HARNISS
CONSULTING

ENERGY STRATEGY REPORT
THE MOUNT, WARGRAVE
PROPOSED NEW CARE HOME

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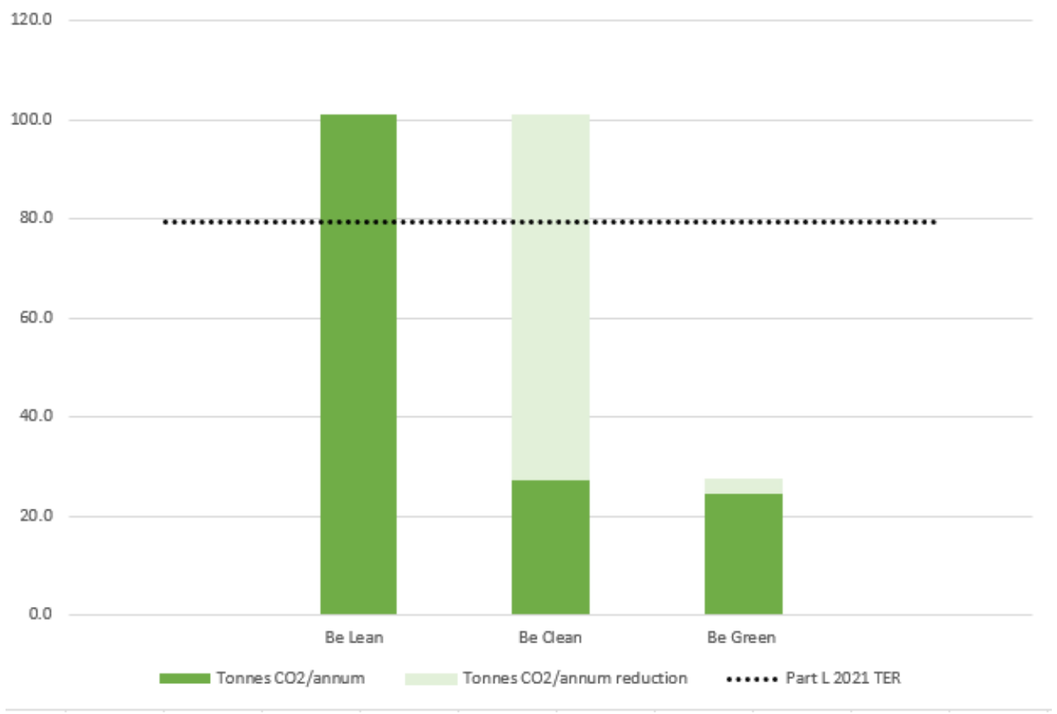
Contents

1.0 Executive Summary

This document details the intended energy and sustainability strategy for the proposed care home based along School Hill, Wargrave. The development briefly comprises of the construction of a new 65 bed care home (Use Class C2) on the site and the associated works including car parking, access, landscaping, and associated engineering. This report has been prepared by Harniss Consulting on behalf of Aedifica UK limited.

The ethos for the design of the proposed development follows the recognised energy hierarchy to "Be Lean, Be Clean, Be Green", i.e. to minimise the building's energy usage before applying renewable technologies to the design.

By following the energy hierarchy, the building was found to be compliant and go beyond the requirements of Building Regulations Approved Document Part L2:2021 with the use of an enhanced building fabric performance, efficient lighting and the use of highly efficient air source heat pumps in . The improvement beyond building regulations is illustrated below, resulting in an overall saving of 54.4 tonnes of carbon dioxide per year, as calculated by the EDSL TAS using the Part L2 2021 methodology.



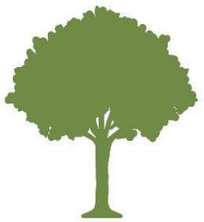
Summary

The following summarises the key drivers of the energy strategy for the development:

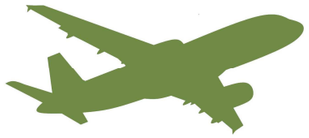
- Enhanced building fabric performance has been targeted through improved thermal performance and reduced air permeability.
- Energy efficient heating, domestic hot water, cooling, ventilation, and lighting systems throughout.
- Energy efficient controls for HVAC and lighting to minimise building in-use energy.
- An initial desk top study was undertaken to assess the most viable low zero caron technologies for proposed implementation to achieve compliance with the local planning policy.
- A full electric system is proposed for the development to aid the compliance with Part L 2021 which includes ASHP on both heating and hot water generation. In addition to this highly efficient technology 350m² Photovoltaic array has been included to

The conclusion of the conceptual design stage energy strategy is to provide energy efficient technologies and an enhanced fabric performance from the constructions of the project. This solution provides a route to compliance with Approved Document Part L2:2021 as of the Building Regulations for the proposed development. With the use of Air Source Heat Pumps, 350m² of photovoltaic array and enhanced fabric performances the development has been able to comply with the new Building regulations Part L2 2021 approved document and the clients aspirations for the omission of natural gas supplies to the development.

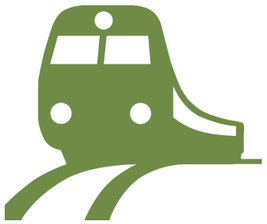
The strategy outlined in this report would result in the same impact as the following (1172.8 tonnes of CO^2 saved over 20 years against the baseline figure):



18,147 trees
Grown for 10 years



1845 Flights
From London to New York
(Per Passenger)

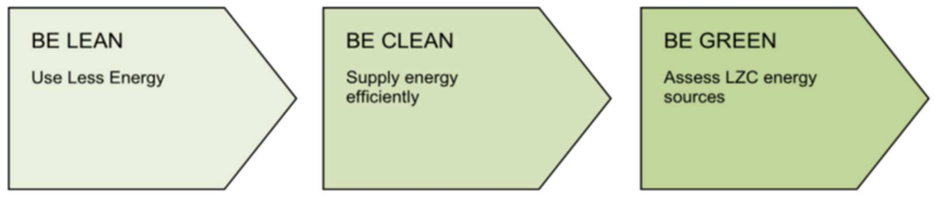


98,985 Train Journeys
From London to Paris
(Per Passenger)

2.0 Introduction

The report has been prepared in accordance with Part L2A:2013 of the building regulations with the assessment showing compliance with all applicable criteria. The solution has also been assessed against Part L2 2021.

The strategy for the development takes into account the recognised energy hierarchy to “Be Lean, Be Clean, Be Green”, i.e. to minimise the energy usage within each building before applying renewable technologies to the design.



Further work will be required at later stages in the detailed design process to ensure that the requirement to comply with the above targets and that all statutory guidelines or local planning enforcement requirements are met.

2.1 Thermal Modelling

Analysis for the building has been undertaken utilising EDSL Tas software version 9.5.2. EDSL Tas is industry leading NCM accredited thermal modelling software which carries out dynamic hourly simulations of the anticipated energy usage and compares it against the notional benchmarks set under AD Part L2A of the building regulations. The software was initially used to determine a baseline carbon emissions using fabric performance values as discussed with the development team (as detailed in the body of the report) without contribution from additional renewable technologies.

