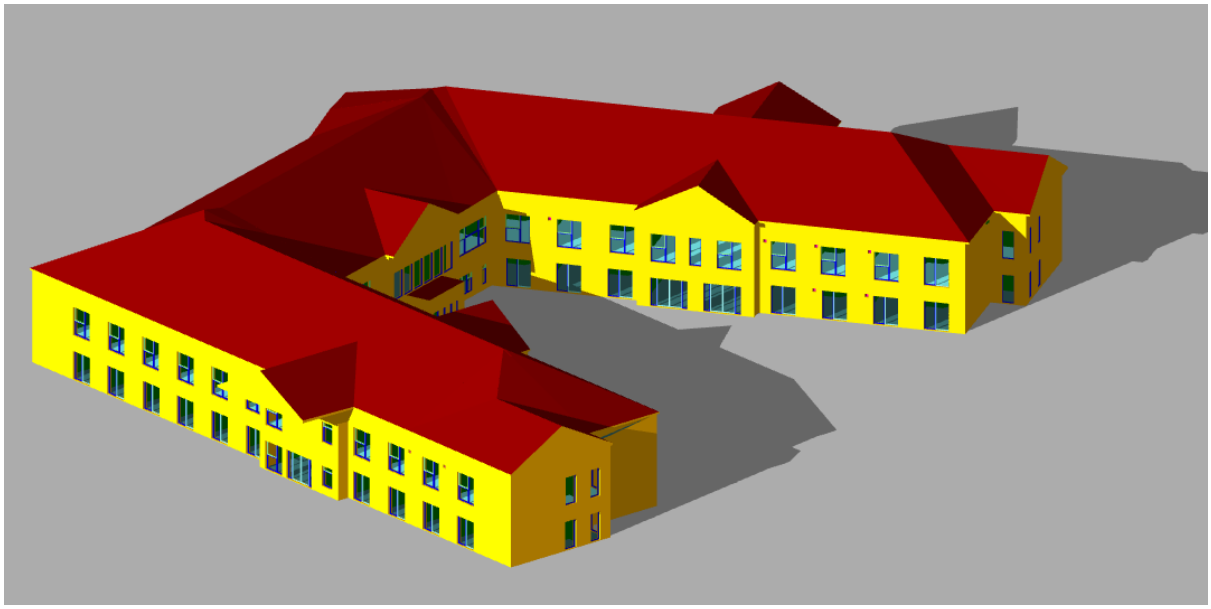
Part L2 Compliance Report

Clitheroe Care Home

PA1674



RIBA STAGE:	0	1	2	3	4	5	6	7

Controlled Document

TACE Project Ref:	PA1674		
	Name	*Signature*	*Date*
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Revision Record					
Rev.	*Date*	*By*	*Summary of Changes*	*Chkd*	*Aprd*
A	03.02.23	AS	Preliminary Issue	SS	JM
B	16.03.23	JL	Updated U-values inline with architects email	SS	JM

Contents

1.0 Executive Summary

This report has been prepared to satisfy the requirements of Eric Wright Developer and Borough of Ribble Valley targets to demonstrate that, that thorough consideration has been given to the energy use and carbon consumption of the proposed new care home at Clitheroe.

The proposed development complies with the requirements of the Building Regulations Approved Document L2 (ADL2) 2021.

1.1 Planning

The Local Planning Authority (LPA) is borough of Ribble Valley, Lancashire.

1.2 Low or Zero Carbon (LZC)

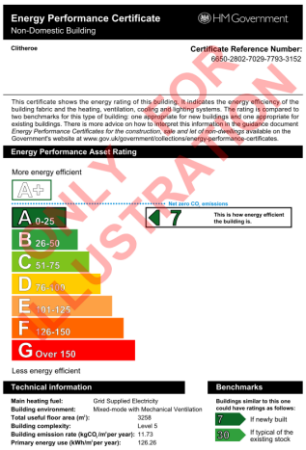
With Passive measures incorporated within the design of the proposed development it was not possible to achieve required BER over TER, therefore, passive measures alone are not enough and so renewables were adopted within the design philosophy. At this stage the advised source of renewable energy is photovoltics.

