

Bartley Wood Business Park Hook

Energy Strategy Report

Issue 2 - Planning

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REVISIONS

Issue	Description	Date
1	Planning Issue	24/05/21
2	Planning Issue <ul style="list-style-type: none">Updated in line with Barton Willmore comments	26/05/21

Latest amendments highlighted red in document.

EXECUTIVE SUMMARY

This Energy Strategy Report has been prepared to support the planning application in connection with the proposed demolition of existing buildings and redevelopment of the site to provide 9no. industrial units (Flexible Use Class B1/B8/E(g)(i)-(iii)) and 1no. retail foodstore (Use Class E(a)), together with associated parking, a new vehicular access off Griffin Way South, landscaping and other associated works at Bartley Wood Business Park, Hook.

The report seeks to demonstrate how compliance with the following can be achieved:

- Building Regulations Part L2A 2013 – Criterion 1-3
- Developer's aspiration for BREEAM 'Very Good' and EPC A Ratings

In demonstrating the above it is considered that the development would be in compliance with Hart District Council Planning Policy NBE9 (i) & (j) in support of reduced energy consumption and the incorporation of Low and Zero Carbon (LZC) technologies.

All calculations undertaken within the report are based on the developer's specification for the shell buildings with future fitout allowances for the warehouse, office undercrofts and retail foodstore.

Building Regulations Part L2A 2013 - Criterion 1 & EPC Rating

All units are in compliance with the Approved Document.

Building Regulations Part L2A 2013 - Criterion 2

The performance of the building fabric and building services proposals are no worse than the design limits set out in the Approved Document.

Building Regulations Part L2A 2013 - Criterion 3

The performance of the buildings against the criterion 3 solar overheating check show that the design is in compliance with the Approved Document.

BREEAM & EPC Ratings

All industrial units and the retail foodstore achieve a BREEAM 'Very Good' Rating and Energy Performance Certificate (EPC) A Rating.

Results Summary

Unit	CO ₂ Emission Compliance	EPC Rating	BREEAM ENE01 Credits	PV Array (kWh/yr)
1	PASS	A (24)	3	3397.13
2	PASS	A (24)	2	921.82
3	PASS	A (23)	3	929.41
4	PASS	A (25)	2	923.14
5	PASS	A (24)	3	775.28
6	PASS	A (23)	3	771.53
7	PASS	A (22)	3	777.50
8	PASS	A (23)	3	2620.55
9	PASS	A (24)	3	2781.82
Retail Foodstore	PASS	A (18)	0	-

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1.0 INTRODUCTION

This Energy Strategy Report has been prepared to support the planning application in connection with the proposed demolition of existing buildings and redevelopment of the site to provide 9no. industrial units (Flexible Use Class B1/B8/E(g)(i)-(iii)) and 1no. retail foodstore (Use Class E(a)), together with associated parking, a new vehicular access off Griffin Way South, landscaping and other associated works at Bartley Wood Business Park, Hook.

The report seeks to demonstrate how compliance with the following can be achieved:

- Building Regulations Part L2A 2013 – Criterion 1-3
- Developer's aspiration for BREEAM 'Very Good' and EPC A Ratings

In demonstrating the above it is considered that the development would be in compliance with Hart District Council Planning Policy NBE9 (i) & (j) in support of reduced energy consumption and the incorporation of Low and Zero Carbon (LZC) technologies.

1.1 Building Regulations Part L2A – Criterion 1-3

To satisfy Criterion 1: the CO₂ Building Emission Rate (**BER**) for the building 'As Designed' must not be greater than the Target Emission Rate (**TER**) calculated as set out in the Approved Document.

To satisfy Criterion 2: the performance of the building fabric and building services systems should be no worse than the design limits set out in the Approved Document.

To satisfy Criterion 3: those parts of the building that are occupied or provided with mechanical cooling systems shall have appropriate passive control measures to limit the effects of solar heat gains in summer.