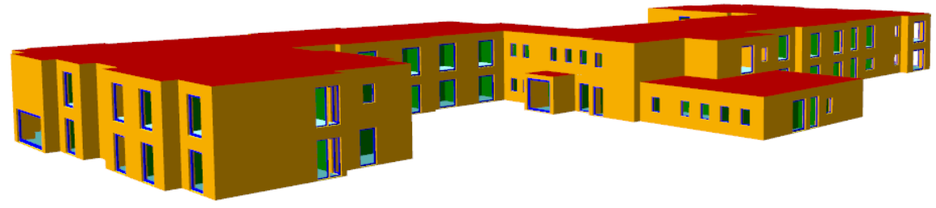


Figure 1— EDSL TAS Model Screenshot

2.3 Local Planning Policies

Policy CC05 of the Wokingham Borough Managing Development Delivery Document (Local Plan) - Adopted 21 February 2014 states

Planning permission will only be granted for proposals that deliver a minimum 10% reduction in carbon emissions through renewable energy or low carbon technology where the development is for:

a) Schemes of more than 10 dwellings (gross), or

b) Non-residential proposals of more than 1,000 sq.m gross floorspace.

This policy has been met through the use of a full ASHP heating and hot water proposal with the inclusion of 350m2 PV. This solution has been assessed against 2013 regulations and has achieved a 34% reduction over Part L2A:2013 which complies with the Wokingham local plan.

2.4 Building Regulations (Part L)

All areas of the proposed development will need to meet Energy Performance Standards which are set for non-domestic by Building Regulations Approved Document Part L2, Conservation of Fuel and Power in New Buildings other than Dwellings.

The role of Part L of the Building Regulations is to set a minimum target for the regulation carbon dioxide emissions and is defined by the Target Emission Rate (TER) which relates to a 'Notional Building' and is automatically generated as part of the Simplified Building Energy Model (SBEM) toolkit.

The resulting Building Emission Rate (BER) must be less than the Target Emission Rate (TER) in order to prove compliance with the Building Regulations.

This energy assessment demonstrates a route to compliance with Approved Document Part:L2 of the building regulations, with this publication being valid at the time of the assessment.

The NCM modelling guide has been released for the 2021 Part L which details an emphasis on reducing carbon dioxide emission, a strong opposition to using fossil fuels and reducing building primary energy usage. The reduction in primary energy shall be assessed through a new additional benchmark, the Target Primary Energy Rate (TPER), following the same format as the existing Target Emissions Rate (TER). In order to achieve compliance with the proposed new regulations both the Building Emissions Rate (BER) and Building Primary Energy Rate (BPER) must be below the Target Emissions Rate (TER) and the Target Primary Energy Rate (TPER), respectively.

Should the scheme fall outside of the transitional provisions, a contingency within the cost plan for alternative energy solutions and variance to the prescribed fixed-building services installations should be accounted for—any change from fossil fuels to a fully electric development may have a significant impact on MEP plant spatial planning through the requirement for a large external plant compound and electrical infrastructure to the site; potentially including a substation. Where increases to the developments electric demand is necessary this may also dictate the need for off-site reinforcement works. Should reinforcement works be required the lead-in for these works to be procured, programmed and completed is typically in the order of a number of months.

3.0 Description of Development

The proposed development consists of a new 65 bed care home (Use Class C2) with a GIA of 3398m^2 located on School Hill, Wargrave, briefly comprising of:

- 65 bed care home with dedicated en-suites
- Community spaces including
    - Main reception area
    - Kitchen and Restaurant Café
    - Lounges
    - Dining Rooms
    - Activity Areas
- Plantroom

Our assessment has been based on the following architectural AutoCAD drawings, produced by Pozzoni Architects :

- T0405-010—Proposed Ground Floor Plan
- T0405-011 - Proposed First Floor Plan
- T0405-105 - Proposed Site Plan

Figure 2— Pozzoni Architects Floor Plan

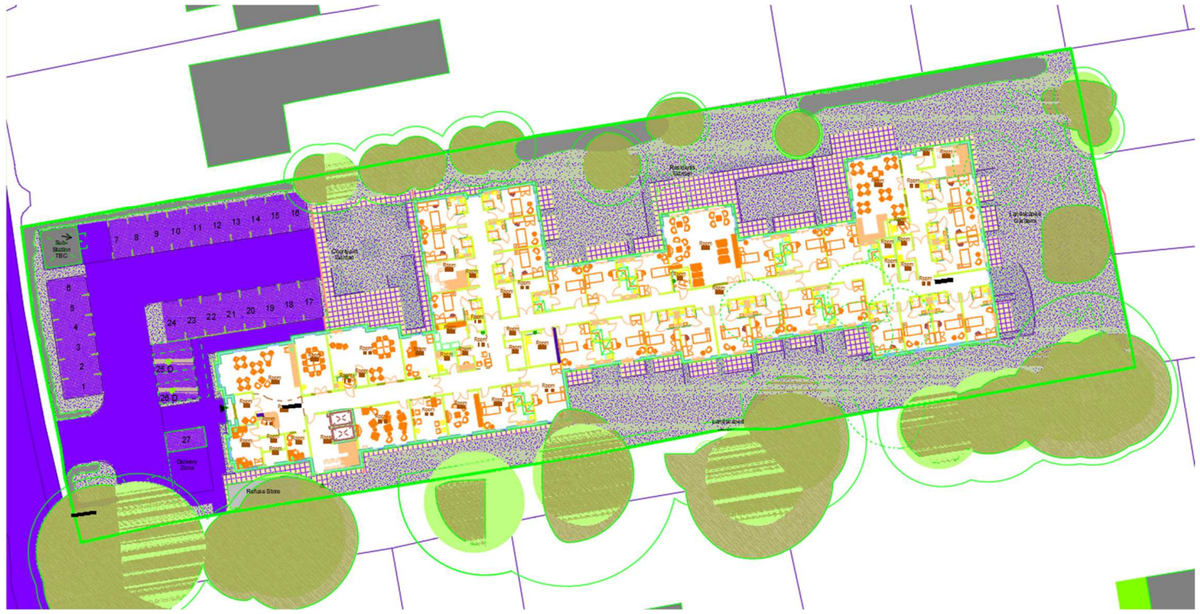


Figure 3—Pozzoni Architects Site Plan

4.0 Use Less Energy (Be Lean)

The proposed development and the energy strategy detailed herein has low-energy use at its core with significant passive and energy efficient measure having been specified, these include: -

- A significant improvement over limiting U-valves within Building Regulations. The thermal performance of the building envelope has been maximised to its fullest within the constraints of a traditional-build with 100mm cavity.
- Air permeability improved of 50% over the limiting value. The target will be to improve yet further on the air permeability during the construction phase but given the relatively small percentage of total energy that the heating system contributes to, any further gain will result in minimal actual reduction against the Target Emission Rate calculated under Approved Document Part L.
- Improved SFP's for ventilation systems including high efficiency heat recovery.
- Improved efficacy lighting specified which reduces primary energy usage.
- Automatic lighting controls used throughout, where appropriate for care i.e. proximity infrared used throughout in en-suites, bathrooms, stores.