1.3 Building Regulations Part L2A 2013

This building is currently complying with Part L2A 2021 with an actual building emissions rate (BER) demonstrating 5.2% reduction in carbon emissions in comparison with the notional building target emissions rate (TER).

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

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	12.37	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	11.73	
Target primary energy rate (TPER), $kWh/m^2.annum$	134.24	
Building primary energy rate (BPER), $kWh/m^2.annum$	126.26	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER



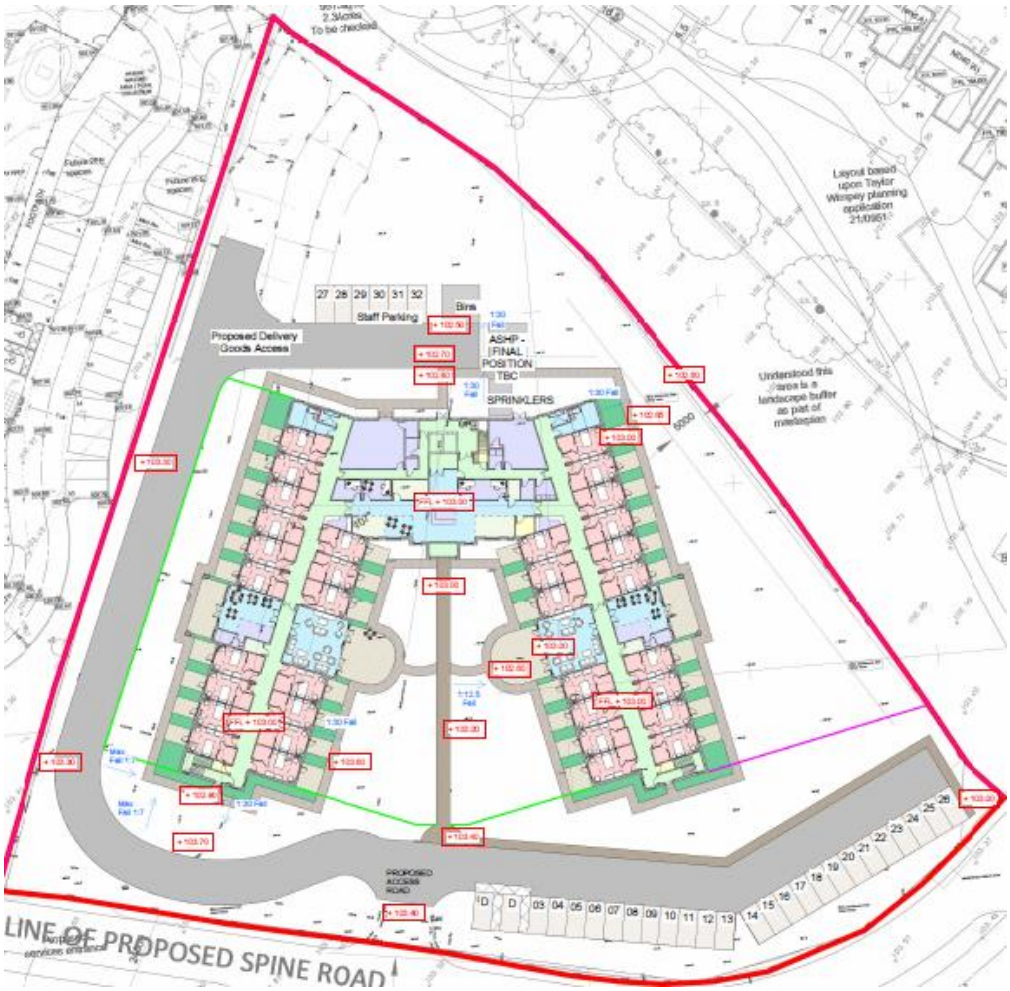
From the attached sketch of Criterion 1 and EPC, it can be seen the building not just comply with the Building Regulation Part L2A, but also achieve EPC rating A.

