

LONDON SQUARE DEVELOPMENTS LTD

FORMER GREGGS BAKERY SITE TWICKENHAM TW2 6RT

Energy Strategy and LZC Report Residential-Led Scheme

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EXECUTIVE SUMMARY

Development Description

The project comprises demolition of existing buildings (with retention of a single dwelling) and redevelopment of the site to provide up to 116 residential units and 175 sqm commercial floorspace (Use Class E) with associated hard and soft landscaping, car parking and highways works and other associated works.

This report outlines the proposed measures for achieving the planning policy requirements set by the local authority for reducing energy consumption and employing Low Zero Carbon (LZC) energy sources to meet the following targets:

- To meet guidance wherever possible as defined in the GLA Energy Assessment Guidance dated June 2022.
- To meet London Plan 2021 targets with respect to CO₂ emissions and other energy targets and methods.
- To minimise and eradicated overheating in dwellings in line with CIBSE standards.
- \circ $\;$ To consider LZC technologies to reduce energy consumption.
- To consider overheating in dwellings in line with GLA methodology for overheating risk analysis.
- Non-residential spaces To achieve the mandatory number of ENE04 credits for an 'Excellent' BREEAM rating.

Current research into local heat networks within the Twickenham area, shows that no existing heat networks are within the vicinity of the site and there currently no proposals for any heat networks in consideration within the local area.

Planning stage analysis indicates that the installation LZC air source heat pumps and roof mounted photovoltaic cells in conjunction with high levels of insulation, good air tightness and good artificial lighting performance enables the project to meet the targets identified.

The application of general energy efficiency measures prior to consideration of LZC energy sources is crucial to meeting the above targets, as it has a multiple effect of reducing running costs, reducing baseline CO₂ emissions and reducing the absolute size of any renewable technologies / financial levies to be applied.

The proposed approach concurs with the GLA Energy Hierarchy:

- **be lean**: use less energy and manage demand during operation through fabric and servicing improvements and the incorporation of flexibility measures
- **be clean**: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly by connecting to district heating networks
- **be green**: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site
- **be seen**: monitor, verify and report on energy performance through the Mayor's post construction monitoring platform.

In line with the above philosophy, the application of low energy lighting and passive improvements to building fabric are proposed.

For residential elements the baseline Carbon Dioxide emissions and LZC energy contribution, on which the %¹ reduction is based, have been calculated using approved SAP 10 software which represents the latest calculation tool as required under The Building Regulations Part L1A 2021.

For non-residential elements (175 sq.m GIA commercial office floorspace) the baseline Carbon Dioxide emissions and LZC energy contribution, on which the % reduction is based, have been calculated using approved DSM Level 5 IESVE 2022 software which represents the latest calculation tool as required under The Building Regulations Part L2A 2021. This software is also used for overheating analysis.

¹ The GLA calls for carbon reductions the equivalent of 10% (residential) & 15% (non-residential) over the Part L 2021 building regulations using passive measures only and 35% using renewable technologies as a minimum. 100% savings on residential dwellings are targeted.

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Analysis shows that that the development will meet Building Regulations compliance through energy efficient measures alone and then further reductions are achieved through use of air source heat pumps and PV's to beat the 35% improvement target.

Overall the site emissions provide a 78% improvement on combined building regulations L1 & L2 target emissions (for both residential and non-residential buildings).

Further reductions in line with GLA requirements for zero carbon homes will be met by way of cash in lieu payment due to limitations at roof level for the placement of additional photovoltaic cells or other renewable technologies.

Summary of Potential Proposals

Apartments

Heating/Cooling system:	Zeroth district heating network
Domestic Hot Water:	Zeroth district heating network and immersion heater 'boost' facility
Ventilation:	MVHR mechanical supply and extract ventilation with heat recovery.
Passive measures:	Enhanced U-Values to all new build elements
Air tightness:	APR = 3 m ³ / m ² ·h @ 50pa
Lighting:	High efficiency LED and compact fluorescent lighting throughout.
On site LZC technology:	Air Source heat pumps

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Townhouses

Heating/Cooling system:	Air source heat pump
Domestic Hot Water:	Air source heat pump and immersion heater 'boost' facility
Ventilation:	MVHR mechanical supply and extract ventilation with heat recovery.
Passive measures:	Enhanced U-Values to all new build elements
Air tightness:	APR = 3 m ³ / m ² ·h @ 50pa
Lighting:	High efficiency LED and compact fluorescent lighting throughout.
On site LZC technology:	Air Source Heat Pumps & Photovoltaics

Commercial office building

Heating and cooling system	: Variable refrigerant flow (VRF) Air conditioning
Domestic Hot Water:	Electric point of use hot water heaters
Ventilation:	Mechanical ventilation with heat recovery
Insulation:	Enhanced U-Values to all elements.
Air tightness:	APR = 3.0m3 / m ² ·h @ 50pa.
Lighting:	High efficiency lamps throughout.
On site LZC technology:	Air source heat pumps and Photovoltaics

Summary of Emissions

Standard Assessment procedure (SAP) 10 has been used to demonstrate compliance with Building regulations approved document Part L 2021 and the GLA's current planning policy targets.

Residential – SAP10

Air Source heat pumps and Photovoltaics (PV)

To achieve a minimum 35% reduction over the Target Emission Rate (TER) with enhanced fabric U-Values and infiltration rate, using the SAP 10 Performance method, the residential apartments (blocks A, F & E) will be served by a centralised air source heat pump and condenser water loop connected to individual heat pumps within each apartment providing space heating, hot water generation and tempered cooling. The residential townhouses will be served by standalone air source heat pump systems, to provide space heating and hot water generation.

PV's will be installed on each of the townhouses (blocks C, D & G). The PV panels will be sized and the quantity selected to contribute to the site wide reduction in carbon dioxide emissions. The PV's will be sized to achieve a peak output of approximately $39kW_e$. The impact on energy savings are highlighted in the table below.

	Carbon dioxide emissions (Tonnes CO2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	103.9	42.9
After energy demand reduction (Be Lean)	82.9	42.9
After application heat network (Be Clean)	82.9	42.9
After renewable energy (Be Green)	23.1	42.9

Residential – SAP10

Table 1b - Carbon Dioxide Emissions after each stage of the Energy Hierarchy (Residential)

	Regulated carbon dioxide savings			
	(Tonnes CO₂ per annum)	(%)		
Be lean: savings from energy demand reductions	21	20%		
Be clean: saving from heat network	0	0%		
Be green: saving from renewable energy	59.8	58%		
Cumulative on site savings	80.9	78%		
Annual savings from offset payment	23.1	_		
Tonnes of CO ₂				
Cumulative savings for offset payments	692			
Cash in-lieu contributions (£)	65,728.00			

Table 2b - Regulated carbon dioxide savings from each stage of the Energy Hierarchy (Residential) Carbon price is based on GLA recommended price of £95 per tonne of Carbon Dioxide

Final dwelling emissions rate incorporates energy efficiency, efficient supply of energy and renewable energy technologies. The following SAP analysis demonstrates RIBA stage 2 status and shall not be the final proposal due to design, build ability and cost considerations.

Resistance electric heating and PV's

Resistance electric heating and PV panels are under consideration to be incorporated into the residential energy strategy and further SAP analysis calculations will be carried out to check the viability in the next stages of design development.

Non-Domestic – SAP10

Commercial Office

To achieve a minimum 35% reduction over the TER with enhanced fabric U-Values and infiltration rate, using approved SAP 10 software, the commercial office will be served by a variable refrigerant flow (VRF) system, providing simultaneous space heating and cooling, with mechanical ventilation with heat recovery to provide the fresh air requirements to the building. Hot water will be generated through electric point of use water heaters. LED lighting will be installed throughout the building. PV panels will be sized and the quantity selected to contribute to the site wide reduction in carbon dioxide emissions. The PV's will be sized to achieve a peak output of approximately 1.0kWe. The impact on energy savings are highlighted in the table below.

Non-Domestic – SAP10

	Carbon dioxide emissions (Tonnes CO2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	0.6	8.5
After energy demand reduction (Be Lean)	0.3	8.5
After heat network (Be Clean)	0.3	8.5
After renewable energy (Be Green)	0.3	8.5

Table 3b - Carbon Dioxide Emissions after each stage of the Energy Hierarchy (Non-domestic)

	Regulated carbon dioxide savings			
	(Tonnes CO₂ per annum)	(%)		
Be lean: savings from energy demand reductions	0.3	46%		
Be clean: saving from heat network	0.0	0%		
Be green: saving from renewable energy	0.0	0%		
Cumulative on site savings	0.3	46%		
Annual savings from offset payment	0.3	-		
Tonnes of CO ₂				
Cumulative savings for offset payments	9	-		
Cash in-lieu contributions (£)	861.00			

Table 4b - Regulated carbon dioxide savings from each stage of the Energy Hierarchy (Nondomestic) Carbon price is based on GLA recommended price of £95 per tonne of Carbon Dioxide

Site Wide Emissions - SAP10

	Total regulated emissions (Tonnes CO ₂ per annum)	CO2 Savings (Tonnes CO2 per annum)	Percentage Savings (%)
Baseline: Part L 2021	104.5	-	-
Be Lean	83.2	21.3	20%
Be Clean	83.2	0.0	0%
Be Green	23.4	59.8	57%
Total Cumulative Savings	-	81.1	78%
	-	CO ₂ Savings off- set (tonnes CO ₂₎	
Off-set	-	700.9	-

Table 5b - Totalised Regulated carbon dioxide savings from each stage of the Energy Hierarchy (Site Wide)

Ref: 1823-50-RPT-05

	Target Fabric Energy Efficiency (kWh/m²)	Dwelling Fabric Energy Efficiency (kWh/m²)	Improvement (%)
Development Total	51.54	25.35	51%

Table 6b - Totalised Fabric energy efficiency (Site Wide)

Introduction

This report provides preliminary proposals for complying with the planning policy set by London Borough of Richmond, London Plan 2021 and the planning requirement for reducing energy consumption below the basic statutory requirement laid down in the Building Regulations Part L1A & L2A 2021.

It is very important for energy efficiency as well as renewable energy to be considered for the development. Buildings that use less energy will therefore need to use a smaller amount of renewable energy to supply the expected proportion of the building's needs.

The reduction in carbon dioxide emissions is quantified as a proportion of baseline carbon emissions for the development (TER). Such reductions take into account energy efficient techniques and technologies such improved insulation, energy efficient lighting etc, before the inclusion of LZC technologies.

All calculations are based on limited planning stage information, for strategy purposes and as such are approximate.

Each LZC technology has been given an evaluation with regard to application to the new development.

Relevant Planning Policy and targets

London Plan 2021

- A. Major development should be net zero-carbon. This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy:
 - 1) be lean: use less energy and manage demand during operation
 - 2) be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly
 - 3) be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site
 - 4) be seen: monitor, verify and report on energy performance.
- B. Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.
- C. A minimum on-site reduction of at least 35 per cent beyond Building Regulations 2013 is required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either:
 - 1) through a cash in lieu contribution to the borough's carbon offset fund, or
 - 2) off-site provided that an alternative proposal is identified and delivery is certain.
- D. Boroughs must establish and administer a carbon offset fund. Offset fund payments must be ring-fenced to implement projects that deliver carbon reductions. The operation of offset funds should be monitored and reported on annually.
- E. Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.
- **F.** Development proposals referable to the Mayor should calculate whole lifecycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions

London Plan Policy S1 2 (2021)

London Borough of Richmond have confirmed the cash offsetting payment as follows:

A nationally recognised non-traded price of £95/tonne has been tested as part of the viability assessment for the London Plan which boroughs may use to collect offset payments.

London Borough of Richmond

Climate Change Adaption

- A. The Council will promote and encourage development to be fully resilient to the future impacts of climate change in order to minimise vulnerability of people and property.
- B. New development, in their layout, design, construction, materials, landscaping and operation, should minimise the effects of overheating as well as minimise energy consumption in accordance with the following cooling hierarchy:
 - 1) minimise internal heat generation through energy efficient design
 - 2) reduce the amount of heat entering a building in summer through shading, reducing solar reflectance, fenestration, insulation and green roofs and walls
 - 3) manage the heat within the building through exposed internal thermal mass and high ceilings
 - 4) passive ventilation
 - 5) mechanical ventilation
 - 6) active cooling systems (ensuring they are the lowest carbon options).
- C. Opportunities to adapt existing buildings, places and spaces to the likely effects of climate change should be maximised and will be supported.

Policy LP 20

Tackling the climate emergency (Strategic Policy)

- A. Climate change is now the greatest challenge facing our society. The Council will promote zero carbon development, with the aim that all buildings and infrastructure projects in the borough will be net-zero carbon by 2050. This will require substantial reductions in greenhouse gas emissions and will also reduce fuel poverty and improve long term energy security for Richmond's residents and businesses. Development must not exacerbate climate change. Development should increase local resilience to current and future impacts of climate changes, especially for the most vulnerable people and property.
- B. This will be achieved by requiring all development to:
 - 1) reduce greenhouse gas emissions in accordance with the London Plan's Energy Hierarchy and support the transition to a low carbon society by maximising energy efficiency, zero and low carbon heat and local renewable energy generation;
 - 2) follow the principles of the circular economy and support effective resources use to ensure that they are kept in use for as long as possible and thereby minimise waste;
 - 3) reuse and refurbishment in preference to demolition and new construction;
 - 4) demonstrate that they are well designed, fully adaptable and resilient to the impacts of a changing climate;
 - 5) adapt to the changing climate by minimising the effects of overheating, mitigating the urban heat island effect, managing flooding, and minimising energy consumption in accordance with the London Plan's Cooling Hierarchy;
 - 6) enhance and improve the borough's green and blue infrastructure to ensure it delivers multifunctional benefits, such as enhancing micro-climates and natural carbon sinks as well as improving air quality;

- 7) adopt an integrated approach to water management which considers flood risk, sustainable drainage, water efficiency, water quality and biodiversity;
- 8) reduce water demand and meet best practice water efficiency targets;
- 9) adopt a circular economy approach and minimise embodied carbon;
- 10) ensure that the principles of active and sustainable modes of travel are adopted;
- 11) promote retrofitting of existing buildings, through low-carbon measures;
- **12)** promote healthy, sustainable and low carbon lifestyles in line with the Council's Climate Emergency Strategy.
- C. To ensure that Richmond is on the right trajectory to achieve its net-zero carbon target, responding to climate change, including sustainable design and construction, must be considered holistically from the start of the design process. Therefore, all development proposals are required to demonstrate how they will comply with all relevant policies on climate change and sustainable design during design, construction and operation of the development.
- D. The Council will work with partners and local communities to improve the energy efficiency of the existing building stock and wider public realm, with a particular focus on increasing energy efficiency of homes and businesses, especially improved insulation in lofts, walls and floors. The Council's Carbon Offset Fund will be used to implement projects to reduce carbon emissions across the borough.

Pre-Publication Draft Local Plan Regulation 18 (January 2022)

BASELINE EMISSIONS ASSESSMENT

Dwellings - Regulated Energy

Sample calculations with respect to the energy consumption and carbon emissions relating to the dwellings have been carried out using the Elmhurst Design SAP 10 computer software, which has been tested by the BRE and is approved by the DCLG.

The primary data input to the calculations is given in the appendices.

All SAP calculations are based on the following architect's drawings and Accommodation Schedule.

Architect	Drawing/Document	Description	Revision	Date
Assael	A2871 200-R16 A2871 201-R16 A2871 202-R16 A2871 203-R15 A2871 204-R16 A2871 205-R16	Site Plans – Ground to Roof	-	01/02/19
Assael	A2871 401-R2 A2871 402-R2 A2871 601-R4 A2871 602-R4 A2871 603-R4 A2871 603-R4 A2871 605-R4 A2871 605-R4 A2871 607-R4 A2871 607-R4 A2871 609-R4 A2871 610-R1 A2871 610-R1 A2871 612-R3 A2871 612-R3 A2871 612-R3 A2871 615-R3 A2871 615-R3 A2871 616-R3 A2871 617-R3 A2871 620-R1 A2871 620-R1 A2871 621-R1 A2871 630-R2 A2871 631-R2	Site Elevations, Apartment layouts, sections and elevations. House type layouts, sections and elevations.	-	21/02/19
Assael	A2871 205-R24	Revised PV Allocation to Residential Townhouses	-	16/06/2020

PASSIVE Energy Reductions (Hierarchy Level 1 – Be Lean)

The ethos of this project is to ensure that passive measures are adopted prior to the application of high efficiency or renewable technologies wherever feasible. This approach is in accordance with the London Plan (2021). The measures that have been included in the baseline emissions model are summarised below. All measures are quantified within the BER and DER/BER figures:

- Thermal Insulation;
- Air tightness;
- Maximised daylighting;
- Passive solar gain.

Building Fabric

The investment in thermal insulation to heated spaces will result in an improvement in heat losses and hence reduction in annual heating fuel consumption. All windows are based on aluminium frames.

Minimum Building constructions required to meet Building Regulations Part L 2021:

Building Element	U-Value
External Wall	0.26 W/m ² K
Roof	0.16 W/m ² K
Ground Floor	0.18 W/m ² K
Windows	1.6 W/m ² K

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Proposed improved Building Constructions to exceed Building Regulations Part L 2021:

Building Element	U-Value
External Wall	0.15 W/m²K
Roof	0.15 W/m²K
Ground Floor	0.12 W/m ² K
Windows	1.3 W/m ² K G-value 0.4

All party walls are taken as U-value = 0 which requires a fully filled and sealed wall with no cavities. **It is important that the architect's details reflect this.**

The U-Values proposed above are indicative and are subject to change, due to the limited information available when carrying out the SAP calculations and preparing this report.

Infiltration and air tightness

To achieve the required result the buildings should be designed to achieve an air permeability of $3 \text{ m}^3/\text{h/m}^2$ at 50Pa.

Efficient Energy Delivery (Hierarchy Level 2 – Be Clean)

Existing District Heating

According to the London Heat Map, unfortunately there are no existing local district heat networks in operation, therefore there is no current opportunity to connect the site to a district heat network. The map is highlighted in appendix A.

Site based District Heating

The London Plan and London Borough of Richmond strongly encourage district heating. The scale of the development permits a district heating strategy to be considered. Although serving the townhouses and commercial unit from a central plant location at the north end of the site, within the central apartment block building, the pipework lengths required to serve all the townhouses and commercial unit will be extensive and will lead to high heat loses. Therefore, the proposal is to only serve the apartment blocks with a centralised heating system.

The centralised plant will be made up of air source heat pumps, a dry cooler and a circulated condenser water loop distributed to all the apartments.

Key elements of centralised heating system:

- 2No. 240kW Air Source heat pumps,
- \circ 1No. dry air cooler;
- 3m3 Buffer vessel;
- Heating Pressurisation Unit and Expansion Vessel;
- Low Loss Header;
- Circulating Pumps;
- Reverse cycle heat pump units in each dwelling with hot water cylinder;
- Control Panels;
- Chemical Dosing Pot;
- \circ $\;$ Louvres for Natural Ventilation to the Plantroom;
- Ancillary plant;
- Allocation for one set of double doors and separate escape door;
- Capped off connections for future external district heat distribution networks.

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The on-site energy centre will be designed to circulate condenser water from the air source heat pumps and or dry air coolers to the apartments. The external plant will operate to maintain the condenser water at temperatures between 15°C - 25°C to serve as a heat sink for the reverse cycle heat pumps in the residential apartments. The centralised air source heat pump will operate when the external ambient temperature is below 15°C or above 25°C, the dry cooler will operate during the mid-band external ambient temperatures.

The tenants will utilise energy from the condenser water via the reverse cycle heat pumps installed in each apartment, energy usage will sub metered at the interface point.

It is envisaged that the landlord or an external metering and billing Company will be responsible for all metering and revenue collection.

From initial plant sizing and planning, the external plant will require a space allocation at roof level of approximately 14mL x 4.5mW x 3.0mH, which has been allowed for on block F. The internal plant area housing the circulation pumps, buffer vessel, pressurisation unit, dosing plant, controls and connections to future district heating networks will be located at ground floor level of the central apartment block.

The mains condenser water pipe work connecting the central heat generation plant to each apartment would be owned and operated by the residential landlord / managing agent.



Figure 1 - Flat District Heating Philosophy

Ref: 1823-50-RPT-05 Date: 5th May 2023

Apartment Internals

The heating system within each apartment will be ostensibly the same as a conventional system. The only obvious difference will be the way in which heat energy is delivered into the apartment. In a conventional system a gas fired boiler generates the heat that is delivered to the radiators and taps through low temperature hot water (LTHW) and domestic hot water (DHW) respectively. Metered gas is piped to the apartment. In the proposed system the boiler is replaced with an electric reverse cycle heat pump, which takes the heat out of the condenser water loop, which is maintained between 15°C and 25°C by the central plant, and further increases the temperature of the water up to 60°C and delivers it to the radiators and taps, via the hot water cylinder. No gas supply is required. Within each apartment the heat pump and hot water cylinder are installed within an internal cupboard.



Figure 2 – A heat pump and hot water cylinder within an apartment utility cupboard

Overheating Issues

There is a general consensus that site wide district heating can cause problems with overheating and thus energy inefficiencies across the development. Utilising lower water temperatures as proposed for the condenser water loop. The risk of overheating in corridors, caused by heat loss from distribution pipework is eliminated and energy inefficiencies across the development are minimised. The heat pump also has the facility to provide tempered cooling in the dwellings via fan assisted radiators to minimise the risk of overheating.

Billing Arrangements

The energy usage by each apartment is monitored by means of a heat meter which may be installed within the heat pump unit or within a meter cupboard located within the common area. This heat meter can be read directly by the managing agent or can be read remotely through either a connection to a data cable network system wired to a central monitoring point or by means of a wireless transmitter (Bluetooth). With the Bluetooth transmitter the meter can be read from outside the apartment by someone with a hand held receiver loaded with dedicated secure monitoring software. The overall cost of providing the heat is then apportioned to the occupiers by the managing agent based upon the heat meter readings.

Centralised Air Sourced heat pumps & individual revers cycle heat pumps.			
Advantages	Disadvantages		
Carbon savings are still good with current carbon emission factors for electricity.	Higher site wide electrical consumption could lead to additional substations and infrastructure reinforcement costs.		
Carbon savings are predicted to increase when revised carbon factors are incorporated.	More roof space required (if ASHPs are utilised to maintain the condenser loop temperatures).		
Renewable Heat Incentive available.	Landlord ASHP Plant can be noisy.		
Low impact on air quality.	Large Utility Cupboards		
Electricity generated on site.	Increased Maintenance requirements.		
Predicted reduction in Landlord's plantroom requirements.	Lower life expectancy for Heat Pumps (10/15 years)		
Capital Costs predicted to be lower	Auto de-frost function takes units off line for periods.		
Limited distribution losses and negligible risk of overheating in corridors.	Controls need to be carefully considered as the Zeroth unit cannot offer simultaneous heating / cooling / DHW recharge.		
Main energy billing to be electricity, therefore tenant can change provider.	Condenser Water pipework is predicted to be larger than district heating pipework due to the lower ΔT and diversity.		
Less metering requirements.	Noise from the unit is currently an unknown. May need a higher spec of doors etc.		
Immersion heater will act as a back-up for domestic hot water if the main plant fails.	Radiators would be oversized due to lower water temperatures.		
2no. District Condenser Water pipes required rather than the 4no. pipes for options 2A and 2B.			

Table 2 - Advantages and Disadvantages of Air Source heat pumps combined with individual heat pumps.

Individual air source heat pump systems - Town houses

Air source heat pumps are proposed to be installed to each of the townhouses to provide both heating and tempered cooling, and hot water generation. The indoor unit will connect to fan assisted radiators, which provide sufficient output to offset the heat loses, with lower operating temperatures than traditional radiators. Air source heat pump systems operate most efficiently when coupled with low temperature heating systems. Therefore to maximise coefficients of performance such systems are typically adopted.

Each system can be stand alone and therefore all financial benefits associated with the system efficiencies will be passed on to the building occupier.

Such a system would typically comprise:

- An external air cooled condenser
- A Wall hung or floor mounted unit (internally mounted), commonly called a hydrobox.
- Refrigerant pipework connecting the condenser and hydrobox
- Hot water cylinder fed from the hydrobox, using LTHW pipework, typically installed in copper.
- Fan assisted radiators.
- Local control via a central time clock, and adjustable thermostats in each room.

The outdoor condenser unit shall be installed within an acoustic enclosure, on a raised flat concrete base, to allow condense water to drain away.



Fan assisted radiator



Condenser in an acoustic enclosure

The exact location and size of the ASHP outdoor units is subject to final unit selection and manufacturer however the rear gardens have been identified as the most suitable location.

Lighting and Metering

In the apartment blocks, lighting within the communal areas will be by means of wall and ceiling mounted compact fluorescent luminaires located within the stair cores and surface and recessed compact fluorescent luminaries within the corridors and foyer. The lighting levels will be designed to the Society of Light and Lighting (SLL) code for lighting. Automatic lighting control will be provided to minimise energy consumption.

System lighting to the all dwellings will be provided by means of a mixture of low energy down lights, low energy ceiling roses and low energy down lights, such that 100% of lighting shall be by low energy fittings.

Each apartment will have individual electricity metering from an appointed meter shipper which will be sited in the main riser cupboards at each block/floor level or in house meter cupboards. The Landlords areas will be separately metered and the cost of the energy used apportioned across the block by service charge.

The townhouses will be individually served with new supplies terminated near to the front elevation of each house, where electricity meter will be installed in line with the local DNO's requirements.

Mechanical Ventilation with Heat Recovery (MVHR)

All houses and apartments shall have a mechanical ventilation system with heat recovery captures heat energy from the outgoing air extracted from kitchens and bathrooms within the homes and warms the fresh air being blown into the home. Heat recovery on the background ventilation further reduces heat loss complementing the improvements in the building fabric. The heat exchanger shall be bypassed during the summer months to ensure that the general background ventilation provided through the MVHR assists in cooling the homes.

Heating and Cooling – Shell and Core Commercial Space

The shell and core commercial space will be provided with capped off incoming services. If cooling is required it is anticipated that this would be dealt with by heat pump technology. This will be provided by a packaged VRF cooling system. Such systems are electrically driven and utilise very good coefficient of performance to minimise running costs and CO2 emissions. The size and nature of the commercial units are well suited to this type of system and it is anticipated that proposed tenants would expect to install such a system as part of their fit out if required. Based on low density occupation and mechanical ventilation the provision of refrigerant based cooling is not anticipated unless fit out activities cause heat gains to necessitate such cooling.

Summary

The energy efficient measures that have been included in the baseline emissions model are summarised below.

- Centralised air source heat pumps combined with reverse cycle heat pumps in each of the apartments;
- \circ $\;$ Individual air source heat pumps serving the townhouses
- High efficiency mechanical ventilation with heat recovery;
- High efficiency lighting;
- Sub-metering to mechanical plant;
- Time-clock and temperature zone control of heating;
- Weather compensated control of heating.

The key efficiency data proposed is:

	Residential
Lighting	High efficiency
Heating seasonal efficiency	0.96
Cooling seasonal efficiency	N/A
Ventilation SFP	0.4
Ventilation heat recovery	91%
HWS efficiency	97% of LTHW

LZC Energy Feasibility (Hierarchy Level 3 - Be Green)

LZC Energy Type	Application	Feasibility
Wind Turbine Power	Roof mounted small scale wind turbines for domestic and non domestic buildings. Wind speeds of 7m/s or above required for large scale therefore high level mounting only option.	Visual electromagnetic and environmental noise impact, and public opposition to such, may have negative effect on planning process. Electricity metering for domestic properties and responsibility for maintenance reduce the feasibility for this to be applied to residential. Vibration isolation required for building mounted turbines. Noise may affect natural ventilation feasibility for domestic properties. Wind study required to ensure conditions are correct. Feasibility for large scale not possible due to urban location. Appearance of turbines problematic. Low wind speeds at location increases number of turbines required.
Photovoltaics	PV panels integrated into building fabric, such as cladding, roof surface or brise soleil. Elevations south-east to south- west unshaded.	 PV panels can be prone to vandalism in certain locations. Simple systems requiring little maintenance other than cleaning and repair. Individual connection to each dwelling required to permit maximum utilisation and FIT entitlement. Appearance can be unappealing where visible, however tile integrated PVs are less obtrusive. South facing roof space limited.
Ground Source Heating	Can be utilised individual systems with central or individual ground loop operation. Particularly suited to underfloor heating. Can preclude the need for gas distribution to individual properties.	Very costly More suited to individual systems, additional heating can be required to domestic hot water as typical temperatures are only 50°C.
Ground Source Heating		Borehole requirements and ground conditions may reduce the amount that could be implemented. Environment Agency Licence may be required.

LZC Energy Type	Application	Feasibility
River Source Heating	Can be utilised individual systems with central or individual operation.	Available source adjacent to site. Limited volume flow rate in river, therefore limited capacity. Environment Agency Licence would be required. Canal and River Trust licence required.
Air Source Heat Pumps	Particularly suited to water based heating and cooling systems. Particularly suited to underfloor heating or fan assisted radiators. Precludes the need for gas distribution to individual properties.	Significant roof or external compound space required. Outdoor units can be unsightly and generate background noise. Conventional heating and cooling delivery plant can still be utilised. Medium capital cost. Sufficient power supply required. Good maintenance support.
Solar Hot Water	Roof mounted solar collectors combined with local hot water calorifiers. Gas or electric back up system still required. Solar hot water is not a replacement of such systems.	Roof space availability for solar collectors subject to planning acceptance relating to visual appearance and height. Suitable for domestic and commercial properties. Limited load utilisation – difficult to achieve large saving. Oversized calorifier space required in each flat. Limited south facing roof space.
Biomass Heating	Central boiler installation for whole block. Wood chips used as primary fuel. Provides space heating and domestic hot water for whole site, or could be limited to residential only.	The necessary transportation of wood chips to site and ash from site using road reduces the carbon emission savings available. The proximity of wood chip sources and congested roads adds to the disadvantage. Wood chip and ash storage on site required. Very little space available for this. Back up gas installation required to ensure heat supply in the event of reliability problems or fuel availability problems. Only compatible with centralised systems.

LZC Energy Type	Application	Feasibility
Biomass CHP	CHP – Combined Heat and Power Adopts same principles as Biomass Heating, however part of the central plant will be utilised to provide power generation for the site and distribution back to the national Grid. Applicable to a commercial trigeneration system when used in conjunction with Biomass Fuel.	Feasibility issues as described above remain. CHP reduces the overall site carbon emissions due to very good efficiencies, therefore reducing the overall amount of renewable energy sources required for the site. Constant year round base load required to ensure generated heat is utilised. Does not suit proposed low operating temperatures.
Natural gas CHP	CHP – Combined Heat and Power Heat source for district heating system. Electrical output for landlord use or export.	Requires district heating for full load utilisation and maximisation of diversified heat load. CHP reduces the overall site carbon emissions due to very good efficiencies. No gas to site proposed. Does not suit proposed low operating temperatures.
Natural gas CHP	CHP – Combined Heat and Power Micro CHP to each dwelling	Complex domestic machinery requires intensive maintenance. No external plant space required Low electrical output reduces carbon efficiency compared to centralised CHP. New gas supply through existing building required – impractical.

Feasibility Matrix

1 = poor

5 = excellent

Site suitability rating doubled to provide weighting

Where site application is less than 6 this option must be ruled out due to impracticalities.

Technology	Cost	Internal Plant Space	Roof space	Suitability of Site Application	Total
Turbines (Tower)	1	4	5	2	12
Turbines (Roof Mounted)	3	4	2	4	13
Photovoltaics	3	5	4	10	22
Solar Hot Water	4	1	1	10	16
Ground Source Heat Pumps	1	2	5	4	12
Air Source Heat Pumps	4	4	2	10	20
Centralised CHP	2	2	5	5	14
Biomass Boiler	2	2	5	5	14
Decentralised CHP	2	2	5	4	13

Energy Monitoring (Hierarchy Level 4 - Be Seen)

The London Plan introduces a fourth stage to the energy hierarchy; the Be Seen stage, which proposes monitoring and reporting of the actual operational energy performance of major developments for at least five years.