To this end, the proposed design promotes reducing the CO_2 emissions from delivered energy consumption by minimising operational energy demand through passive and best-practice measures. With these measures incorporated, then the addition of a renewable energy system will have a greater impact – renewable energy sources should not be used as an alternative to a well-designed building.

4.1 Building Fabric / Fabric First Approach

A preliminary thermal energy model has been constructed of the care home EDSL Tas software version 9.5.2. The software was used to determine a baseline performance utilising the employer's requirements including the project specifications, room data sheets and good industry custom and practice.

The model was produced using constructions advised by the project architect which were:

Building Fabric Parameter	Value
Air permeability	5.0
External Wall U-value	0.21
Roof U-value	0.15
Ground Floor U-value	0.16
Glazing U-value	1.4
Glazing G-value	0.4

Equally, uncontrolled ventilation losses should be controlled, and the new building constructed to meet stringent air permeability targets. Whilst Part L minimum requirements are $10m^3/m^2/hr$ at 50Pa, the notional building used for analysis includes a significantly lower rate ($3m^3/m^2/hr$ at 50Pa), therefore it would be advantageous for the project to target a better air permeability. A rate of $5.0m^3/m^2/hr$ at 50Pa has been assumed for the purpose of this analysis which would be easily achieved with traditional construction and still be attained with SFS.

4.2 Energy Use in the Built Environment

In line with the recognised energy hierarchy of intervention to "Be Lean, Be Clean, Be Green", the fixed building services for the development should be designed with energy efficiency at the forefront, with plant and systems selected to have efficiencies in excess of those required by legislation, to maximise carbon reduction.

It is proposed that the care home's heating and domestic hot water generation shall be provided by gas fired boilers to meet the buildings space heating, and ventilation requirements, complete with weather compensation and local thermostatic control.

Extract ventilation of vitiated air from en-suites, WC's, kitchenettes, sluice rooms, bathrooms, etc., shall be provided in accordance with the employer's requirements and MEP performance specification, via local extract fans operating in trickle and boost modes responding to occupancy. The systems will provide continuous extract with a 'boost' activated upon presence detection.

Cooling systems shall be provided to reception/café, day spaces, drugs stores, cinema and the communications room. The Contractor shall develop the proposals and may use individual heat pump systems or utilise VRV/VRF systems to serve multiple indoor units from a single external unit. Units shall be heating and cooling type in all spaces. The communications room shall be fed from a separate DX system.

Electrical services shall generally be as per the specification and room data sheets, with LED lighting utilised throughout.

4.3 Summary of Key Input Data

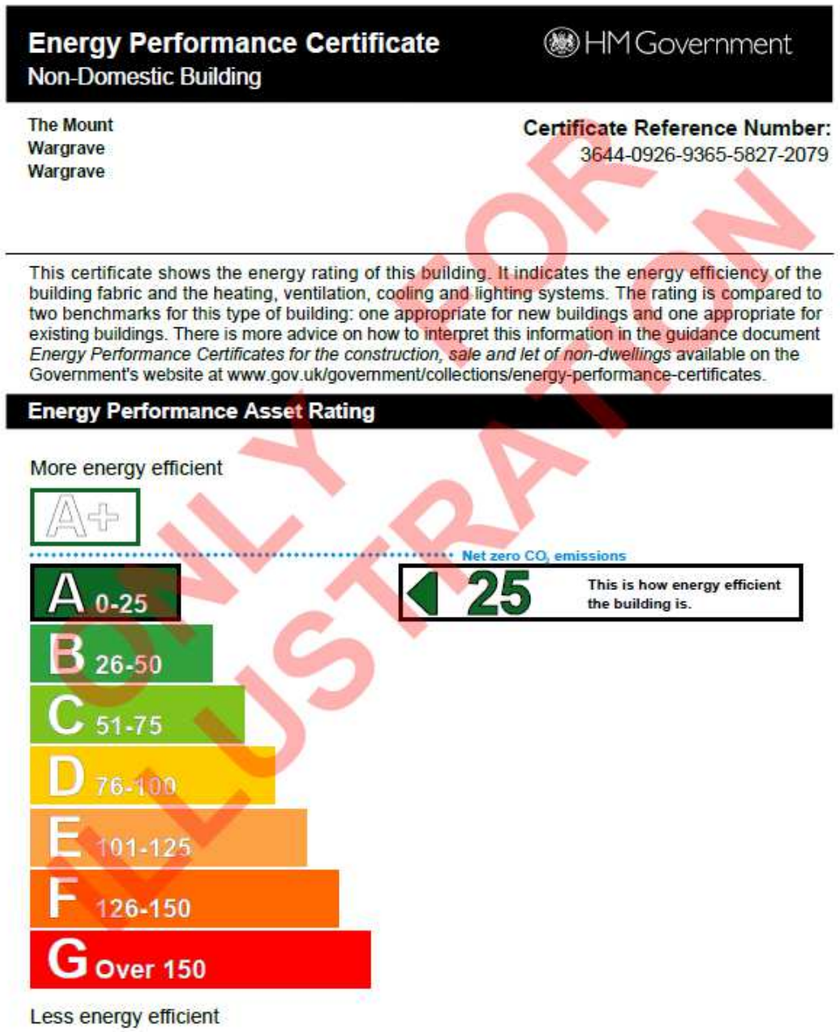
As well as the U-values and design air permeability previously indicated, the following information summarises the key input information used for this analysis detailing the enhanced building services:

Weather File	Swindon TRY
LTHW Heating System	
Heat Source	Air Source Heat Pump
Fuel Type	Grid Supplied Electricity
Seasonal Efficiency	310%
Circulation Pump	Variable speed, pressure control across pump
System Controls	Central time control, Weather compensation control
DHWS System	
Heat Source	Air Source Heat Pump
Fuel Type	Grid Supplied Electricity
Ventilation Systems	
Overall supply & extract SFP	1.4W/l/s
Min. heat recovery efficiency	80%
Overall extract SFP	0.3 W/l/s
Kitchen Extract SFP	1.0 W/l/s
Lighting	
Lumens / circuit watt	110 (average)

4.4 Results without renewables

In line with the first stage of the recognised energy hierarchy of intervention to "Be Lean, Be Clean, Be Green", it is essential to ensure that an efficient building and building services systems have been designed and proposed, prior to the consideration of application of LZC technologies.