2.0 Introduction

TACE have been appointed to develop model and perform Part L2A analysis for new care home development Clitheroe Care Home, Standen Central Site, Clitheroe.

This developed comprises of 2 storey care home containing around 70 ensuite bedrooms for the elderly. While on the ground floor beside ensuite bedrooms, the floor also contains admin and manager offices, dining rooms, lounges, hair saloon, library, seating area and bar. While the first floor contains ensuite bedrooms, dining areas, cinema, activities.

This report is about the areas within the building which falls under Building Regulations Part L2A.



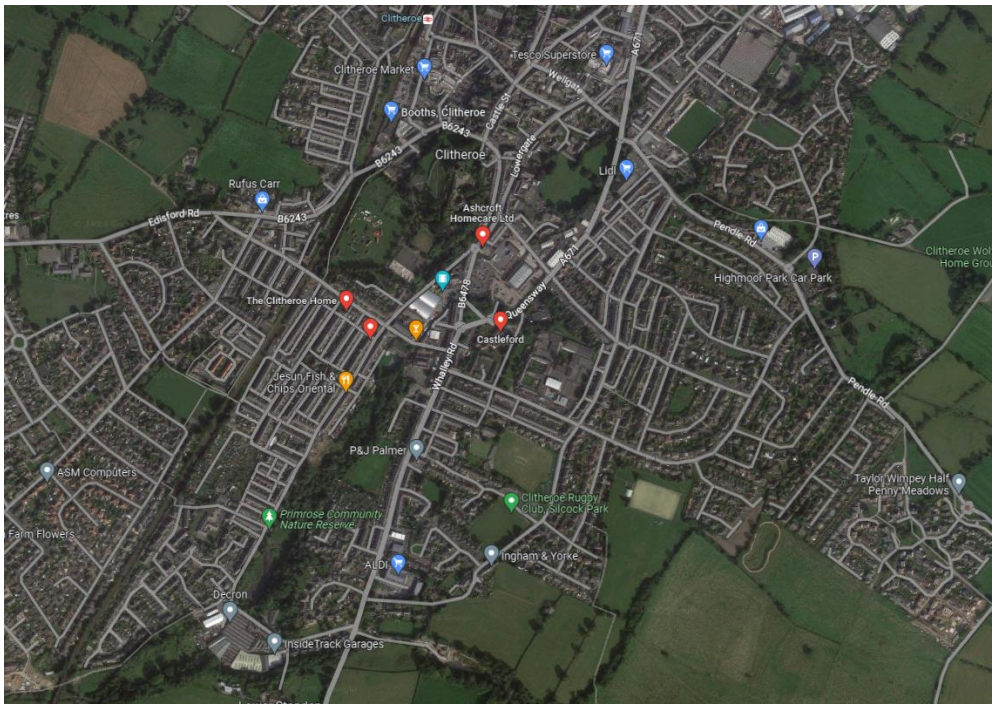
Proposed development

2.1 Software

This study has been undertaken using TAS dynamic simulation software V9.5.4 and UK Building regulations 2021 studio to generate a BRUKL and EPC rating. This allows us to assess the building servicing strategy and energy profiles.

2.2 Location

The weather file selected for the project is Manchester in accordance with the SBEM weather locations application.
The proposed development is situated at Standen Central Site, Clitheroe.



Project location

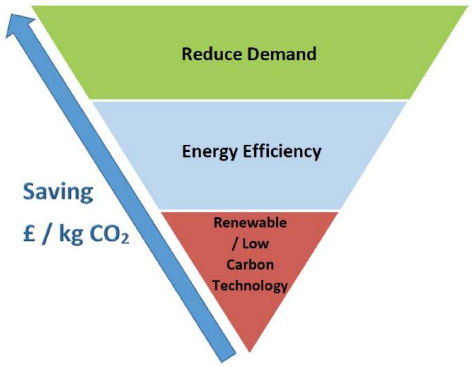
3.0 Energy & Sustainability Strategy

3.1 Introduction

A sustainable building will be delivered through the utilisation of a holistic approach, which considers, plans and monitors the use of natural resources. The strategy for achieving this is outlined as follows:

The Low Carbon Design Hierarchy
The strategy for reducing carbon dioxide (CO_2) emissions and energy consumption within the temporary accommodation, development will be to embrace a lean, mean and green approach as defined below.