An effectively implemented post-construction monitoring regime can have several benefits including environmental (e.g. reduced grid infrastructure strain, carbon emissions reduction) and socio-economic (e.g. reduced occupants bills and raised awareness around energy use).

The Be Seen stage aims to monitor that the actual energy and carbon performance of buildings is aligned with the estimate figures. This is expected to assist with achieving a zero-carbon London.

Standard monitoring of the Energy Centre and heat network will be undertaken during operation and It is expected that the following will be metered:

- Electricity, and water used in the Energy Centre;
- Heat leaving the Energy Centre;
- Heat entering each block;
- Final customer heat consumption.

The metering and controls strategy will be further developed during the detailed design process

ENERGY ASSESSMENT

Low or Zero carbon Energy Assessment

The incorporation of 2No. 240kW air source heat pumps in combination with the individual reverse cycle heat pumps form the district heating system to serve the 65 apartments. Individual air source heat pump systems will serve the townhouses and will contribute to meeting in excess of the 35% reduction on the building regulations L1 target emissions.

Renewable Energy Assessment

PV cells will be provided to the townhouses and commercial unit contributing to a minimum site wide reduction in carbon dioxide emissions of 35%.

Tile PV panels are specified to provide the required kWh/year output to achieve the energy target for the site.



SAP Assessments and PV design has led to the following provision:

Where roof space allows an array of 330W Mono Black panels are proposed on the roofs of all the townhouses, providing 35kW peak in total.

The commercial unit has an array providing 1.0kW peak output from PV panels.

Summary of Emissions

To achieve a minimum 35% reduction over the TER with enhanced fabric U-Values and infiltration rate, Air source heat pumps will cater for the heating and hot water demand across the site. PV's will need to be sized for the townhouses to achieve a peak output of approximately 35kW_e. The impact on energy savings are highlighted in the table below.

When calculating the site wide carbon emissions, a provision 1.0kW peak output from PV panels was applied to the commercial space.

	Carbon dioxide emissions (Tonnes CO2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	103.9	42.9
After energy demand reduction (Be Lean)	82.9	42.9
After application heat network (Be Clean)	82.9	42.9
After renewable energy (Be Green)	23.1	42.9

Residential – SAP10

Table 3b - Carbon Dioxide Emissions after each stage of the Energy Hierarchy (Residential)

	Regulated carbon dioxide savings		
	(Tonnes CO₂ per annum)	(%)	
Be lean: savings from energy demand reductions	21	20%	
Be clean: saving from heat network	0	0%	
Be green: saving from renewable energy	59.8	58%	
Cumulative on site savings	80.9	78%	
Annual savings from offset payment	23.1	-	
Tonnes of CO ₂			
Cumulative savings for offset payments	692		
Cash in-lieu contributions (£)	65,728.00		

Table 2b - Regulated carbon dioxide savings from each stage of the Energy Hierarchy (Residential) Carbon price is based on GLA recommended price of £95 per tonne of Carbon Dioxide

Final dwelling emissions rate incorporates energy efficiency, efficient supply of energy and renewable energy technologies. The following SAP analysis demonstrates RIBA stage 2 status and shall not be the final proposal due to design, buildability and cost considerations.

Commercial Unit

Non-Domestic - SAP10

	Carbon dioxide emissions (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	0.6	8.5
After energy demand reduction (Be Lean)	0.3	8.5
After heat network (Be Clean)	0.3	8.5
After renewable energy (Be Green)	0.3	8.5

Table 3b - Carbon Dioxide Emissions after each stage of the Energy Hierarchy (Non-domestic)

	Regulated carbon dioxide savings		
	(Tonnes CO₂ per annum)	(%)	
Be lean: savings from energy demand reductions	0.3	46%	
Be clean: saving from heat network	0.0	0%	
Be green: saving from renewable energy	0.0	0%	
Cumulative on site savings	0.3	46%	
Annual savings from offset payment	0.3	-	
Tonnes of CO ₂			
Cumulative savings for offset payments	9	-	
Cash in-lieu contributions (£)	861.00		

Table 4b - Regulated carbon dioxide savings from each stage of the Energy Hierarchy (Nondomestic) Carbon price is based on GLA recommended price of £95 per tonne of Carbon Dioxide

Site Wide Emissions

SAP10

	Total regulated emissions (Tonnes CO ₂ per annum)	CO2 Savings (Tonnes CO2 per annum)	Percentage Savings (%)
Baseline: Part L 2021	104.5	-	-
Be Lean	83.2	21.3	20%
Be Clean	83.2	0.0	0%
Be Green	23.4	59.8	57%
Total Cumulative Savings	-	81.1	78%
	-	CO ₂ Savings off- set (tonnes CO ₂₎	
Off-set	-	701	-

Table 5b - Totalised Regulated carbon dioxide savings from each stage of the Energy Hierarchy (Site Wide)

	Target Fabric Energy Efficiency (kWh/m²)	Dwelling Fabric Energy Efficiency (kWh/m²)	Improvement (%)
Development Total	51.54	25.35	51%

Table 6b - Totalised Fabric energy efficiency (Site Wide)

Final dwelling emissions rate incorporates energy efficiency, efficient supply of energy and renewable energy technologies. The SAP analysis demonstrates RIBA stage 2 status and shall not be the final proposal due to design, build ability and cost considerations.
Cash In lieu Carbon Payment

To meet the zero carbon target for the **site wide development** element of the development a cash in lieu payment can be made, as quoted below:

London Plan 2021

Boroughs should develop a price for offsetting carbon using either a nationally recognised carbon pricing mechanism or a price based on the cost of offsetting carbon across the borough. A nationally recognised non-traded price of \pounds 95/tonne has been tested as part of the viability assessment for the London Plan which boroughs may use to collect offset payments.

London Borough of Richmond recognise £95/tonne carbon offset payment.

Based upon the planning stage energy strategy calculations a carbon dioxide shortfall of 701 tonnes over 30 years is estimated (see Carbon Emissions table above), and this will therefore result in a carbon offsetting cash payment in the order of **£66,589.00**

The above calculations are based on pre planning stage 2 apartment layouts and are therefore estimates. Figures will need to be refined as the design progresses and when final design stage SAP calculations are submitted during RIBA design stage 4.

Appendix A – Local heat networks

The extract below shows the current heat map for the surrounding area as accessed from https://maps.london.gov.uk/heatmap/

The grey shaded areas shows identified decentralised heat potential.

There are currently no local heat networks within the area surrounding the site.



Appendix B – SAP Analysis BE LEAN

 Ref:
 1823-50-RPT-05

 Date:
 5th May 2023

 Revision:
 09

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 05 May 2023 08:22:21

Project Information								
Assessed By	Keith Ketchley	Building Type	Flat, Detached					
OCDEA Registration	EES/027679	Assessment Date	2023-05-05					

Dwelling Details						
Assessment Type	As designed	Total Floor Area	72 m ²			
Site Reference	Greggs Bakery	Plot Reference	Greggs-A-2B4P-Be Lean			
Address	D12 Gregs Bakery D12 - Townhouse, Twickenham					

Client Details	
Name	London Square
Company	London Square
Address	ONE YORK ROAD, , UXBRIDGE, UB8 1RN

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

1a Target emission rate and dwelling emission rate							
Fuel for main heating system	Mains gas						
Target carbon dioxide emission rate	10.36 kgCO ₂ /m ²						
Dwelling carbon dioxide emission rate	7.89 kgCO ₂ /m ²	OK					
1b Target primary energy rate and dwelling primary energy							
Target primary energy	54.2 kWh _{PE} /m ²						
Dwelling primary energy	42.66 kWh _{PE} /m ²	OK					
1c Target fabric energy efficiency and dwelling fabric energy efficiency							
Target fabric energy efficiency	23.5 kWh/m ²						
Dwelling fabric energy efficiency	20.4 kWh/m ²	OK					

2a Fabric U-values								
Element	Maximum permitted	Dwelling average U-Value	Element with highest					
	average U-Value [W/m²K]	[W/m²K]	individual U-Value					
External walls	0.26	0.15	Walls (1) (0.15)	OK				
Party walls	0.2	N/A	N/A	N/A				
Curtain walls	1.6	N/A	N/A	N/A				
Floors	0.18	N/A	N/A	N/A				
Roofs	0.16	N/A	N/A	N/A				
Windows, doors,	1.6	1.3	Opening (1.3)	OK				
and roof windows								
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: W	alls (1)			29.7	0.15			
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]			
Opening, Openin	g Type 2	2.5	East	0.8	1.3			
Opening, Openin	g Type 2	2.5	East	0.8	1.3			
Patio Door, Oper	ning Type 2	5.6	East	0.8	1.3			
Opening, Openin	g Type 2	3.6	West	0.8	1.3			
Front Door, Oper	ning Type 1	2	North	N/A	1.3			
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	Drawing /			

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E7: Party floor between dwellings (in blocks of flats)	Government-approved scheme	0 (!)	
External wall	E16: Corner (normal)	Government-approved scheme	0 (!)	

3 Air permeability (better than typically	y expected	values are flagged with a subsequent (!))	
Maximum permitted air permeability at 50	0Pa	8 m ³ /hm ²	
Dwelling air permeability at 50Pa		3 m ³ /hm ² , Design value (!)	OK
Air permeability test certificate reference		1	
4 Space heating			
Main heating system 1. Boiler with radia	ators or unde	erfloor beating - Mains gas	
Efficiency	89.1%		
Emitter type	Radiators		
Flow temperature	35°C		
System type	Notional		
Manufacturer	Notional		
Model	Notional		
Commissioning			
Secondary heating system: N/A			
Fuel	N/A		
Efficiency	N/A		
Commissioning			
5 Hot water			
Cylinder/store - type: N/A			
Capacity	N/A		
Declared heat loss	N/A		
Primary pipework insulated	N/A		
Manufacturer			
Model			
Commissioning			
Waste water heat recovery system 1 -	type: Instan	taneous	
Efficiency	0.0%		
Manufacturer	Hel-tech b.	V.	
Model	Recon-ven	t RV3	
6 Controls			
Main heating 1 - type: Programmer, room	m thermosta	at, and TRVs	
Function			
Ecodesign class			
Manufacturer			
Water neating - type: N/A	1		
Manufacturer			
7 Lighting	1		
Minimum permitted light source efficacy	75 lm/W		
Lowest light source efficacy	85 lm/W		OK
External lights control	N/A		
8 Mechanical ventilation			
System type: Balanced whole-house me	echanical ve	entilation with heat recovery	
Maximum permitted specific fan power	1.5 W/(l/s)		
Specific fan power	0.55 W/(l/s		OK
Minimum permitted heat recovery	73%		
efficiency			
Heat recovery efficiency	92%		OK
Manufacturer/Model	Sentinel Ki	inetic Plus B	
Commissioning			
9 Local generation			
Technology type: Photovoltaic system	(1)		
Peak power	1.47 kWp		
Orientation	South East	t	
Pitch	Horizontal		
Overshading	None or ve	ery 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	b. Client Declaration						
N/A							



Property Reference		Greggs Bak	ery							Issued	on Date	05/0)5/202	3
Assessment Reference	9	Greggs-A-2	eggs-A-2B4P-Be Lean Prop Type Ref Greg					Greggs I	eggs Bakery					
Property		Gregs Bake	ry D12 - Towr	nhouse, D	12, Twickenh	am, Tha	mes Valle	ey						
SAP Rating				03 /		DER		7.90			FR		10.36	
Environmental				01 A		% DER	< TER	7.08)			L	23.84	
CO, Emissions (t/vear)				0.53		DFFF		20.4	10		FEE		23.04	
Compliance Check				See BR	=1	% DFF	F < TFFF	20.4					13.00	
% DPER < TPER				21 30		DPER		42 6	86		PER		54 20	
				21.00		DI ER		42.0					54.20	
Assessor Details	Mr.	Keith Ketchle	y								Assesso	r ID	2303-0	0001
Client														
SUMMARY FOR INP	UT DAT	A FOR: Ne	w Build (A	ls Desig	gned)									
Orientation				Northeas	st									
Property Tenture				ND										
Transaction Type				6										
Terrain Type				Suburba	n									
1.0 Property Type				Flat, Det	ached									
Position of Flat				Mid-floor	r 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 Param	eter			Precise calculation]			
Thermal Mass				N/A						k	kJ/m²K			
7.0 Electricity Tariff				Standard	d									
Smart electricity meter	fitted			Yes										
Smart gas meter fitted				Yes										
7.0 Measurements														
					Basement Ground floor 1st Storey 2nd Storey 3rd Storey 4th Storey 5th Storey 6th Storey 7th Storey	Heat	Loss Pe 0.00 m 27.00 n 12.70 n 12.70 n 0.00 m 0.00 m 0.00 m 0.00 m	rimete n n n n n i i i i	r Inf	ternal Flo 0.00 n 72.00 r 54.00 r 31.00 r 0.00 n 0.00 n 0.00 n 0.00 n	or Area 1 ² 11 ² 11 ² 1 ² 1 ² 1 ² 1 ² 1	Avera	ge Sto 0.00 2.50 2.50 0.00 0.00 0.00 0.00 0.00	rey Height m m m m m m m m m m m m
8.0 Living Area				25.00						m	2			
9.0 External Walls Description External Wall 1	Type Cavity Wa	Cons all Cavit filled	struction y wall : plasterbo cavity, any outsid	oard on dabs	s, AAC block,	U-Value (W/m²K) 0.15	Kappa (kJ/m²K) 60.00	Gross Area(m²) 45.90	Nett Area (m²) 29.70	Shelter Res 0.00	Shelter None	Openii 16.2	n gs Are 0 Ent	a Calculation Type er Gross Area
9.1 Party Walls			,,, outor											
Description	Тур	pe	Construc	tion					U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	5	Shelter
Party Wall 1	Fill Edg	ed Cavity witl ge Sealing	n Plasterboa sides, AA0	ard on dat C blocks,	os mounted o cavity	n cemen	it render o	on both	0.00	45.00	55.65	0.00		None
9.2 Internal Walls Description			Constructi	on								Ki (ki	appa	Area (m²)
Internal Wall 1			Dense bloc	k, plasteri	board on dab	S						7	5.00	43.22
10.1 Party Ceilings Description			Constructi	on								K (kJ	appa //m²K)	Area (m²)



Party Ceiling 1		In-situ (concrete slab su	upported by	profiled metal d	eck, carpete	ed			90.00	71.30
11.1 Party Floors											
Description		Storey Index	Construction							Kappa (kJ/m ² K)	Area (m²)
Party Floor 1		Lowest occupied	In-situ concrete	e slab suppo	rted by profiled	metal deck	, carpeted			90.00	71.30
12.0 Opening Types											
Description	Data Source	Туре	Gla	zing		Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Opening Type 1 Opening Type 2	Manufacturer Manufacturer	Solid Door Window	- Dou Dou	ible Low-E S ible Low-E S	oft 0.05 oft 0.05	Cup	Air Filled Air Filled	0.63 0.63	Wood Wood	0.80 0.80	1.30 1.30
13.0 Openings											
Name Opening	Opening Ty Opening Typ	pe pe 2	Location External V	Vall 1		Orient Ea	ation st	Area 2.5	(m²) 0	Pi	tch 0
Opening Patio Door	Opening Typ	be 2	External V	Vall 1 Vall 1		Ea	st et	2.5	0		0
Opening	Opening Typ	be 2	External V	Vall 1		We	st	3.6	0		0
Front Door	Opening Typ	be 1	External V	Vall 1		Nor	th	2.0	0		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	Pei	Adjusted	Reference			Imported
E7 Party floor between dw E16 Corner (normal)	ellings (in block	s of flats)	Gov Approved Gov Approved	Scheme Scheme	27.00 10.00	0.00 0.00	0.00 0.00	Reference	•		Yes Yes
Y-value			0.00					W/m²K			
18.0 Pressure Testing			Yes								
Designed AP ₅₀			3.00					m³/(h.m	²) @ 50 Pa	a	
Property Tested?			Yes								
Test Method			Blower Do	or							
As Built AP50			0.10					m³/(h.m	²) @ 50 Pa	a	
19.0 Mechanical Ventilation											
Mechanical Ventilation								_			
Mechanical Ventilation	on System Pres	ent	Yes					4			
Approved Installatior	ו		No					_			
Mechanical Ventilation	on data Type		Database								
Туре			Balanced	mechanical	ventilation with	heat recove	ery				
MV Reference Numb	ber		500167								
Configuration			2								
MVHR Duct Insulate	d		Insulated	Ducts							
Manufacturer SFP			0.55								
Duct Type			Rigid								
MVHR Efficiency			92.00								
Wet Rooms			2								
SFP from Installer Co	ommissioning C	ertificate	No								
MVHR System Locat	tion		Inside hea	ated envelop	e (installed excl	usively)					
Duct Installation Spe	cification		Level 1								
20.0 Fans, Open Fireplaces,	Flues										
21.0 Fixed Cooling System			No								
22.0 Lighting								_			
No Fixed Lighting			No						•	_	
			Name Lighting	1	∈пісасу 85.00	Po	wer 5	Capa 42	acity 25	Co	10



24.0 Main Heating 1	Manufacturer	
Description	Notional	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Mains gas	
SAP Code	104	
In Winter	89.10	
In Summer	89.10	
Model Name	Notional	
Manufacturer	Notional	
System Type	Notional	
Controls SAP Code	2106	
Delayed Start Stat	Yes	
Burner Control	Modulating	
HETAS approved System	No	
Oil Pump Inside	No	
FI Case	0.00	
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Enter value	
Flow Temperature Value	35.00	
Boiler Interlock	Yes	
Combi boiler type	Standard Combi	
Combi keep hot type	None	
25.0 Main Heating 2	None	

26.0 Heat Networks

None

	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	9								

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	Yes
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
Supplementary Immersion	No



Immersion Only Heating Hot Water	No		
28.1 Showers			
Description Shower Type		Flow Rate Rated Power C	connected Connected To
Shower Vented hot wa	ter system	7.00	No Storage System
28.3 Waste Water Heat Recovery System			
Database ID	80003		
Brand Model	Showersave, Recoh-vert RV3		
Details	Year: 2011 + 2017 Efficiency: 0	Utilisation factor: 0.974	
29.0 Hot Water Cylinder	None		·
Cylinder Stat	No		
Cylinder In Heated Space	No		
Independent Time Control	No		
Insulation Type	Measured Loss		
Cvlinder Volume	245.00		
Loss	1.92		kWh/day
In Airing Cupboard	No		
	NI		·
31.0 Thermal Store	None		
32.0 Photovoltaic Unit	One Dwelling		
Export Capable Meter?	Yes		
Connected To Dwelling	Yes		
Diverter	No		
Battery Capacity [kWh]	0.00		
PV Cells kWp Orientation Elevation	Overshading FGHRS	MCS Certificate Over Factor	shading MCS Panel or Certificate Manufacturer
1.47 South East Horizontal	None Or Little No	No 1.00	Reference
34.0 Small-scale Hydro	None		
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
35.0 Special Features			
Energy Fuel Saved Energy Fuel Used Descrij Saved Used	ption Monthly Air Change Rates Te	Special Jan Feb Mar A echnologies Type	Apr May Jun Jul Aug Sep Oct Nov Dec
0.00 0.00	(CO2 saving 0.00 0.00 0.00 0 feature	.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

Recommendations

Lower cost measures None

Further measures to achieve even higher standards None



Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley

Dwelling type: Date of assessment: Produced by: Total floor area: DRRN: Flat, Detached 05/05/2023 Keith Ketchley 72 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 (CO_2) emissions. The higher the rating the less impact it has on the environment.



Dwelling Address	Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley		
Report Date	05/05/2023		
Property Type	Flat, Detached		
Floor Area [m ²]	72		

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.





Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
Feature	Description			Energy Performance
Walls	Average thermal transmit	ttance 0.15 W/m²K		Very Good
Windows	High performance glazing			Good
Main heating	Boiler and radiators, mains gas			Very Good
Main heating controls	Programmer, room thermostat and TRVs			Good
Secondary heating	None			
Hot water	From main system, waste water heat recovery			Very Good
Lighting	Good lighting efficiency			Good
Air tightness	Air permeability [AP50] = 3.0 m³/h.m² (assumed)			Good

Primary Energy use

The primary energy use for this property per year is 40 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The estimated CO emissions for this dwellings is: 0.5	per year
With the recommended measures the potential CO emission	s could be: 1 per year

Recommendations



The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Estimated energy use and potential savings



The estimated cost and savings show how much the average household would spend in this property for heating, lighting and hot water. It is not based on how energy is used by the people living at the property.

Contacting the assessor and the accreditation scheme

Assessor contact details				
Assessor name	Mr. Keith Ketchley			
Assessor's accreditation number	EES/027679			
Email Address	keith.ketchley@desco.uk.com			

Accreditation scheme contact details				
Accreditation scheme	Elmhurst Energy Systems Ltd			
Telephone	0191 522 2070			
Email Address	keith.ketchley@desco.uk.com			



Assessment details					
Related party disclosure	Employed by the professional dealing with the property transaction				
Date of assessment	02/05/2023				
Date of certificate	02/05/2023				
Type of assessment	SAP, new dwelling				

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 05 May 2023 08:22:21

Project Information					
Assessed By	Keith Ketchley	Building Type	House, Mid-terrace		
OCDEA Registration	EES/027679	Assessment Date	2023-05-05		

Dwelling Details				
Assessment Type	As designed	Total Floor Area	126 m ²	
Site Reference	Greggs Bakery	Plot Reference	Greggs-C-TH-Be Lean	
Address	D12 Gregs Bakery D12 - Townhouse, Twickenham			

Client Details	
Name	London Square
Company	London Square
Address	ONE YORK ROAD, , UXBRIDGE, UB8 1RN

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

1a Target emission rate and dwelling emission rate									
Fuel for main heating system	Mains gas								
Target carbon dioxide emission rate 8.44 kgCO ₂ /m ²									
Dwelling carbon dioxide emission rate	7.52 kgCO ₂ /m ²	OK							
1b Target primary energy rate and dwelling primary energy									
Target primary energy	43.86 kWh _{PE} /m ²								
Dwelling primary energy	40.64 kWh _{PE} /m ² OK								
1c Target fabric energy efficiency and dwelling fabric ene	1c Target fabric energy efficiency and dwelling fabric energy efficiency								
Target fabric energy efficiency27.4 kWh/m²									
Dwelling fabric energy efficiency	31.6 kWh/m ²	FAIL							

2a Fabric U-values											
Element	Maximum permitted	Dwelling average U-Value	Element with highest								
	average U-Value [W/m ² K]	[W/m ² K]	individual U-Value								
External walls	0.26	0.15	Walls (1) (0.15)	OK							
Party walls	0.2	0	Party Wall (1) (0)	N/A							
Curtain walls	1.6	0	N/A	N/A							
Floors	0.18	0.12	Heatloss Floor 1 (0.12)	OK							
Roofs	0.16	0.11	Roof (1) (0.11)	OK							
Windows, doors,	1.6	1.3	Opening (1.3)	OK							
and roof windows											
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)	25.53	0.15								
Party wall: Party Wall (1)	188.5	0 (!)								
Ground floor: Heatloss Floor 1, Heatloss Floor 1	42.04	0.12								
Exposed roof: Roof (1)	24.1	0.11								

2c Openings (better than typically expected values are flagged with a subsequent (!))											
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]							
Opening, Opening Type 2	14.89	West	0.8	1.3							
Opening, Opening Type 2	7.9	East	0.8	1.3							
Door, Opening Type 1	2.53	East	N/A	1.3							

2d Thermal brid	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 Draw												
			[W/mK]	reference								
External wall	E5: Ground floor (normal)	SAP table default	0.32									
External wall	E6: Intermediate floor within a	SAP table default	0.14									
	dwelling											
External wall	E18: Party wall between dwellings	SAP table default	0.24									
Party wall	P3: Intermediate floor between	SAP table default	0 (!)									

Main element	Junction detail		Source	Psi value	Drawing /				
				[W/mK]	reference				
	dwellings (in blocks of flats)		-						
Party wall	P2: Intermediate floor v dwelling	vithin a	SAP table default	0 (!)					
Party wall	P5: Roof (insulation at	rafter level)	SAP table default	0.48					
3 Air permeabili	ty (better than typically	v expected	values are flagged with a subseq	uent (!))					
Maximum permit	ted air permeability at 50)Pa	$8 m^3/hm^2$						
Dwelling air perm	eability at 50Pa		3 m ³ /hm ² , Design value (!)		OK				
Air permeability to	est certificate reference		1						
4 Space heating									
Main heating sy	stem 1: Boiler with radia	ators or unde	erfloor heating - Mains gas						
Efficiency		89.1%	<u> </u>						
Emitter type		Radiators							
Flow temperature)	45°C	5°C						
System type		Notional Sp	Dec						
Manufacturer		Notional Sp	Dec						
Model		Notional Sp	Dec						
Commissioning		•							
Secondary heat	ing system: N/A								
Fuel		N/A							
Efficiency		N/A							
Commissioning									
E Hot water		•							
5 Hot water	turna: NI/A								
Connoity	type: N/A								
		IN/A							
Declared heat los	SS S	IN/A							
Manufacturer	Insulated	IN/A							
Manufacturer									
Model									
Weste weter ber	t receivery eveter 1	tuno: Inotoni							
Efficiency	at recovery system 1 -		laneous						
Monufacturor		U.U%							
Modol		Recently.	v. D\/2						
		INECOIL-VEIL	1895						
6 Controls									
Main heating 1 -	type: Programmer, roor	n thermosta	t, and TRVs						
Function									
Ecodesign class									
Manufacturer									
Model									
Water heating -	type: N/A								
Manufacturer									
Model									
7 Lighting									
Minimum permitte	ed light source efficacy	75 lm/W							
Lowest light sour	ce efficacy	85 lm/W		0	K				
External lights control N/A									
8 Mechanical ve	ntilation								
System type: Ba	lanced whole-house me	chanical ve	ntilation with heat recovery						
Maximum nermit	ted specific fan nower	1.5 W/(I/s)							
Specific fan nowe	er	0.55 W/(I/s))	0	К				
Minimum permitted heat recovery 73%			/						
efficiency									
Heat recovery eff	iciency	92%		0	К				
Manufacturer/Mo	del	Sentinel Ki	netic Plus B	U					
Commissioning	~~.								

9 Local generation									
Technology type: Photovoltaic system (1)									
2.52 kWp									
Orientation	South East								
Pitch	30°								
Overshading	None or very little								
Manufacturer									
MCS certificate									
10 Heat notworks									
N/A									
11 Supporting documentary evidence									
N/A									
12 Declarations									
12 Decidiations									
This dealeration by the appearance is as	nfirmation that the as	ntanta of this DDEL Compliance Depart							
This decial alloit by the assessor is co	ninnation that the co	formation submitted for this dwalling for							
the purpose of corruing out the "As do	ed upon the design in	and that the supporting desurportary							
une purpose of carrying out the As de	signed assessment,	and that the supporting documentary							
evidence (SAP Conventions, Appendi	x 1 (documentary evi	aence) schedules the minimum							
documentary evidence required) has i	been reviewed in the	course of preparing this BREL							
Compliance Report.									
Circa e di									
Signed:		Assessor ID:							
vame: Date:									
h Client Declaration									
IN/A									



Property Reference	Greggs	Bakery	y							Issu	ied on D	ate	05/05/	2023	
Assessment Reference	Greggs	-C-TH-	Be Lean				Pro	p Type l	Ref	Grego	gs Baker	/			
Property	Gregs	Bakery	D12 - Town	house, D12	2, Twickenh	am, Thar	nes Val	ley							
SAP Rating				94 A		DER		7.52	2		TER		8.4	4	
Environmental				93 A		% DER	< TER		-				10	90	
CO ₂ Emissions (t/year)				0.79		DFEE		31.6	60		TFEE		27.	37	
Compliance Check				See BRFI		% DFE	E < TFE	E					-15	47	
% DPER < TPER				7.34		DPER		40.6	64		TPER		43.	86	
											A				
Assessor Details	Mr. Keith Ke	etchley									Asses	Sor ID	Q3	03-000	1
	DATA FOR	: New	Build (A	s Desian	ed)										
Orientation			Dana (F	Unknown											
Property Tenture															
Transaction Type				6											
Terrain Type				Suburban											
1 0 Property Type				House Mir	d-Terrace										
Which Floor				0											
2 0 Number of Storeys				3											
3.0 Date Built				2023											
4 0 Sheltered Sides				0											
5.0 Sunlight/Shade					runknown										
6 0 Thermal Mass Paramete	r			Precise ca											
Thermal Mass	•1			N/A	louiation						kJ/m²K				
7.0 Electricity Tariff				Standard											
Smort electricity farm	od			Voc											
Smart electricity meter int	ed			Yes											
				res											
7.0 Measurements				Gr 2	Basement round floor 1st Storey 2nd Storey 3rd Storey 4th Storey 5th Storey 6th Storey 7th Storey	Heat : : :	Loss P 0.00 (23.87 23.87 12.70 0.00 (0.00 (0.00 (0.00 (erimete m m m m m m m m m	r Int	ternal F 0.00 41.0 54.0 31.0 0.00 0.00 0.00 0.00 0.00	Floor Ard 0 m ² 00 m ² 00 m ² 00 m ² 0 m ² 0 m ² 0 m ² 0 m ² 0 m ²	ea A	verage (22) (12) (12) (12) (12) (12) (12) (12)	Storey 0.00 m 2.50 m 2.50 m 0.00 m 0.00 m 0.00 m 0.00 m 0.00 m	Height
8.0 Living Area				20.50							m²				
9.0 External Walls															
Description T	уре	Constru	uction			U-Value (W/m²K)	Kappa	Gross Area/m²	Nett Area	Shelter Res	She	lter	Openings	Area Ca	alculation
External Wall 1 C	avity Wall	Cavity w filled cav	vall : plasterbo vity, any outsid	ard on dabs, A le structure	AC block,	0.15	60.00	50.85	25.53	0.00	No	ne	25.32	Enter G	iross Area
9.1 Party Walls															
Description	Туре		Construct	tion					U-Value (W/m ² K)	Kapp (k.l/m ²	a Are	a She	elter es	She	lter
Party Wall 1	Filled Cavit Edge Seali	y with ng	Plasterboa sides, AAC	ard on dabs C blocks, ca	mounted o	n cemen	t render	on both	0.00	45.00	0 188.	50 0.	00	No	ne
10.0 External Roofs															
Description	Туре	Cor	nstruction			U- (M	Value	Kappa	Gross	Nett Area	Shelte Code	r Shelte	r Calcu	lationC	penings
External Roof 1	External Flat Roof	Pla	sterboard, i	nsulated fla	t roof	(**	0.11	9.00	24.10	(m²) 0.00	None	0.00	Enter Are	Gross ea	0.00
10.2 Internal Ceilings															
Description Internal Ceiling 1		Storey +1	/	Constru Plasterbo	oard ceiling	, carpete	d chipb	oard floo	or					Area (40.8	(m²) 30



