as required by Policy DMEI 10 of the Hillingdon Local Plan.

Calculations to prove this can be carried out at later design stages once specific sanitaryware has been selected.

5.5 Flood Risk

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

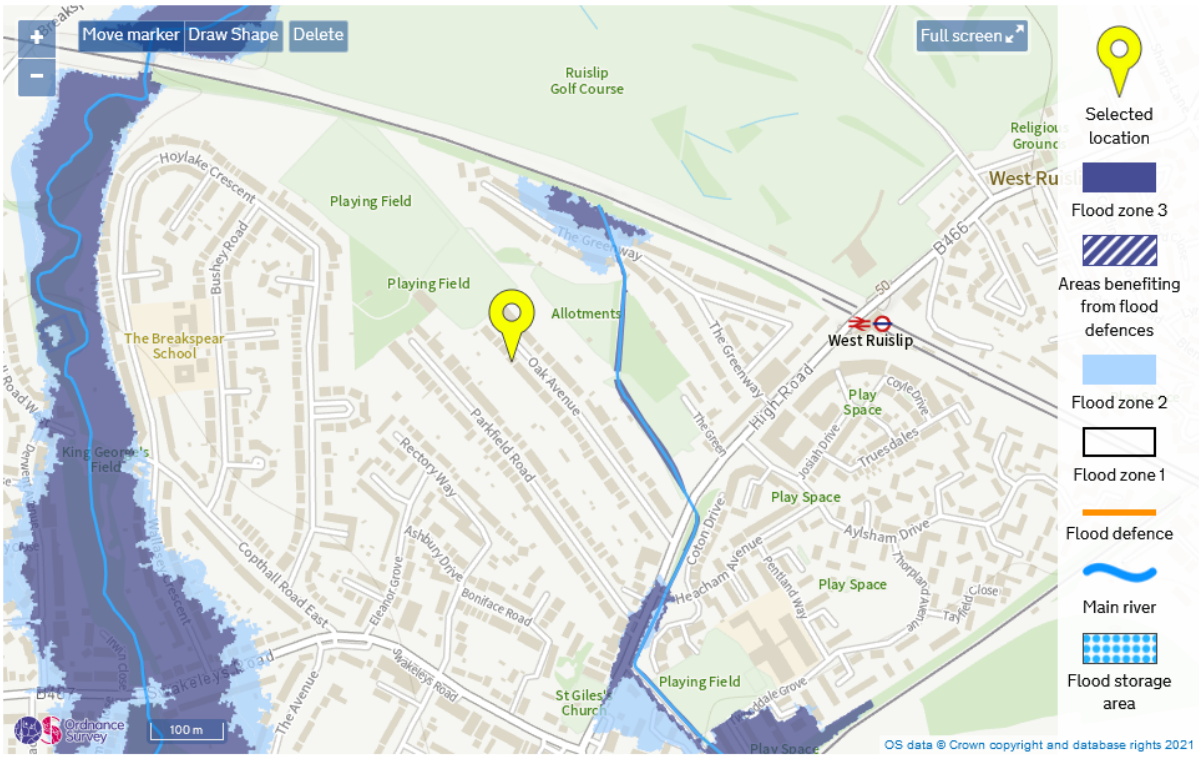

Figure 2 - Flood Risk Map for the Site

The flood map shows that the proposed development site is within Flood Zone 1.

Figure 3 - Surface Water Map for the Site

The surface water flood map service states that the proposed site sits within an area of medium risk from surface water flooding. The final drainage design must reduce surface water run-off rates to no higher than the pre-development greenfield run-off rate in a 1:100 year storm scenario, plus an appropriate allowance for climate change.

5.6 Noise

The road noise map below shows that the site is located far away from high levels of road noise.