- Lean – the use of advanced building modelling software and passive construction techniques.
- Mean – Incorporation of high-efficiency systems and effective controls throughout the design.
- Green – Incorporation of renewable energy sources where possible



3.1.1 Lean – Building Passive Measures

The passive measures are to be included within the design of the development to reduce energy use and the associated CO_2 emissions are;

- Improved building fabric parameters over those required by Building Regulations Part L2A 2021
- Windows with high thermal insulation
- Improved air permeability
- Maximisation of daylight
- Optimise glazing solar energy transmittance

Enhanced Insulation to The Building Envelope

Limiting heat losses across the entire building envelope will future proof the energy efficiency of the development over its whole life. To achieve this, the fabric thermal U-Value requirements as detailed within Approved Document L2A 2021 of the Building Regulations will be improved upon.

The table below shows the limiting U-values required to meet Building Regulations compared to the targeted values which exceed the Building Regulations requirements.

The targeted values as noted will be confirmed during the detailed design stage of the building in conjunction with finalisation of the energy efficiency measures included to meet the CO_2 emission rates required by Building Regulations.

Building Element	Building Regulations Limiting Value ($W/m^2.K$)	Proposed Construction Value ($W/m^2.K$)
Roof Pitched	0.16	0.16
External Wall	0.26	0.22
Floor	0.25	0.12
Windows & Door	1.6	1.2

Engineered Facade Design
The glazed proportion of the building facades and the glazing location will be designed to maximise the use of natural daylight to offset demand for artificial lighting.

Building Element	AD L2A Solar G Value	Target Solar G Value
Glazed Units	0.7	0.4

Reduced Air Permeability
The development will be constructed to improved building airtightness criteria beyond the level required to comply with Building Regulations.

Building Regulations Document	Maximum allowable air permeability (m^3/m^2.hr at 50 Pa)	Targeted air permeability (m^3/m^2.hr at 50 Pa)
Approved Document L2A	8.0	5.0

Weather File
For the analysis, the weather file used was Manchester.TRY weather file taken from CIBSE weather data.

3.1.2 Mean – High-Efficiency Systems, Plant and Controls

High-efficiency systems, plant, controls and equipment will be incorporated as follows:

Optimised Plant Controls
Control of heating and cooling plant will be optimised, and weather compensated to ensure plant operates as close to demand as possible and not at full capacity.

Variable Speed Drives
Variable speed drives shall be installed on circulation pumps and ventilation fans to allow the speed of the respective motors to be amended by the automatic controls to suit changing load of the building. This will ensure energy usage matches demand requirements.

Energy Efficient LED Lighting
Internal lighting within the landlord areas will incorporate energy-efficient LED lighting where practicable.

Lighting controls will be provided to limit energy use.

Automatic presence/absence detection will be included in appropriate areas. This form of control will ensure lights are automatically switched off during periods of non-occupancy.

External lighting will be designed to incorporate energy efficient luminaires and an automatic lighting control system utilising daylight sensors and time clock control to ensure energy-efficient operation of the lighting.

Heat Recovery on Ventilation Systems
Where installed, the ventilation systems installed within the development will also incorporate heat recovery units within the building. This is then used to heat the incoming fresh air and therefore reduce energy usage.

The heat recovery units will have a low specific fan power to minimise the energy used by the fans.

3.1.3 Green – Renewable Technologies

The design of the building as detailed above place emphasis on passive energy saving by careful design of the building and the building services.

The thermal modelling undertaken based on the TACE M&E design strategy demonstrates that the passive design measures in conjunction with solar photovoltics will meet the CO_2 requirement for Building Regulation Part L2A 2021 compliance.

PV data used for the Part L2A analysis is as followed.