11.0 Heat Loss Floors	Туре	Storey Index	Co	nstruction		11-1/21	110	Shelter Code	She	ltor Kanr	a Area (m²)
Heatloss Floor 1	Ground Floor - Solic	d Lowest occup	ied Sus	spended concrete flo	oor, carpeted	(W/m 0.12	2 2	None	Fac	tor (kJ/m ²) 0 75.0	K) 0 42.04
12.0 Opening Types Description	Data Source	Туре		Glazing		Glazing	Filling	G-value	Frame	Frame	U Value
Opening Type 1 Opening Type 2	Manufacturer Manufacturer	Half Glaze Window	d Door	Double Low-E Double Low-E	E Soft 0.05 E Soft 0.05	Gap	Air Filled Air Filled	0.63 0.63	Type Wood Wood	0.80 0.80	(W/m²K) 1.30 1.30
13.0 Openings											
Name Opening Opening Door	Opening Ty Opening Ty Opening Ty Opening Ty	/pe pe 2 pe 2 pe 1	Loc Exte Exte	cation ernal Wall 1 ernal Wall 1 ernal Wall 1		Orient We Eas Eas	ation st st st	Area (14.8 7.90 2.53	m²) 9) }	Pi	tch 0 0 0
14.0 Conservatory			Nor	ne							
15.0 Draught Proofing			100)				%			
16.0 Draught Lobby			No								
17.0 Thermal Bridging			Cal	culate Bridges							
Bridge Type E5 Ground floor (norma E6 Intermediate floor wi E18 Party wall between P3 Party wall - Intermec (in blocks of flats) P2 Party wall - Intermec P5 Party wall - Roof (ins	l) thin a dwelling dwellings liate floor betweer liate floor within a sulation at rafter le	n dwellings dwelling evel)	Source Table K1 Table K1 Table K1 Table K1 Table K1 Table K1	Type - Default - Default - Default - Default - Default - Default	Length 8.59 25.40 30.00 19.20 33.00 12.60	Psi 0.32 0.14 0.24 0.00 0.00 0.48	Adjusted 0.32 0.14 0.24 0.00 0.00 0.48	Reference:			Imported Yes Yes No No No
Y-value		,	0.17	7				W/m²K			
								<u> </u>			
			2.00	י 					2) @ 50 Po		
Designed AP ₅₀			3.00	J				m*(n.m	-)@ 50 Pa		
Property Tested?			Yes	wan Daan							
			BIO	wer Door				3//1	N O 50 D-		
AS BUILT AP 50			0.10	J				m³/(n.m	•) @ 50 Pa		
19.0 Mechanical Ventilation	on										
Mechanical Ventilation	1 ation System Pres	sent	Yes								
Approved Installat	ion		No	·							
Mechanical Ventil	ation data Type		Data	abase				=			
			Bala	anced mechanic	al ventilation with h	eat recove	rv	=			
MV/ Reference Nu	mber		500	167			, y	-			
	iniber		2					=			
	ated		Inci	ulated Ducts				=			
Manufacturer SEE			0.58								
			Rigi	id							
MV/HR Efficiency/											
			32.0	50							
SED from Installer		Cortificato	Z No								
		Jertificate	Inci	do bootod opvol	one (installed evel						
Duct Installation S						isively)					
20 0 Fana Onen Eirenlage			Lev								
	s, riues										
21.0 Fixed Cooling System	n		No								
22.0 Lighting No Fixed Lighting			No Lic	Name ghting 1	Efficacy 85.00	Ро	wer 5	Capa 42	city 5	Co	ount IO
24.0 Main Heating 1			Mar	nufacturer							



26	.0 Heat Networks	None	
25	.0 Main Heating 2	None	
	Combi keep hot type	None	
	Combi boiler type	Standard Combi	
	Boiler Interlock	Yes	
	Flow Temperature Value	45.00	
	Flow Temperature	Enter value	
	Underfloor Heating	Yes - Pipes in thin screed	
	Heat Emitter	Radiators	
	Heating Pump Age	2013 or later	
	Is MHS Pumped	Pump in heated space	
	Fan Assisted Flue	No	
	Flue Type	None or Unknown	
	FI Case	0.00	
	Oil Pump Inside	No	
	HETAS approved System	No	
	Burner Control	Modulating	
	Delayed Start Stat	Yes	
	Controls SAP Code	2106	
	System Type	Notional Spec	
	Manufacturer	Notional Spec	
	Model Name	Notional Spec	
	In Summer	89.10	
	In Winter	89.10	
	SAP Code	104	
	Fuel Type	Mains gas	
	Database Ref. No.	0	
	Percentage of Heat	100.00	%
	Description	Notional Spec	

	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	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	Yes
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No



28.1 Showers Description Shower Type Flow Rate Rated Power Connected Connected To [l/min] [kW] Shower Vented hot water system Storage System 7.00 No 28.3 Waste Water Heat Recovery System Instantaneous System 1 Database ID 80003 Brand Model Showersave, Recoh-vert RV3 Details Year: 2011 + 2017 Efficiency: 0 Utilisation factor: 0.974 29.0 Hot Water Cylinder None No Cylinder Stat Cylinder In Heated Space No No Independent Time Control Insulation Type Measured Loss 245.00 Cylinder Volume L 1.92 kWh/day Loss No In Airing Cupboard 31.0 Thermal Store None 32.0 Photovoltaic Unit One Dwelling Export Capable Meter? Yes Connected To Dwelling Yes No Diverter Battery Capacity [kWh] 0.00 PV Cells kWp Overshading FGHRS MCS Certificate Orientation Elevation Overshading MCS Panel Manufacturer Factor Certificate Reference 2.52 South East 30° None Or Little No 1.00 No None 34.0 Small-scale Hydro **Electricity Generated** 0.00 Apportioned 0.00 kWh/Year Connected to dwelling's electricity meter Yes Annual **Electricity Generation** Feb May Jan Mar Apr Jun Jul Aug Sep Oct Nov Dec 35.0 Special Features Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Energy Fuel Saved Energy Fuel Used Description Monthly Air Special Change Rates Saved Used Technologies Type CO2 saving 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 feature

Recommendations

Lower cost measures

None Further measures to achieve even higher standards None



Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley

Dwelling type: Date of assessment: Produced by: Total floor area: DRRN: House, Mid-Terrace 05/05/2023 Keith Ketchley 126 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 (CO_2) emissions. The higher the rating the less impact it has on the environment.



Dwelling Address	Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley		
Report Date	05/05/2023		
Property Type	House, Mid-Terrace		
Floor Area [m ²]	126		

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.





Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
Feature	Description			Energy Performance
Walls	Average thermal transmi	ttance 0.15 W/m²K		Very Good
Roof	Average thermal transmi	ttance 0.11 W/m²K		Very Good
Floor	Average thermal transmi	ttance 0.12 W/m²K		Very Good
Windows	High performance glazing		Good	
Main heating	Boiler and radiators, mains gas		Very Good	
Main heating controls	Programmer, room thermostat and TRVs		Good	
Secondary heating	None			
Hot water	From main system, waste water heat recovery		Very Good	
Lighting	Good lighting efficiency		Good	
Air tightness	Air permeability [AP50] = 3.0 m³/h.m² (assumed)		Good	

Primary Energy use

The primary energy use for this property per year is 34 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

0.8

The	estimated	CO	emissions	for	this	dwellings	is:
-----	-----------	----	-----------	-----	------	-----------	-----

per year



With the recommended measures the potential CO emissions could be:

per year

1

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical	Potential Rating	Cumulative	Cumulative
	Yearly	after	savings	Potential
	Saving	measure installed	(per year)	Rating

Estimated energy use and potential savings



Contacting the assessor and the accreditation scheme

Assessor contact details			
Assessor name	Mr. Keith Ketchley		
Assessor's accreditation number	EES/027679		
Email Address	keith.ketchley@desco.uk.com		



Accreditation scheme contact details			
Accreditation scheme	Elmhurst Energy Systems Ltd		
Telephone	0191 522 2070		
Email Address	keith.ketchley@desco.uk.com		

Assessment details			
Related party disclosure	Employed by the professional dealing with the property transaction		
Date of assessment	02/05/2023		
Date of certificate	02/05/2023		
Type of assessment	SAP, new dwelling		

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 05 May 2023 08:22:19

Project Information					
Assessed By	Keith Ketchley	Building Type	House, Mid-terrace		
OCDEA Registration	EES/027679	Assessment Date	2023-05-05		

Dwelling Details			
Assessment Type	As designed	Total Floor Area	126 m ²
Site Reference	Greggs Bakery	Plot Reference	Greggs-D-TH-Be Lean
Address	D12 Gregs Bakery D12 - Towr	house, Twickenham	

Client Details	
Name	London Square
Company	London Square
Address	ONE YORK ROAD, , UXBRIDGE, UB8 1RN

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

1a Target emission rate and dwelling emission rate				
Fuel for main heating system	Mains gas			
Target carbon dioxide emission rate	8.7 kgCO ₂ /m ²			
Dwelling carbon dioxide emission rate	8.64 kgCO ₂ /m ²	OK		
1b Target primary energy rate and dwelling primary energ	l y			
Target primary energy	45.26 kWh _{PE} /m ²			
Dwelling primary energy	46.98 kWh _{PE} /m ²	FAIL		
1c Target fabric energy efficiency and dwelling fabric energy efficiency				
Target fabric energy efficiency	29.0 kWh/m ²			
Dwelling fabric energy efficiency	32.9 kWh/m ²	FAIL		

2a Fabric U-values										
Element	Maximum permitted	Dwelling average U-Value	Element with highest							
	average U-Value [W/m ² K]	[W/m ² K]	individual U-Value							
External walls	0.26	0.15	Walls (1) (0.15)	OK						
Party walls	0.2	0	Party Wall (1) (0)	N/A						
Curtain walls	1.6	0	N/A	N/A						
Floors	0.18	0.12	Heatloss Floor 1 (0.12)	OK						
Roofs	0.16	0.11	Roof (1) (0.11)	OK						
Windows, doors,	1.6	1.3	Opening (1.3)	OK						
and roof windows										
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)	25.53	0.15								
Party wall: Party Wall (1)	55.65	0 (!)								
Ground floor: Heatloss Floor 1, Heatloss Floor 1	31	0.12								
Exposed roof: Roof (1)	70.6	0.11								

2c Openings (better than typically expected values are flagged with a subsequent (!))										
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]						
Opening, Opening Type 2	14.89	West	0.8	1.3						
Opening, Opening Type 2	7.9	East	0.8	1.3						
Door, Opening Type 1	2.53	East	N/A	1.3						

2d Thermal bridging (better than typically expected values are flagged with a subsequent (1))										
zu merma bruging (better than typically expected values are hagged with a subsequent (1))										
Building part 1 - Main Dwelling : Thermal bridging calculated from linear thermal transmittances for each junction										
Main element	Junction detail	Source	Psi value	Drawing /						
			[W/mK]	reference						
External wall	E5: Ground floor (normal)	SAP table default	0.32							
External wall	E6: Intermediate floor within a	SAP table default	0.14							
	dwelling									
External wall	E18: Party wall between dwellings	SAP table default	0.24							
Party wall	P3: Intermediate floor between	SAP table default	0 (!)							

Main element	Junction detail		Source	Psi value	Drawing /		
	duudlinge (in blocks of f	lete)		[vv/mĸj	reference		
Dorth (Wall	dweilings (in blocks of f	iats)	CAD table default	0 (1)			
Party wall	dwelling	vitnin a	SAP table default	0 (!)			
Party wall	P5: Roof (insulation at I	rafter level)	SAP table default	0.48			
3 Air permeabili	ty (better than typically	vexpected	values are flagged with a subseq	uent (!))			
Maximum permit	ted air permeability at 50)Pa	8 m ³ /hm ²				
Dwelling air perm	eability at 50Pa		3 m³/hm², Design value (!)		OK		
Air permeability to	est certificate reference		1				
4 Space heating							
Main heating sy	stem 1: Boiler with radia	itors or unde	erfloor heating - Mains gas				
Efficiency		89.1%					
Emitter type		Radiators					
Flow temperature)	35°C					
System type		Notional					
Manufacturer		Notional					
Model		Notional					
Commissioning							
Secondary heat	ing system: N/A						
Fuel		N/A					
Efficiency		N/A					
Commissioning							
5 Hot water							
Cylinder/store -	type: N/A						
Capacity		N/A					
Declared heat los	SS	N/A					
Primary pipework	c insulated	N/A					
Manufacturer							
Model							
Commissioning							
Waste water hea	at recovery system 1 - 1	type: Instan	taneous				
Efficiency		0.0%					
Manufacturer		Hei-tech b.	V.				
Model		Recoh-vert	RV3				
6 Controls							
Main heating 1 -	type: Programmer, roon	n thermosta	t, and TRVs				
Function							
Ecodesign class							
Manufacturer							
Model							
Water heating -	type: Cylinder thermosta	t and HW s	eparately timed				
Manufacturer							
Model							
7 Lighting							
Minimum permitte	ed light source efficacy	75 lm/W					
Lowest light sour	ce efficacy	85 lm/W		0	K		
External lights co	ntrol	N/A					
8 Mechanical ve	ntilation						
System type: Balanced whole-house mechanical ventilation with heat recovery							
Maximum permit	ted specific fan power	1.5 W/(l/s)	· · · · · · · · · · · · · · · · · · ·				
Specific fan power 0.55 W/(I/s				0	K		
Minimum permitted heat recovery 73%							
efficiency							
Heat recovery eff	iciency	92%		0	K		
Manufacturer/Mo	del	Sentinel Ki	netic Plus B				
Commissioning							

9 Local generation									
Technology type: Photovoltaic system (1)									
Peak power	1.91 kWp								
Orientation	South East	South East							
Pitch	30°	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									
Signed:		Assessor ID:							
Name:		Date:							
b. Client Declaration									
N/A									



Property Reference	Greggs	Greggs Bakery						Issu					ssued on Date 05/05/2023			
Assessment Reference	Greggs	-D-TH-	Be Lean				Pro	р Туре	Ref	Greg	reggs Bakery					
Property	Gregs I	Bakery	D12 - Town	house, D12, Twicke	nham,	ham, Thames Valley										
SAP Rating				92 A	DE	R		8.64	Ļ		TE	R		8.7	0	
Environmental				92 A	%	DER <	TER							0.6	9	
CO ₂ Emissions (t/year)				0.95	DF	EE		32.8	37		TF	EE		29.	02	
Compliance Check				See BREL	%	DFEE <	< TFE	E						-13	.29	
% DPER < TPER				-3.79	DP	PER		46.9	8		TP	ER		45.	26	
Assassor Datails	Mr. Koith Ka	tablay									٨٥	20000		02	02 000	1
Client											As	58550	טו זע	Q3	03-000	1
	JT DATA FOR	: New	/ Build (A	s Designed)												
Orientation			,	Unknown												
Property Tenture				ND												
Transaction Type				6												
Terrain Type				Suburban												
1 0 Property Type				House Mid-Terrace	<u> </u>											
Which Floor					,											
2 0 Number of Storeys				3												
2.0 Number of otoreys				2022												
3.0 Date Built				2023												
4.0 Shellered Sides																
5.0 Sunlight/Shade				Average of unknow	11											
6.0 Thermal Mass Parame	ter			Precise calculation												
Thermal Mass N/A				N/A							KJ/ľ	m²ĸ				
7.0 Electricity Tariff				Standard												
Smart electricity meter f	fitted			Yes												
Smart gas meter fitted				Yes												
7.0 Measurements				Baseme Ground flo 1st Stor 2nd Stor 3rd Stor 4th Stor 5th Stor 6th Stor 7th Stor	H ent: eor: ey: ey: ey: ey: ey: ey:	Heat Lo	0.00 r 0.00 r 8.59 r 12.70 12.70 12.70 12.70 0.00 r 0.00 r 0.00 r 0.00 r	erimete n m m n n n n n	r Int	ternal I 0.0 41.0 54.0 31.0 0.0 0.0 0.0 0.0 0.0 0.0	Floor 0 m ² 00 m ² 00 m ² 0 m ² 0 m ² 0 m ² 0 m ² 0 m ²	· Area	A۱	/erage (2 2 2 2 2 2 2 0 0 0 0 0 0 0 0 0 0 0 0	Storey 0.00 m 2.50 m 2.50 m 2.50 m 0.00 m 0.00 m 0.00 m 0.00 m	Height
8.0 Living Area				20.50							m²					
9.0 External Walls																
Description	Туре	Constru	uction		U-V (W/	value k /m²K) (k	(appa J/m²K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res		Shelte	r O	penings	Area C	alculation vpe
External Wall 1	Cavity Wall	Cavity v filled ca	vall : plasterbo vity, any outsid	ard on dabs, AAC block, le structure	` 0.	0.15 ``6	60.00	50.85	25.53	0.00		None		25.32	Enter G	ross Area
9.1 Party Walls	_			_								_				
Description	Туре		Construct	ion					U-Value (W/m ² K)	Kapp (kJ/m ²	a ² K)	Area (m²)	Shel Re	lter s	She	lter
Party Wall 1	Filled Cavit Edge Seali	y with ng	Plasterboa sides, AAC	rd on dabs mounted blocks, cavity	l on ce	ement r	ender	on both	0.00	45.0	0	55.65	0.0	0	No	ne
10.0 External Roofs																
Description	Туре	Co	nstruction			U-Va (W/n	alue h n²K)(k	(Xappa (J/m ² K)	Gross Area(m ²)	Nett Area	Sh	elter S ode	Shelter Factor	Calcu Tv	lationC)penings
External Roof 1	External Plane Roof	e Pla	sterboard, i	nsulated at ceiling le	evel	0.1	11	9.00	70.60	(m²) 0.00	N	one	0.00	Enter Are	Gross ea	0.00
10.2 Internal Ceilings Description Internal Ceiling 1		Storey +1	y	Construction Plasterboard ceili	ng, cai	rpeted	chipbo	pard floo	or						Area 54.0	(m²))0



Internal Ceiling 2 +2		Plasterboard ceiling	, carpeted chipbo	oard floor				42	.00
11.0 Heat Loss Floors Description Type Stor	ey Index	Construction	U-Val	ue	Shelter Code Sh		elter Kappa	a Area (m²)	
Heatloss Floor 1 Ground Floor - Solid Low	est occupied	Suspended concrete floor	, carpeted	0.12	2	None	га 0	.00 75.00	31.00
12.0 Opening Types Description Data Source Ty	be	Glazing		Glazing	Filling	G-value	Frame	Frame	U Value
Opening Type 1 Manufacturer Ha Opening Type 2 Manufacturer Wi	lf Glazed Do ndow	oor Double Low-E S Double Low-E S	Soft 0.05 Soft 0.05	Gap	Type Air Filled Air Filled	0.63 0.63	Type Wood Wood	Factor 0.80 0.80	(W/m²K) 1.30 1.30
13.0 Openings									
NameOpening TypeOpeningOpening Type 2OpeningOpening Type 2DoorOpening Type 1		Location External Wall 1 External Wall 1 External Wall 1		Orienta Wes Eas Eas	ation st st st	Area (14.8 7.90 2.53	m²) 9 0 3	Pit 0 0 0	ch
14.0 Conservatory		None							
15.0 Draught Proofing		100				%			
16.0 Draught Lobby		No				Ē			
						 ¬			
17.0 Thermal Bridging 17.1 List of Bridges		Calculate Bridges							
 Bridge Type E5 Ground floor (normal) E6 Intermediate floor within a dwelling E18 Party wall between dwellings P3 Party wall - Intermediate floor between dwe (in blocks of flats) P2 Party wall - Intermediate floor within a dwell P5 Party wall - Roof (insulation at rafter level) 	Sou Tab Tab Ilings Tab Iling Tab Tab	Irce Type le K1 - Default le K1 - Default	Length 8.59 25.40 30.00 19.20 33.00 12.60	Psi 0.32 0.14 0.24 0.00 0.00 0.48	Adjusted 0.32 0.14 0.24 0.00 0.00 0.48	Reference:			Imported Yes Yes No No No
Y-value		0.13				W/m²K			
		Vee							
18.0 Pressure lesting							2) O FO D	_	
		3.00				m³/(n.m [.]	²) @ 50 P	а	
Property lested?		Yes							
lest Method		Blower Door							
AS Built AP ₅₀		0.10				m³/(n.m	²) @ 50 P	а	
19.0 Mechanical Ventilation									
Mechanical Ventilation		Yes							
		No				4			
Mechanical Ventilation data Type		Database							
		Balanced mechanical	ventilation with h	eat recove	rv	4			
MV Reference Number		500167			. ,	4			
Configuration		2				4			
MVHR Duct Insulated		Insulated Ducts				=			
Manufacturer SEP		0.55							
		Rigid							
MVHR Efficiency		92.00							
Wet Rooms		2							
SFP from Installer Commissioning Certifi	cate	No				i i			
MVHR System Location		Inside heated envelor	oe (installed exclu	usivelv)		4			
Duct Installation Specification		Level 1		i i					
20 0 Fans Open Firenlaces Flues									
21.0 Fixed Coolina System		No							
22.0.1 ighting		L							
No Fixed Lighting		No							
		Name Lighting 1	Efficacy 85.00	Por	wer 5	Capa 42	city 5	Co i 1	u nt 0



24.0 Main Heating 1	Manufacturer	
Description	Notional Spec Boiler	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Mains gas	
SAP Code	104	
In Winter	89.10	
In Summer	89.10	
Model Name	Notional	
Manufacturer	Notional	
System Type	Notional	
Controls SAP Code	2106	
Delayed Start Stat	Yes	
Burner Control	Modulating	
HETAS approved System	No	
Oil Pump Inside	No	
FI Case	0.00	
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Enter value	
Flow Temperature Value	35.00	
Boiler Interlock	Yes	
Combi boiler type	Standard Combi	
Combi keep hot type	None	
25.0 Main Heating 2	None	

26.0 Heat Networks

None

	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	I								
Water Heating		Ma	ain Heating 1						

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	Yes
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
Supplementary Immersion	No



Immersion Only Heating Hot Water			Yes								
28.1 Showers											
Description	:	Shower Type	Flow Rate Rated Power (wer C	onnected	Connected	Го
Shower		Vented hot wa	ater system			7.00	[(11]		Yes	Storage Syst	em
28.3 Waste Water Heat Recovery	System										
Database ID			80003								
Brand Model			Showersave	, Recol	h-vert RV3						
Details			Year: 2011 +	2017	Efficiency: 0 L	Itilisation fa	ctor: 0.974				
29 0 Hot Water Cylinder			None						·		
Cylinder Stat			Yes								
Cylinder In Heated Space			Yes								
Independent Time Control			Yes								
Insulation Type			Jacket								
Insulation Thickness Type			50 mm								
Insulation Thickness			50								
Cylinder Volume			150.00						L		
Loss			1.92						kWh/day		
Pipes insulation			All accessibl	e pipev	vork insulated						
In Airing Cupboard			No								
31.0 Thermal Store			Hot water								
Thermal Store Pipework			connected b	v > 1.5	m pipework						
				,							
32.0 Photovoltaic Unit			One Dwellin	g							
Export Capable Meter?			Yes								
Connected To Dwelling			Yes								
Diverter			No								
Battery Capacity [kWh]			0.00								
PV Cells kWp	Orientation	Elevation	Oversh	ading	FGHRS	MCS Ce	ertificate	Over: Facto	shading M or C	MCS Certificate	Panel Manufacturer
1.91	South East	30°	None O	r Little	No	No		1.00	г	Celefence	
34.0 Small-scale Hydro			None								
Electricity Generated			0.00								
Apportioned			0.00						kWh/Yea	r	
Connected to dwelling's electric	city meter		Yes								
Electricity Generation			Annual								
Jan Feb	Mar	Apr	Мау	Jun	Jul	Aug	g S	ер	Oct	Nov	Dec

Recommendations

Lower cost measures None Further measures to achieve even higher standards None



Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley

Dwelling type: Date of assessment: Produced by: Total floor area: DRRN: House, Mid-Terrace 05/05/2023 Keith Ketchley 126 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 (CO_2) emissions. The higher the rating the less impact it has on the environment.



Dwelling Address	Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley
Report Date	05/05/2023
Property Type	House, Mid-Terrace
Floor Area [m ²]	126

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.




Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
Feature	Description			Energy Performance
Walls	Average thermal transmi	ttance 0.15 W/m²K		Very Good
Roof	Average thermal transmi	ttance 0.11 W/m²K		Very Good
Floor	Average thermal transmi	ttance 0.12 W/m²K		Very Good
Windows	High performance glazin	High performance glazing		
Main heating	Boiler and radiators, mains gas			Very Good
Main heating controls	Programmer, room thermostat and TRVs			Good
Secondary heating	None			
Hot water	From main system, waste water heat recovery			Very Good
Lighting	Good lighting efficiency			Good
Air tightness	Air permeability [AP50] =	3.0 m³/h.m² (assumed)		Good

Primary Energy use

The primary energy use for this property per year is 41 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

0.9

The	estimated	CO	emissions	for	this	dwellings	is:
-----	-----------	----	-----------	-----	------	-----------	-----

per year



With the recommended measures the potential CO emissions could be:

per year

1

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical	Potential Rating	Cumulative	Cumulative
	Yearly	after	savings	Potential
	Saving	measure installed	(per year)	Rating

Estimated energy use and potential savings



Contacting the assessor and the accreditation scheme

Assessor contact details		
Assessor name	Mr. Keith Ketchley	
Assessor's accreditation number	EES/027679	
Email Address	keith.ketchley@desco.uk.com	



Accreditation scheme contact details			
Accreditation scheme	Elmhurst Energy Systems Ltd		
Telephone	0191 522 2070		
Email Address	keith.ketchley@desco.uk.com		

Assessment details			
Related party disclosure	Employed by the professional dealing with the property transaction		
Date of assessment	02/05/2023		
Date of certificate	02/05/2023		
Type of assessment	SAP, new dwelling		

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 05 May 2023 08:22:19

Project Information			
Assessed By	Keith Ketchley	Building Type	Flat, Mid-terrace
OCDEA Registration	EES/027679	Assessment Date	2023-05-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	71 m ²
Site Reference	Greggs Bakery	Plot Reference	Greggs-F-2B4P-Be Lean
Address	D12 Gregs Bakery D12 - Towr	nhouse, Twickenham	

Client Details	
Name	London Square
Company	London Square
Address	ONE YORK ROAD, , UXBRIDGE, UB8 1RN

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Mains gas	
Target carbon dioxide emission rate	13.31 kgCO ₂ /m ²	
Dwelling carbon dioxide emission rate	10.65 kgCO ₂ /m ²	OK
1b Target primary energy rate and dwelling primary energy	l y	
Target primary energy	70.93 kWh _{PE} /m ²	
Dwelling primary energy	57.96 kWh _{PE} /m ²	OK
1c Target fabric energy efficiency and dwelling fabric ene	rgy efficiency	
Target fabric energy efficiency	35.6 kWh/m ²	
Dwelling fabric energy efficiency	36.3 kWh/m ²	FAIL

2a Fabric U-values						
Element	Maximum permitted	Dwelling average U-Value	Element with highest			
	average U-Value [W/m ² K]	[W/m ² K]	individual U-Value			
External walls	0.26	0.15	Walls (1) (0.15)	OK		
Party walls	0.2	0	Party Wall (1) (0)	N/A		
Curtain walls	1.6	0	N/A	N/A		
Floors	0.18	0.12	Heatloss Floor 1 (0.12)	OK		
Roofs	0.16	N/A	N/A	N/A		
Windows, doors,	1.6	1.3	Opening (1.3)	OK		
and roof windows						
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)	33.65	0.15		
Party wall: Party Wall (1)	55.65	0 (!)		
Ground floor: Heatloss Floor 1, Heatloss Floor 1	31	0.12		

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]			
Opening, Opening Type 2	2.4	North	0.8	1.3			
Opening, Opening Type 2	2.4	North	0.8	1.3			
Patio Door, Opening Type 2	5.6	North	0.8	1.3			
Opening, Opening Type 2	2.4	West	0.8	1.3			
Opening, Opening Type 2	2.4	West	0.8	1.3			
Front Door, Opening Type 1	2	South	N/A	1.3			

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 Dra							
			[W/mK]	reference			
External wall	E5: Ground floor (normal)	SAP table default	0.32				
External wall	E18: Party wall between dwellings	SAP table default	0.24				

3 Air permeability (better than typicall	y expected	values are flagged with a subsequent (!))	
Maximum permitted air permeability at 5	OPa		014
Dwelling air permeability at 50Pa		3 m [°] /hm ² , Design value (!)	OK
Air permeability test certificate reference		1	
4 Space heating			
Main heating system 1: Boiler with radia	ators or unde	erfloor heating - Mains gas	
Efficiency	89.1%	· · ·	
Emitter type	Radiators		
Flow temperature	45°C		
System type	Notional		
Manufacturer	Notional		
Model	Notional		
Commissioning			
Secondary heating system: N/A			
Fuel	N/A		
Efficiency	N/A		
Commissioning			
5 Hot water			
Cylinder/store - type: N/A			
Capacity	N/A		
Declared heat loss			
Primary pinework insulated			
Manufacturer	1 10/71		
Model			
Commissioning			
Waste water heat recovery system 1 -	tvne: Instan	taneous	
Efficiency	0.0%		
Manufacturer	Hei-tech h	V	
Model	Recoh-vert	t R\/3	
INOGEI	Trecon-ven		
6 Controls			
Main heating 1 - type: Programmer, room	m thermosta	it, and TRVs	
Function			
Ecodesign class			
Manufacturer			
Model			
Water heating - type: N/A	1		
Manufacturer			
Model			
7 Lighting			
Minimum permitted light source efficacy	75 lm/W		
Lowest light source efficacy	85 lm/W		OK
External lights control	N/A	1	
	•		
8 Mechanical ventilation		a Che Cara sa Alla da a chara a sa sa sa	
System type: Balanced Whole-house me		nuiauon with neat recovery	
Maximum permitted specific fan power	1.5 W/(I/S)	N .	01/
Specific fail power	U.33 VV/(I/S)	UN
Minimum permitted neat recovery	13%		
	0.001/		01/
Monufacturor/Model	Sontinal 12	notio Pluc P	UN
	Senunei Ki		
9 Local generation			
Technology type: Photovoltaic system	(1)		
Peak power	1.46 kWp		
Orientation	South East		
Pitch	30°		
Overshading	0.8 (oversh	nading factor calculated according to MCS)	
Manufacturer			
MCS certificate			

10 Heat networks							
N/A	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							



Property Reference	Gregg	js Bakery							Issued	l on Date	05/05	/2023	
Assessment Reference	Gregg	js-F-2B4P-Be L	ean			Prop	Type I	Ref	Greggs	eggs Bakery			
Property	Gregs	Bakery D12 - 1	ownhouse, D12,	Twickenha	am, Thar	nes Valle	у						
SAP Rating			90 B		DER		10.6	5	-	TER	13	.31	
Environmental			92 A		% DER	< TER					19	.98	
CO₂ Emissions (t/year)			0.66		DFEE		36.3	32		IFEE	35	.58	
Compliance Check			See BREL		% DFEE	< TFEE					-2	.07	
% DPER < TPER			18.29		DPER		57.9	6		TPER	70	.93	
Assessor Details	Mr. Keith K	Ketchley								Assessor	D Q	303-00	001
Client													
SUMMARY FOR INPUT		R: New Build	l (As Designe	d)									
Orientation			Northeast										
Property Tenture			ND										
Transaction Type			6										
Terrain Type			Suburban										
1.0 Property Type			Flat, Mid-Ter	race									
Position of Flat			Ground-floor	flat									
Which Floor			0										
2.0 Number of Storeys			1										
3.0 Date Built			2023										
4.0 Sheltered Sides	4.0 Sheltered Sides												
5.0 Sunlight/Shade			Average or u	Average or unknown									
6.0 Thermal Mass Parameter			Precise calcu	Precise calculation									
Thermal Mass N/A			k	J/m²K									
7.0 Electricity Tariff			Standard										
Smart electricity meter fit	ted		Yes										
Smart gas meter fitted			Yes										
7.0 Measurements													
			Bi Grou 1s	asement Ind floor St Storey	Heat	Loss Per 0.00 m 15.00 m 12.70 m	imete	r Int	ternal Flo 0.00 n 71.00 i 54.00 i	or Area 1 ² 11 ² 11 ² 11 ² 11 ²	Average	9 Stor 0.00 r 3.00 r 2.50 r	ey Height n n n
			2n 3r	d Storey: d Storey:		0.00 m	l		0.00 n	n∸ 1²		2.50 r 0.00 r	n n
			4t 5t	h Storey: h Storey:		0.00 m 0.00 m			0.00 n 0.00 n	1 ² 1 ²		0.00 r 0.00 r	n n
			6t 7t	h Storey h Storey		0.00 m 0.00 m			0.00 n 0.00 n	1² 1²		0.00 r 0.00 r	n n
8 0 Living Area			24.60						m	2			
9.0 External Walls									' ''	-			
Description T	Туре	Construction			U-Value	Kappa	Gross	Nett Area	Shelter	Shelter	Opening	s Area	Calculation
External Wall 1 C	Cavity Wall	Cavity wall : plas filled cavity, any	terboard on dabs, AAC outside structure	block,	0.15	60.00	50.85	33.65	0.00	None	17.20	Ente	r Gross Area
9.1 Party Walls													
Description	Туре	Const	ruction					U-Value (W/m ² K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Sł	nelter
Party Wall 1	Filled Cav Edge Sea	rity with Plaste ling sides,	rboard on dabs m AAC blocks, cavit	ounted or y	n cement	render o	n both	0.00	45.00	55.65	0.00	N	lone
10.1 Party Ceilings Description		Constr	uction								Kap (kJ/n	opa n²K)	Area (m²)
Party Ceiling 1		In-situ o	oncrete slab supp	orted by	profiled r	netal dec	k, carp	eted			90.	00 ′	71.30
10.2 Internal Ceilings Description Internal Ceiling 1		Storey Lowest occup	Construct vied Plasterboa	ion rd ceiling	, carpete	d chipboa	ard floc	or				Are 54	a (m²) 4.00