Target Emissions Rating (TER)	**23.4 $kgCO_2/m^2$.annum**
Building Emissions Rating (BER)	**29.8 $kgCO_2/m^2$.annum**



Energy Performance Certificate
Non-Domestic Building

HM Government

The Mount
Wargrave
Wargrave

Certificate Reference Number:
3644-0926-9365-5827-2079

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

25 This is how energy efficient the building is.

Less energy efficient

5.0 Heating Infrastructure (Be Clean)

The second stage of the recognised energy hierarchy of 'Be Lean, Be Clean, Be Green' is to exploit local energy resources such as secondary heat to reduce the developments carbon emissions. From reviewing online heat maps from the Department for Business, Energy, & Industrial Strategy there are no available heat networks to readily connect to in the local vicinity of the proposed development. Due to there being no local heat network that can be capitalised upon there are no associated carbon emission savings at this stage. However, this does not preclude a future heat network connection, should one become operational locally.

6.0 Low Carbon and Renewable Technology

This section provides a brief overview of available renewable and low/zero carbon technologies (LZC). The technical feasibility of installing each LZC technology at the proposed care home has been assessed in order to discount any unsuitable options at an early stage. A summary of the feasibility process is presented in the following table discusses the advantages and disadvantages that are specific to the project:

Technology	Brief Description	Benefits	Issues/Limitations	Feasible
Solar Photovoltaic	Photovoltaic panels convert solar radiation into electrical energy	Low maintenance. No moving parts. Easily integrated into building design.	Any overshadowing affects panel performance. Large area required for installation. Panels ideally inclined and facing southerly direction.	Yes
Solar Thermal and hybrid PVT	Solar thermal energy can contribute towards space heating and hot water requirements as well as electrical pow-	Low maintenance.	Must be sized for the building base load hot water requirements. Panels ideally inclined at around 30 degrees and facing southerly direction	No
Wind Turbine	Wind generation equipment operates on the basis of wind turning a propeller, which is used to drive an alternator to generate electricity. Small scale (1kW – 15kW) wind turbines can be pole or roof mounted.	Low maintenance/ On-going cost. Excess electricity can be exported to the grid.	Planning issues. Aesthetic impact. Background noise Space limitations on site. Minimum wind speed requirements. Wind survey to be undertaken to verify 'local' viability.	No
Biomass	Modern wood-fuel boilers are highly efficient, clean and almost carbon	Stable long-term running costs. Potential good CO_2 saving.	Large area needed for fuel delivery and storage. Reliable fuel supply chain required. Regular maintenance required Significant plant space required. Air pollution / Clean Air Act limits use.	No
Ground Source Heat Pump (GSHP)	GSHP systems tap into the earth's considerable energy store to provide both heating and cooling to buildings.	Minimal maintenance. Unobtrusive technology. Flexible installation options to meet available site footprint.	Large area required for horizontal pipes Full ground survey required to determine geology. More beneficial to the development if cooling is required. Integration with piled foundations must be done at an early stage. The lack of space to locate the underground pipework loops and the associated plant around the site.	Yes
Air Source Heat Pump	Electric air source heat pumps extract thermal energy from the surrounding air and transfer it to the working fluid (air or water).	Efficient use of fuel. Relatively low capital costs.	Specialist maintenance. Some additional plant space required. External proximity to boundary and noise generation with units cycling. Impact of the required external plant and associated noise within the domestic setting can be a nuisance to residents.	Yes
Combined Heat and Power	A Combined Heat and Power (CHP) installation is effectively a mini on-site power plant providing both electrical power and thermal heat. CHP is strictly an energy efficiency measure rather than a renewable energy technology.	Potential high CO_2 saving available. Efficient use of fuel. Excess electricity can be exported to the grid	Maintenance intensive. Sufficient base thermal and electrical demand required. Additional plant space required. Noise and air quality constraints.	Yes
Earth Ducts	Passive pre-treatment of fresh air	Low cost Free energy	Requires significant air loads and riser space	No

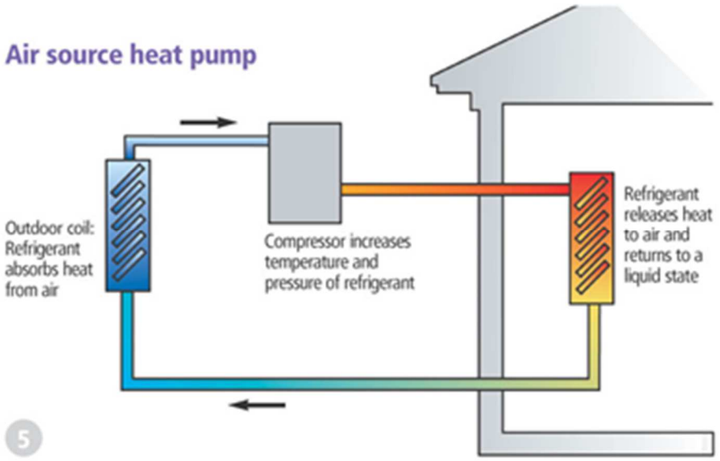
To comply with building regulations Harniss Consulting suggest that the site is provided with a Air source heat pumps to provide heating and hot water demands as well as 350m2 of Photovoltaic array. With using this type of renewable technology the development complies with Building Regulations Part L:2021.

7.0 Heat Pumps

Heat pumps take a low grade source of heat e.g. a lake or external air, and though a process similar to that of a domestic refrigerator, “upgrade“ the heat for use in a heating system, or for domestic hot water generation.

Reverse-cycle heat pumps can also use the same process in reverse to provide cooling if required. For the purposes of this report, given the nature of the development and typical servicing strategy it is assumed that any heat pumps installed will only operate in heating mode. Although there are several day spaces that will require cooling, the typical servicing arrangement would suggest these are best fed from local plant rather than the introduction of multiple heat pump units, chilled water pipework and equipment etc.

Air source heat pumps operate on the same principle as ground source heat pumps, but instead of using the earth as a heat source, they extract heat from external air. Heat pumps that generate significant amounts of heat will require external plant areas.



Picture 1—Air Source Heat Pump

7.2 Photovoltaic System (PV)

A PV system uses layers of semi-conductor material to produce electricity generated directly from sunlight. Several types of PV are available with varying costs and performance.

The efficiency ranges around 20% for high performance panels, based on peak output under ideal conditions. For the panels to function effectively, they must be installed in an unshaded location, and correctly orientated based on the site latitude.

The PV panel system proposed requires a large roof area of 350m². PV panels are mounted on a metal racking system which are typically angled at between 5 and 30 degrees to improve the energy capture, for maintenance the system requires access paths, provided with man safe system where required. Visual impact has to be taken in consideration, PV solar system installation will be prevented on a sloping roof and therefore will be visible. The intermittency and unpredictability of solar energy due to weather is an element which can dictate that the system is not used at full potential. A further consideration is the additional structural provisions to support the photovoltaic panels and metal racking system which for a system of this size is considerable.