- Total PV Area = 70m^2
- PV Efficiency = 20%
- PV Inclination = 30°
- PV Orientation = South Facing

- Total PV Area = 110m^2
- PV Efficiency = 20%
- PV Inclination = 30°
- PV Orientation = East Facing

- Total PV Area = 50m^2
- PV Efficiency = 20%
- PV Inclination = 30°
- PV Orientation = West Facing

With the inclusion of 230m^2 of PV area for the care home recommended by EDSL TAS thermal modelling analysis the building achieve improvement over TER.

4.0 Mechanical Services Design Criteria

The modelled mechanical services systems, configurations and efficiencies are all based on the current TACE design. Any deviations need to be carefully considered to ensure the minimum efficiencies are achieved.

It is the responsibility of the contractor as part of his plant selection and installation to implement these measures. Should the contractor deviate from these assumptions he will be responsible for producing a revised Part L calculation and report to demonstrate compliance.

The following table summarises the strategy adopted by TACE to the mechanical services installation:

Type of system	System Performance Data	System Performance Values
Heating System All Zones except the zones fitted with VRF/VRV & Underfloor Heating	a) Heat Source Generator Type b) Fuel Type c) Generator Seasonal Efficiency d) Heat Recovery Effectiveness e) Delivery Efficiency	Electric Panel Heaters Grid Supplied Electricity 100% N/A 100%
Heating System Zones with Under Floor Heating	a) Heat Source Generator Type b) Fuel Type c) Generator Seasonal Efficiency d) Heat Recovery Effectiveness e) Delivery Efficiency	ASHP Grid Supplied Electricity 3.43 N/A N/A
Heating System Comms Room	a) Heat Source Generator Type b) Fuel Type c) Generator Seasonal Efficiency d) Heat Recovery Effectiveness e) Delivery Efficiency	ASHP Grid Supplied Electricity 410% N/A 100%
Heating System Zones with VRF	a) Heat Source Generator Type b) Fuel Type c) Generator Seasonal Efficiency d) Heat Recovery Effectiveness e) Delivery Efficiency	ASHP Grid Supplied Electricity 300% N/A 100%
Cooling System VRF/VRV	a) Heat Source Generator Type b) Fuel Type c) Generator Seasonal Efficiency d) Heat Recovery Effectiveness f) Delivery Efficiency	ASHP Grid Supplied Electricity 4.0 N/A 100%
Cooling System HP	a) Heat Source Generator Type b) Fuel Type c) Generator Seasonal Efficiency d) Heat Recovery Effectiveness e) Delivery Efficiency	ASHP Grid Supplied Electricity 7% N/A 100%

DHW	a) Method of DHW generation, i.e. combi boilers, cylinder, etc. b) Size and type of DHW cylinder c) DHW delivery efficiency d) Fuel Type e) Generator Seasonal Efficiency	Air Source Heat Pump 2000L 95% Grid Supplied Electricity N/A
Mechanical Ventilation HRU	a) Details of all AHUs and which areas served by AHU b) Specific fan power of AHUs (W/l/s) c) Efficiency of heat recovery	HRU 1.8W/l/s 80%
Mechanical Ventilation Kitchen S&E	a) Details of all AHUs and which areas served by AHU b) Specific fan power of AHUs (W/l/s) c) Efficiency of heat recovery	Kitchen S&E 0.6 + 0.6 W/l/s N/A
Mechanical Ventilation Extract Only Laundry, Cleaners, Bathrooms	d) Details of all AHUs and which areas served by AHU e) Specific fan power of AHUs (W/l/s) f) Efficiency of heat recovery	Extract Only 0.5 W/l/s N/A
Control Corrections	a) Are there system provisions for metering? b) Does the system warn of 'out of range' values?	Yes No Following controls are installed on HVAC systems a) Room Temperature Control b)

5.0 Electrical Services Design Criteria

The modelled services systems, configurations and efficiencies are all based on the current TACE design. Any deviations need to be carefully considered to ensure the minimum efficiencies are achieved.