Internal Ceiling 2 Lowest c	cupied Plasterboard ceiling, carpeted chipt	ooard floor			42.	00
11.0 Heat Loss Floors						
Description Type Storey	dex Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m²)
Heatloss Floor 1 Ground Floor - Solid Lowest	Suspended concrete floor, carpeted	0.12	None	0.00	75.00	31.00
12.0 Opening Types Description Data Source Type	Glazing	Glazing Filling	G-value F	rame Fi	ame	U Value
Opening Type 1 Manufacturer Solid Opening Type 2 Manufacturer Windo	oor Double Low-E Soft 0.05 v Double Low-E Soft 0.05	Air Filled	d 0.63 d 0.63	Nood (Nood ().80).80	1.30 1.30
13.0 Openings						
NameOpening TypeOpeningOpening Type 2OpeningOpening Type 2Patio DoorOpening Type 2OpeningOpening Type 2OpeningOpening Type 2OpeningOpening Type 2OpeningOpening Type 2OpeningOpening Type 1	Location External Wall 1 External Wall 1 External Wall 1 External Wall 1 External Wall 1 External Wall 1	Orientation North North North West West South	Area (m 2.40 2.40 5.60 2.40 2.40 2.00	?)	Pitc 0 0 0 0 0 0	h
14.0 Conservatory	None					
15.0 Draught Proofing	100		%			
16.0 Draught Lobby	No					
17.0 Thermal Bridging 17.1 List of Bridges Bridge Type	Calculate Bridges	Psi Adiuste	d Reference:		I	mported
E5 Ground floor (normal) E18 Party wall between dwellings	Table K1 - Default15.00Table K1 - Default12.00	0.32 0.32 0.24 0.24			_	Yes Yes
Y-value	0.09		W/m²K			
18.0 Pressure Testing	Yes					
Designed AP ₅₀	3.00		 m³/(h.m²)	@ 50 Pa		
Property Tested?	Yes					
Test Method	Blower Door					
As Built AP ₅₀	0.10		m³/(h.m²)	@ 50 Pa		
19.0 Mechanical Ventilation						
Mechanical Ventilation						
Mechanical Ventilation System Present	Yes					
Approved Installation	No					
Mechanical Ventilation data Type	Database					
Туре	Balanced mechanical ventilation with	heat recovery				
MV Reference Number	500167					
Configuration	2					
MVHR Duct Insulated	Insulated Ducts					
Manufacturer SFP	0.55					
Duct Type	Rigid					
MVHR Efficiency	92.00					
Wet Rooms	2					
SFP from Installer Commissioning Certificat	No					
MVHR System Location	Inside heated envelope (installed excl	usively)				
Duct Installation Specification	Level 1					
20.0 Fans, Open Fireplaces, Flues						
21.0 Fixed Cooling System	No					
22.0 Lighting	No					
INO FIXEA LIGNUNG	No Name Efficacy Lighting 1 85.00	Power	 Capaci 425	ty	Cou	nt
		*	0			



26.0	Heat Networks	None	
25.0	Main Heating 2	None	
C	Combi keep hot type	None	
C	Combi boiler type	Standard Combi	
E	Boiler Interlock	Yes	
F	low Temperature Value	45.00	
F	low Temperature	Enter value	
ι	Inderfloor Heating	Yes - Pipes in thin screed	
F	leat Emitter	Radiators	
F	leating Pump Age	2013 or later	
ls	s MHS Pumped	Pump in heated space	
F	an Assisted Flue	No	
F	lue Туре	None or Unknown	
F	I Case	0.00	
C	Dil Pump Inside	No	
F	IETAS approved System	No	
E	Burner Control	Modulating	
C	Delayed Start Stat	Yes	
C	Controls SAP Code	2106	
S	System Type	Notional	
Ν	lanufacturer	Notional	
Ν	lodel Name	Notional	
	In Summer	89.10	
	In Winter	89.10	
S	AP Code	104	
F	uel Type	Mains gas	
C	Database Ref. No.	0	
F	Percentage of Heat	100.00	%
D	Description	Notional Spec Boiler	

Heat Source	Fuel Type Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
None								
None								
None								
None								
None								
	Heat Source None None None None None	Heat Source Fuel Type Heating Use None None None None None None None None	Heat Source Fuel Type Heating Use Efficiency None None None None None None None None	Heat Source Fuel Type Heating Use Efficiency Percentage Of Heat None None None None None None	Heat Source Fuel Type Heating Use Efficiency Percentage Of Heat Heat None None None None None None None None None	Heat Source Fuel Type Heating Use Efficiency Percentage Of Heat Heat Heat None None None None None None None None None None None	Heat Source Fuel Type Heating Use Efficiency Percentage Of Heat Heat Heat Power Ratio None None None None None None None None None None None None None None None None None None	Heat Source Fuel Type Heating Use Efficiency Percentage Of Heat Heat Heat Electrical Fuel Factor None None None None None None None None None None None None None None None None None None None None None

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	Yes
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No



28.1 Showers Description Shower Type Flow Rate Rated Power Connected Connected To [l/min] [kW] Shower Vented hot water system Storage System 7.00 No 28.3 Waste Water Heat Recovery System Instantaneous System 1 Database ID 80003 Brand Model Showersave, Recoh-vert RV3 Details Year: 2011 + 2017 Efficiency: 0 Utilisation factor: 0.974 29.0 Hot Water Cylinder None No Cylinder Stat Cylinder In Heated Space No No Independent Time Control Insulation Type Measured Loss 245.00 Cylinder Volume L 1.92 kWh/day Loss No In Airing Cupboard 31.0 Thermal Store None 32.0 Photovoltaic Unit Multiple Dwellings – Connected Export Capable Meter? Yes Connected To Dwelling Yes No Diverter Battery Capacity [kWh] 0.00 PV Cells kWp Overshading FGHRS MCS Certificate Orientation Elevation Overshading MCS Panel Manufacturer Factor Certificate Reference 1.46 South East 30° Modest Yes 0.80 No None 34.0 Small-scale Hydro **Electricity Generated** 0.00 Apportioned 0.00 kWh/Year Connected to dwelling's electricity meter Yes Annual **Electricity Generation** Feb May Jan Mar Apr Jun Jul Aug Sep Oct Nov Dec 35.0 Special Features Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Energy Fuel Saved Energy Fuel Used Description Monthly Air Special Change Rates Saved Used Technologies Type CO2 saving 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 feature

Recommendations

Lower cost measures

None Further measures to achieve even higher standards None



Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley

Dwelling type: Date of assessment: Produced by: Total floor area: DRRN: Flat, Mid-Terrace 05/05/2023 Keith Ketchley 71 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 (CO_2) emissions. The higher the rating the less impact it has on the environment.



Dwelling Address	Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley				
Report Date	05/05/2023				
Property Type	Flat, Mid-Terrace				
Floor Area [m ²]	71				

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.





Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
Feature	Description			Energy Performance
Walls	Average thermal transmi	Very Good		
Floor	Average thermal transmi	Very Good		
Windows	High performance glazin	Good		
Main heating	Boiler and radiators, main	Very Good		
Main heating controls	Programmer, room therm	Good		
Secondary heating	None			
Hot water	From main system, wast	Very Good		
Lighting	Good lighting efficiency	Good		
Air tightness	Air permeability [AP50] =	3.0 m³/h.m² (assumed)		Good

Primary Energy use

The primary energy use for this property per year is 50 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The estimated CO emissions for this dwellings is:	0.7	per year		
With the recommended measures the potential CO emissions could be:				per year



Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical	Potential Rating	Cumulative	Cumulative
	Yearly	after	savings	Potential
	Saving	measure installed	(per year)	Rating

Estimated energy use and potential savings



The estimated cost and savings show how much the average household would spend in this property for heating, lighting and hot water. It is not based on how energy is used by the people living at the property.

Contacting the assessor and the accreditation scheme

Assessor contact details			
Assessor name	Mr. Keith Ketchley		
Assessor's accreditation number EES/027679			
Email Address	keith.ketchley@desco.uk.com		



Accreditation scheme contact details			
Accreditation scheme	Elmhurst Energy Systems Ltd		
Telephone	0191 522 2070		
Email Address	keith.ketchley@desco.uk.com		

Assessment details			
Related party disclosure	Employed by the professional dealing with the property transaction		
Date of assessment	02/05/2023		
Date of certificate	02/05/2023		
Type of assessment	SAP, new dwelling		

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 05 May 2023 08:22:20

Project Information			
Assessed By	Keith Ketchley	Building Type	Flat, Detached
OCDEA Registration	EES/027679	Assessment Date	2023-05-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	71 m ²
Site Reference	Greggs Bakery	Plot Reference	Greggs - 3F 2B4P - Be Lean
Address	D12 Gregs Bakery D12 - Towr	house, Twickenham	

Client Details	
Name	London Square
Company	London Square
Address	ONE YORK ROAD, , UXBRIDGE, UB8 1RN

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

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Mains gas		
Target carbon dioxide emission rate	11.93 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	11.75 kgCO ₂ /m ²	OK	
1b Target primary energy rate and dwelling primary energy			
Target primary energy	62.68 kWh _{PE} /m ²		
Dwelling primary energy	67.57 kWh _{PE} /m ²	FAIL	
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	33.2 kWh/m ²		
Dwelling fabric energy efficiency	30.5 kWh/m ²	OK	

2a Fabric U-values					
Element	Maximum permitted	Dwelling average U-Value	Element with highest		
	average U-Value [W/m ² K]	[W/m ² K]	individual U-Value		
External walls	0.26	0.15	Walls (1) (0.15)	OK	
Party walls	0.2	N/A	N/A	N/A	
Curtain walls	1.6	N/A	N/A	N/A	
Floors	0.18	N/A	N/A	N/A	
Roofs	0.16	0.11	Roof (1) (0.11)	OK	
Windows, doors,	1.6	1.3	Opening (1.3)	OK	
and roof windows					
Rooflights	2.2	N/A	N/A	N/A	

2b Envelope elements (better than typically expected values are flagged with		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	26.7	0.15
Exposed roof: Roof (1)	71	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
Opening, Opening Type 2	2.4	North	0.8	1.3
Opening, Opening Type 2	2.4	North	0.8	1.3
Patio Door, Opening Type 2	5.6	North	0.8	1.3
Opening, Opening Type 2	2.4	East	0.8	1.3
Opening, Opening Type 2	2.4	East	0.8	1.3
Opening, Opening Type 1	2	South	N/A	1.3
Front Door, Opening Type 1	2	South	N/A	1.3

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))						
Building part 1 - I	Main Dwelling: Thermal bridging ca	Iculated from linear thermal transmit	tances for each ju	nction		
Main element	Junction detail	Source	Psi value	Drawing /		
	[W/mK] reference					
External wall	E7: Party floor between dwellings	Not government-approved	0 (!)			
(in blocks of flats) scheme						

Main element	Junction detail		Source	Psi value	Drawing /		
External wall	F16: Corner (normal)		Not government-approved		reference		
			scheme	0 (1)			
• • • • • • • • • • • • • • • • • • •	to the stars the sectors is all						
3 Air permeabili	ty (better than typically	y expected	values are flagged with a subsec	luent (!))			
Dwelling air permit	eability at 50Pa	JFa	$3 \text{ m}^3/\text{hm}^2$ Design value (1)		OK		
Air permeability t	est certificate reference		1		UN		
4 Chase heating			1.				
4 Space neating	stom 1: Boiler with radic	ators or unde	arfloor beating - Mains gas				
Efficiency	Stell 1. Doller with radio	89.1%	eniour neating - Mains gas				
Emitter type		Radiators					
Flow temperature	9	45°C					
System type		Notional					
Manufacturer		Notional					
Model		Notional					
Commissioning	ing avotom: N/A						
Fuel	ing system. N/A	N/A					
Efficiency		N/A					
Commissioning							
5 Hot water							
Cylinder/store -	type: N/A						
Capacity		N/A					
Declared heat los	SS	N/A					
Primary pipework	c insulated	N/A					
Manufacturer							
Model	Nodel						
Commissioning	Commissioning						
Waste water hea	at recovery system 1 -	type: Instant	taneous				
Manufacturer		U.U% Hei-tech h	N .				
Model		Recoh-vert	RV3				
6 Controls	tupo: Brogrommor, roor	n thormooto	t and TR\/a				
Function	type. Programmer, roor						
Ecodesign class							
Manufacturer							
Model							
Water heating -	type: N/A						
Manufacturer							
Model							
7 Lighting							
Minimum permitt	ed light source efficacy	75 lm/W					
Lowest light sour	ce efficacy	85 lm/W		(DK		
External lights co	ontrol	N/A					
8 Mechanical ve	entilation						
System type: Ba	alanced whole-house me	chanical ve	ntilation with heat recovery				
Maximum permit	ted specific fan power	1.5 W/(I/s)					
Specific fan powe	ed heat recovery	U.55 VV/(I/S))	C	NN		
efficiency	eu neal recovery	13/0					
Heat recovery eff	ficiency	92%		(Ж		
Manufacturer/Mo	del	Sentinel Ki	netic Plus B				
Commissioning							
9 Local generati	ion						
N/A	N/A						
	15						

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							



Property Reference G	reggs Baker	у							Issu	ed on Da	te	05/05/2	2023	
Assessment Reference G	reggs - 3F 2	B4P - Be Le	Be Lean Prop Type Ref Grego			Gregg	s Bakery							
Property G	regs Bakery	D12 - Town	ihouse, D´	12, Twickenh	am, Tha	nes Va	ley							
SAP Rating			85 B		DER		11.7	75		TER		11.9	93	
Environmental			91 B		% DER	< TER						1.51	1	
CO ₂ Emissions (t/vear)			0.77		DFEE		30 !	54		TFEE		33 1	17	
Compliance Check			See BRE		% DFE	E < TFE	E	, ,				7 92	> 	
% DPER < TPER			-7 80		DPER		67 5	57		TPER		62 6	-	
			1.00				01.0					02.0		
Assessor Details Mr. Kei	ith Ketchley									Assess	or ID	Q30	03-0001	
SUMMARY FOR INPUT DATA	FOR: New	/ Build (A	s Desig	ned)										
Orientation			Northeas	t										
Property Tenture			ND											
Transaction Type			6											
Terrain Type			Suburbar	ı										
1.0 Property Type			Flat, Deta	ached										
Position of Flat			Top-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 c	alculation										
Thermal Mass			N/A							kJ/m²K				
7.0 Electricity Tariff			Standard											
Smart electricity meter fitted			Yes											
Smart gas meter fitted			Yes											
7.0 Measurements														
			G	Basement Fround floor 1st Storey 2nd Storey 3rd Storey 4th Storey 5th Storey 6th Storey 7th Storey	Heat	Loss P 0.00 45.95 12.70 12.70 0.00 0.00 0.00 0.00 0.00	rerimete m m m m m m m m m	r In	ternal F 0.00 71.3 54.0 31.0 0.00 0.00 0.00 0.00 0.00	loor Area) m ² 0 m ² 0 m ²) m ²) m ²) m ²) m ²) m ²	a Av	verage \$ 0 2 2 0 0 0 0 0 0 0 0	Storey 1 .00 m .50 m .50 m .50 m .00 m .00 m .00 m .00 m	Height
8.0 Living Area			26.00							m²				
9.0 External Walls Description Type	Constru	uction			U-Value (W/m²K)	Kappa (kJ/m²K	Gross Area(m²	Nett Area) (m²)	Shelter Res	Shelt	er O	penings	Area Cal Tv	culation
External Wall 1 Cavity Wall	Cavity v filled ca	vall : plasterbo vity, any outsid	ard on dabs, le structure	AAC block,	0.15	60.00	45.90	26.70	0.00	Non	e	19.20	Enter Gr	oss Area
9.1 Party Walls Description Type Party Wall 1 Filled Edge	Cavity with Sealing	Construct Plasterboa sides, AAC	t ion ard on dab C blocks, c	s mounted o avity	n cemen	t rendei	⁻ on both	U-Value (W/m²K) 0.00	Kappa (kJ/m²l 45.00	a Area K) (m²) 55.65	She l Re 5 0.0	lter s 00	Shelf Non	e
10.0 External Roofs	~					Volu-	Ka	0	N-44	Ok alta	Ok alt-	Colori	otion C	
External Roof 1 External	Co Plane Pla	sterboard in	nsulated a	at ceiling leve	U. (M	• value //m²K)(0.11	kappa kJ/m ² K) 9,00	Gross Area(m ²) 71.00	Nett Area (m ²) 0.00	Sneiter Code	5neiter Factor	Enter (ationOj De Gross	0.00
Roof						-						Are	a	



Description		Storey	Con	struction							Kappa	Area (m²)
Party Floor 1		Lowest occupied	In-si	tu concrete slab supp	orted b	y profiled r	netal deck	, carpeted			90.00	71.30
12.0 Opening Types												
Description	Data Source	Туре		Glazing			Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Opening Type 1 Opening Type 2	Manufacturer Manufacturer	Solid Dool Window	r	Double Low-E Double Low-E	Soft 0.0 Soft 0.0)5)5		Air Filled Air Filled	0.63 0.63	Wood Wood	0.80 0.80	1.30 1.30
13.0 Openings												
Name Opening Patio Door Opening Opening Opening Front Door	Opening Ty Opening Ty Opening Ty Opening Ty Opening Ty Opening Ty Opening Ty Opening Ty	pe be 2 be 2 be 2 be 2 be 2 be 2 be 1		Location External Wall 1 External Wall 1 External Wall 1 External Wall 1 External Wall 1 External Wall 1 External Wall 1			Orient Nor Nor Eas Sou Sou	ation th th st st st ith	Area 2.4 2.4 5.6 2.4 2.4 2.0 2.0	(m²) 0 0 0 0 0 0 0	Pi	tch 0 0 0 0 0 0 0
14.0 Conservatory			[None								
15.0 Draught Proofing			[100					%			
16.0 Draught Lobby			[No								
17.0 Thermal Bridging 17.1 List of Bridges Bridge Type			[Sou	Calculate Bridges		Length	Psi	Adjusted	Reference	:		Imported
E7 Party floor between c E16 Corner (normal)	dwellings (in block	s of flats)	Non Non	Gov Approved Schen Gov Approved Schen	nes nes	45.95 10.00	0.00 0.00	0.00 0.00				Yes Yes
Y-value			[0.00					W/m²K			
18.0 Pressure Testing			[Yes								
Designed AP ₅₀			[3.00					m³/(h.m	²) @ 50 Pa	a	
Property Tested?			[Yes								
Test Method			[Blower Door								
As Built AP50			[0.10					m³/(h.m	²) @ 50 Pa	a	
19.0 Mechanical Ventilation	n											
Mechanical Ventilation	tion System Pres	ent	[Yes					7			
Approved Installati	on			No					i i			
Mechanical Ventila	tion data Type			Database					i i			
Туре				Balanced mechanical	ventila	ation with h	eat recove	erv	Ξ́			
MV Reference Nur	nber		[500167				,	Ξ́			
Configuration			[2					Ħ			
MVHR Duct Insula	ted		ĺ	Insulated Ducts					i i			
Manufacturer SFP			Ì	0.55					Ξ́			
Duct Type			Ì	Rigid					Ī			
MVHR Efficiency			Ī	92.00					Ī			
Wet Rooms			ĺ	2					Ī			
SFP from Installer	Commissioning C	ertificate	Ī	No					Ē			
MVHR System Loc	cation		Ī	Inside heated envelo	ce (inst	alled exclu	isively)		Ę			
Duct Installation Sp	pecification		Ì	Level 1					Ŧ			
20.0 Fans, Open Fireplace	s, Flues											
21.0 Fixed Cooling System	1		[No								
22.0 Lighting									_			
No Fixed Lighting			[No Name Lighting 1	Effic 85	acy	Ро	wer 5	Capa 42	acity 25	Co	ount 10
24.0 Main Heating 1			[Manufacturer					7			



26.0	Heat Networks	None	
25.0	Main Heating 2	None	
C	Combi keep hot type	None	
C	Combi boiler type	Standard Combi	
E	Boiler Interlock	Yes	
F	low Temperature Value	45.00	
F	low Temperature	Enter value	
ι	Inderfloor Heating	Yes - Pipes in thin screed	
F	leat Emitter	Radiators	
F	leating Pump Age	2013 or later	
ls	s MHS Pumped	Pump in heated space	
F	an Assisted Flue	No	
F	lue Туре	None or Unknown	
F	I Case	0.00	
C	Dil Pump Inside	No	
F	IETAS approved System	No	
E	Burner Control	Modulating	
C	Delayed Start Stat	Yes	
C	Controls SAP Code	2106	
S	System Type	Notional	
Ν	lanufacturer	Notional	
Ν	lodel Name	Notional	
	In Summer	89.10	
	In Winter	89.10	
S	AP Code	104	
F	uel Type	Mains gas	
C	Database Ref. No.	0	
F	Percentage of Heat	100.00	%
D	Description	Notional Spec Boiler	

Heat Source	Fuel Type Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
None								
None								
None								
None								
None								
	Heat Source None None None None None	Heat Source Fuel Type Heating Use None None None None None None None None	Heat Source Fuel Type Heating Use Efficiency None None None None None None None None	Heat Source Fuel Type Heating Use Efficiency Percentage Of Heat None None None None None None	Heat Source Fuel Type Heating Use Efficiency Percentage Of Heat Heat None None None None None None None None None	Heat Source Fuel Type Heating Use Efficiency Percentage Of Heat Heat Heat None None None None None None None None None None None	Heat Source Fuel Type Heating Use Efficiency Percentage Of Heat Heat Heat Power Ratio None None None None None None None None None None None None None None None None None None	Heat Source Fuel Type Heating Use Efficiency Percentage Of Heat Heat Heat Electrical Fuel Factor None None None None None None None None None None None None None None None None None None None None None

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	Yes
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No



28.1 Showers Description Shower Type Flow Rate Rated Power Connected Connected To [l/min] [kW] Shower Vented hot water system Storage System 7.00 No 28.3 Waste Water Heat Recovery System Instantaneous System 1 Database ID 80003 Brand Model Showersave, Recoh-vert RV3 Details Year: 2011 + 2017 Efficiency: 0 Utilisation factor: 0.974 29.0 Hot Water Cylinder None No Cylinder Stat Cylinder In Heated Space No No Independent Time Control Insulation Type Measured Loss 245.00 Cylinder Volume L 1.92 kWh/day Loss No In Airing Cupboard 31.0 Thermal Store None None 34.0 Small-scale Hydro 0.00 **Electricity Generated** 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 35.0 Special Features Monthly Air Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Energy Fuel Saved Energy Fuel Used Description Special Saved Used Change Rates Technologies Type CO2 saving feature 0.00 0.00

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards None



Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley

Dwelling type: Date of assessment: Produced by: Total floor area: DRRN: Flat, Detached 05/05/2023 Keith Ketchley 71.3 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 (CO_2) emissions. The higher the rating the less impact it has on the environment.



Dwelling Address	Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley
Report Date	05/05/2023
Property Type	Flat, Detached
Floor Area [m ²]	71

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.





Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor Average Good		Good	Very Good			
Feature	Description	Description					
Walls	Average thermal transmi	Average thermal transmittance 0.15 W/m²K					
Roof	Average thermal transmi	Average thermal transmittance 0.11 W/m²K					
Windows	High performance glazin	Good					
Main heating	Boiler and radiators, main	Boiler and radiators, mains gas					
Main heating controls	Programmer, room thermostat and TRVs Good						
Secondary heating	None						
Hot water	From main system, waste	Very Good					
Lighting	Good lighting efficiency	Good					
Air tightness	Air permeability [AP50] =	3.0 m³/h.m² (assumed)		Good			

Primary Energy use

The primary energy use for this property per year is 62 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The estimated CO emissions for this dwellings is:	0.8	per year		
With the recommended measures the potential CC	emissions	s could be:	1	per year



Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical	Potential Rating	Cumulative	Cumulative
	Yearly	after	savings	Potential
	Saving	measure installed	(per year)	Rating

Estimated energy use and potential savings



The estimated cost and savings show how much the average household would spend in this property for heating, lighting and hot water. It is not based on how energy is used by the people living at the property.

Contacting the assessor and the accreditation scheme

Assessor contact details					
Assessor name	Mr. Keith Ketchley				
Assessor's accreditation number	EES/027679				
Email Address	keith.ketchley@desco.uk.com				



Accreditation scheme contact details			
Accreditation scheme	Elmhurst Energy Systems Ltd		
Telephone	0191 522 2070		
Email Address	keith.ketchley@desco.uk.com		

Assessment details			
Related party disclosure	Employed by the professional dealing with the property transaction		
Date of assessment	27/04/2023		
Date of certificate	27/04/2023		
Type of assessment	SAP, new dwelling		

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 05 May 2023 08:22:20

Project Information				
Assessed By	Keith Ketchley	Building Type	House, Mid-terrace	
OCDEA Registration	EES/027679	Assessment Date	2023-05-05	

Dwelling Details				
Assessment Type	As designed	Total Floor Area	80 m ²	
Site Reference	Greggs Bakery Plot Reference Greggs-G-TH-Be Lean			
Address	D12 Gregs Bakery D12 - Townhouse, Twickenham			

Client Details	
Name	London Square
Company	London Square
Address	ONE YORK ROAD, , UXBRIDGE, UB8 1RN

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

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Mains gas		
Target carbon dioxide emission rate	10.54 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	7.46 kgCO ₂ /m ²	OK	
1b Target primary energy rate and dwelling primary energy			
Target primary energy	55.2 kWh _{PE} /m ²		
Dwelling primary energy	44.87 kWh _{PE} /m ²	OK	
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	38.6 kWh/m ²		
Dwelling fabric energy efficiency	34.0 kWh/m ²	ОК	

2a Fabric U-values	;			
Element	Maximum permitted	Dwelling average U-Value	Element with highest	
	average U-Value [W/m ² K]	[W/m ² K]	individual U-Value	
External walls	0.26	0.15	Walls (1) (0.15)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.12	Heatloss Floor 1 (0.12)	OK
Roofs	0.16	0.11	Roof (1) (0.11)	ОК
Windows, doors,	1.6	1.3	Opening (1.3)	ОК
and roof windows				
Rooflights	2.2	1.3	Opening, North (1.3)	OK

2h Envelope elements (better than typically expected values are flagged with a subsequent (II)			
In the second seco			
Name	Net area [m]	0-value [w/m K]	
Exposed wall: Walls (1)	34.77	0.15	
Party wall: Party Wall (1)	32.5	0 (!)	
Ground floor: Heatloss Floor 1, Heatloss Floor 1	57.09	0.12	
Exposed roof: Roof (1)	71.2	0.11	

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
Opening, Opening Type 2	8.15	North	0.8	1.3
Opening, Opening Type 2	5.4	East	0.8	1.3
Door, Opening Type 1	2.53	East	N/A	1.3
Opening, Opening Type 3	5	North	0.7	1.3

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))					
Building part 1 - I	Main Dwelling: Thermal bridging ca	Iculated from linear thermal transmi	ttances for each ju	Inction	
Main element	Main element Junction detail Source Psi value Drawing /				
			[W/mK]	reference	
External wall	E5: Ground floor (normal)	Government-approved scheme	0 (!)		
External wall	E6: Intermediate floor within a dwelling	Government-approved scheme	0 (!)		