Picture 1 —Roof mounted PV panels

Picture 2—Frame mounted PV on flat roof

8.1 Life Cycle Costing—Air Source Heat Pump

In order to establish the life cycle cost for the renewable systems the report will need to establish costing for Energy Consumption, Energy Generation, Maintenance and Estimated Fuel Tariffs.

For the basis of this study the following estimated fuel costs shall be used:

PAYBACK

Fuel	Cost (£/kWh)
Electricity	£0.280
Gas	£0.080

DHW Generator (Gas Fired)	Heat Energy Required (kWh)	Generator Efficiency (%)	Total Energy Consumed (kWh)	Fuel Cost (Gas) (£)	Fuel Cost (Electic) (£)
Boiler	372,204	96%	387,713	£31,017	£0
ASHP	-	310%	-	£0	£0
			Cost Difference	£31,017	£0

DHW Generator (Pre-Heat)	Heat Energy Required (kWh)	Generator Efficiency (%)	Total Energy Consumed (kWh)	Fuel Cost (Gas) (£)	Fuel Cost (Electic) (£)
Boiler	248,136	96%	258,475	£20,678	£0
ASHP	148,882	310%	48,026	£0	£13,447
			Cost Difference	£20,678	£13,447

DHW Generator	Cost for Gas Consumption (£)	Cost for Electrical Consumption (£)	Total Fuel Cost (£)
Gas Fired	£31,017	£0	£31,017
ASHP Pre-Heat	£20,678	£13,447	£34,125
		Cost Difference	-£3,108

Cost of ASHP unit (£)	Total Annum Savings (£)	Year to Payback
£25,000	-£3,693	-6.8

Cost of ASHP unit (£)	Savings x 20 Years (£)	Net Savings over 20 Years
£25,000	-£73,867	-£98,867

8.2 Life Cycle Costing—Photovoltaic Array

In order to establish the life cycle cost for the renewable systems the report will need to establish costing for Energy Consumption, Energy Generation, Maintenance and Estimated Fuel Tariffs.

For the basis of this study the following estimated fuel costs shall be used:

PAYBACK

Fuel	Cost (£/kWh)
Electricity	£0.280

Electricity Generator	Electrical Energy Required (kWh)	Fuel Cost (Electric) (£)
Grid	65,330	£18,292
PV	65,330	£0
	Cost Difference	£18,292

Cost of PV	Total Annum Savings after Maintenance (£/annum)	Years to Payback
£52,800	£18,292	2.9

Cost of PV	Total Annum Savings after Maintenance x 20 Years (£)	Total Savings over 20 Years (£)
£52,800	£365,848	£313,048

9.0 Result with renewable technology (Be Green)

Harniss Consulting suggest that air source heat pumps and 350m2 PV should be utilised to achieve maximum gain over building regulations target and to achieve planning conditions.

Target Emissions Rating (TER)	**7.46 $kgCO_2/m^2$.annum**
Building Emissions Rating (BER)	**7.31 $kgCO_2/m^2$.annum**

Energy Performance Certificate
Non-Domestic Building

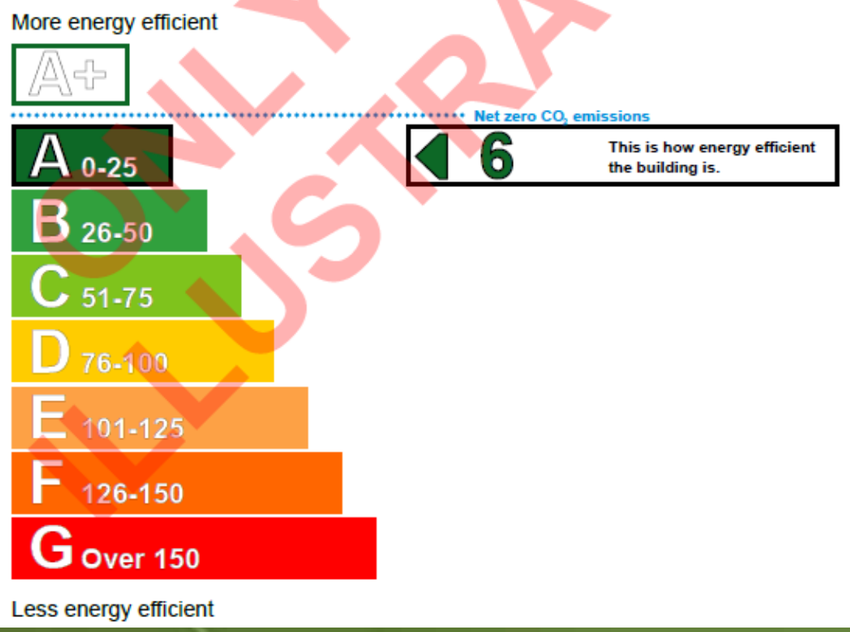
HM Government

The Mount
Wargrave
Wargrave

Certificate Reference Number:
8302-0585-5179-3106-9835

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



Appendix A - BRUKL Documentation

The following pages detail the predicted BRUKL output and Part L compliance information for the proposed care home building based on the solution as described elsewhere in this report.

This analysis demonstrates feasibility only. The contractor shall be responsible for developing a holistic solution in conjunction with the detailing architect to achieve compliance.

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

1991 - Wargrave - As Designed

As designed

Date: Mon Jul 04 16:37:35 2022

Administrative information

Building Details

Address: The Mount, Wargrave , Wargrave ,

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.5.3"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.5.3

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

Certifier details

Name:

Telephone number:

Address: , ,

Foundation area [m^2]: 3392

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

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	7.46	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	7.31	
Target primary energy rate (TPER), $kWh/m^2.annum$	81.21	
Building primary energy rate (BPER), $kWh/m^2.annum$	77.93	
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	0.21	0.21	External Wall
Floors	0.18	0.13	0.13	Ground Floor
Pitched roofs	0.16	-	-	
Flat roofs	0.18	-	-	
Windows** and roof windows	1.6	1.45	1.45	EW.02 - 1.472x2.110x0.05
Rooflights***	2.2	-	-	
Personnel doors^	1.6	-	-	No personal doors in project
Vehicle access & similar large doors	1.3	-	-	No vehicle 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 [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* 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/m^2K

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

Building services

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

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

1- Rad Heat/Mech Vent (28 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.1	-	-	1.4	0.8
Standard value	2.5*	N/A	N/A	1.5^	N/A
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. ^ Limiting SFP may be extended by the amounts specified in the Approved Documents if the installation includes particular components.					

2- Rad Heat/Extract (87 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.1	-	-	-	-
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 for all types >12 kW output, except absorption and gas engine heat pumps.					

3- Rad Heat/Nat Vent

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.1	-	-	-	-
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 for all types >12 kW output, except absorption and gas engine heat pumps.					

4- VRF/Mech Vent (6 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	-	-	1.4	0.8
Standard value	2.5*	N/A	N/A	2^	N/A
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. ^ Limiting SFP may be extended by the amounts specified in the Approved Documents if the installation includes particular components.					