It is the responsibility of the contractor as part of his plant selection and installation to implement these measures. Should the contractor deviate from these assumptions he will be responsible for producing a revised Part L calculation and report to demonstrate compliance.

In the absence of the lighting calculation standard luminaire efficacy of 95 lm/W has been applied to the remaining zones throughout.

The following table summarises the assumptions made to the electrical services installation:

Spaces	Power correction factor	Lighting level (Lux)	Day light dimming	Local manual switching
Circulation	0.95	150	No	Presence Detection
Stairs	0.95	150	No	Presence Detection
Plantroom	0.95	200	No	Manual
Offices	0.95	350	No	Presence Detection
Lounge	0.95	300	No	Manual
Activity Room	0.95	350	No	Presence Detection
Staff Room	0.95	350	No	Presence Detection
Laundry	0.95	400	No	Manual
Cinema	0.95	350	No	Manual
Kitchen	0.95	500	No	Manual
Dining	0.95	200	No	Presence Detection
Stores	0.95	100	No	Presence Detection
Meds	0.95	100	No	Presence Detection
Toilets	0.95	200	No	Presence Detection
Reception	0.95	500	No	Presence Detection
Bedroom	0.95	100	No	Manual
Server	0.95	100	No	Presence Detection
Bathroom	0.95	200	No	Presence Detection
Seating/Bar	0.95	350	No	Presence Detection
Hair Salon	0.95	350	No	Presence Detection
Comms	0.95	100	No	Manual
Library	0.95	350	No	Presence Detection

6.0 Conclusion

From this report, with the design parameters used within Part L2A compliance analysis, calculation performed exceeds the requirements set out in Building Regulation Part L 2021.

From the results in Appendix I it can be noted that with the passive measures and high efficiency mechanical and electrical systems in conjunction with photovoltaic cells as renewable energy source, the Care Home at Clitheroe complies with Building Regulation Part L2A analysis.

It should be noted that the calculation and subsequent results outlined within this report have been produced from TACE stage 3 information.

Appendix I – BRUKL Report

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Clitheroe Care Home — As designed

Date: Thu Mar 16 14:19:34 2023

Administrative information

Building Details

Address: Clitheroe,

Certifier details

Name:

Telephone number:

Address: , ,

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.5.4"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.5.4

BRUKL compliance check version: v6.1.b.0

Foundation area [m²]: 1190.78

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

Target CO_2 emission rate (TER), $kgCO_2/m^2$annum	12.37	
Building CO_2 emission rate (BER), $kgCO_2/m^2$annum	11.73	
Target primary energy rate (TPER), kWh/m^2annum	134.24	
Building primary energy rate (BPER), kWh/m^2annum	126.26	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

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

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.22	0.22	External Wall 375mm
Floors	0.18	0.12	0.12	Ground Floor
Pitched roofs	0.16	0.16	0.16	Roof
Flat roofs	0.18	-	-	No flat roofs in project
Windows** and roof windows	1.6	1.38	1.56	W8A Openable
Rooflights***	2.2	-	-	No rooflights in project
Personnel doors^	1.6	1.35	1.61	D1 Louvre Door
Vehicle access & similar large doors	1.3	-	-	No vehicle access or similar large doors in project
High usage entrance doors	3	-	-	No high usage entrance doors in project