Main element	Junction detail		Source	Psi value [W/mK]	Drawing /
External wall	E18: Party wall betwee	n dwellings	Government-approved scheme	0 (!)	
2 A in manual alkili					
3 Air permeability (better than typically expected values are flagged with a subsequent (!))					
Maximum permit	ted air permeability at 50	JPa	$8 \text{ m}^2/\text{nm}^2$		01/
Dweiling air perm	eability at 50Pa		3 m²/nm², Design value (!)		UK
Air permeability t	est certificate reference				
4 Space heating					
Main heating sy	stem 1: Boiler with radia	ators or unde	erfloor heating - Mains gas		
Efficiency		89.1%			
Emitter type		Radiators			
Flow temperature	9	45°C			
System type		Notional			
Manufacturer		Notional			
Model		Notional			
Commissioning	N1/A				
Secondary neat	ing system: N/A				
Fuel		N/A			
Efficiency		IN/A			
Commissioning					
5 Hot water					
Cylinder/store -	type: N/A				
Capacity		N/A			
Declared heat los	SS	N/A			
Primary pipework	c insulated	N/A			
Manufacturer					
Model					
Commissioning					
Waste water heat recovery system 1 - type: Instantaneous					
Efficiency		0.0%			
Manufacturer		Hei-tech b.	V.		
Model		Recoh-vert	RV3		
6 Controls					
Main heating 1 -	type: Programmer, roor	n thermosta	t, and TRVs		
Function	<u> </u>		·		
Ecodesign class					
Manufacturer					
Model					
Water heating -	type: N/A				
Manufacturer					
Model					
7 Lighting					
Minimum permitt	ed light source efficacy	75 lm/M/			
Lowest light sour	ce efficacy	85 lm/W		0	K
External lights co	introl	N/A		U	
		1.0/7.			
8 Mechanical ve	ntilation				
System type: Ba	alanced whole-house me	chanical ve	ntilation with heat recovery		
Maximum permit	ted specific fan power	1.5 W/(l/s)			
Specific fan powe	er	0.55 W/(I/s))	0	ĸ
Minimum permitt	ed neat recovery	/3%			
efficiency	" - 1	000/			17
Heat recovery eff		92%	natia Dhua D	0	ĸ
Commissioning	uei	Sentinei Ki			
Commissioning					

9 Local generation			
Technology type: Photovoltaic system	(1)		
Peak power	3.5 kWp		
Orientation	South East		
Pitch	Horizontal		
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:		Date:	
b. Client Declaration			
N/A			



Property Reference	Greggs	Baker	ý						lssu	ed on Da	te	05/05/2	2023	
Assessment Reference	Greggs-G-TH-Be Lean			Prop Type Ref Greg			Gregg	eggs Bakery						
Property	Gregs	Bakery	D12 - Town	house, D12, Twickenl	nam, Thai	mes Val	ley							
SAP Rating				93 A	DER		7.46	3		TER		10.	54	
Environmental				94 A	% DER	< TER			!			29.2	22	
CO₂ Emissions (t/year)				0.48	DFEE		33.9	97		TFEE		38.0	64	
Compliance Check				See BREL	% DFEI	E < TFE	E		!			12.	10	
% DPER < TPER				18.71	DPER		44.8	37		TPER		55.2	20	
Accessor Dataila	Ma Kaith Ka	tebless								Access	or ID			4
Client		etchiey								ASSESS		Q3	J3-000	1
SUMMARY FOR INPU	T DATA FOR	: New	Build (A	s Designed)										
Orientation				Unknown										
Property Tenture				ND										
Transaction Type				6										
Terrain Type			ו ן	Suburban										
1 0 Property Type			l I	House Mid-Terrace										
Which Eloor			l I											
2 0 Number of Storeys			l I	2										
2.0 Number of Storeys			l	2022										
4.0 Sheltered Sides			l	0										
4.0 Shellered Sides			l											
6.0 Thermal Mass Deremo	ha.u		l											
5.0 Thermal Mass Paramet	ler		l]] k l/m²K				
				N/A						KJ/III K				
7.0 Electricity Tariff			ļ	Standard										
Smart electricity meter fi	tted		l	Yes										
Smart gas meter fitted				Yes										
7.0 Measurements				Basemen Ground floo 1st Store 2nd Store 3rd Store 4th Store 5th Store 6th Store 7th Store	Heat t: /: /: /: /: /: /: /:	Loss P 0.00 r 10.90 11.20 12.70 0.00 r 0.00 r 0.00 r 0.00 r	erimete n m m n n n n n n	r Int	ternal F 0.00 57.0 23.1 31.0 0.00 0.00 0.00 0.00 0.00	loor Area) m ² 0 m ² 5 m ² 0 m ²) m ²) m ²) m ²) m ²) m ²	a Av	verage 3 0 2 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Storey 0.00 m 0.50 m 0.50 m 0.00 m 0.00 m 0.00 m 0.00 m 0.00 m	Height
8.0 Living Area			[23.03						m²				
9.0 External Walls														
Description	Туре	Constru	uction		U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelt	er O	penings	Area Ca Ty	alculation ype
External Wall 1	Cavity Wall	Cavity v filled ca	vall : plasterboa vity, any outsid	ard on dabs, AAC block, e structure	0.15	60.00	50.85	34.77	0.00	None	9	16.08	Enter G	ross Area
9.1 Party Walls	Туре		Construct	ion				II-Value	Kann	a Aroa	Sho	tor	Sho	ltor
Berty Well 1		ith	Diastarbas	rd on dobo mounted (trandar	on hoth	(W/m ² K)	(kJ/m²l	K) (m ²)	Re	S	No	
	Edge Seali	ng	sides, AAC	blocks, cavity	on cemen	t render	on boln	0.00	45.00	32.50	0.0	10	INO	ne
10.0 External Roofs														
Description	Туре	Co	nstruction		U- (M	Value //m²K)(k	Kappa (J/m²K)	Gross Area(m ²)	Nett Area	Shelter Code	Shelter Factor	Calcul [.] Typ	ationO be	penings
External Roof 1	External Slop Roof	e Pla	sterboard, ir	nsulated slope		0.11	, 9.00	76.20	(m²) 5.00	None	0.00	Enter (Are	Gross ea	5.00
10.2 Internal Ceilings														
Description Internal Ceiling 1		Storey +1	/	Construction Plasterboard ceiling	g, carpete	d chipb	oard floo	or					Area (23.1	(m²) 5



11.0 Heat Loss Floors											
Description Type	Eleor Selid	Storey Index	Cons	struction	arpoted	U-Val (W/m	ue °K)	Shelter Code	Shel Fact	ter Kapp or (kJ/m ²	a Area (m²) K)
12.0 Opening Types	F1001 - S0110	Lowest occupied	Susp	ended concrete hoor, c	arpeted	0.1.	2	None	0.0	0 75.00	57.09
Description Data	Source	Туре		Glazing		Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Opening Type 1 Manu Opening Type 2 Manu Opening Type 3 Manu	ufacturer ufacturer ufacturer	Half Glazed Window Roof Light	Door	Double Low-E So Double Low-E So Triple Low-E Soft	oft 0.05 oft 0.05 : 0.05		Air Filled Air Filled Air Filled	0.63 0.63 0.57	Wood Wood Wood	0.80 0.80 0.70	1.30 1.30 1.30
13.0 Openings											
NameOpening TypeOpeningOpening Type 2OpeningOpening Type 2DoorOpening Type 1OpeningOpening Type 3			Loca Exte Exte Exte Exte	Location External Wall 1 External Wall 1 External Wall 1 External Roof 1		Orientation North East East North		Area (m²) 8.15 5.40 2.53 5.00		Pitch 0 0 0 11	
14.0 Conservatory			None)							
15.0 Draught Proofing			100					%			
16.0 Draught Lobby			No								
17.0 Thermal Bridging			Calc	ulate Bridges							
Bridge Type E5 Ground floor (normal) E6 Intermediate floor within a dw E18 Party wall between dwelling	velling Is	S G G G	ource T ov Appr ov Appr ov Appr	ype oved Scheme oved Scheme oved Scheme	Length 10.90 11.20 20.00	Psi 0.00 0.00 0.00	Adjusted 0.00 0.00 0.00	Reference	:		Imported Yes Yes Yes
Y-value			0.00					W/m²K			
18.0 Pressure Testing			Yes								
Designed AP50			3.00	3.00			m³/(h.m	²) @ 50 Pa			
Property Tested?			Yes								
Test Method			Blow	er Door							
As Built AP50			0.10					m³/(h.m	²) @ 50 Pa		
19.0 Mechanical Ventilation											
Mechanical Ventilation								_			
Mechanical Ventilation System Present			Yes					4			
Approved Installation			No					4			
Mechanical Ventilation data	а Туре		Data	base				4			
Туре			Bala	nced mechanical v	entilation with h	neat recove	ry				
MV Reference Number			5001	67							
Configuration			2								
MVHR Duct Insulated			Insul	Insulated Ducts							
Manufacturer SFP			0.55	0.55							
Duct Type			Rigid	Rigid							
MVHR Efficiency			92.00)							
Wet Rooms			2								
SFP from Installer Commis	ssioning Ce	ertificate	No								
MVHR System Location			Insid	Inside heated envelope (installed exclusively)							
Duct Installation Specification			Leve	Level 1							
20.0 Fans, Open Fireplaces, Flues	•										
21.0 Fixed Cooling System			No								
22.0 Lighting								_			
No Fixed Lighting			No N Ligi	ame nting 1	Efficacy 85.00	Ро	wer 5	Capa 42	acity 25	Co	ount 0
24.0 Main Heating 1			Manu	ufacturer							
Description			Notic	onal							



25.0 Main Heating 2	None	
Combi keep hot type	Electric, time clock	
Combi boiler type	Standard Combi	
Boiler Interlock	Yes	
Flow Temperature Value	45.00	
Flow Temperature	Enter value	
Underfloor Heating	Yes - Pipes in thin screed	
Heat Emitter	Radiators	
Heating Pump Age	2013 or later	
Is MHS Pumped	Pump in heated space	
Fan Assisted Flue	No	
Flue Type	None or Unknown	
FI Case	0.00	
Oil Pump Inside	No	
HETAS approved System	No	
Burner Control	Modulating	
Delayed Start Stat	Yes	
Controls SAP Code	2106	
System Type	Notional	
Manufacturer	Notional	
Model Name	Notional	
In Summer	89.10	
In Winter	89.10	
SAP Code	104	
Fuel Type	Mains gas	
Database Ref. No.	0	
Percentage of Heat	100.00	%

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	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	Yes
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	No
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

None

28.1 Showers



Description	Shower Type		Flow Rate Rated Power	Connected Connected To		
Shower	Vented hot wa	ter system	7.00	No	Storage System	
28.3 Waste Water Heat Recovery Instantaneous System 1	y System					
Database ID		80003				
Brand Model		Showersave, Recoh-vert RV3				
Details		Year: 2011 + 2017 Efficiency: 0	Utilisation factor: 0.974			
29.0 Hot Water Cylinder		None				
Cylinder Stat		No]		
Cylinder In Heated Space		No]		
Independent Time Control		No]		
Insulation Type		Measured Loss]		
Cylinder Volume		245.00] L		
Loss		1.92		kWh/day		
In Airing Cupboard		No				
31.0 Thermal Store		None				
32.0 Photovoltaic Unit		One Dwelling				
Export Capable Meter?		Yes]		
Connected To Dwelling		Yes				
Diverter		No]		
Battery Capacity [kWh]		0.00]		
PV Cells kWp	Orientation Elevation	Overshading FGHRS	MCS Certificate Ove Fac	rshading I tor	MCS Panel Certificate Manufacturer Reference	
3.50	South East Horizontal	None Or Little No	No 1.00			
34.0 Small-scale Hydro		None				
Electricity Generated		0.00]		
Apportioned		0.00		kWh/Yea	r	
Connected to dwelling's electr	icity meter	Yes]		
Electricity Generation		Annual]		
Jan Feb	Mar Apr	May Jun Jul	Aug Sep	Oct	Nov Dec	
35.0 Special Features Energy Fuel Saved Ener Saved Use	gy Fuel Used Descri d	ption Monthly Air Change Rates Te	Special Jan Feb Mar schnologies Type CO2 saving 0.00 0.00 0.00	Apr May Ju	In Jul Aug Sep Oct Nov Dec	
			feature			

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards None



Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley

Dwelling type: Date of assessment: Produced by: Total floor area: DRRN: House, Mid-Terrace 05/05/2023 Keith Ketchley 80.15 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 (CO_2) emissions. The higher the rating the less impact it has on the environment.



Dwelling Address	Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley					
Report Date	05/05/2023					
Property Type	House, Mid-Terrace					
Floor Area [m ²]	80					

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.




Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor Average Go		Good	Very Good
Feature	Description			Energy Performance
Walls	Average thermal transmi	ttance 0.15 W/m²K		Very Good
Roof	Average thermal transmi	ttance 0.11 W/m²K		Very Good
Floor	Average thermal transmi	Very Good		
Windows	High performance glazin	Good		
Main heating	Boiler and radiators, mai	Very Good		
Main heating controls	Programmer, room thern	Good		
Secondary heating	None			
Hot water	From main system, wast	Very Good		
Lighting	Good lighting efficiency	Good		
Air tightness	Air permeability [AP50] =	- 3.0 m³/h.m² (assumed)		Good

Primary Energy use

The primary energy use for this property per year is 37 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The	estimated	CO	emissions	for	this	dwellings	is:
-----	-----------	----	-----------	-----	------	-----------	-----

0.5 per year



With the recommended measures the potential CO emissions could be:

per year

0

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical	Potential Rating	Cumulative	Cumulative
	Yearly	after	savings	Potential
	Saving	measure installed	(per year)	Rating

Estimated energy use and potential savings



Contacting the assessor and the accreditation scheme

Assessor contact details				
Assessor name	Mr. Keith Ketchley			
Assessor's accreditation number	EES/027679			
Email Address	keith.ketchley@desco.uk.com			



Accreditation scheme contact details			
Accreditation scheme	Elmhurst Energy Systems Ltd		
Telephone	0191 522 2070		
Email Address	keith.ketchley@desco.uk.com		

Assessment details			
Related party disclosure	Employed by the professional dealing with the property transaction		
Date of assessment	28/04/2023		
Date of certificate	28/04/2023		
Type of assessment	SAP, new dwelling		

Appendix C – SAP Analysis BE GREEN

 Ref:
 1823-50-RPT-05

 Date:
 5th May 2023

 Revision:
 09

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 05 May 2023 08:22:20

Project Information					
Assessed By	Keith Ketchley	Building Type	Flat, Detached		
OCDEA Registration	EES/027679	Assessment Date	2023-05-05		

Dwelling Details			
Assessment Type	As designed	Total Floor Area	72 m ²
Site Reference	Greggs Bakery	Plot Reference	Greggs-A-2B4P-Be Green
Address	D12 Gregs Bakery D12 - Towr	nhouse, Twickenham	

Client Details	
Name	London Square
Company	London Square
Address	ONE YORK ROAD, , UXBRIDGE, UB8 1RN

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

1a Target emission rate and dwelling emission rate				
Fuel for main heating system	Electricity			
Target carbon dioxide emission rate	9.2 kgCO ₂ /m ²			
Dwelling carbon dioxide emission rate	1.94 kgCO ₂ /m ²	OK		
1b Target primary energy rate and dwelling primary energy				
Target primary energy	47.96 kWh _{PE} /m ²			
Dwelling primary energy	21.83 kWh _{PE} /m ²	OK		
1c Target fabric energy efficiency and dwelling fabric energy efficiency				
Target fabric energy efficiency	23.5 kWh/m ²			
Dwelling fabric energy efficiency	20.4 kWh/m ²	OK		

2a Fabric U-values						
Element	Maximum permitted	Dwelling average U-Value	Element with highest			
	average U-Value [W/m²K]	[W/m²K]	individual U-Value			
External walls	0.26	0.15	Walls (1) (0.15)	OK		
Party walls	0.2	N/A	N/A	N/A		
Curtain walls	1.6	N/A	N/A	N/A		
Floors	0.18	N/A	N/A	N/A		
Roofs	0.16	N/A	N/A	N/A		
Windows, doors,	1.6	1.3	Opening (1.3)	OK		
and roof windows						
Rooflights	2.2	N/A	N/A	N/A		

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))						
Name Net a					U-Value [W/m ² K]	
Exposed wall: W	alls (1)			29.7	0.15	
2c Openings (be	etter than typically	vexpected value	es are flagged with a sul	bsequent (!))		
Name		Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]	
Opening, Openin	g Type 2	2.5	East	0.8	1.3	
Opening, Openin	g Type 2	2.5	East	0.8	1.3	
Patio Door, Oper	ning Type 2	5.6	East	0.8	1.3	
Opening, Openin	g Type 2	3.6	West	0.8	1.3	
Front Door, Oper	ning Type 1	2	North	N/A	1.3	
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	Drawing /	

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E7: Party floor between dwellings (in blocks of flats)	Government-approved scheme	0 (!)	
External wall	E16: Corner (normal)	Government-approved scheme	0 (!)	

3 Air permeability (better than typicall	y 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		1	
4 Space heating		•	
4 Space neating Main heating system 1: Heat nump with	radiators o	r underfleer besting Electricity	
Efficiency	287 0%	i undernoor heating - Electricity	
Emitter type	207.970 Padiatore		
Elimiter type	125°C		
Suctom type	Joot Dump	<u></u>	
Manufacturer	Daikin Euro	one NIV	
Model	ERI 00080		
Commissioning	LIVEQUOOC		
Secondary heating system: N/A			
Fuel	N/A		
Efficiency	N/A		
Commissioning	19/73		
Commodeling	1		
5 Hot water			
Cylinder/store - type: N/A	1		
Capacity	N/A		
Declared heat loss	N/A		
Primary pipework insulated	N/A		
Manufacturer			
Model			
Commissioning			
Waste water heat recovery system 1 -	type: N/A		
Efficiency			
Manufacturer			
Model			
6 Controls			
0 00111 013			
Main heating 1 - type: Programmer, room	m thermosta	at and TRVs	
Main heating 1 - type: Programmer, root Function	m thermosta	at and TRVs	
Main heating 1 - type: Programmer, room Function Ecodesign class	m thermosta	at and TRVs	
Main heating 1 - type: Programmer, room Function Ecodesign class Manufacturer	m thermosta	at and TRVs	
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model	m thermosta	at and TRVs	
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A	m thermosta	at and TRVs	
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer	m thermosta	at and TRVs	
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model	m thermosta	at and TRVs	
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model Zater heating - type: N/A Manufacturer Model Zater heating - type: N/A	m thermosta	at and TRVs	
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model Zighting Minimum permitted light source efficacy	75 Im/W	at and TRVs	
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy	m thermosta	at and TRVs	
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model Zighting Minimum permitted light source efficacy Lowest light source efficacy External lights control	m thermosta	at and TRVs	
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model Vater heating - type: N/A Manufacturer Model Z Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control	75 Im/W 85 Im/W	at and TRVs	{
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model Vater heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation Sustem turge: Polagood whole bougger	75 Im/W 85 Im/W N/A	at and TRVs	(
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model Vater heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house method	75 Im/W 85 Im/W N/A	entilation with heat recovery	(
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house me Maximum permitted specific fan power	75 Im/W 85 Im/W N/A 2.5 W/(//s) 0.55 W/(//s)	entilation with heat recovery	
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model Vater heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house me Maximum permitted specific fan power Specific fan power Minimum permitted hoot recovery	m thermosta	entilation with heat recovery	(
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model Vater heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house me Maximum permitted specific fan power Specific fan power Minimum permitted heat recovery officiency	m thermosta	entilation with heat recovery	(
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Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model Vater heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house me Maximum permitted specific fan power Specific fan power Minimum permitted heat recovery efficiency Heat recovery efficiency Manufacturer/Model Commissioning 9 Local generation	m thermosta	entilation with heat recovery	
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Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house me Maximum permitted heat recovery efficiency Heat recovery efficiency Manufacturer/Model Commissioning 9 Local generation Technology type: Photovoltaic system Peak power	m thermosta	entilation with heat recovery	
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house me Maximum permitted specific fan power Specific fan power Minimum permitted heat recovery efficiency Heat recovery efficiency Manufacturer/Model Commissioning 9 Local generation Technology type: Photovoltaic system Peak power Orientation	m thermosta	et and TRVs OK entilation with heat recovery) OK inetic Plus B OK	
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house me Maximum permitted specific fan power Specific fan power Minimum permitted heat recovery efficiency Heat recovery efficiency Manufacturer/Model Commissioning 9 Local generation Technology type: Photovoltaic system Peak power Orientation Pitch	m thermosta	entilation with heat recovery	
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house me Maximum permitted specific fan power Specific fan power Minimum permitted heat recovery efficiency Heat recovery efficiency Manufacturer/Model Commissioning 9 Local generation Technology type: Photovoltaic system Peak power Orientation Pitch Overshading	T5 Im/W 85 Im/W 85 Im/W N/A 1.5 W/(I/s) 0.55 W/(I/s) 73% 92% Sentinel Ki 92% Sentinel Ki 0.47 kWp South Horizontal None or ve	entilation with heat recovery	
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house me Maximum permitted specific fan power Specific fan power Minimum permitted heat recovery efficiency Heat recovery efficiency Manufacturer/Model Commissioning 9 Local generation Technology type: Photovoltaic system Peak power Orientation Pitch Overshading Manufacturer Manufacturer	T5 Im/W 85 Im/W 85 Im/W N/A 1.5 W/(I/s) 0.55 W/(I/s) 73% 92% Sentinel Ki 92% Sentinel Ki 0.47 kWp South Horizontal None or ve	entilation with heat recovery	

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	b. Client Declaration					
N/A						



Property Reference		Greggs Ba	akery							Issued	on Date	05/05	/2023	
Assessment Reference	sessment Reference Greggs-A-2B4P-Be Green Prop Type Ref				Ref	Greggs E	Bakery							
Property		Gregs Bal	kery D12 -	Townhouse, D12, Tw	vickenh	nam, Tha	mes Valle	әу						
SAP Rating				92 A		DER		1.94		Т	ER	9.2	20	
Environmental				98 A	-1	% DER	< TER					78	.91	
CO₂ Emissions (t/year))			0.13		DFEE		20.4	10	Т	FEE	23	.45	
Compliance Check				See BREL	-1	% DFE	E < TFEE		-			13	.00	
% DPER < TPER				54.49		DPER		21.8	33	Т	PER	47	.96	
Assassor Dotails	Mr	Kaith Katak									200000			201
Client			lley								13363301		505-0	
SUMMARY FOR INP		A FOR: N	lew Buil	d (As Designed)										
Orientation				Northeast										
Property Tenture				NOTTIeast										
Transaction Type				6										
Terrain Type				Suburban										
1.0 Property Type				Flat, Detached										
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	2									
5.0 Sunlight/Shade				Average or unk	Average or unknown									
6.0 Thermal Mass Param	eter			Precise calcula	Precise calculation									
Thermal Mass				N/A						kJ	l/m²K			
7.0 Electricity Tariff				Standard										
Smart electricity meter	fitted			Yes	Yes									
Smart gas meter fitted				Yes	Yes									
7.0 Measurements														
				Bas Groun 1st 2nd 3rd 4th 5th 6th 7th	emeni d flooi Storey Storey Storey Storey Storey Storey	Heat t: /: /: /: /: /: /: /:	Loss Pe 0.00 m 27.00 r 12.70 r 12.70 r 0.00 m 0.00 m 0.00 m 0.00 m	rimete n n n n i i i i	r In	ternal Floc 0.00 m 72.00 n 54.00 n 31.00 n 0.00 m 0.00 m 0.00 m 0.00 m	or Area ² n ² n ² n ² ² ² ² ² ²	Average	Stor 0.00 2.50 2.50 2.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	ey Height n n n n n n n n
8.0 Living Area				25.00						m	2			
9.0 External Walls Description External Wall 1	Type Cavity Wa	Co all Ca	nstruction vity wall : pla	isterboard on dabs, AAC b	lock,	U-Value (W/m²K) 0.15	Kappa (kJ/m²K) 60.00	Gross Area(m²) 45.90	Nett Area (m²) 29.70	Shelter Res 0.00	Shelter None	Opening 16.20	s Area Ente	Calculation Type or Gross Area
9.1 Party Walls			,, any											
Description Party Wall 1	Typ Fille	be ed Cavity w	Cons	erboard on dabs mou	unted c	on cemer	t render o	on both	U-Value (W/m²K) 0.00	Kappa (kJ/m²K) 45.00	Area (m²) 55.65	Shelter Res 0.00	S I	h elter None
9.2 Internal Walls	Edę	ye sealing	sides	, AAU DIOCKS, CAVITY										Anc - (
Description Construction			hlock plasterboard	n dah	S						rkap (kJ/n 75	ра n²K) 00	Area (m²)	
10.1 Party Ceilings			Dense	sion, plasterboard (-						73.	50	70.22
Description			Const	ruction								Kap (kJ/n	opa n²K)	Area (m²)



Party Ceiling 1		In-situ (concrete slab su	upported by	profiled metal d	eck, carpete	ed			90.00	71.30
11.1 Party Floors											
Description		Storey Index	Construction							Kappa (kJ/m ² K)	Area (m²)
Party Floor 1		Lowest occupied	In-situ concrete	e slab suppo	rted by profiled	metal deck	, carpeted			90.00	71.30
12.0 Opening Types											
Description	Data Source	Туре	Gla	zing		Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Opening Type 1 Opening Type 2	Manufacturer Manufacturer	Solid Door Window	- Dou Dou	ible Low-E S ible Low-E S	oft 0.05 oft 0.05	Cup	Air Filled Air Filled	0.63 0.63	Wood Wood	0.80 0.80	1.30 1.30
13.0 Openings											
Name Opening	Opening Ty Opening Typ	pe pe 2	Location External V	Vall 1		Orient Ea	ation st	Area 2.5	(m²) 0	Pi	tch 0
Opening Patio Door	Opening Typ	be 2	External V	Vall 1 Vall 1		Ea	st et	2.5	0		0
Opening	Opening Typ	be 2	External V	Vall 1		We	st	3.6	0		0
Front Door	Opening Typ	be 1	External V	Vall 1		Nor	th	2.0	0		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					Length	Pei	Adjusted	Reference			Imported
E7 Party floor between dw E16 Corner (normal)	ellings (in block	s of flats)	Gov Approved Gov Approved	Scheme Scheme	27.00 10.00	0.00 0.00	0.00 0.00	Reference	•		Yes Yes
Y-value			0.00					W/m²K			
18.0 Pressure Testing			Yes								
Designed AP ₅₀			3.00					m³/(h.m	²) @ 50 Pa	a	
Property Tested?			Yes								
Test Method			Blower Do	or							
As Built AP50			0.10					m³/(h.m	²) @ 50 Pa	a	
19.0 Mechanical Ventilation											
Mechanical Ventilation								_			
Mechanical Ventilation	on System Pres	ent	Yes					4			
Approved Installatior	ו		No					_			
Mechanical Ventilation	on data Type		Database								
Туре			Balanced	mechanical	ventilation with	heat recove	ery				
MV Reference Numb	ber		500167								
Configuration			2								
MVHR Duct Insulate	d		Insulated	Ducts							
Manufacturer SFP			0.55								
Duct Type			Rigid								
MVHR Efficiency			92.00								
Wet Rooms			2								
SFP from Installer Co	ommissioning C	ertificate	No								
MVHR System Locat	tion		Inside hea	ated envelop	e (installed excl	usively)					
Duct Installation Spe	cification		Level 1								
20.0 Fans, Open Fireplaces,	Flues										
21.0 Fixed Cooling System			No								
22.0 Lighting								_			
No Fixed Lighting			No						•	_	
			Name Lighting	1	∈пісасу 85.00	Po	wer 5	Capa 42	acity 25	Co	10



24.0 Main Heating 1	Database]
Description	Electric Heat Pumps	
Percentage of Heat	100.00	%
Database Ref. No.	102672	
Fuel Type	Electricity]
SAP Code	0]
In Winter	0.00]
In Summer	0.00]
Model Name	ERLQ008CAV3 + EHVH08SU26CB6W]
Manufacturer	Daikin Europe NV]
System Type	Heat Pump]
Controls SAP Code	2210]
Delayed Start Stat	No]
HETAS approved System	No]
Oil Pump Inside	No]
FI Case	0.00]
Flue Type	None or Unknown]
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space]
Heating Pump Age	2013 or later	
Heat Emitter	Radiators	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Enter value	
Flow Temperature Value	35.00	
Boiler Interlock	No]
Combi boiler type	No Combi]
Combi keep hot type	None]
25.0 Main Heating 2	None]
26.0 Heat Networks	None	

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

Heat source 4 Heat source 5 28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	No
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No



28.1 Showers Description Shower Type Flow Rate Rated Power Connected Connected To [l/min] [kW] Shower Vented hot water system 7.00 Storage System No 28.3 Waste Water Heat Recovery System Internal Store 29.0 Hot Water Cylinder No Cylinder Stat No Cylinder In Heated Space Independent Time Control No Insulation Type Measured Loss 245.00 Cylinder Volume L kWh/day 1.92 Loss In Airing Cupboard No 31.0 Thermal Store None 32.0 Photovoltaic Unit One Dwelling Export Capable Meter? Yes Yes Connected To Dwelling Diverter No Battery Capacity [kWh] 0.00 PV Cells kWp Orientation Elevation Overshading FGHRS **MCS** Certificate Overshading MCS Panel Factor Certificate Manufacturer Reference 0.47 South Horizontal None Or Little No No 1.00 34.0 Small-scale Hydro None **Electricity Generated** 0.00 Apportioned 0.00 kWh/Year Connected to dwelling's electricity meter Yes **Electricity Generation** Annual Jun Jul Oct Dec Jan Feb Mar Apr May Aug Sep Νον 35.0 Special Features Fuel Saved Energy Fuel Used Description Monthly Air Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Energy Special Change Rates Technologies Saved Used Type CO2 saving 0.00 0.00 feature

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None



Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley

Dwelling type: Date of assessment: Produced by: Total floor area: DRRN: Flat, Detached 05/05/2023 Keith Ketchley 72 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 (CO_2) emissions. The higher the rating the less impact it has on the environment.



Dwelling Address	Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley
Report Date	05/05/2023
Property Type	Flat, Detached
Floor Area [m ²]	72

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.





Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good			
Feature	Description	Description					
Walls	Average thermal transmi	ttance 0.15 W/m²K		Very Good			
Windows	High performance glazing	Good					
Main heating	Air source heat pump, ra	Good					
Main heating controls	Programmer, room therm	Good					
Secondary heating	None						
Hot water	From main system			Good			
Lighting	Good lighting efficiency	Good					
Air tightness	Air permeability [AP50] =	Good					

Primary Energy use

The primary energy use for this property per year is 20 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The estimated CO emissions for this dwellings is: 0.1 per year	
With the recommended measures the potential CO emissions could be:	0 per year

Recommendations



The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Estimated energy use and potential savings



The estimated cost and savings show how much the average household would spend in this property for heating, lighting and hot water. It is not based on how energy is used by the people living at the property.

Contacting the assessor and the accreditation scheme

Assessor contact details				
Assessor name	Mr. Keith Ketchley			
Assessor's accreditation number	EES/027679			
Email Address	keith.ketchley@desco.uk.com			

Accreditation scheme contact details			
Accreditation scheme	Elmhurst Energy Systems Ltd		
Telephone	0191 522 2070		
Email Address	keith.ketchley@desco.uk.com		



Assessment details			
Related party disclosure	Employed by the professional dealing with the property transaction		
Date of assessment	02/05/2023		
Date of certificate	02/05/2023		
Type of assessment	SAP, new dwelling		

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 05 May 2023 08:22:20

Project Information				
Assessed By	Keith Ketchley	Building Type	House, Mid-terrace	
OCDEA Registration	EES/027679	Assessment Date	2023-05-05	

Dwelling Details				
Assessment Type	As designed	Total Floor Area	126 m ²	
Site Reference	Greggs Bakery	Plot Reference	Greggs-C-TH-Be Green	
Address	D12 Gregs Bakery D12 - Townhouse, Twickenham			

Client Details		
Name	London Square	
Company	London Square	
Address	ONE YORK ROAD, , UXBRIDGE, UB8 1RN	

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	7.73 kgCO ₂ /m ²			
Dwelling carbon dioxide emission rate	2.05 kgCO ₂ /m ²	OK		
1b Target primary energy rate and dwelling primary energy				
Target primary energy	40.02 kWh _{PE} /m ²			
Dwelling primary energy	22.32 kWh _{PE} /m ²	OK		
1c Target fabric energy efficiency and dwelling fabric energy efficiency				
Target fabric energy efficiency	27.4 kWh/m ²			
Dwelling fabric energy efficiency	31.6 kWh/m ²	FAIL		

2a Fabric U-values	;			
Element	Maximum permitted	Dwelling average U-Value	Element with highest	
	average U-Value [W/m ² K]	[W/m ² K]	individual U-Value	
External walls	0.26	0.15	Walls (1) (0.15)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.12	Heatloss Floor 1 (0.12)	OK
Roofs	0.16	0.11	Roof (1) (0.11)	OK
Windows, doors,	1.6	1.3	Opening (1.3)	OK
and roof windows				
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)	25.53	0.15		
Party wall: Party Wall (1)	188.5	0 (!)		
Ground floor: Heatloss Floor 1, Heatloss Floor 1	42.04	0.12		
Exposed roof: Roof (1)	24.1	0.11		

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
Opening, Opening Type 2	14.89	West	0.8	1.3
Opening, Opening Type 2	7.9	East	0.8	1.3
Door, Opening Type 1	2.53	East	N/A	1.3

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part 1 -	Main Dwelling: Thermal bridging ca	Iculated from linear therma	al transmittances for each	junction
Main element	Junction detail	Source	Psi value	Drawing /
			[W/mK]	reference
External wall	E5: Ground floor (normal)	SAP table default	0.32	
External wall	E6: Intermediate floor within a	SAP table default	0.14	
	dwelling			
External wall	E18: Party wall between dwellings	SAP table default	0.24	
Party wall	P3: Intermediate floor between	SAP table default	0 (!)	