5- DX/Nat Vent (3 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0	-	-	-	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

6- Laundry (2 - Laundry 1)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0	-	-	1.4	0.8
Standard value	N/A	N/A	N/A	1.5^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
^ Limiting SFP may be extended by the amounts specified in the Approved Documents if the installation includes particular components.					

7- Kitchen (3 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.1	-	-	-	-
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 for all types >12 kW output, except absorption and gas engine heat pumps.					

1- ASHP

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.1	0
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

Local mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
0 - Ensuite 1	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 2	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 3	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 4	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 5	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 6	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 7	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 8	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 9	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 10	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 11	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 12	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 13	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 14	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 15	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 16	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 17	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 18	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 19	0.3	-	-	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
0 - Ensuite 20	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 21	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 22	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 23	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 24	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 25	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 26	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 27	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 28	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Ensuite 29	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Cafe 1	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - Reception 1	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - Private Dining 1	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - Cinema 1	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - Hair Salon 1	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - GF Quiet Lounge 1	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - Bar/Activity 1	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - Visitors WC 1	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Corridor 1	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - Corridor 2	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - Corridor 3	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - Corridor 4	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - Corridor 5	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - Corridor 6	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - Sluice 1	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Nurse Office 1	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - Waiting Area 1	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - Cleaner Store 1	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Cleaner Store 2	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Wheelchair Store 1	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Assisted WC 1	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - WC 1	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - WC 2	0.3	-	-	-	-	-	-	-	-	-	N/A
0 - Lounge 1	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - Lift Lobby 1	-	-	-	1.4	-	-	-	-	-	-	N/A
0 - Dining Room 1	-	-	-	1.4	-	-	-	-	-	-	N/A
1 - Dining 1	-	-	-	1.4	-	-	-	-	-	-	N/A
1 - Lounge 1	-	-	-	1.4	-	-	-	-	-	-	N/A
1 - Ensuite 1	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 2	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 3	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 4	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 5	0.3	-	-	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
1 - Ensuite 6	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 7	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 8	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 9	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 10	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 11	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 12	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 13	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 14	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 15	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 16	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 17	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 18	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 19	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 20	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 21	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 22	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 23	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 24	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 25	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 26	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 27	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 28	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 29	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 30	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 31	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 32	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 33	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 34	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 35	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Ensuite 36	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Sluice 1	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Sluice 2	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Nurse Office 1	-	-	-	1.4	-	-	-	-	-	-	N/A