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

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

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

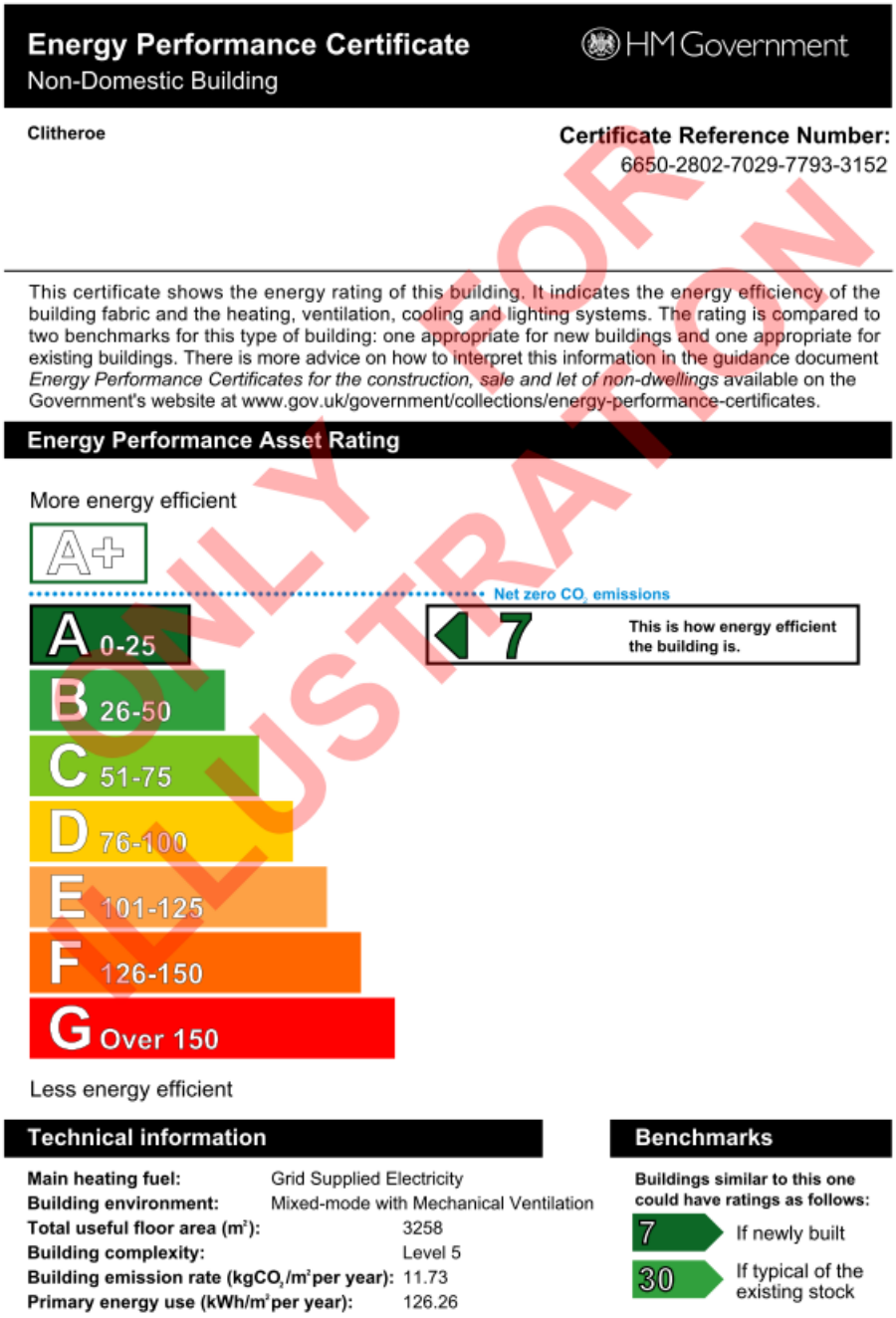
** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

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

N.B.: 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
$m^3/(h.m^2)$ at 50 Pa	8	5

Appendix II – EPC



Energy Performance Certificate
Non-Domestic Building

HM Government

Clitheroe

Certificate Reference Number:
6650-2802-7029-7793-3152

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government's website at www.gov.uk/government/collections/energy-performance-certificates.

Energy Performance Asset Rating

More energy efficient

A+

Net zero CO_2 emissions

A 0-25

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

7 This is how energy efficient the building is.

Less energy efficient

Technical information

Main heating fuel:	Grid Supplied Electricity
Building environment:	Mixed-mode with Mechanical Ventilation
Total useful floor area (m^2):	3258
Building complexity:	Level 5
Building emission rate ($kgCO_2/m^2$ per year):	11.73
Primary energy use (kWh/m^2 per year):	126.26

Benchmarks

Buildings similar to this one could have ratings as follows:

7 If newly built

30 If typical of the existing stock