Main element	Junction detail		Source	Psi value	Drawing /
	dwallinga (in blocks of f	loto)			reference
Dorty woll	D2: Intermediate fleer w	ials)	SAD toble default	0.(1)	
Party wall	dwelling	vitnin a	SAP lable delault	0 (!)	
Party wall	P5: Roof (insulation at	rafter level)	SAP table default	0.48	
3 Air permeabili	ty (better than typically	/ expected	values are flagged with a subseq	uent (!))	
Maximum permit	ted air permeability at 50)Pa	8 m ³ /hm ²		
Dwelling air perm	eability at 50Pa		3 m ³ /hm ² , Design value (!)		OK
Air permeability to	est certificate reference		1		
4 Space beating					
Main heating sy	stem 1 : Heat numn with	radiators o	r underfloor beating - Electricity		
Efficiency		320.0%			
Emitter type		Radiators			
Flow temperature	<i>.</i>	35°C			
System type	, 	Heat Pump)		
Manufacturer		Daikin Fur	ne NV		
Model		ERI Q0080	CAV3 + EHVH08SU26CB6W		
Commissioning		LILLGOODE			
Secondary heat	ina svstem: N/A				
Fuel		N/A			
Efficiency		N/A			
Commissioning		10/7			
_ contraction ing					
5 Hot water					
Cylinder/store -	type: N/A	-			
Capacity		N/A			
Declared heat los	SS	N/A			
Primary pipework	c insulated	ulated N/A			
Manufacturer					
Model					
Commissioning					
Waste water heat recovery system 1 - type: N/A					
Efficiency					
Manufacturer					
Model					
6 Controls					
Main heating 1 - type: Programmer, room thermostat and TRVs					
Function					
Ecodesign class					
Manufacturer					
Model					
Water heating -	type: N/A				
Manufacturer					
Model					
7 Lighting					
Minimum permitte	ed light source efficacy	75 lm/W			
Lowest light sour	ce efficacy	85 lm/W			OK
External lights co	ntrol	N/A			
8 Mochanical-ve	ntilation				
System type: De	lanced whole house me	chanical va	ntilation with heat receivery		
Mavimum normit	ted specific fan nower		ninauon with near lecovery		
Specific for norm	or	0.55 \N////>			OK
Minimum normitt	ad heat recovery	0.55 W/(I/S)		UN	
	eu neal recovery	13%			
Heat roomany of	iciency	0.2%			OK
Manufacturor/Ma	dol	JZ /0 Sentinal Ki	notic Plus B		UN
Commissioning		Senunei M			

9 Local generation			
Technology type: Photovoltaic system	(1)		
Peak power	0.66 kWp		
Orientation	South		
Pitch	Horizontal		
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:	ne: Date:		
b. Client Declaration			
N/A			



Property Reference	Greggs Baker	у						lssu	ed on Da	te	05/05/2	2023	
Assessment Reference	Greggs-C-TH-	Be Green			Pro	p Type I	Ref	Gregg	s Bakery				
Property	Gregs Bakery	D12 - Town	house, D12, Twickenl	nam, Than	nes Vall	еу							
SAP Rating			90 B	DER		2.05	5		TER		7.7	3	
Environmental			98 A	% DER	< TER	2.00	, 				73 4	48	
CO₂ Emissions (t/vear)			0.22	DFEE		31.6	50		TFEE		27 :	37	
Compliance Check			See BRFI	% DFEE	< TFE	E					-15	47	
% DPER < TPER			44.23	DPER		22.3	32		TPER		40.0)2	
Assessor Details M	r. Keith Ketchley								Assess	or ID	Q30	03-000	1
Client													
SUMMARY FOR INPUT DA	TA FOR: New	/ Build (A	s Designed)										
Orientation			Unknown										
Property Tenture			ND										
Transaction Type			6										
Terrain Type			Suburban										
1.0 Property Type			House, Mid-Terrace										
Which Floor			0										
2.0 Number of Storeys			3										
3.0 Date Built			2023										
4.0 Sheltered Sides			0										
5.0 Sunlight/Shade			Average or unknown										
6.0 Thermal Mass Parameter			Precise calculation										
Thermal Mass			N/A						kJ/m²K				
7.0 Electricity Tariff			Standard										
Smart electricity meter fitted			Yes										
Smart gas meter fitted			Yes										
7 0 Measurements													
r.o measurements			Basemen Ground floo 1st Store 2nd Store 3rd Store 4th Store 5th Store 6th Store 7th Store	Heat r: /: /: /: /: /: /: /:	Loss Pe 0.00 r 23.87 23.87 12.70 0.00 r 0.00 r 0.00 r 0.00 r 0.00 r	erimete n m m m n n n n n n	r Int	ternal F 0.00 41.0 54.0 31.0 0.00 0.00 0.00 0.00 0.00	(loor Area) m ² 0 m ² 0 m ²) m ²) m ²) m ²) m ²) m ²	1 A1	verage : 0 2 2 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Storey .00 m .50 m .50 m .50 m .00 m .00 m .00 m .00 m .00 m	Height
8.0 Living Area			20.50						m²				
9.0 External Walls													
Description Type External Wall 1 Cavity	Vall Cavity v	uction vall : plasterboa vity, any outsid	ard on dabs, AAC block, le structure	U-Value (W/m²K) 0.15	Kappa (kJ/m²K) 60.00	Gross Area(m²) 50.85	Nett Area (m²) 25.53	Shelter Res 0.00	Shelt None	er O	penings 25.32	Area Ca Tr Enter G	alculation ype ross Area
9.1 Party Walls		, ,											
Description T	уре	Construct	ion				U-Value	Kapp	a Area	She	lter	She	lter
Party Wall 1 F	illed Cavity with dge Sealing	Plasterboa sides, AAC	rd on dabs mounted o blocks, cavity	on cement	render	on both	(vv/m²k) 0.00	45.00	K) (m-)) 188.5	0 0.0	i s 10	Nor	ne
10.0 External Roofs							0	N	01. 1	0. "		-41 -	
Description Typ	e Co	nstruction		(W	value ł /m²K)(k	(appa (J/m²K)	Gross Area(m²)	Nett Area	Code	Factor	Calcul Typ	ationO pe	penings
External Roof 1 External Roof 1 Roo	ernal Flat Pla f	sterboard, ii	nsulated flat roof).11	9.00	24.10	(m²) 0.00	None	0.00	Enter (Are	Gross ea	0.00
10.2 Internal Ceilings Description Internal Ceiling 1	Store +1	y	Construction Plasterboard ceiling	g, carpete	d chipbo	pard floo	or					Area (40.8	(m²) 30



11.0 Heat Loss Floors	Construction				Shaltar Cada	Sho	ltor Kapr	a Aroa (m²)
Heatloss Floor 1 Ground Floor - Solid Lowest occupied	Suspended concrete floor, ca	rpeted	(W/m ² 0.12	2 2	None	Fac	tor (kJ/m ²) 0 75.0	K) 0 42.04
12.0 Opening Types Description Data Source Type	Glazing		Glazing	Filling	G-value	Frame	Frame	U Value
Opening Type 1 Manufacturer Half Glazed I Opening Type 2 Manufacturer Window	Door Double Low-E Sof Double Low-E Sof	ft 0.05 ft 0.05	Gap	Air Filled Air Filled	0.63 0.63	Wood Wood	0.80 0.80	(w/m-k) 1.30 1.30
Name Opening Type Opening Opening Type 2 Opening Opening Type 2 Door Opening Type 1	Location External Wall 1 External Wall 1 External Wall 1		Orient a We Eas Eas	ation st st st	Area (14.8 7.90 2.53	m²) 9) 3	Pi	tch 0 0 0
14.0 Conservatory	None				7			
15.0 Draught Proofing	100				%			
16.0 Draught Lobby	No							
17.0 Thermal Bridging	Calculate Bridges							
Bridge Type Sot E5 Ground floor (normal) Ta E6 Intermediate floor within a dwelling Ta E18 Party wall between dwellings Ta P3 Party wall - Intermediate floor between dwellings Ta (in blocks of flats) P2 Party wall - Intermediate floor within a dwelling Ta P5 Party wall - Roof (insulation at rafter level) Ta	burce Type ble K1 - Default ble K1 - Default	Length 8.59 25.40 30.00 19.20 33.00 12.60	Psi 0.32 0.14 0.24 0.00 0.00 0.48	Adjusted 0.32 0.14 0.24 0.00 0.00 0.48	Reference:			Imported Yes Yes No No No
Y-value	0.17				W/m²K			
18 0 Pressure Testing	Yes				 7			
	3 00				 	²) @ 50 Pa		
Property Tested?	Yes)@0014		
Test Method	Blower Door				-			
As Built AP ₅₀	0.10				 m³/(h.m ²	²) @ 50 Pa		
19.0 Mechanical Ventilation	L				``			
Mechanical Ventilation								
Mechanical Ventilation System Present	Yes							
Approved Installation	No							
Mechanical Ventilation data Type	Database							
Туре	Balanced mechanical ve	entilation with h	eat recove	ry				
MV Reference Number	500167							
Configuration	2	7						
MVHR Duct Insulated	Insulated Ducts	7						
Manufacturer SFP	0.55	7						
Duct Type	Rigid	Rigid						
MVHR Efficiency	92.00				Ξ			
Wet Rooms	2				Ξ			
SFP from Installer Commissioning Certificate	No				Ξ.			
MVHR System Location	Inside heated envelope	(installed exclu	isively)		Ξ			
Duct Installation Specification	Level 1							
20.0 Fans, Open Fireplaces, Flues								
21.0 Fixed Cooling System	No							
22.0 Lighting No Fixed Lighting	No Name I	Efficacy	Po	wer	Capa	city	Co	punt
24.0 Main Heating 1	Database			~		-		



26.0 Heat Networks	None	
25.0 Main Heating 2	None	
Combi keep hot type	None	
Combi boiler type	No Combi	
Boiler Interlock	No	
Flow Temperature Value	35.00	
Flow Temperature	Enter value	
Underfloor Heating	Yes - Pipes in thin screed	
Heat Emitter	Radiators	
Heating Pump Age	2013 or later	
Is MHS Pumped	Pump in heated space	
Fan Assisted Flue	No	
Flue Type	None or Unknown	
FI Case	0.00	
Oil Pump Inside	No	
HETAS approved System	No	
Delayed Start Stat	No	
Controls SAP Code	2210	
System Type	Heat Pump	
Manufacturer	Daikin Europe NV	
Model Name	ERLQ008CAV3 + EHVH08SU26CB6W	
In Summer	0.00	
In Winter	0.00	
SAP Code	0	
Fuel Type	Electricity	
Database Ref. No.	102672	
Percentage of Heat	100.00	%
Description	Electric Heat Pumps	

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	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	No
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers



Descripti	on		s	hower Type	•			Flo	w Rate	Rated Pov	wer C	onnected	Connected	То
Shower			N	ented hot wa	ater syst	em		10	7.00	[KVV]		No	Storage Sys	tem
28.3 Waste V	Vater Heat Re	covery Sy	/stem											
29.0 Hot Wat	er Cylinder				Interna	l Store								
Cylinder S	Stat				No									
Cylinder I	n Heated Spa	ce			No									
Independ	ent Time Cont	rol			No									
Insulation	Туре				Measu	red Loss								
Cylinder \	Volume				245.00							L		
Loss					1.92							kWh/day	/	
In Airing (Cupboard				No									
31.0 Therma	I Store				None									
32.0 Photovo	oltaic Unit				One Dv	velling								
Export Ca	apable Meter?				Yes									
Connecte	d To Dwelling				Yes									
Diverter					No									
Battery C	apacity [kWh]				0.00									
PV	Cells kWp	0	rientation	Elevation	Ov	rershading	FGHRS	;	MCS Ce	ertificate	Overs Facto	shading or	MCS Certificate	Panel Manufacturer
0.66	6	S	outh	Horizontal	No	ne Or Little	No		No		1.00		Reference	
34.0 Small-s	cale Hydro				None									
Electricity	Generated				0.00									
Apportion	ed				0.00							kWh/Yea	ar	
Connecte	d to dwelling's	electricity	meter		Yes									
Electricity	Generation				Annual									
Jan	Feb	М	ar	Apr	Мау	Jun		Jul	Aug	g S	ер	Oct	Nov	Dec
35.0 Special	Features													
Energy Saved	Fuel Saved	Energy Used	Fuel Used	l Descri	ption	Monthl Change	y Air Rates	Sp Techr T	ecial tologies vpe	Jan Feb	Mar A	pr May Ju	un Jul Aug S	ep Oct Nov Dec
0.00		0.00						CO2 fea	saving	0.00 0.00	0.000	.00 0.00 0.	00 0.00 0.00 0	.00 0.00 0.00 0.00

Recommendations

Lower cost measures None

Further measures to achieve even higher standards None



Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley

Dwelling type: Date of assessment: Produced by: Total floor area: DRRN: House, Mid-Terrace 05/05/2023 Keith Ketchley 126 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 (CO_2) emissions. The higher the rating the less impact it has on the environment.



Dwelling Address	Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley
Report Date	05/05/2023
Property Type	House, Mid-Terrace
Floor Area [m ²]	126

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.





Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good	
Feature	Description			Energy Performance	
Walls	Average thermal transmi	ttance 0.15 W/m²K		Very Good	
Roof	Average thermal transmi	ttance 0.11 W/m²K		Very Good	
Floor	Average thermal transmi	Average thermal transmittance 0.12 W/m²K			
Windows	High performance glazin	Good			
Main heating	Air source heat pump, ra	diators, electric		Very Good	
Main heating controls	Programmer, room therm	nostat and TRVs		Good	
Secondary heating	None				
Hot water	From main system	Good			
Lighting	Good lighting efficiency		Good		
Air tightness	Air permeability [AP50] = 3.0 m ³ /h.m ² (assumed)		Good		

Primary Energy use

The primary energy use for this property per year is 20 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The	estimated	СО	emissions	for	this	dwellings	is:	
-----	-----------	----	-----------	-----	------	-----------	-----	--

0.2 per year



With the recommended measures the potential CO emissions could be:

per year

0

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical	Potential Rating	Cumulative	Cumulative
	Yearly	after	savings	Potential
	Saving	measure installed	(per year)	Rating

Estimated energy use and potential savings



Contacting the assessor and the accreditation scheme

Assessor contact details					
Assessor name	Mr. Keith Ketchley				
Assessor's accreditation number	EES/027679				
Email Address	keith.ketchley@desco.uk.com				



Accreditation scheme contact details						
Accreditation scheme	Elmhurst Energy Systems Ltd					
Telephone	0191 522 2070					
Email Address	keith.ketchley@desco.uk.com					

Assessment details						
Related party disclosure	Employed by the professional dealing with the property transaction					
Date of assessment	02/05/2023					
Date of certificate	02/05/2023					
Type of assessment	SAP, new dwelling					

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 05 May 2023 08:22:19

Project Information			
Assessed By	Keith Ketchley	Building Type	House, Mid-terrace
OCDEA Registration	EES/027679	Assessment Date	2023-05-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	126 m ²
Site Reference	Greggs Bakery	Plot Reference	Greggs-D-TH-Be Green
Address	D12 Gregs Bakery D12 - Towr	house, Twickenham	

Client Details	
Name	London Square
Company	London Square
Address	ONE YORK ROAD, , UXBRIDGE, UB8 1RN

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

1a Target emission rate and dwelling emission rate							
Fuel for main heating system	Electricity						
Target carbon dioxide emission rate	8.02 kgCO ₂ /m ²						
Dwelling carbon dioxide emission rate	2.18 kgCO ₂ /m ²	OK					
1b Target primary energy rate and dwelling primary energy	l y						
Target primary energy	41.6 kWh _{PE} /m ²						
Dwelling primary energy	23.69 kWh _{PE} /m ²	OK					
1c Target fabric energy efficiency and dwelling fabric energy efficiency							
Target fabric energy efficiency	29.0 kWh/m ²						
Dwelling fabric energy efficiency	32.9 kWh/m ²	FAIL					

2a Fabric U-values	;			
Element	Maximum permitted	Dwelling average U-Value	Element with highest	
	average U-Value [W/m ² K]	[W/m ² K]	individual U-Value	
External walls	0.26	0.15	Walls (1) (0.15)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.12	Heatloss Floor 1 (0.12)	OK
Roofs	0.16	0.11	Roof (1) (0.11)	OK
Windows, doors,	1.6	1.3	Opening (1.3)	OK
and roof windows				
Rooflights	2.2	N/A	N/A	N/A

2b Envelope elements (better than typically expected values are flagged with		
Name	Net area [m ²]	U-Value [W/m ² K]
Exposed wall: Walls (1)	25.53	0.15
Party wall: Party Wall (1)	55.65	0 (!)
Ground floor: Heatloss Floor 1, Heatloss Floor 1	31	0.12
Exposed roof: Roof (1)	70.6	0.11

2c Openings (better than typically expected values are flagged with a subsequent (!))								
Name Area [m ²] Orientation Frame factor U-Value [W/r								
Opening, Opening Type 2	14.89	West	0.8	1.3				
Opening, Opening Type 2	7.9	East	0.8	1.3				
Door, Opening Type 1	2.53	East	N/A	1.3				

2d Thermal bridging (better than typically expected values are flagged with a subsequent (1))										
zu merma bruging (better man typicany expected values are nagged with a subsequent (!))										
Building part 1 - I	Building part 1 - Main Dwelling : Thermal bridging calculated from linear thermal transmittances for each junction									
Main element	ent Junction detail Source Psi value Drawin									
			[W/mK]	reference						
External wall	E5: Ground floor (normal)	SAP table default	0.32							
External wall	E6: Intermediate floor within a	SAP table default	0.14							
	dwelling									
External wall	E18: Party wall between dwellings	SAP table default	0.24							
Party wall	P3: Intermediate floor between	SAP table default	0 (!)							

Main element	Junction detail		Source	Psi value	Drawing /		
				[W/mK]	reference		
	dwellings (in blocks of f	lats)					
Party wall	P2: Intermediate floor v dwelling	vithin a	SAP table default	0 (!)			
Party wall	P5: Roof (insulation at	rafter level)	SAP table default	0.48			
3 Air permeability (better than typically expected			values are flagged with a subse	quent (!))			
Maximum permit	ted air permeability at 50)Pa	8 m ³ /hm ²				
Dwelling air perm	neability at 50Pa		3 m ³ /hm ² , Design value (!)		OK		
Air permeability to	est certificate reference		1				
A Space beating							
4 Space nearing	stom 1: Hoot pump with	radiatore o	underfloor beating Electricity				
Efficiency	Stem T. Heat pump with	210 00/	undernoor nearing - Electricity				
Emiliency		310.0% Dedictors					
Emilier type		Radiators					
Flow temperature	;	35°C					
System type		Heat Pump					
Manufacturer		Daikin Euro					
		EKLQ0080	AV3 + EHVHU8SU26CB6W				
Secondary heat	ing system: N/A						
Fuel		N/A					
Efficiency		N/A					
Commissioning							
5 Hot water							
Cylinder/store -	type: N/A						
Capacity	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	N/A					
Declared heat los	22	N/A					
Primary pipework	cinsulated	N/A					
Manufacturer		110/7					
Model							
Commissioning							
Waste water be	at recovery system 1 -	type: N/A					
Efficiency	at recovery system r						
Manufacturer							
Model							
Model							
6 Controls							
Main heating 1 -	type: Programmer, roor	n thermosta	t and TRVs				
Function							
Ecodesign class							
Manufacturer							
Model							
Water heating -	type: N/A						
Manufacturer							
Model							
7 Lighting							
Minimum permitte	ed light source efficacy	75 lm/W					
Lowest light sour	ce efficacy	85 lm/W		(OK		
External lights co	Introl	N/A					
8 Mechanical ve	ntilation						
System type: Re	alanced whole-house me	chanical ve	ntilation with heat recovery				
Maximum permit	ted specific fan nower	1.5 W/////e1					
Specific fan now		0.55 \\/////0			אר		
Minimum normitt	od hoat rocovery	73%	/				
officiency	eu neal recovery	13/0					
Hoot rocovery of	licionav	0.20/					
Manufacturar/Ma	dol	Sontinal K	notic Plus B				
Commissioning		Senunei M					

9 Local generation						
Technology type: Photovoltaic system	(1)					
Peak power	0.66 kWp					
Orientation	South	South				
Pitch	Horizontal					
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						



Property Reference	Greggs	Baker	у						lssu	ied on D	ate	05/05/	2023	
Assessment Reference	Greggs	-D-TH-	Be Green			Pro	р Туре	Ref	Grego	s Baker	/			
Property	Gregs I	Bakery	D12 - Town	house, D12, Twickenh	nam, Tha	mes Val	ley							
SAP Rating				89 B	DER		2.18	3		TER		8.0	2	
Environmental				98 A	% DER	< TER						72.	82	
CO ₂ Emissions (t/year)				0.24	DFEE		32.8	37		TFEE 29.02				
Compliance Check				See BREL	% DFEE < TFEE					-13.2			.29	
% DPER < TPER				43.06	DPER		23.6	69		TPER		41.	60	
Assessor Details	Mr. Koith Ka	tchley								Asses	sor ID	03	03 000	1
Client		storney								A3503	301 12	00	05-000	1
SUMMARY FOR INPU	T DATA FOR	: New	/ Build (A	s Designed)										
Orientation			Ň	Unknown										
Property Tenture				ND										
Transaction Type				6										
Terrain Type				Suburban										
1 0 Property Type				House Mid-Terrace										
Which Floor														
2.0 Number of Storevs				3										
3.0 Data Built				2023										
3.0 Date Built				0										
4.0 Shellered Sides														
5.0 Sumgnu/Shade	4 a m			Average of unknown										
5.0 Thermal Mass Parame	ter													
				N/A						KJ/M-K				
7.0 Electricity Tariff				Standard										
Smart electricity meter f	itted			Yes										
Smart gas meter fitted				Yes										
7.0 Measurements				Basement Ground floor 1st Storey 2nd Storey 3rd Storey 5th Storey 6th Storey 7th Storey	Heat :: :: :: :: :: :: :: :: :: :	Loss P 0.00 8.59 12.70 12.70 0.00 0.00 0.00 0.00	Perimete m m m m m m m m m	r In	ternal F 0.0(41.0 54.0 31.0 0.0(0.0(0.0(0.0(0.0(Floor Are 0 m ² 10 m ² 10 m ² 0 m ²	a A	verage (2 2 2 2 2 2 2 0 0 0 0 0 0 0 0 0 0 0 0	Storey 0.00 m 2.50 m 2.50 m 2.50 m 0.00 m 0.00 m 0.00 m 0.00 m	Height
8.0 Living Area				20.50						m²				
9.0 External Walls														
Description	Туре	Constru	uction		U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m ²	Nett Area	Shelter Res	She	lter (Openings	Area Ca	alculation
External Wall 1	Cavity Wall	Cavity v filled ca	vall : plasterbo vity, any outsic	ard on dabs, AAC block, le structure	`0.15 <i>´</i>	60.00	50.85	25.53	0.00	No	ne	25.32	Enter G	ross Area
9.1 Party Walls														
Description	Туре		Construct	tion				U-Value (W/m ² K)	Kapp (kJ/m ²	a Are K) (m [:]	a She	lter es	She	lter
Party Wall 1	Filled Cavit Edge Sealii	y with ng	Plasterboa sides, AAC	ard on dabs mounted o C blocks, cavity	on cemer	nt render	on both	n 0.00	45.00	55.6	, 50.	00	No	ne
10.0 External Roofs														
Description	Туре	Co	nstruction		U	-Value V/m²K\/I	Kappa kJ/m²K`\	Gross Area(m ²)	Nett Area	Shelte Code	r Shelte	r Calcu	lationC	penings
External Roof 1	External Plane Roof	e Pla	sterboard, i	nsulated at ceiling leve	v) el	0.11	9.00	70.60	(m²) 0.00	None	0.00	Enter Ar	Gross ea	0.00
10.2 Internal Ceilings Description Internal Ceiling 1		Store +1	y	Construction Plasterboard ceiling	g, carpete	ed chipb	oard floo	or					Area 54.0	(m²))0



Internal Ceiling 2	+2	Plasterboard ceilin	g, carpeted chipbo	oard floor				42.	.00
11.0 Heat Loss Floors Description Type	Storey Index	Construction		U-Val	ue	Shelter Code	She	elter Kappa	Area (m²)
Heatloss Floor 1 Ground Floor - S	olid Lowest occupied	Suspended concrete floc	or, carpeted	0.12	2	None	гас 0.	00 75.00	31.00
12.0 Opening Types Description Data Sourc	е Туре	Glazing		Glazing	Filling	G-value	Frame	Frame	U Value
Opening Type 1 Manufacture Opening Type 2 Manufacture	er Half Glazed Do er Window	oor Double Low-E Double Low-E	Soft 0.05 Soft 0.05	Gap	Type Air Filled Air Filled	0.63 0.63	Type Wood Wood	Factor 0.80 0.80	(W/m²K) 1.30 1.30
13.0 Openings									
NameOpeningOpeningOpeningOpeningOpeningDoorOpening	Type Type 2 Type 2 Type 1	Location External Wall 1 External Wall 1 External Wall 1		Orienta Wes Eas Eas	ation st st st	Area (14.8 7.90 2.53	m²) 9) 3	Pitc 0 0 0	ch
14.0 Conservatory		None							
15.0 Draught Proofing		100				%			
16.0 Draught Lobby		No				Ē			
						 ¬			
17.0 Thermal Bridging 17.1 List of Bridges		Calculate Bridges							
Bridge Type E5 Ground floor (normal) E6 Intermediate floor within a dwelling E18 Party wall between dwellings P3 Party wall - Intermediate floor betwe (in blocks of flats) P2 Party wall - Intermediate floor within P5 Party wall - Roof (insulation at rafter	Sou Tab Tab Tab Tab Tab Tab Tab Tab Tab Tab	Irce Type le K1 - Default le K1 - Default	Length 8.59 25.40 30.00 19.20 33.00 12.60	Psi 0.32 0.14 0.24 0.00 0.00 0.48	Adjusted 0.32 0.14 0.24 0.00 0.00 0.48	Reference:			Imported Yes Yes Yes No No
Y-value		0.13				W/m²K			
		Vee							
18.0 Pressure Testing		res				3//1			
		3.00				m³/(n.m	²) @ 50 Pa	1	
Property Tested?		Yes							
lest Method		Blower Door							
As Built AP ₅₀		0.10				m³/(n.m	²) @ 50 Pa	1	
19.0 Mechanical Ventilation									
Mechanical Ventilation	esent	Vec				_			
		No							
Approved Installation		NO Database							
		Balanced mechanica	l ventilation with h	eat recove	n/				
MV Peference Number		500167		eatrecove	i y				
		2							
Manufacturer SEP		0.55				=			
		Rigid				=			
MVHR Efficiency		92.00				=			
Wet Rooms		2				=			
SED from Installer Commissioning Cartificate		No				\exists			
MVHR System Location	goerimoute	Inside beated envelo	ne (installed exclu	isively)		\exists			
20.0 Fails, Open Fireplaces, Flues		No							
22.0 Lighting						_			
No Fixed Lighting		No							



24.0 Main Heating 1	Database]
Description	Electric Heat Pumps	
Percentage of Heat	100.00	%
Database Ref. No.	102672	
Fuel Type	Electricity	
SAP Code	0	
In Winter	0.00]
In Summer	0.00]
Model Name	ERLQ008CAV3 + EHVH08SU26CB6W]
Manufacturer	Daikin Europe NV]
System Type	Heat Pump]
Controls SAP Code	2210]
Delayed Start Stat	No]
HETAS approved System	No]
Oil Pump Inside	No]
FI Case	0.00]
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space]
Heating Pump Age	2013 or later	
Heat Emitter	Radiators	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Enter value	
Flow Temperature Value	35.00	
Boiler Interlock	No]
Combi boiler type	No Combi]
Combi keep hot type	None]
25.0 Main Heating 2	None]
26.0 Heat Networks	None	

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

Heat source 4 Heat source 5 28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	No
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No



28.1 Showers Description Shower Type Flow Rate Rated Power Connected Connected To [l/min] [kW] Shower Vented hot water system 7.00 Storage System No 28.3 Waste Water Heat Recovery System Internal Store 29.0 Hot Water Cylinder No Cylinder Stat No Cylinder In Heated Space Independent Time Control No Insulation Type Measured Loss 245.00 Cylinder Volume L kWh/day 1.92 Loss In Airing Cupboard No 31.0 Thermal Store None 32.0 Photovoltaic Unit One Dwelling Export Capable Meter? Yes Yes Connected To Dwelling Diverter No Battery Capacity [kWh] 0.00 PV Cells kWp Orientation Elevation Overshading FGHRS **MCS** Certificate Overshading MCS Panel Factor Certificate Manufacturer Reference South 0.66 Horizontal None Or Little No No 1.00 34.0 Small-scale Hydro None **Electricity Generated** 0.00 Apportioned 0.00 kWh/Year Connected to dwelling's electricity meter Yes **Electricity Generation** Annual Jun Jul Oct Dec Jan Feb Mar Apr May Aug Sep Νον 35.0 Special Features Fuel Saved Energy Fuel Used Description Monthly Air Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Energy Special Change Rates Technologies Saved Used Type CO2 saving 0.00 0.00 feature

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None



Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley

Dwelling type: Date of assessment: Produced by: Total floor area: DRRN: House, Mid-Terrace 05/05/2023 Keith Ketchley 126 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 (CO_2) emissions. The higher the rating the less impact it has on the environment.


Dwelling Address	Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley
Report Date	05/05/2023
Property Type	House, Mid-Terrace
Floor Area [m ²]	126

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.





Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
Feature	Description			Energy Performance
Walls	Average thermal transmi	ttance 0.15 W/m²K		Very Good
Roof	Average thermal transmi	ttance 0.11 W/m²K		Very Good
Floor	Average thermal transmi	ttance 0.12 W/m²K		Very Good
Windows	High performance glazin	High performance glazing		
Main heating	Air source heat pump, radiators, electric			Very Good
Main heating controls	Programmer, room thermostat and TRVs			Good
Secondary heating	None			
Hot water	From main system			Good
Lighting	Good lighting efficiency			Good
Air tightness	Air permeability [AP50] =	3.0 m³/h.m² (assumed)		Good

Primary Energy use

The primary energy use for this property per year is 21 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The	estimated	СО	emissions	for	this	dwellings	is:	
-----	-----------	----	-----------	-----	------	-----------	-----	--

0.2 per year



With the recommended measures the potential CO emissions could be:

per year

0

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical	Potential Rating	Cumulative	Cumulative
	Yearly	after	savings	Potential
	Saving	measure installed	(per year)	Rating

Estimated energy use and potential savings



Contacting the assessor and the accreditation scheme

Assessor contact details		
Assessor name	Mr. Keith Ketchley	
Assessor's accreditation number	EES/027679	
Email Address	keith.ketchley@desco.uk.com	



Accreditation scheme contact details			
Accreditation scheme	Elmhurst Energy Systems Ltd		
Telephone	0191 522 2070		
Email Address	keith.ketchley@desco.uk.com		

Assessment details			
Related party disclosure	Employed by the professional dealing with the property transaction		
Date of assessment	02/05/2023		
Date of certificate	02/05/2023		
Type of assessment	SAP, new dwelling		

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 05 May 2023 08:22:19

Project Information			
Assessed By	Keith Ketchley	Building Type	Flat, Mid-terrace
OCDEA Registration	EES/027679	Assessment Date	2023-05-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	71 m ²
Site Reference	Greggs Bakery	Plot Reference	Greggs-F-2B4P-Be Green
Address	D12 Gregs Bakery D12 - Towr	house, Twickenham	

Client Details	
Name	London Square
Company	London Square
Address	ONE YORK ROAD, , UXBRIDGE, UB8 1RN

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	12.84 kgCO ₂ /m ²	
Dwelling carbon dioxide emission rate	2.69 kgCO ₂ /m ²	OK
1b Target primary energy rate and dwelling primary energy	IY	
Target primary energy	68.38 kWh _{PE} /m ²	
Dwelling primary energy	29.39 kWh _{PE} /m ²	OK
1c Target fabric energy efficiency and dwelling fabric ene	rgy efficiency	
Target fabric energy efficiency	35.6 kWh/m ²	
Dwelling fabric energy efficiency	36.3 kWh/m ²	FAIL

2a Fabric U-values	;			
Element	Maximum permitted	Dwelling average U-Value	Element with highest	
	average U-Value [W/m ² K]	[W/m ² K]	individual U-Value	
External walls	0.26	0.15	Walls (1) (0.15)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.12	Heatloss Floor 1 (0.12)	OK
Roofs	0.16	N/A	N/A	N/A
Windows, doors,	1.6	1.3	Opening (1.3)	OK
and roof windows				
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)	33.65	0.15					
Party wall: Party Wall (1)	55.65	0 (!)					
Ground floor: Heatloss Floor 1, Heatloss Floor 1	31	0.12					

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]				
Opening, Opening Type 2	2.4	North	0.8	1.3				
Opening, Opening Type 2	2.4	North	0.8	1.3				
Patio Door, Opening Type 2	5.6	North	0.8	1.3				
Opening, Opening Type 2	2.4	West	0.8	1.3				
Opening, Opening Type 2	2.4	West	0.8	1.3				
Front Door, Opening Type 1	2	South	N/A	1.3				

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 Drawing							
			[W/mK]	reference				
External wall	E5: Ground floor (normal)	SAP table default	0.32					
External wall	all E18: Party wall between dwellings SAP table default 0.24							

3 Air permeability (better than typicall	y expected	values are flagged with a subsequent (!))					
Maximum permitted air permeability at 5	0Pa	8 m ³ /hm ²					
Dwelling air permeability at 50Pa		3 m ³ /hm ² , Design value (!) OK					
Air permeability test certificate reference		1					
A Space besting		·					
4 Space neating Main heating system 1: Heat nump with	radiatore or	ar underfloor booting Electricity					
Efficiency	304 5%	in undernoor heating - Electricity					
Emitter type	Padiatare						
Elimiter type	25°C						
Suctom type	Joot Dump	<u></u>					
Manufacturer	Daikin Euro	p cone NV					
Model	ERI 00080						
Commissioning	LIVEQUOC	CAV3 + EITVI10000200B0W					
Secondary heating system: N/A							
Fuel	N/A						
Efficiency	N/A						
Commissioning							
Commodeling	1						
5 Hot water							
Cylinder/store - type: N/A							
Capacity	N/A						
Declared heat loss	N/A						
Primary pipework insulated	N/A						
Manufacturer							
Model							
	tum a. NI/A						
Waste water neat recovery system 1 -	type: N/A						
Efficiency							
Manufacturer							
Model							
6 Controls							
Main heating 1 - type: Programmer, room	m thermosta	at and TRVs					
Main heating 1 - type: Programmer, root Function	m thermosta	at and TRVs					
Main heating 1 - type: Programmer, root Function Ecodesign class	m thermosta	at and TRVs					
Main heating 1 - type: Programmer, room Function Ecodesign class Manufacturer	m thermosta	at and TRVs					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model	m thermosta	at and TRVs					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A	m thermosta	at and TRVs					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer	m thermosta	at and TRVs					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model	m thermosta	at and TRVs					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model 7 Lighting	m thermosta	at and TRVs					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy	75 lm/W	at and TRVs					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model Zighting Minimum permitted light source efficacy Lowest light source efficacy	m thermosta	at and TRVs					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model Zighting Minimum permitted light source efficacy Lowest light source efficacy External lights control	m thermosta	at and TRVs					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model Zighting Minimum permitted light source efficacy Lowest light source efficacy External lights control	m thermosta	at and TRVs					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model Zighting Minimum permitted light source efficacy Lowest light source efficacy External lights control System type: Balanced whole-house me	75 Im/W 85 Im/W N/A	at and TRVs OK					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model Zighting Minimum permitted light source efficacy Lowest light source efficacy External lights control System type: Balanced whole-house mer Maximum permitted specific fan power	75 Im/W 85 Im/W N/A	entilation with heat recovery					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house med Maximum permitted specific fan power	75 Im/W 85 Im/W N/A echanical ve 1.5 W/(I/s) 0.55 W/(I/s)	entilation with heat recovery					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house med Maximum permitted specific fan power Specific fan power Minimum permitted heat recovery	m thermosta	entilation with heat recovery					
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Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house me Maximum permitted specific fan power Specific fan power Minimum permitted heat recovery efficiency Heat recovery efficiency Manufacturer/Model Commissioning 9 Local generation Technology type: Photovoltaic system Peak power	m thermosta	entilation with heat recovery					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house me Maximum permitted specific fan power Specific fan power Minimum permitted heat recovery efficiency Heat recovery efficiency Manufacturer/Model Commissioning 9 Local generation Technology type: Photovoltaic system Peak power Orientation Diate	m thermosta	entilation with heat recovery					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house me Maximum permitted specific fan power Specific fan power Minimum permitted heat recovery efficiency Heat recovery efficiency Manufacturer/Model Commissioning 9 Local generation Technology type: Photovoltaic system Peak power Orientation Pitch	m thermosta	at and TRVs OK OK entilation with heat recovery O OK inetic Plus B OK					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house me Maximum permitted specific fan power Specific fan power Minimum permitted heat recovery efficiency Heat recovery efficiency Manufacturer/Model Commissioning 9 Local generation Technology type: Photovoltaic system Peak power Orientation Pitch Overshading	m thermosta	at and TRVs OK entilation with heat recovery OK inetic Plus B ery little					
Main heating 1 - type: Programmer, root Function Ecodesign class Manufacturer Model Water heating - type: N/A Manufacturer Model 7 Lighting Minimum permitted light source efficacy Lowest light source efficacy External lights control 8 Mechanical ventilation System type: Balanced whole-house me Maximum permitted specific fan power Specific fan power Minimum permitted heat recovery efficiency Heat recovery efficiency Manufacturer/Model Commissioning 9 Local generation Technology type: Photovoltaic system Peak power Orientation Pitch Overshading Manufacturer	m thermosta	entilation with heat recovery					

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							



Property Reference	Greggs	Bakery							Issued	l on Date	05/0	5/2023	3
Assessment Reference	Greggs	s-F-2B4P-Be	Green	I		Prop	Туре	Ref	Greggs I	eggs Bakery			
Property	Gregs	Bakery D12	Town	house, D12, Twickenl	nam, Thai	mes Valley	/						
SAP Rating				89 B	DER		2.69)		TER	1	2.84	
Environmental				98 A	% DER	< TER					7	9.05	
CO ₂ Emissions (t/year)				0.17	DFEE		36.3	32		TFEE	3	5.58	
Compliance Check				See BREL	% DFE	E < TFEE					-	2.07	
% DPER < TPER				57.02	DPER		29.3	39		TPER	6	8.38	
Assessor Details	Mr. Keith Ke	etchley								Assessor	r ID	2303-0	001
Client													
SUMMARY FOR INPUT	DATA FOR	R: New Bu	ld (A	s Designed)									
Orientation			[Northeast									
Property Tenture			[ND									
Transaction Type			[6									
Terrain Type			[Suburban									
1.0 Property Type			[Flat, Mid-Terrace									
Position of Flat			Ī	Ground-floor flat									
Which Floor			[0									
2.0 Number of Storeys			Ī	1									
3.0 Date Built			Ī	2023									
4.0 Sheltered Sides			Ì	0									
5.0 Sunlight/Shade			Ì	Average or unknown									
6.0 Thermal Mass Parameter	r		Ì	Precise calculation									
Thermal Mass			ĺ	N/A							_] kJ/m²K		
7.0 Electricity Tariff			[Standard									
Smart electricity meter fitte	ed		Ì	Yes									
Smart gas meter fitted			ĺ	Yes									
7.0 Measurements													
				Basemen	Heat t:	Loss Per 0.00 m	imete	r Int	ternal Flo 0.00 n	or Area	Averag	e Stoi 0.00	rey Height m
				Ground floo	r:	15.00 m			71.00	m² m²		3.00	m
				2nd Store	/: /:	12.70 m			31.00 i	m²		2.50	m
				3rd Store 4th Store	/: /:	0.00 m 0.00 m			0.00 n 0.00 n	n² n²		0.00 0.00	m m
				5th Store	, /: /:	0.00 m			0.00 n	11 ²		0.00	m
				7th Store	/. /:	0.00 m			0.00 n	n²		0.00	m
8.0 Living Area			[24.60					m	1 ²			
9.0 External Walls													
Description Ty	pe	Construction			U-Value (W/m²K)	Kappa (kJ/m²K) A	Gross rea(m²)	Nett Area (m²)	Shelter Res	Shelter	Openin	gs Are	a Calculation Type
External Wall 1 Ca	avity Wall	Cavity wall : pl filled cavity, ar	asterboa y outsid	ard on dabs, AAC block, e structure	0.15	60.00	50.85	33.65	0.00	None	17.20	Ent	er Gross Area
9.1 Party Walls		•						11.1/=!		A	Ch - 14	_	
Description	туре	Con	struct					(W/m ² K)	rappa (kJ/m²K)	Area (m²)	Res	S	neiter
Party Wall 1	Filled Cavi Edge Seali	ty with Plas ng side	terboa s, AAC	rd on dabs mounted of blocks, cavity	on cemen	t render o	n both	0.00	45.00	55.65	0.00		None
10.1 Party Ceilings													
		Cons	tructio	n							Ka (kJ	ippa /m²K)	Area (m²)
Party Ceiling 1		In-situ	I concr	ete slab supported by	profiled	metal decl	k, carp	peted			90	0.00	/1.30
Description Internal Ceiling 1		Storey Lowest occ	upied	Construction Plasterboard ceiling	g, carpete	ed chipboa	ird floo	or				Are 5	ea (m²) 54.00



Internal Ceiling 2	Lowest occupied	Plasterboard ceiling,	carpeted chipbo	oard floor				42.	00
11.0 Heat Loss Floors									
Description Type	Storey Index	Construction		U-Val (W/m²	ue K)	Shelter Code	Shelt Fact	er Kappa or (kJ/m²K	Area (m²)
Heatloss Floor 1 Ground Floo	r - Solid Lowest occupied	Suspended concrete floor,	carpeted	0.12	2	None	0.00	0 75.00	31.00
12.0 Opening Types Description Data So	urce Type	Glazing		Glazing	Filling	G-value	Frame	Frame	U Value
Opening Type 1 Manufac Opening Type 2 Manufac	turer Solid Door turer Window	Double Low-E So Double Low-E So	oft 0.05 oft 0.05	Gap	Air Filled Air Filled	0.63 0.63	Wood Wood	0.80 0.80	1.30 1.30
13.0 Openings									
NameOpeningOpeningOpeningOpeningOpeningPatio DoorOpeningOpeningOpeningOpeningOpeningFront DoorOpening	ing Type ng Type 2 ng Type 2 ng Type 2 ng Type 2 ng Type 2 ng Type 2 ng Type 1	Location External Wall 1 External Wall 1 External Wall 1 External Wall 1 External Wall 1 External Wall 1		Orienta Nori Nori Wes Wes Sou	ation th th th st st st th	Area (2.40 5.60 2.41 2.41 2.41 2.00	m²))))))	Pitc 0 0 0 0 0 0	:h
14.0 Conservatory		None							
15.0 Draught Proofing		100				%			
16.0 Draught Lobby		No							
17.0 Thermal Bridging 17.1 List of Bridges		Calculate Bridges							
Bridge Type E5 Ground floor (normal) E18 Party wall between dwellings	So Tal Tal	u rce Type ble K1 - Default ble K1 - Default	Length 15.00 12.00	Psi 0.32 0.24	Adjusted 0.32 0.24	Reference:		I	I mported Yes Yes
Y-value		0.09				W/m²K			
18.0 Pressure Testing		Yes							
		3.00				 	²) @ 50 Pa		
Property Tested?		Yes		, e					
Test Method		Blower Door							
As Built AP ₅₀		0.10	 m³/(h.m	²) @ 50 Pa					
19.0 Mechanical Ventilation									
Mechanical Ventilation									
Mechanical Ventilation System	n Present	Yes							
Approved Installation		No							
Mechanical Ventilation data Ty	/pe	Database							
Туре		Balanced mechanical	entilation with h	eat recove	ry				
MV Reference Number		500167							
Configuration		2							
MVHR Duct Insulated		Insulated Ducts							
Manufacturer SFP		0.55							
Duct Type		Rigid							
MVHR Efficiency		92.00							
Wet Rooms		2							
SFP from Installer Commission	ning Certificate	No							
MVHR System Location		Inside heated envelope	e (installed exclu	usively)					
Duct Installation Specification		Level 1							
20.0 Fans, Open Fireplaces, Flues									
21.0 Fixed Cooling System		No							
22.0 Lighting									
No Fixed Lighting		No Name Lighting 1	Efficacy 85.00	Po	wer	 Capa 42	city 5	Cou 10	int
24.0 Main Heating 1		Database							



26.0 Heat Networks	None	
25.0 Main Heating 2	None	
Combi keep hot type	None	
Combi boiler type	No Combi	
Boiler Interlock	No	
Flow Temperature Value	35.00	
Flow Temperature	Enter value	
Underfloor Heating	Yes - Pipes in thin screed	
Heat Emitter	Radiators	
Heating Pump Age	2013 or later	
Is MHS Pumped	Pump in heated space	
Fan Assisted Flue	No	
Flue Type	None or Unknown	
FI Case	0.00	
Oil Pump Inside	No	
HETAS approved System	No	
Delayed Start Stat	No	
Controls SAP Code	2210	
System Type	Heat Pump	
Manufacturer	Daikin Europe NV	
Model Name	ERLQ008CAV3 + EHVH08SU26CB6W	
In Summer	0.00	
In Winter	0.00	
SAP Code	0	
Fuel Type	Electricity	
Database Ref. No.	102672	
Percentage of Heat	100.00	%
Description	Electric Heat Pumps	

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	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	No
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers



Descripti	on		s	hower Type	•			Flo	w Rate	Rated Pov	wer C	onnected	Connected	То
Shower			N	ented hot wa	ater syst	em		10	7.00	[KVV]		No	Storage Sys	tem
28.3 Waste V	Vater Heat Re	covery Sy	/stem											
29.0 Hot Wat	er Cylinder				Interna	l Store								
Cylinder S	Stat				No									
Cylinder I	n Heated Spa	ce			No									
Independ	ent Time Cont	rol			No									
Insulation	Туре				Measu	red Loss								
Cylinder \	Volume				245.00							L		
Loss					1.92							kWh/day	/	
In Airing (Cupboard				No									
31.0 Therma	I Store				None									
32.0 Photovo	oltaic Unit				One Dv	velling								
Export Ca	apable Meter?				Yes									
Connecte	d To Dwelling				Yes									
Diverter					No									
Battery C	apacity [kWh]				0.00									
PV	Cells kWp	0	rientation	Elevation	Ov	rershading	FGHRS	;	MCS Ce	ertificate	Overs Facto	shading or	MCS Certificate	Panel Manufacturer
0.47	7	S	outh	Horizontal	No	ne Or Little	No		No		1.00		Reference	
34.0 Small-s	cale Hydro				None									
Electricity	Generated				0.00									
Apportion	ed				0.00							kWh/Yea	ar	
Connecte	d to dwelling's	electricity	meter		Yes									
Electricity	Generation				Annual									
Jan	Feb	М	ar	Apr	Мау	Jun		Jul	Aug	g S	ер	Oct	Nov	Dec
35.0 Special	Features													
Energy Saved	Fuel Saved	Energy Used	Fuel Used	l Descri	ption	Monthl Change	y Air Rates	Sp Techr T	ecial tologies vpe	Jan Feb	Mar A	pr May Ju	un Jul Aug S	ep Oct Nov Dec
0.00		0.00						CO2 fea	saving	0.00 0.00	0.000	.00 0.00 0.	00 0.00 0.00 0	.00 0.00 0.00 0.00

Recommendations

Lower cost measures None

Further measures to achieve even higher standards None



Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley

Dwelling type: Date of assessment: Produced by: Total floor area: DRRN: Flat, Mid-Terrace 05/05/2023 Keith Ketchley 71 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 (CO_2) emissions. The higher the rating the less impact it has on the environment.



Dwelling Address	Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley
Report Date	05/05/2023
Property Type	Flat, Mid-Terrace
Floor Area [m ²]	71

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.





Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
Feature	Description			Energy Performance
Walls	Average thermal transmit	ttance 0.15 W/m²K		Very Good
Floor	Average thermal transmit	ttance 0.12 W/m²K		Very Good
Windows	High performance glazing			Good
Main heating	Air source heat pump, radiators, electric			Very Good
Main heating controls	Programmer, room thermostat and TRVs			Good
Secondary heating	None			
Hot water	From main system			Good
Lighting	Good lighting efficiency			Good
Air tightness	Air permeability [AP50] =	3.0 m³/h.m² (assumed)		Good

Primary Energy use

The primary energy use for this property per year is 26 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The estimated CO emissions for this dwellings is:	0.2	per year		
With the recommended measures the potential CC) emission:	s could be:	0	per year



Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical	Potential Rating	Cumulative	Cumulative
	Yearly	after	savings	Potential
	Saving	measure installed	(per year)	Rating

Estimated energy use and potential savings



The estimated cost and savings show how much the average household would spend in this property for heating, lighting and hot water. It is not based on how energy is used by the people living at the property.

Contacting the assessor and the accreditation scheme

Assessor contact details			
Assessor name	Mr. Keith Ketchley		
Assessor's accreditation number EES/027679			
Email Address keith.ketchley@desco.uk.com			



Accreditation scheme contact details			
Accreditation scheme	Elmhurst Energy Systems Ltd		
Telephone	0191 522 2070		
Email Address	keith.ketchley@desco.uk.com		

Assessment details			
Related party disclosure	Employed by the professional dealing with the property transaction		
Date of assessment	02/05/2023		
Date of certificate	02/05/2023		
Type of assessment	SAP, new dwelling		

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 05 May 2023 08:22:19

Project Information			
Assessed By	Keith Ketchley	Building Type	Flat, Detached
OCDEA Registration	EES/027679	Assessment Date	2023-05-05

Dwelling Details			
Assessment Type	As designed	Total Floor Area	71 m ²
Site Reference	Greggs Bakery	Plot Reference	Greggs - 3F 2B4P - Be Green
Address	D12 Gregs Bakery D12 - Towr	house, Twickenham	

Client Details	
Name	London Square
Company	London Square
Address	ONE YORK ROAD, , UXBRIDGE, UB8 1RN

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

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	11.28 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	2.46 kgCO ₂ /m ²	OK	
1b Target primary energy rate and dwelling primary energy			
Target primary energy	59.14 kWh _{PE} /m ²		
Dwelling primary energy	27.07 kWh _{PE} /m ²	OK	
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	31.9 kWh/m ²		
Dwelling fabric energy efficiency	30.6 kWh/m ²	OK	

2a Fabric U-values					
Element	Maximum permitted	Dwelling average U-Value	Element with highest		
	average U-Value [W/m ² K]	[W/m ² K]	individual U-Value		
External walls	0.26	0.15	Walls (1) (0.15)	OK	
Party walls	0.2	N/A	N/A	N/A	
Curtain walls	1.6	N/A	N/A	N/A	
Floors	0.18	N/A	N/A	N/A	
Roofs	0.16	0.11	Roof (1) (0.11)	OK	
Windows, doors,	1.6	1.3	Opening (1.3)	OK	
and roof windows					
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)	26.7	0.15	
Exposed roof: Roof (1)	71.3	0.11	

2c Openings (better than typically expected values are flagged with a subsequent (!))									
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]					
Opening, Opening Type 2	2.4	North	0.8	1.3					
Opening, Opening Type 2	2.4	North	0.8	1.3					
Patio Door, Opening Type 2	5.6	North	0.8	1.3					
Opening, Opening Type 2	2.4	East	0.8	1.3					
Opening, Opening Type 2	2.4	East	0.8	1.3					
Opening, Opening Type 1	2	South	N/A	1.3					
Front Door, Opening Type 1	2	South	N/A	1.3					

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	Drawing /						
			[W/mK]	reference						
External wall	E7: Party floor between dwellings	Government-approved scheme	0 (!)							
	(in blocks of flats)									

Main element	Junction detail		Source	Psi value [W/mK]	Drawing / reference					
External wall	E16: Corner (normal)		Government-approved scheme	0 (!)						
3 Air permeabili	ty (better than typically	v expected	values are flagged with a subsequ	uent (!))						
Maximum permit	ted air permeability at 50)Pa	8 m ³ /hm ²							
Dwelling air perm	neability at 50Pa		3 m ³ /hm ² , Design value (!)		OK					
Air permeability to	est certificate reference		1							
4 Space heating										
Main heating sy	stem 1: Heat pump with	radiators or	r underfloor heating - Electricity							
Efficiency		307.3%								
Emitter type		Radiators								
Flow temperature)	35°C								
System type		Heat Pump)							
Manufacturer		Daikin Euro	ppe NV							
Model		ERLQ008C	CAV3 + EHVH08SU26CB6W							
Commissioning										
Secondary heat	ing system: N/A									
Fuel		N/A								
Efficiency		N/A								
Commissioning										
5 Hot water										
Cylinder/store -	type: N/A									
Capacity		N/A								
Declared heat los	ŝs	N/A								
Primary pipework	c insulated	N/A								
Manufacturer										
Model										
Commissioning										
Waste water hea	at recovery system 1 -	type: N/A								
Efficiency										
Manufacturer										
Model										
6 Controls										
Main heating 1 -	type: Programmer, roor	n thermosta	t and TRVs							
Function										
Ecodesign class										
Manufacturer										
Model										
Water heating -	type: N/A									
Manufacturer										
Model										
7 Lighting										
Minimum permitte	ed light source efficacy	75 lm/W								
Lowest light sour	ce efficacy	85 lm/W		0	K					
External lights co	ntrol	N/A								
8 Mechanical ve	ntilation									
System type: Ba	lanced whole-house me	chanical ve	ntilation with heat recovery							
Maximum permit	ted specific fan power	1.5 W/(I/s)	<i>.</i>							
Specific fan power 0.55 W/(I/		0.55 W/(I/s)	(I/s) OK							
Minimum permitted heat recovery 73%			I							
efficiency	-									
Heat recovery eff	iciency	92%		0	K					
Manufacturer/Mo	del	Sentinel Ki	netic Plus B							
Commissioning										

9 Local generation									
Technology type: Photovoltaic system (1)									
Peak power	0.47 kWp								
Orientation	South								
Pitch	Horizontal	Iorizontal							
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									
Signed:		Assessor ID:							
Name:		Date:							
b. Client Declaration									
N/A									



Property Reference	Greggs	Bakery	/							lssu	ed on Da	te	05/05/2	2023	
Assessment Reference	Greggs	s - 3F 2E	34P - Be G	reen	reen Prop Type Ref Gregg					gs Bakery					
Property	Gregs	Bakery	D12 - Towr	nhouse, D	012, Twicken	ham, Th	ames Va	lley							
SAP Rating				90 B		DER		2.40	3		TER		11.2	28	
Environmental				98 A		% DE	R < TER			1			78.	19	
CO ₂ Emissions (t/year)				0.16		DFEE		30.5	56		TFEE		31.9	92	
Compliance Check				See BR	FI	% DF	EE < TFE	E		!			4 2	4	
% DPER < TPER				54.22		DPER		27.0)7		TPER		59.	14	
				0.122								10			
Assessor Details	Mr. Keith Ke	etchley									Assess	or ID	Q30	03-0001	
SUMMARY FOR INPU	r data for	: New	Build (A	s Desi	gned)										
Orientation				Northea	ist										
Property Tenture				ND											
Transaction Type				6											
Terrain Type				Suburba	an										
1.0 Property Type				Flat, De	tached										
Position of Flat				Top-floo	or 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	e or unknown										
6.0 Thermal Mass Paramet	er			Precise	calculation										
Thermal Mass				N/A							kJ/m²K				
7.0 Electricity Tariff				Standar	ď										
Smart electricity meter fit	ted			Yes											
Smart gas meter fitted				Yes											
7.0 Measurements															
					Basemer Ground floc 1st Store 2nd Store 3rd Store 4th Store 5th Store 6th Store 7th Store	Hea nt: y: y: y: y: y: y: y: y:	at Loss F 0.00 18.40 12.70 12.70 0.00 0.00 0.00 0.00 0.00	Perimete m m m m m m m m m	r In	ternal F 0.00 71.3 54.0 31.0 0.00 0.00 0.00 0.00 0.00	loor Area) m ² 0 m ² 0 m ²) m ²) m ²) m ²) m ²) m ²	a Av	/erage 2 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Storey 0.00 m 2.50 m 2.50 m 0.00 m 0.00 m 0.00 m 0.00 m 0.00 m	Height
8.0 Living Area				26.00							m²				
9.0 External Walls Description	Fype	Constru	iction			U-Valu (W/m²ł	e Kappa () (kJ/m²K	Gross) Area(m ²	Nett Area	Shelter Res	Shelt	er O	penings	Area Ca Ty	lculation
External Wall 1	avity Wall	Cavity w	/all : plasterbo /ity, any outsio	ard on dab	e	0.15	60.00	45.90	26.70	0.00	None	e 	19.20	Enter Gr	oss Area
9.1 Party Walls Description Party Wall 1	Type Filled Cavit Edge Seali	y with ng	Construc Plasterboa sides, AAC	tion ard on da C blocks,	ibs mounted cavity	on ceme	ent rende	r on both	U-Value (W/m²K) 0.00	Kapp (kJ/m ²l 45.00	a Area K) (m²) 55.65	She Re 5 0.0	lter es 00	Shel Non	ter le
10.0 External Roofs Description	Туре	Cor	nstruction			I	J-Value	Карра	Gross	Nett	Shelter	Shelter	Calcul	ationO	penings
External Roof 1	External Plan Roof	e Plas	sterboard, i	nsulated	at ceiling lev	el	W/m²K)(0.11	kJ/m²K) 9.00	Area(m²) 71.30	Area (m²) 0.00	Code None	Factor 0.00	Typ Enter (Are	oe Gross ea	0.00
11.1 Party Floors															



Description		Storey Index	Con	struction						Kappa (kJ/m²K)	Area (m²)
Party Floor 1		Lowest occupied	In-si	tu concrete slab suppo	orted by profiled n	netal deck,	carpeted			90.00	71.30
12.0 Opening Types											
Description	Data Source	Туре		Glazing		Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Opening Type 1 Opening Type 2	Manufacturer Manufacturer	Solid Door Window	r	Double Low-E S	Soft 0.05 Soft 0.05		Air Filled Air Filled	0.63 0.63	Wood Wood	0.80 0.80	1.30 1.30
13.0 Openings	0			1		0		•	(2)		4 - I-
Name Opening Patio Door Opening Opening Opening Front Door	Opening Ty Opening Typ Opening Typ Opening Typ Opening Typ Opening Typ Opening Typ Opening Typ	pe be 2 be 2 be 2 be 2 be 2 be 2 be 1 be 1		Location External Wall 1 External Wall 1 External Wall 1 External Wall 1 External Wall 1 External Wall 1 External Wall 1		Orienta Nor Nor Eas Eas Sou Sou	ation th th th st st th th	Area (2.4 2.4 5.6 2.4 2.4 2.0 2.0	(m²) 0 0 0 0 0 0 0	Pi	tch 0 0 0 0 0 0 0
14.0 Conservatory				None							
15.0 Draught Proofing				100				%			
16.0 Draught Lobby				No							
17.0 Thermal Bridging 17.1 List of Bridges				Calculate Bridges							
Bridge Type E7 Party floor between d E16 Corner (normal)	wellings (in block	s of flats)	Sou Gov Gov	rce Type Approved Scheme Approved Scheme	Length 18.40 10.00	Psi 0.00 0.00	Adjusted 0.00 0.00	Reference	:		Imported Yes Yes
Y-value				0.00				W/m²K			
18.0 Pressure Testing				Yes				7			
Designed AP ₅₀				3.00					²) @ 50 Pa	1	
Property Tested?				Yes							
Test Method				Blower Door							
As Built AP50				0.10				m³/(h.m	²) @ 50 Pa	1	
19.0 Mechanical Ventilation	ı										
Mechanical Ventilation	tion System Dress	ant		Vac				-			
	uon System Pres	ent		No							
Mechanical Ventilat	tion data Type			No							
				Balanced mechanical	ventilation with h	eat recove	rv	i i			
MV Reference Nun	nber			500167			. ,	i i			
Configuration				2							
MVHR Duct Insulat	ed			Insulated Ducts				i i			
Manufacturer SFP				0.55				Ī			
Duct Type				Rigid				Ī			
MVHR Efficiency				92.00							
Wet Rooms				2							
SFP from Installer	Commissioning C	ertificate		No							
MVHR System Loc	ation			Inside heated envelop	be (installed exclu	isively)					
Duct Installation Sp	pecification			Level 1							
20.0 Fans, Open Fireplaces	s, Flues										
21.0 Fixed Cooling System				No							
22.0 Lighting											
No Fixed Lighting				No							
				Name Lighting 1	Efficacy 85.00	Po	wer 5	Capa 42	acity 25	Co	ount 10
24.0 Main Heating 1				Database				7			



26.0 Heat Networks	None	
25.0 Main Heating 2	None	
Combi keep hot type	None	
Combi boiler type	No Combi	
Boiler Interlock	No	
Flow Temperature Value	35.00	
Flow Temperature	Enter value	
Underfloor Heating	Yes - Pipes in thin screed	
Heat Emitter	Radiators	
Heating Pump Age	2013 or later	
Is MHS Pumped	Pump in heated space	
Fan Assisted Flue	No	
Flue Type	None or Unknown	
FI Case	0.00	
Oil Pump Inside	No	
HETAS approved System	No	
Delayed Start Stat	No	
Controls SAP Code	2210	
System Type	Heat Pump	
Manufacturer	Daikin Europe NV	
Model Name	ERLQ008CAV3 + EHVH08SU26CB6W	
In Summer	0.00	
In Winter	0.00	
SAP Code	0	
Fuel Type	Electricity	
Database Ref. No.	102672	
Percentage of Heat	100.00	%
Description	Electric Heat Pumps	

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	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	No
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers



Descripti	on		s	hower Type	•			Flo	w Rate	Rated Pov	wer C	onnected	Connected	То
Shower			N	ented hot wa	ater syst	em		10	7.00	[KVV]		No	Storage Sys	tem
28.3 Waste V	Vater Heat Re	covery Sy	/stem											
29.0 Hot Wat	er Cylinder				Interna	l Store								
Cylinder S	Stat				No									
Cylinder I	n Heated Spa	ce			No									
Independ	ent Time Cont	rol			No									
Insulation	Туре				Measu	red Loss								
Cylinder \	Volume				245.00							L		
Loss					1.92							kWh/day	/	
In Airing (Cupboard				No									
31.0 Therma	I Store				None									
32.0 Photovo	oltaic Unit				One Dv	velling								
Export Ca	apable Meter?				Yes									
Connecte	d To Dwelling				Yes									
Diverter					No									
Battery C	apacity [kWh]				0.00									
PV	Cells kWp	0	rientation	Elevation	Ov	rershading	FGHRS	;	MCS Ce	ertificate	Overs Facto	shading or	MCS Certificate	Panel Manufacturer
0.47	7	S	outh	Horizontal	No	ne Or Little	No		No		1.00		Reference	
34.0 Small-s	cale Hydro				None									
Electricity	Generated				0.00									
Apportion	ed				0.00							kWh/Yea	ar	
Connecte	d to dwelling's	electricity	meter		Yes									
Electricity	Generation				Annual									
Jan	Feb	М	ar	Apr	Мау	Jun		Jul	Aug	g S	ер	Oct	Nov	Dec
35.0 Special	Features													
Energy Saved	Fuel Saved	Energy Used	Fuel Used	l Descri	ption	Monthl Change	y Air Rates	Sp Techr T	ecial tologies vpe	Jan Feb	Mar A	pr May Ju	un Jul Aug S	ep Oct Nov Dec
0.00		0.00						CO2 fea	saving	0.00 0.00	0.000	.00 0.00 0.	00 0.00 0.00 0	.00 0.00 0.00 0.00

Recommendations

Lower cost measures None

Further measures to achieve even higher standards None



Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley

Dwelling type: Date of assessment: Produced by: Total floor area: DRRN: Flat, Detached 05/05/2023 Keith Ketchley 71.3 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 (CO_2) emissions. The higher the rating the less impact it has on the environment.



Dwelling Address	Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley
Report Date	05/05/2023
Property Type	Flat, Detached
Floor Area [m ²]	71

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.





Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average Good		Very Good			
Feature	Description	Energy Performance					
Walls	Average thermal transmi	Very Good					
Roof	Average thermal transmi	Very Good					
Windows	High performance glazin	Good					
Main heating	Air source heat pump, ra	Very Good					
Main heating controls	Programmer, room therm	nostat and TRVs		Good			
Secondary heating	None						
Hot water	From main system	From main system					
Lighting	Good lighting efficiency			Good			
Air tightness	Air permeability [AP50] =	3.0 m³/h.m² (assumed)		Good			

Primary Energy use

The primary energy use for this property per year is 24 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The estimated CO emissions for this dwellings is:	0.2	per year		
With the recommended measures the potential CC) emission:	s could be:	0	per year



Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Estimated energy use and potential savings



The estimated cost and savings show how much the average household would spend in this property for heating, lighting and hot water. It is not based on how energy is used by the people living at the property.