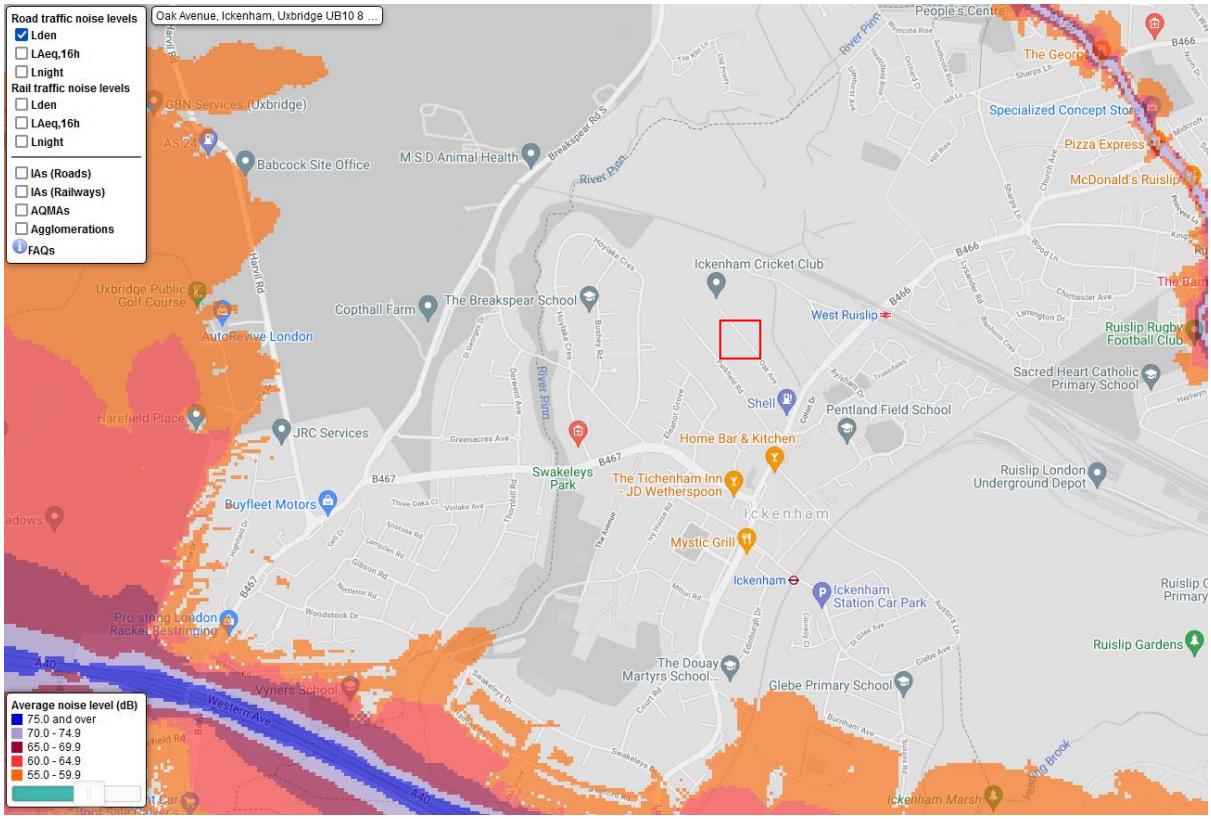

Figure 4 - Road Noise Map for the Site

Appendix A - SAP 10.2 Calculation Sheet

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Elmhurst Sap 10 SAP 10 program, 1.0

Date: Fri 15 Jul 2022 08:05:17

Project Information			
Assessed By	Darren Coham	Building Type	House, Detached
OCDEA Registration	EES/022007	Assessment Date	2022-07-15

Dwelling Details			
Assessment Type	As designed	Total Floor Area	260 m^2
Site Reference	000254	Plot Reference	001
Address	39 Oak Avenue, UXBRIDGE, UB10 8LR		

Client Details	
Name	Amol
Company	-
Address	39, Oak Avenue, Uxbridge, UB10 8LR

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Electricity	
Target carbon dioxide emission rate	*10.12 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	3.36 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*50.06 kWh_{PE}/m^2*	
Dwelling primary energy	34.83 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*42.3 kWh/m^2*	
Dwelling fabric energy efficiency	40.5 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.16	Walls (1) (0.16)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	0.18	Heat Loss Floor 1 (0.18)	OK
Roofs	*0.16*	0.16	Roof (1) (0.16)	OK
Windows, doors, and roof windows	*1.6*	1.2	se - rl (1.4)	OK
Rooflights	*2.2*	1.4	se - rl, South East (1.4)	OK

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Walls (1)	173.3738	0.16
Exposed wall: Walls (2)	5.4	0.16
Ground floor: Heat Loss Floor 1, Heat Loss Floor 1	129.67	0.18
Exposed roof: Roof (1)	53.8	0.16
Exposed roof: Roof (2)	28.84	0.16
Exposed roof: Roof (3)	16.21	0.16
Exposed roof: Roof (4)	7.7	0.16