1 - Cleaner Store 1	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Cleaner Store 2	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Waiting Area 1	-	-	-	1.4	-	-	-	-	-	-	N/A
1 - Assisted Bathroom 1	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Wheelchair Store 1	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - WC 1	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - WC 2	0.3	-	-	-	-	-	-	-	-	-	N/A
1 - Lounge 2	-	-	-	1.4	-	-	-	-	-	-	N/A
1 - Dining 2	-	-	-	1.4	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
1 - Lift Lobby 1	-	-	-	1.4	-	-	-	-	-	-	N/A
1 - Corridor 1	-	-	-	1.4	-	-	-	-	-	-	N/A
1 - Corridor 2	-	-	-	1.4	-	-	-	-	-	-	N/A
1 - Corridor 3	-	-	-	1.4	-	-	-	-	-	-	N/A
1 - Corridor 4	-	-	-	1.4	-	-	-	-	-	-	N/A
1 - Corridor 5	-	-	-	1.4	-	-	-	-	-	-	N/A
1 - Corridor 6	-	-	-	1.4	-	-	-	-	-	-	N/A
2 - Changing 1	0.3	-	-	-	-	-	-	-	-	-	N/A
2 - Changing 2	0.3	-	-	-	-	-	-	-	-	-	N/A
2 - Changing 3	0.3	-	-	-	-	-	-	-	-	-	N/A
2 - Laundry 1	-	-	-	-	1.4	-	-	-	-	-	N/A
2 - Kitchen 1	-	-	-	-	-	-	-	-	0.3	-	N/A
2 - Chef Office 1	0.3	-	-	-	-	-	-	-	-	-	N/A
2 - Dry Store 1	-	-	-	-	-	-	-	-	0.3	-	N/A
2 - Cold Store 1	-	-	-	-	-	-	-	-	0.3	-	N/A
2 - COSHH 1	0.3	-	-	-	-	-	-	-	-	-	N/A
2 - Corridor 1	-	-	-	1.4	-	-	-	-	-	-	N/A
2 - Corridor 2	-	-	-	1.4	-	-	-	-	-	-	N/A
2 - Corridor 3	-	-	-	1.4	-	-	-	-	-	-	N/A
Sluice 2	0.3	-	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
0 - Bedroom 1	-	-	-
0 - Bedroom 2	-	-	-
0 - Bedroom 3	-	-	-
0 - Bedroom 4	-	-	-
0 - Bedroom 5	-	-	-
0 - Bedroom 6	-	-	-
0 - Bedroom 7	-	-	-
0 - Bedroom 8	-	-	-
0 - Bedroom 9	-	-	-
0 - Bedroom 10	-	-	-
0 - Bedroom 11	-	-	-
0 - Bedroom 12	-	-	-
0 - Bedroom 13	-	-	-
0 - Bedroom 14	-	-	-
0 - Bedroom 15	-	-	-
0 - Bedroom 16	-	-	-
0 - Bedroom 17	-	-	-
0 - Bedroom 18	-	-	-
0 - Bedroom 19	-	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
0 - Bedroom 20	-	-	-
0 - Bedroom 21	-	-	-
0 - Bedroom 22	-	-	-
0 - Bedroom 23	-	-	-
0 - Bedroom 24	-	-	-
0 - Bedroom 25	-	-	-
0 - Bedroom 26	-	-	-
0 - Bedroom 27	-	-	-
0 - Bedroom 28	-	-	-
0 - Bedroom 29	-	-	-
0 - Ensuite 1	-	-	-
0 - Ensuite 2	-	-	-
0 - Ensuite 3	-	-	-
0 - Ensuite 4	-	-	-
0 - Ensuite 5	-	-	-
0 - Ensuite 6	-	-	-
0 - Ensuite 7	-	-	-
0 - Ensuite 8	-	-	-
0 - Ensuite 9	-	-	-
0 - Ensuite 10	-	-	-
0 - Ensuite 11	-	-	-
0 - Ensuite 12	-	-	-
0 - Ensuite 13	-	-	-
0 - Ensuite 14	-	-	-
0 - Ensuite 15	-	-	-
0 - Ensuite 16	-	-	-
0 - Ensuite 17	-	-	-
0 - Ensuite 18	-	-	-
0 - Ensuite 19	-	-	-
0 - Ensuite 20	-	-	-
0 - Ensuite 21	-	-	-
0 - Ensuite 22	-	-	-
0 - Ensuite 23	-	-	-
0 - Ensuite 24	-	-	-
0 - Ensuite 25	-	-	-
0 - Ensuite 26	-	-	-
0 - Ensuite 27	-	-	-
0 - Ensuite 28	-	-	-
0 - Ensuite 29	-	-	-
0 - Cafe 1	-	-	-
0 - Lobby 1	-	-	-
0 - Reception 1	-	22	-
0 - Admin Office 1	110	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
0 - Comms 1	110	-	-
0 - Electrical Intake 1	110	-	-
0 - Office 1	110	-	-
0 - Private Dining 1	-	-	-
0 - Stair 1	-	-	-
0 - Stair 2	-	-	-
0 - Stair 3	-	-	-
0 - Cinema 1	-	-	-
0 - Hair Salon 1	-	-	-
0 - GF Quiet Lounge 1	-	-	-
0 - Bar/Activity 1	-	-	-
0 - Visitors WC 1	-	-	-
0 - Store 1	110	-	-
0 - Store 2	110	-	-
0 - Store 3	110	-	-
0 - Store 4	110	-	-
0 - Store 5	110	-	-
0 - Store 6	110	-	-
0 - Corridor 1	-	-	-
0 - Corridor 2	-	-	-
0 - Corridor 3	-	-	-
0 - Corridor 4	-	-	-
0 - Corridor 5	-	-	-
0 - Corridor 6	-	-	-
0 - Managers office 1	110	-	-
0 - Sluice 1	110	-	-
0 - Nurse Office 1	110	-	-
0 - Medication Store 1	110	-	-
0 - Waiting Area 1	-	-	-
0 - Cleaner Store 1	110	-	-
0 - Cleaner Store 2	110	-	-
0 - Wheelchair Store 1	110	-	-
0 - Assisted WC 1	-	-	-
0 - WC 1	-	-	-
0 - WC 2	-	-	-
0 - Lounge 1	-	-	-
0 - Lift Lobby 1	-	-	-
0 - Dining Room 1	-	-	-
1 - Dining 1	-	-	-
1 - Lounge 1	-	-	-
1 - Stair 1	-	-	-
1 - Stair 2	-	-	-
1 - Stair 3	-	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
1 - Bedroom 1	-	-	-
1 - Bedroom 2	-	-	-
1 - Bedroom 3	-	-	-
1 - Bedroom 4	-	-	-
1 - Bedroom 5	-	-	-
1 - Bedroom 6	-	-	-
1 - Bedroom 7	-	-	-
1 - Bedroom 8	-	-	-
1 - Bedroom 9	-	-	-
1 - Bedroom 10	-	-	-
1 - Bedroom 11	-	-	-
1 - Bedroom 12	-	-	-
1 - Bedroom 13	-	-	-
1 - Bedroom 14	-	-	-
1 - Bedroom 15	-	-	-
1 - Bedroom 16	-	-	-
1 - Bedroom 17	-	-	-
1 - Bedroom 18	-	-	-
1 - Bedroom 19	-	-	-
1 - Bedroom 20	-	-	-
1 - Bedroom 21	-	-	-
1 - Bedroom 22	-	-	-
1 - Bedroom 23	-	-	-
1 - Bedroom 24	-	-	-
1 - Bedroom 25	-	-	-
1 - Bedroom 26	-	-	-
1 - Bedroom 27	-	-	-
1 - Bedroom 28	-	-	-
1 - Bedroom 29	-	-	-
1 - Bedroom 30	-	-	-
1 - Bedroom 31	-	-	-
1 - Bedroom 32	-	-	-
1 - Bedroom 33	-	-	-
1 - Bedroom 34	-	-	-
1 - Bedroom 35	-	-	-
1 - Bedroom 36	-	-	-
1 - Ensuite 1	-	-	-
1 - Ensuite 2	-	-	-
1 - Ensuite 3	-	-	-
1 - Ensuite 4	-	-	-
1 - Ensuite 5	-	-	-
1 - Ensuite 6	-	-	-
1 - Ensuite 7	-	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
1 - Ensuite 8	-	-	-
1 - Ensuite 9	-	-	-
1 - Ensuite 10	-	-	-
1 - Ensuite 11	-	-	-
1 - Ensuite 12	-	-	-
1 - Ensuite 13	-	-	-
1 - Ensuite 14	-	-	-
1 - Ensuite 15	-	-	-
1 - Ensuite 16	-	-	-
1 - Ensuite 17	-	-	-
1 - Ensuite 18	-	-	-
1 - Ensuite 19	-	-	-
1 - Ensuite 20	-	-	-
1 - Ensuite 21	-	-	-
1 - Ensuite 22	-	-	-
1 - Ensuite 23	-	-	-
1 - Ensuite 24	-	-	-
1 - Ensuite 25	-	-	-
1 - Ensuite 26	-	-	-
1 - Ensuite 27	-	-	-
1 - Ensuite 28	-	-	-
1 - Ensuite 29	-	-	-
1 - Ensuite 30	-	-	-
1 - Ensuite 31	-	-	-
1 - Ensuite 32	-	-	-
1 - Ensuite 33	-	-	-
1 - Ensuite 34	-	-	-
1 - Ensuite 35	-	-	-
1 - Ensuite 36	-	-	-
1 - Sluice 1	110	-	-
1 - Sluice 2	110	-	-
1 - Nurse Office 1	110	-	-
1 - Medication Store 1	110	-	-
1 - Cleaner Store 1	110	-	-
1 - Cleaner Store 2	110	-	-
1 - Waiting Area 1	-	-	-
1 - PPE Store 1	110	-	-
1 - Store 1	110	-	-
1 - Store 2	110	-	-
1 - Store 3	110	-	-
1 - Store 4	110	-	-
1 - Assisted Bathroom 1	-	-	-
1 - Wheelchair Store 1	110	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
1 - WC 1	-	-	-
1 - WC 2	-	-	-
1 - Lounge 2	-	-	-
1 - Dining 2	-	-	-
1 - Lift Lobby 1	-	-	-
1 - Corridor 1	-	-	-
1 - Corridor 2	-	-	-
1 - Corridor 3	-	-	-
1 - Corridor 4	-	-	-
1 - Corridor 5	-	-	-
1 - Corridor 6	-	-	-
2 - Changing 1	-	-	-
2 - Changing 2	-	-	-
2 - Changing 3	-	-	-
2 - Stair 1	-	-	-
2 - Stair 2	-	-	-
2 - Store 1	110	-	-
2 - Store 2	110	-	-
2 - Store 3	110	-	-
2 - Staff Room 1	-	-	-
2 - Maintenance Store 1	110	-	-
2 - Tank 1	110	-	-
2 - Plant Room 1	110	-	-
2 - Laundry 1	-	-	-
2 - Kitchen 1	-	-	-
2 - Kitchen Store 1	110	-	-
2 - Chef Office 1	110	-	-
2 - Dry Store 1	110	-	-
2 - Cold Store 1	110	-	-
2 - COSHH 1	110	-	-
2 - Corridor 1	-	-	-
2 - Corridor 2	-	-	-
2 - Corridor 3	-	-	-
Sluice 2	110	-	-