Contacting the assessor and the accreditation scheme

Assessor contact details			
Assessor name	Mr. Keith Ketchley		
Assessor's accreditation number	EES/027679		
Email Address	keith.ketchley@desco.uk.com		



Accreditation scheme contact details			
Accreditation scheme	Elmhurst Energy Systems Ltd		
Telephone	0191 522 2070		
Email Address	keith.ketchley@desco.uk.com		

Assessment details			
Related party disclosure	Employed by the professional dealing with the property transaction		
Date of assessment	27/04/2023		
Date of certificate	27/04/2023		
Type of assessment	SAP, new dwelling		

Building Regulations England Part L (BREL) Compliance Report

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

Date: Fri 05 May 2023 08:22:20

Project Information				
Assessed By	Keith Ketchley	Building Type	House, Mid-terrace	
OCDEA Registration	EES/027679	Assessment Date	2023-05-05	

Dwelling Details			
Assessment Type	As designed	Total Floor Area	80 m ²
Site Reference	Greggs Bakery	Plot Reference	Greggs-G-TH-Be Green
Address	D12 Gregs Bakery D12 - Towr	nhouse, Twickenham	

Client Details	
Name	London Square
Company	London Square
Address	ONE YORK ROAD, , UXBRIDGE, UB8 1RN

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

1a Target emission rate and dwelling emission rate				
Fuel for main heating system	Electricity			
Target carbon dioxide emission rate	9.5 kgCO ₂ /m ²			
Dwelling carbon dioxide emission rate	2.32 kgCO ₂ /m ²	ОК		
1b Target primary energy rate and dwelling primary energy				
Target primary energy	49.62 kWh _{PE} /m ²			
Dwelling primary energy	25.89 kWh _{PE} /m ²	OK		
1c Target fabric energy efficiency and dwelling fabric energy efficiency				
Target fabric energy efficiency	38.6 kWh/m ²			
Dwelling fabric energy efficiency	34.0 kWh/m ²	OK		

2a Fabric U-values					
Element	Maximum permitted	Dwelling average U-Value	Element with highest		
	average U-Value [W/m ² K]	[W/m ² K]	individual U-Value		
External walls	0.26	0.15	Walls (1) (0.15)	OK	
Party walls	0.2	0	Party Wall (1) (0)	N/A	
Curtain walls	1.6	0	N/A	N/A	
Floors	0.18	0.12	Heatloss Floor 1 (0.12)	OK	
Roofs	0.16	0.11	Roof (1) (0.11)	ОК	
Windows, doors,	1.6	1.3	Opening (1.3)	ОК	
and roof windows					
Rooflights	2.2	1.3	Opening, North (1.3)	OK	

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)	34.77	0.15		
Party wall: Party Wall (1)	32.5	0 (!)		
Ground floor: Heatloss Floor 1, Heatloss Floor 1	57.09	0.12		
Exposed roof: Roof (1)	71.2	0.11		

2c Openings (better than typically expected values are flagged with a subsequent (!))					
Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]	
Opening, Opening Type 2	8.15	North	0.8	1.3	
Opening, Opening Type 2	5.4	East	0.8	1.3	
Door, Opening Type 1	2.53	East	N/A	1.3	
Opening, Opening Type 3	5	North	0.7	1.3	

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	in element Junction detail Source Psi value Drawing /											
	[W/mK] refer											
External wall	E5: Ground floor (normal)	Government-approved scheme	0 (!)									
External wall	E6: Intermediate floor within a dwelling	Government-approved scheme	0 (!)									

Main element	Junction detail		Source	Psi value	Drawing /					
External wall	E18: Party wall betwee	n dwellinas	Government-approved scheme	0 (!)	Telefelice					
2 Air normookili	tu (hattar than turiadh									
3 Air permeabili Movimum pormit	ty (better than typically		and a subseq	uent (! <i>))</i>						
		JFa	$0 \frac{11}{1111}$		OK					
Air permeability t	est certificate reference				UK					
All permeability t										
4 Space heating										
Main heating sy	stem 1: Heat pump with	radiators of	r underfloor heating - Electricity							
Efficiency		316.2%								
Emitter type		Radiators								
System type	3	Jost Dumn	<u>, </u>							
Manufacturor		Doikin Eur								
Model										
Commissioning			2403 + EIT01005020CB000							
Secondary heat	ing system [.] N/A									
Fuel		N/A								
Efficiency		N/A								
Commissioning										
5 Hot water	type: N/A									
Canacity		Ν/Δ								
Declared heat los	20									
Primary pinework	c insulated	N/A								
Manufacturer	Insulated	1.1.7.1								
Model										
Commissioning										
Waste water her	at recoverv system 1 -	tvpe: N/A								
Efficiency	, , , , , , , , , , , , , , , , , , ,									
Manufacturer										
Model										
6 Controls		•								
Main heating 1 -	type: Programmer roor	n thermosta	t and TR\/s							
Function	type. I rogrammer, roor									
Ecodesign class										
Manufacturer										
Model										
Water heating -	type: N/A									
Manufacturer	71									
Model										
7 Lighting										
Minimum permitt	ed light source efficacy	75 lm/W								
Lowest light sour	ce efficacy	85 lm/W		0	K					
External lights co	ontrol	N/A								
8 Mechanical ve	entilation		a file fire and the large tensor and							
System type: Ba	alanced whole-house me		ntilation with neat recovery							
Specific for new	ieu specilic fan power	1.5 VV/(I/S))		V					
Minimum normitte	el host recevery	U.33 VV/(I/S)	0	n					
officiones	eu neat recovery	13%								
Hoot recovery of	ficionav	0.2%			K					
Manufacturor/Ma	iciency dol	Sentinal Vi	natic Plus B	0	n.					
Commissioning										
Sommosioning										

9 Local generation										
Technology type: Photovoltaic system (1)										
Peak power	eak power 0.66 kWp									
Orientation	South									
Pitch	Horizontal	Horizontal								
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										



Property Reference	Greggs	s Baker	y						lssu	ed on Da	te	05/05/2	2023	
Assessment Reference	Greggs	s-G-TH-	Be Green			Pro	р Туре	Ref	Gregg	s Bakery				
Property	Gregs	Bakery	D12 - Town	house, D12, Twicken	cenham, Thames Valley									
SAP Rating				90 B	DER		2.32	2		TER		9.5)	
Environmental				98 A	% DER < TER							75.	58	
CO ₂ Emissions (t/vear)				0.16	DFEE 33.97					TFEE		38 (
Compliance Check				See BRFI	% DFEE < TFEE							12	10	
% DPER < TPER				47.83	DPER 25.89					TPER		49 (49.62	
	_						2010							
Assessor Details	Mr. Keith K	etchley								Assess	or ID	Q30	03-000	1
Client														
SUMMARY FOR INPU	T DATA FOF	R: New	Build (A	s Designed)										
Orientation			[Unknown										
Property Tenture			[ND										
Transaction Type			[6										
Terrain Type			[Suburban										
1.0 Property Type				House, Mid-Terrace										
Which Floor				0										
2.0 Number of Storeys				2										
3.0 Date Built			ĺ	2023										
4.0 Sheltered Sides			ĺ	0										
5.0 Sunlight/Shade			İ	Average or unknown										
6.0 Thermal Mass Parame	ter		i	Precise calculation										
Thermal Mass			i	N/A							kJ/m²K			
7.0 Electricity Tariff				Standard										
Smart electricity meter f	itted		i	Yes										
Smart gas meter fitted			Ì	Yes										
7 0 Measurements														
				Basemer Ground floo 1st Store 2nd Store 3rd Store 4th Store 5th Store 6th Store 7th Store	Heat it: y: y: y: y: y: y: y: y:	Loss P 0.00 r 10.90 11.20 12.70 0.00 r 0.00 r 0.00 r 0.00 r	erimete m m m m m m m m m	r Inf	ternal F 0.00 57.0 23.1 31.0 0.00 0.00 0.00 0.00 0.00	loor Area) m ² 0 m ² 5 m ² 0 m ²) m ²) m ²) m ²) m ²) m ²		verage 0 2 2 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0	Storey .00 m .50 m .50 m .50 m .00 m .00 m .00 m .00 m .00 m	Height
8.0 Living Area				23.03						m²				
9.0 External Walls														
Description	Туре	Constru	uction		U-Value	Kappa	Gross	Nett Area	Shelter Res	Shelte	er O	penings	Area Ca	alculation
External Wall 1	Cavity Wall	Cavity v filled ca	vall : plasterboa vity, any outsid	ard on dabs, AAC block, e structure	0.15	60.00	50.85	34.77	0.00	None	•	16.08	Enter G	ross Area
9.1 Party Walls														
Description	Туре		Construct	ion				U-Value	Kappa	a Area	She	lter	She	lter
Party Wall 1	Filled Cavi Edge Seal	ty with ing	Plasterboa sides, AAC	rd on dabs mounted blocks, cavity	on cemen	t render	on both	(VV/III-K) 0.00	45.00	32.50	0.0	io 10	Nor	ne
10.0 External Roofs	_				-			-	•-	. .	 .			_
Description	Туре	Co	nstruction		U- (W	-value //m²K)(ł	Kappa (J/m ² K)	Gross Area(m ²)	Nett Area	Shelter Code	Shelter Factor	Calcul Typ	ationO pe	penings
External Roof 1	External Slop Roof	e Pla	sterboard, ir	nsulated slope		0.11	9.00	76.20	(m²) 5.00	None	0.00	Enter (Are	Gross ea	5.00
10.2 Internal Ceilings														
Description Internal Ceiling 1		Store +1	/	Construction Plasterboard ceilin	g, carpete	ed chipb	oard floo	or					Area (23.1	(m²) 5



11.0 Heat Loss Floors	_	e									• ()
Description Heatloss Floor 1	Type Ground Floor - Solic	Storey Index	C ed be	Construction	U-Va (W/m 0 1	lue I²K) 2	None	Shel Fact	ter Kapp or (kJ/m ² 0 75.0	a Area (m²) ⁶ K) 0 57.09	
12.0 Opening Types Description Opening Type 1	Data Source Manufacturer	Type Half Glazed	l Door	Glazing Double Low-E Sc	oft 0.05	Glazing Gap	Filling Type Air Filled	G-value 0.63	Frame Type Wood	Frame Factor 0.80	U Value (W/m²K) 1.30
Opening Type 2 Opening Type 3	Manufacturer Manufacturer	Window Roof Light		Double Low-E So Triple Low-E Soft	oft 0.05 0.05		Air Filled Air Filled	0.63 0.57	Wood Wood	0.80 0.70	1.30 1.30
13.0 Openings											
Name Opening Opening Door Opening	Opening Ty Opening Typ Opening Typ Opening Typ Opening Typ		LocationOrientationExternal Wall 1NorthExternal Wall 1EastExternal Wall 1EastExternal Roof 1North					m²) 5 0 3 0	Pitch 0 0 0 11		
14.0 Conservatory			N	one							
15.0 Draught Proofing			1(00				%			
16.0 Draught Lobby			N	0							
17.0 Thermal Bridging 17.1 List of Bridges			C	alculate Bridges							
Bridge Type E5 Ground floor (norma E6 Intermediate floor w E18 Party wall between	al) ⁄ithin a dwelling n dwellings		Sourc Gov Ap Gov Ap Gov Ap	e Type oproved Scheme oproved Scheme oproved Scheme	Length 10.90 11.20 20.00	Psi 0.00 0.00 0.00	Adjusted 0.00 0.00 0.00	Reference			Imported Yes Yes Yes
Y-value			0.	00				W/m²K			
18.0 Pressure Testing			Ye	es							
Designed AP50			3.	00				m³/(h.m	²) @ 50 Pa		
Property Tested?			Ye	es							
Test Method			B	lower Door							
As Built AP50			0.	10				m³/(h.m	²) @ 50 Pa		
19.0 Mechanical Ventilati	on										
Mechanical Ventilatio	n Intion System Dres	ont	V					_			
	vien	ent									
Approved Installa				otabasa							
	ation data Type		B		entilation with h	eat recove					
NV/ Reference N	umbor		5			leat lecove	er y				
	under		2	50107							
	latad		2								
	F		0.								
Wet Booms			32	2.00							
SED from Installa		ortificato	2								
		enincale		u sida haatad anvalana	(installed evalu						
	Specification										
20.0 Fans, Open Fireplac	es, Flues										
21.0 Fixed Cooling Syste	m		N	0							
22.0 Lighting No Fixed Lighting			N	o Name Lighting 1	Efficacy 85.00	Po	ower 5	Capa 42	i city 5	Co 1	unt 0
24.0 Main Heating 1			D	atabase							
Description			E	lectric Heat Pumps				Ξ			
'				· · ·							



Percentage of Heat	100.00	%						
Database Ref. No.	102672							
Fuel Type	Electricity							
SAP Code	0							
In Winter	0.00							
In Summer	0.00							
Model Name	ERLQ008CAV3 + EHVH08SU26CB6W							
Manufacturer	Daikin Europe NV							
System Type	Heat Pump							
Controls SAP Code	2210							
Delayed Start Stat	No							
HETAS approved System	No							
Oil Pump Inside	No							
FI Case	0.00							
Flue Type	None or Unknown							
Fan Assisted Flue	No							
Is MHS Pumped	Pump in heated space							
Heating Pump Age	2013 or later							
Heat Emitter	Radiators							
Underfloor Heating	Yes - Pipes in thin screed							
Flow Temperature	Enter value							
Flow Temperature Value	35.00							
Boiler Interlock	No							
Combi boiler type	No Combi							
Combi keep hot type	None							
25.0 Main Heating 2	None							
26.0 Heat Networks	None							
Heat Source Fuel Type Heating U	se Efficiency Percentage Of Heat Heat Elec Heat Power	trical Fuel Factor Efficiency type						
Heat source 1NoneHeat source 2NoneHeat source 3NoneHeat source 4NoneHeat source 5None	Katio							
28.0 Water Heating								
Water Heating	Main Heating 1							
SAP Code	901							
Flue Gas Heat Recovery System	No							
Waste Water Heat Recovery Instantaneous System 1	No							
Waste Water Heat Recovery Instantaneous System 2	No							
Waste Water Heat Recovery Storage System	No							

Solar Panel

Water use <= 125 litres/person/day Summer Immersion

	901
	No
/stem 1	No
/stem 2	No
	From mains
	0
	No
	No

28.1 Showers

Cold Water Source Bath Count

Supplementary Immersion Immersion Only Heating Hot Water



Description		s	Shower Type			Flo	Flow Rate Rated Power C		onnected	Connected	То			
Shower			N	ented hot wa	ater syst	em		10	7.00	[KVV]		No	Storage Sys	tem
28.3 Waste V	Vater Heat Re	covery Sy	/stem											
29.0 Hot Wat	er Cylinder				Interna	I Store								
Cylinder S	Stat				No									
Cylinder I	n Heated Spa	ce			No									
Independ	ent Time Cont	rol			No									
Insulation	Туре				Measu	red Loss								
Cylinder \	Volume				245.00							L		
Loss					1.92							kWh/day	/	
In Airing (Cupboard				No									
31.0 Therma	I Store				None									
32.0 Photovo	oltaic Unit				One Dv	velling								
Export Ca	apable Meter?				Yes									
Connecte	d To Dwelling				Yes									
Diverter					No									
Battery C	apacity [kWh]				0.00									
PV	Cells kWp	0	rientation	Elevation	Ov	rershading	FGHRS	;	MCS Ce	ertificate	Overs Facto	shading or	MCS Certificate	Panel Manufacturer
0.66	6	S	outh	Horizontal	No	ne Or Little	No		No		1.00		Reference	
34.0 Small-s	cale Hydro				None									
Electricity	Generated				0.00									
Apportion	ed				0.00							kWh/Yea	ar	
Connecte	d to dwelling's	electricity	meter		Yes									
Electricity	Generation				Annual									
Jan	Feb	М	ar	Apr	Мау	Jun		Jul	Aug	g S	ер	Oct	Nov	Dec
35.0 Special	Features													
Energy Saved	Fuel Saved	Energy Used	Fuel Used	l Descri	ption	Monthl Change	y Air Rates	Sp Techr T	ecial tologies vpe	Jan Feb	Mar A	pr May Ju	un Jul Aug S	ep Oct Nov Dec
0.00		0.00						CO2 fea	saving	0.00 0.00	0.000	.00 0.00 0.	00 0.00 0.00 0	.00 0.00 0.00 0.00

Recommendations

Lower cost measures None

Further measures to achieve even higher standards None



Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley

Dwelling type: Date of assessment: Produced by: Total floor area: DRRN: House, Mid-Terrace 05/05/2023 Keith Ketchley 80.15 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 (CO_2) emissions. The higher the rating the less impact it has on the environment.
Overview Report



Dwelling Address	Gregs Bakery D12 - Townhouse, D12, Twickenham, Thames Valley			
Report Date	05/05/2023			
Property Type	House, Mid-Terrace			
Floor Area [m ²]	80			

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.





Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average Good		Very Good			
Feature	Description			Energy Performance			
Walls	Average thermal transmi	ttance 0.15 W/m²K		Very Good			
Roof	Average thermal transmi	ttance 0.11 W/m²K		Very Good			
Floor	Average thermal transmi	Average thermal transmittance 0.12 W/m²K					
Windows	High performance glazin	Good					
Main heating	Air source heat pump, ra	Very Good					
Main heating controls	Programmer, room therm	Good					
Secondary heating	None						
Hot water	From main system	Good					
Lighting	Good lighting efficiency	Good					
Air tightness	Air permeability [AP50] =	3.0 m³/h.m² (assumed)		Good			

Primary Energy use

The primary energy use for this property per year is 23 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The	estimated	СО	emissions	for	this	dwellings	is:	
-----	-----------	----	-----------	-----	------	-----------	-----	--

0.2 per year



With the recommended measures the potential CO emissions could be:

per year

0

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical	Potential Rating	Cumulative	Cumulative
	Yearly	after	savings	Potential
	Saving	measure installed	(per year)	Rating

Estimated energy use and potential savings



Contacting the assessor and the accreditation scheme

Assessor contact details				
Assessor name	Mr. Keith Ketchley			
Assessor's accreditation number	EES/027679			
Email Address	keith.ketchley@desco.uk.com			

Overview Report



Accreditation scheme contact details				
Accreditation scheme	Elmhurst Energy Systems Ltd			
Telephone	0191 522 2070			
Email Address	keith.ketchley@desco.uk.com			

Assessment details			
Related party disclosure	Employed by the professional dealing with the property transaction		
Date of assessment	02/05/2023		
Date of certificate	02/05/2023		
Type of assessment	SAP, new dwelling		

Appendix D – Be LEAN BRUKL report for commercial unit

BRUKL Output Document

Compliance with England Building Regulations Part L 2021

Project name

Greggs Bakery Commerical Unit

Date: Tue May 02 15:21:04 2023

Administrative information

Building Details Address: London, W1F 8GY

Certification tool

Calculation engine: Apache Calculation engine version: 7.0.20 Interface to calculation engine: IES Virtual Environment Interface to calculation engine version: 7.0.20 BRUKL compliance module version: v6.1.e.1

🛞 HM Government

Certifier details Name: Desco Telephone number: 0191 522 2070 Address: Azure House, 2 Azure Ct, Sunderland, SR3 3BE

Foundation area [m²]: 105.14

The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	3.05
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	2.25
Target primary energy rate (TPER), kWhe/m?annum	31.68
Building primary energy rate (BPER), kWhee/m?annum	23.71
Do the building's emission and primary energy rates exceed the targets?	BER =< TER BPER =< TPER

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

Fabric element	Ua-Limit	Ua-Calc	Ui-Calc	First surface with maximum value
Walls*	0.26	0.15	0.15	0000000:Surf[0]
Floors	0.18	0.12	0.12	0000000:Surf[5]
Pitched roofs	0.16	0.15	0.15	01000001:Surf[13]
Flat roofs	0.18	-	-	No flat roofs in building
Windows** and roof windows	1.6	1.31	1.31	00000003:Surf[0]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	1.6	1:6	0000000:Surf[1]
Vehicle access & similar large doors	1.3	-		No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building
U a Limit = Limiting area-weighted average U-values (W/(mi	K)]		UI-Calc = Ca	alculated maximum individual element U-values [W/(m²K)]

$$\label{eq:U-stimit} \begin{split} & U_{\text{s-timit}} = Limiting \text{ area-weighted average U-values } [W/(m^2K)] \\ & U_{\text{s-calc}} = Calculated area-weighted average U-values } [W/(m^2K)] \end{split}$$

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

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

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

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

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

Shell and Core

As designed

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	>0.95

1- BE LEAN - ASHP RADS

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(I/s)]	HF	R efficiency
This system	2.78	-	0	-	0.9)
Standard value	2.5*	N/A	N/A	N/A	N//	Α
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system NO						
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.						

1- DHWS

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

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
В	Zonal supply system where the fan is remote from the zone
С	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
Е	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
Н	Fan coil units
1	Kitchen extract with the fan remote from the zone and a grease filter
NB: L	imiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name			SFP [W/(I/s)]					ficionau				
	ID of system type	Α	B	С	D	E	F	G	Н	1	HK efficiency	
	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
00 WC		-	-	-	1:1	-	-	-	-	-	-	N/A
00 Tea point		-	-	-	1,:1	-		-	-	-	-	N/A
00 Commercial		-	-		1.1	-	-		-	-	-	N/A
01 Commercial		-	-	-	1:1	-	-	-	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
00 WC	NO
00 Tea point	NO
00 Commercial	NO
01 Commercial	NO

General lighting and display lighting	General luminaire	eneral luminaire Display light source		
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]	
Standard value	95	80	0.3	
00 WC	120	-	-	

General lighting and display lighting	General luminaire	Displa	Display light source		
Zone name	Efficacy [Im/W]	Efficacy [im/W] Power density [W/			
Standard value	95	80	0.3		
00 Tea point	120		-		
00 Commercial	120	-	-		
01 Commercial	120	-	-		

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00 Tea point	NO (-2.6%)	NO
00 Commercial	NO (-43.1%)	NO
01 Commercial	NO (-64.3%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional	% Ar
Floor area [m ²]	210.3	210.3	
External area [m ²]	538.8	538.8	
Weather	LON	LON	100
Infiltration [m³/hm²@ 50Pa]	3	3	
Average conductance [W/K]	160.01	251.02	_
Average U-value [W/m ² K]	0.3	0.47	_
Alpha value* [%]	9.12	10	_

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	5.41	10.77
Cooling	0	0
Auxiliary	2.99	2.3
Lighting	4.66	5.26
Hot water	2.7	2.57
Equipment*	40.49	40.49
TOTAL**	15.77	20.9

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

Energy Production by Technology [kWh/m²]

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

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	54.17	107.71
Primary energy [kWhee/m2]	23.71	31.68
Total emissions [kg/m ²]	2.25	3.05

Building Use

% Area Building Type

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

HVAC Systems Performance										
System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST	[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
	Actual	54.2	0	5.4	0	3	2.78	0	2.78	0
	Notional	107.7	0	10.8	0	2.3	2.78	0		
[ST] No Heatin	g or Coolin	g							
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0		

Key to terms

Heat dem [MJ/m2] Cool dem [MJ/m2] = Cooling energy demand Heat con [kWh/m2] = Heating energy consumption Heat SSEFF Cool SSEER Heat gen SSEFF Cool gen SSEER ST HS HFT CFT

= Heating energy demand

Cool con [kWh/m2] = Cooling energy consumption

Aux con [kWh/m2] = Auxiliary energy consumption

- = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
- = Cooling system seasonal energy efficiency ratio

= Heating generator seasonal efficiency

- = Cooling generator seasonal energy efficiency ratio
- = System type
- = Heat source
- = Heating fuel type
- = Cooling fuel type

Appendix E – Be GREEN BRUKL report for commercial unit

BRUKL Output Document

Compliance with England Building Regulations Part L 2021

Project name

Greggs Bakery Commerical Unit

Date: Tue May 02 15:24:57 2023

Administrative information

Building Details Address: London, W1F 8GY

Certification tool

Calculation engine: Apache Calculation engine version: 7.0.20 Interface to calculation engine: IES Virtual Environment Interface to calculation engine version: 7.0.20 BRUKL compliance module version: v6.1.e.1

Certifier details Name: Desco Telephone number: 0191 522 2070 Address: Azure House, 2 Azure Ct, Sunderland, SR3 3BE

Foundation area [m²]: 105.14

The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	3.05
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	1.65
Target primary energy rate (TPER), kWhe/m?annum	31.68
Building primary energy rate (BPER), kWhee/m?annum	16.74
Do the building's emission and primary energy rates exceed the targets?	BER =< TER BPER =< TPER

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

Fabric element	Ua-Limit	Ua-Calc	Ui-Calc	First surface with maximum value
Walls*	0.26	0.15	0.15	0000000:Surf[0]
Floors	0.18	0.12	0.12	0000000:Surf[5]
Pitched roofs	0.16	0.15	0.15	01000001:Surf[13]
Flat roofs	0.18	-	-	No flat roofs in building
Windows** and roof windows	1.6	1:31	1.31	0000003:Surf[0]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	1.6	1.6	00000000:Surf[1]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building
Uatimi = Limiting area-weighted average U-values [W/(m²K)]			Ui-Cale = Ca	alculated maximum individual element U-values [W/(m²K)]

U a Limit = Limiting area-weighted average U-values [W/(m²K)] U a Cate = Calculated area-weighted average U-values [W/(m²K)]

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

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

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

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

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

Shell and Core

As designed

HM Government

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	>0.95

1- BE LEAN - ASHP RADS

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR effic	ciency	
This system	2.78	- 1	0	-	0.9		
Standard value	2.5*	N/A	N/A	N/A	N/A		
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system NO							
* Standard shown is f	or all types >12 kW output	except absorption and gas	engine heat pumps.				

1- DHWS

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

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
Α	Local supply or extract ventilation units
В	Zonal supply system where the fan is remote from the zone
С	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
Н	Fan coil units
	Kitchen extract with the fan remote from the zone and a grease filter
NB: L	imiting SEP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name		SFP [W/(I/s)]										
	ID of system type	Α	В	С	D	E	F	G	н		пке	пісіепсу
	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
00 WC		1-	-	-	101	-	-	-	-	-	+	N/A
00 Tea point		-	-	-	1.1	-	2 I	-	-	-	-	N/A
00 Commercial		-	-		1,1_	1. J.	-	-	-	-	-	N/A
01 Commercial			-	-	1::1		-	-	-		70	N/A

Shell and core configuration

Zone	Assumed shell?
00 WC	NO
00 Tea point	NO
00 Commercial	NO
01 Commercial	NO

General lighting and display lighting	General luminaire	Displa	y light source
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
Standard value	95	80	0.3
00 WC	120	-	-

General lighting and display lighting	General luminaire	Displa	y light source
Zone name	Efficacy [Im/W]	Efficacy [lm/W]	Power density [W/m ²]
Standard value	95	80	0.3
00 Tea point	120	÷	-
00 Commercial	120	-	-
01 Commercial	120		-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?	
00 Tea point	NO (-2.6%)	NO	
00 Commercial	NO (-43.1%)	NO	
01 Commercial	NO (-64.3%)	NO	

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional	% A
Floor area (m ²)	210.3	210.3	
External area [m ²]	538.8	538.8	
Weather	LON	LON	100
Infiltration [m³/hm²@ 50Pa]	3	3	-
Average conductance [W/K]	160.01	251.02	_
Average U-value [W/m ² K]	0.3	0.47	-
Alpha value* [%]	9.12	10	-

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	5.41	10.77
Cooling	0	0
Auxiliary	2.99	2.3
Lighting	4.66	5.26
Hot water	2.7	2.57
Equipment*	40.49	40.49
TOTAL**	15.77	20.9

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

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	4.76	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	4.76	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	54.17	107.71
Primary energy [kWh _{PE} /m ²]	16.74	31.68
Total emissions [kg/m ²]	1.65	3.05

Building Use

% Area Building Type

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

ŀ	IVAC Sys	stems Pei	formanc	е						
Sy	stem Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[S1] Central he	eating using	y water: rad	iators, [HS]] ASHP, [HF	T] Electric	ity, [CFT] E	lectricity		
	Actual	54.2	0	5.4	0	3	2.78	0	2.78	0
	Notional	107.7	0	10.8	0	2.3	2.78	0		
[\$1] No Heatin	g or Coolin	g							
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0		

= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)

Key to terms

Heat dem [MJ/m2] = Heating energy demand Cool dem [MJ/m2] Heat con [kWh/m2] = Heating energy consumption Cool con [kWh/m2] = Cooling energy consumption Aux con [kWh/m2] = Auxiliary energy consumption Heat SSEFF Cool SSEER Heat gen SSEFF Cool gen SSEER ST HS HFT CFT

= System type = Heat source

= Cooling energy demand

= Cooling system seasonal energy efficiency ratio = Heating generator seasonal efficiency

= Cooling generator seasonal energy efficiency ratio

- = Heating fue type
 - = Cooling fuel type

Appendix F – GLA summary tables

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Part L 2021 Performance Non-residential

Residential

Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for residential building				
	Carbon Dioxide Emissions for residential buildings (Tonnes CO_2 per annum)			
	Regulated	Unregulated		
Baseline: Part L 2021 of the Building Regulations Compliant Development	103.9	42.9		
After energy demand reduction (be lean)	82.9	42.9		
After heat network connection (be clean)	82.9	42.9		
After renewable energy (be green)	23.1	42.9		

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for residential buildings

	Regulated residential carbon dioxide savings		
	(Tonnes CO ₂ per annum)	(%)	
Be lean: savings from energy demand reduction	21.0	20%	
Be clean: savings from heat network	0.0	0%	
Be green: savings from renewable energy	59.8	58%	
Cumulative on site savings	80.9	78%	
Annual savings from off-set payment	23.1	-	
	(Tonne	es CO ₂)	
Cumulative savings for off- set payment	692	-	
Cash in-lieu contribution (£)	65,728		
*carbon price is based on GL	recommended price of £95 n	er tonne of carbon diovide	

"carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab



SITE-WIDE

	Total regulated emissions (Tonnes CO ₂ / year)	CO ₂ savings (Tonnes CO ₂ / year)	Percentage savings (%)
Part L 2021 baseline	104.5		
Be lean	83.2	21.3	20%
Be clean	83.2	0.0	0%
Be green	23.4	59.8	57%
Total Savings	-	81.1	78%
	-	CO ₂ savings off-set (Tonnes CO ₂)	-
Off-set	-	700.9	-

EUI & space heating demand (predicted energy use)

Residential

Building type	EUI (kWh/m ² /year) (excluding renewable energy)	Space heating demand (kWh/m ² /year) (excluding renewable energy)	EUI value from Table 4 of the guidance (kWh/m ² /year) (excluding renewable energy)	Space heating demand from Table 4 of the guidance(kWh/m²/year) (excluding renewable energy)	Methodology used (e.g. 'be seen' methodology or an alternative predictive energy modelling methodology)	Explanatory notes (if expected performance differs from the Table 4 values in the guidance)
Residential	32.76744267	11.5054199	35	15	Part L1 - SAP 10.2 & none dwellings / & none Landlord Circulation	

Non-residential

Building type	EUI (kWh/m ² /year) (excluding renewable energy)	Space heating demand (kWh/m ² /year) (excluding renewable energy)	EUI value from Table 4 of the guidance (kWh/m²/year) (excluding renewable energy)	Space heating demand from Table 4 of the guidance(kWh/m²/year) (excluding renewable energy)	Methodology used (e.g. 'be seen' methodology or an alternative predictive energy modelling methodology)	Explanatory notes (if expected performance differs from the Table 4 values in the guidance)
Office	61.01997147	5.402282454	55	15	Part L2 - approved DSM & none	

Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-residential buildings

	Carbon Dioxide Emissions for non-residential buildings (Tonnes CO ₂ per annum)		
	Regulated	Unregulated	
Baseline: Part L 2021 of the Building Regulations Compliant Development	0.6	8.5	
After energy demand reduction (be lean)	0.3	8.5	
After heat network connection (be clean)	0.3	8.5	
After renewable energy (be green)	0.3	8.5	

Table 4: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-residential buildings

	Regulated non-residential carbon dioxide savings			
	(Tonnes CO ₂ per annum)	(%)		
Be lean: savings from energy demand reduction	0.3	46%		
Be clean: savings from heat network	0.0	0%		
Be green: savings from renewable energy	0.0	0%		
Total Cumulative Savings	0.3	46%		
Annual savings from off-set payment	0.3	-		
	(Tonnes CO ₂)			
Cumulative savings for off- set payment	9	-		
Cash in-lieu contribution (£)	861			

*carbon price is based on GLA recommended price of £55 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab



	Target Fabric Energy	Dwelling Fabric Energy	Improvement
	Efficiency (kWh/m²)	Efficiency (kWh/m ²)	(%)
Development total	51.54	25.35	51%

	Area weighted non-residential cooling demand (MJ/m ²)	Total non-residential cooling demand (MJ/year)	
Actual	0	0	
Notional	0	0	