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
NE - Bay windows, Windows	4.215	North East	0.8	1.2
NE - Bay windows, Windows	4.215	North East	0.8	1.2
Entrance Door, Solid Door	2.3	North East	N/A	1 **(!)**
ED - Windows, Windows	1.125	North East	0.8	1.2
ED - Windows, Windows	1.125	North East	0.8	1.2
FF - Bay Window, Windows	5.04	North East	0.8	1.2
FF - Bay Window, Windows	5.04	North East	0.8	1.2
Front Glazing, Windows	3.36	North East	0.8	1.2
sw - window, Windows	4.2292	South West	0.8	1.2
sw - window, Windows	4.2292	South West	0.8	1.2

Name	Area [m^2]	Orientation	Frame factor	U-Value [W/m^2K]
SW - Doors, Windows	4.6968	South West	0.8	1.2
SW - Doors, Windows	4.6968	South West	0.8	1.2
sw - ff windows, Windows	3.78	South West	0.8	1.2
sw - ff door, Windows	3.45	South West	0.8	1.2
sw - ff door windows, Windows	1.62	South West	0.8	1.2
sw - ff door windows, Windows	1.62	South West	0.8	1.2
sw - dorma, Windows	1.2	South West	0.8	1.2
sw - dorma, Windows	1.2	South West	0.8	1.2
nw - w1, Windows	1.26	North West	0.8	1.2
nw - w2, Windows	1.89	North West	0.8	1.2
nw - w2, Windows	1.89	North West	0.8	1.2
nw - w3, Windows	1.3365	North West	0.8	1.2
se - w1, Windows	1.4	South East	0.8	1.2
se - w2, Windows	1.1	South East	0.8	1.2
se - d1, Windows	3.8577	South East	0.8	1.2
se - rl, Roof Lights	0.81	South East	0.7	1.4
se - rl, Roof Lights	0.81	South East	0.7	1.4
nw - rl, Roof Lights	0.81	North West	0.7	1.4
nw - rl, Roof Lights	0.81	North West	0.7	1.4
roof lanterns, Roof Lanterns	3.45	South West	0.7	1.2
roof lanterns, Roof Lanterns	3.45	South West	0.7	1.2
RL, Roof Lights	0.81	South	0.7	1.4

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

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

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Government-approved scheme	0.058	e2
External wall	E3: Sill	Government-approved scheme	0.032 **(!)**	e3
External wall	E4: Jamb	Government-approved scheme	0.035 **(!)**	e4
External wall	E5: Ground floor (normal)	Government-approved scheme	0.122	e5
External wall	E6: Intermediate floor within a dwelling	Government-approved scheme	0.002 **(!)**	e6
External wall	E16: Corner (normal)	Government-approved scheme	0.047	e16
Roof	R1: Head of roof window	Government-approved scheme	0.08	r1
Roof	R2: Sill of roof window	Government-approved scheme	0.06	r2
Roof	R3: Jamb of roof window	Government-approved scheme	0.08	r3
External wall	E11: Eaves (insulation at rafter level)	Government-approved scheme	0.04	e11
External wall	E10: Eaves (insulation at ceiling level)	Government-approved scheme	0.06	e10
External wall	E14: Flat roof	Government-approved scheme	0.08	E14
External wall	E17: Corner (inverted - internal area greater than external area)	Government-approved scheme	-0.09	E17
Roof	R7: Flat ceiling (inverted)	Government-approved scheme	0.04	r7
Roof	R8: Roof to wall (rafter)	Government-approved scheme	0.06	R8
Roof	R9: Roof to wall (flat ceiling)	Government-approved scheme	0.04	R9
Roof	R6: Flat ceiling	Government-approved scheme	0.06	r6

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	5 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	249.9%
Emitter type	Radiators
Flow temperature	35°C
System type	Air source heat pump
Manufacturer	
Model	
Commissioning	

Secondary heating system: N/A	
Fuel	N/A
Efficiency	0.0%
Commissioning	

5 Hot water		
Cylinder/store - type: Cylinder		
Capacity	200 litres	
Declared heat loss	1.5 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: Programmer and at least two room thermostats		
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: N/A		
Maximum permitted specific fan power	*N/A*	
Specific fan power	N/A	**N/A**
Minimum permitted heat recovery efficiency	*N/A*	
Heat recovery efficiency	N/A	**N/A**
Manufacturer/Model		
Commissioning		

9 Local generation
N/A

10 Heat networks
N/A

11 Supporting documentary evidence
N/A

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

b. Client Declaration
N/A