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?
0 - Bedroom 1	NO (-45%)	NO
0 - Bedroom 2	NO (-77%)	NO
0 - Bedroom 3	NO (-42%)	NO
0 - Bedroom 4	NO (-34%)	NO
0 - Bedroom 5	NO (-66%)	NO
0 - Bedroom 6	NO (-70%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
0 - Bedroom 7	NO (-41%)	NO
0 - Bedroom 8	NO (-34%)	NO
0 - Bedroom 9	NO (-9%)	NO
0 - Bedroom 10	NO (-40%)	NO
0 - Bedroom 11	NO (-40%)	NO
0 - Bedroom 12	NO (-19%)	NO
0 - Bedroom 13	NO (-19%)	NO
0 - Bedroom 14	NO (-23%)	NO
0 - Bedroom 15	NO (-34%)	NO
0 - Bedroom 16	NO (-36%)	NO
0 - Bedroom 17	NO (-36%)	NO
0 - Bedroom 18	NO (-8%)	NO
0 - Bedroom 19	NO (-13%)	NO
0 - Bedroom 20	NO (-40%)	NO
0 - Bedroom 21	NO (-35%)	NO
0 - Bedroom 22	NO (-11%)	NO
0 - Bedroom 23	NO (-90%)	NO
0 - Bedroom 24	NO (-81%)	NO
0 - Bedroom 25	NO (-81%)	NO
0 - Bedroom 26	NO (-61%)	NO
0 - Bedroom 27	NO (-3%)	NO
0 - Bedroom 28	YES (+6%)	NO
0 - Bedroom 29	YES (+6%)	NO
0 - Cafe 1	NO (-58%)	NO
0 - Reception 1	N/A	N/A
0 - Admin Office 1	NO (-43%)	NO
0 - Comms 1	N/A	N/A
0 - Office 1	NO (-19%)	NO
0 - Private Dining 1	NO (-62%)	NO
0 - Cinema 1	NO (-31%)	NO
0 - GF Quiet Lounge 1	NO (-49%)	NO
0 - Bar/Activity 1	NO (-51%)	NO
0 - Managers office 1	NO (-50%)	NO
0 - Nurse Office 1	N/A	N/A
0 - Medication Store 1	N/A	N/A
0 - Lounge 1	NO (-37%)	NO
0 - Dining Room 1	NO (-36%)	NO
1 - Dining 1	NO (-34%)	NO
1 - Lounge 1	NO (-64%)	NO
1 - Bedroom 1	NO (-62%)	NO
1 - Bedroom 2	NO (-56%)	NO
1 - Bedroom 3	NO (-46%)	NO
1 - Bedroom 4	NO (-72%)	NO
1 - Bedroom 5	NO (-46%)	NO
1 - Bedroom 6	NO (-56%)	NO
1 - Bedroom 7	NO (-49%)	NO
1 - Bedroom 8	NO (-45%)	NO
1 - Bedroom 9	NO (-77%)	NO
1 - Bedroom 10	NO (-38%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
1 - Bedroom 11	NO (-22%)	NO
1 - Bedroom 12	NO (-37%)	NO
1 - Bedroom 13	NO (-34%)	NO
1 - Bedroom 14	NO (-66%)	NO
1 - Bedroom 15	NO (-76%)	NO
1 - Bedroom 16	NO (-37%)	NO
1 - Bedroom 17	NO (-61%)	NO
1 - Bedroom 18	NO (-60%)	NO
1 - Bedroom 19	NO (-47%)	NO
1 - Bedroom 20	NO (-46%)	NO
1 - Bedroom 21	NO (-49%)	NO
1 - Bedroom 22	NO (-57%)	NO
1 - Bedroom 23	NO (-58%)	NO
1 - Bedroom 24	NO (-58%)	NO
1 - Bedroom 25	NO (-39%)	NO
1 - Bedroom 26	NO (-42%)	NO
1 - Bedroom 27	NO (-60%)	NO
1 - Bedroom 28	NO (-57%)	NO
1 - Bedroom 29	NO (-38%)	NO
1 - Bedroom 30	NO (-70%)	NO
1 - Bedroom 31	NO (-41%)	NO
1 - Bedroom 32	NO (-40%)	NO
1 - Bedroom 33	NO (-72%)	NO
1 - Bedroom 34	NO (-42%)	NO
1 - Bedroom 35	NO (-37%)	NO
1 - Bedroom 36	NO (-37%)	NO
1 - Nurse Office 1	N/A	N/A
1 - Medication Store 1	N/A	N/A
1 - Lounge 2	NO (-41%)	NO
1 - Dining 2	NO (-35%)	NO
1 - Corridor 1	N/A	N/A
1 - Corridor 2	N/A	N/A
1 - Corridor 3	NO (-70%)	NO
1 - Corridor 4	N/A	N/A
1 - Corridor 5	YES (+21%)	NO
1 - Corridor 6	NO (-77%)	NO
2 - Staff Room 1	N/A	N/A
2 - Chef Office 1	N/A	N/A

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
Floor area [m^2]	3392	3392
External area [m^2]	5023	5023
Weather	SWI	SWI
Infiltration [m^3/hm^2@ 50Pa]	5	3
Average conductance [W/K]	1295	1469.29
Average U-value [W/m^2K]	0.26	0.29
Alpha value* [%]	14.1	14.1

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

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
100	**Residential Institutions: Hospitals and Care Homes**
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

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

	Actual	Notional
Heating	3.1	1.76
Cooling	1.45	2.86
Auxiliary	13.92	9.78
Lighting	17.36	11.85
Hot water	34.3	28.75
Equipment*	59.08	59.08
TOTAL**	**70.12**	**55**

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

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	19.26	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*19.26*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	58.97	69.01
Primary energy [kWh/m^2]	77.93	81.21
Total emissions [kg/m^2]	7.31	7.46

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] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	0	0	0	0	27.1	2.95	0	3.1	0
	Notional	0	0	0	0	19	3.2	0	----	----
[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	76.8	0	7.3	0	13.6	2.95	0	3.1	0
	Notional	65.3	0	5.7	0	15.3	3.2	0	----	----
[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	48.7	0	4.6	0	3	2.95	0	3.1	0
	Notional	24.9	0	2.2	0	1.8	3.2	0	----	----
[ST] Variable refrigerant flow, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	0.1	237.3	0	13.2	28.8	4	5	4	5
	Notional	0	451.7	0	28.5	14.1	0	4.4	----	----
[ST] Single room cooling system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	0	372.8	0	20.7	0	0	5	0	5
	Notional	0	473.5	0	29.9	0	0	4.4	----	----
[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	0	0	0	0	12.6	0	0	0	0
	Notional	0	0	0	0	6.5	0	0	----	----
[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	0.1	0	0	0	31.4	2.95	0	3.1	0
	Notional	0	0	0	0	39.5	3.2	0	----	----

Key to terms

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