1.2 Developer's Aspirations

The developer is targeting a BREEAM 'Very Good' Rating and Energy Performance Certificate (EPC) A Rating for all industrial units and the retail foodstore.

1.3 BREEAM Credits Ene01 & ENE04

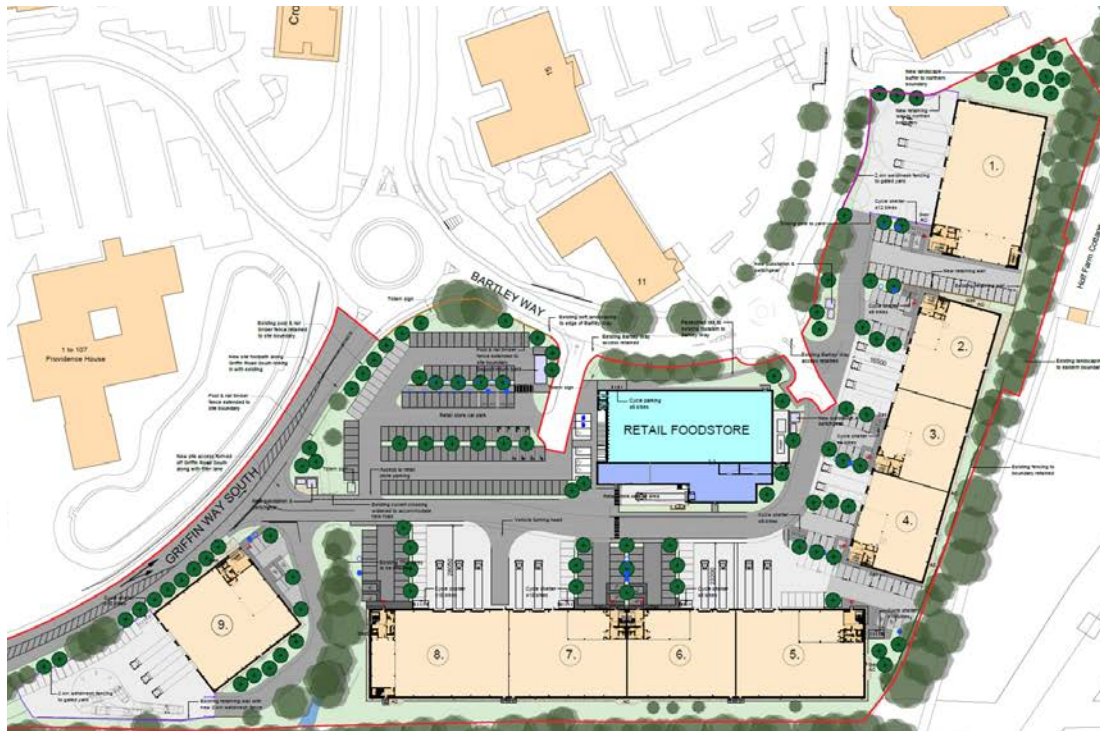
This report is structured in line with the requirements of ENE04 and advises the number of credits that would be achieved under Ene01 based on the calculated **TER** and **BER** figures.

1.4 Draft Energy Performance Certificate (EPC) Ratings

This report advises the draft EPC ratings based on the calculated **TER** and **BER** figures.

2.0 BRIEF SCOPE OF DEVELOPMENT PROPOSALS

The proposed development comprises 9no. new industrial units (Flexible Use Class B1/B8/E(g)(i)-(iii)) with first floor office mezzanines and associated service yard and car parking areas and 1no. new retail foodstore (Use Class E(a)), together with associated service yard and car parking areas.



Proposed Site Plan

The proposed building form and orientation are as detailed on PRC's plan and elevation drawings accompanying the planning submission.

Refer to Appendix 1 for full details of all building and services design data.

3.0 APPROACH & METHODOLOGY

3.1 Energy Calculations

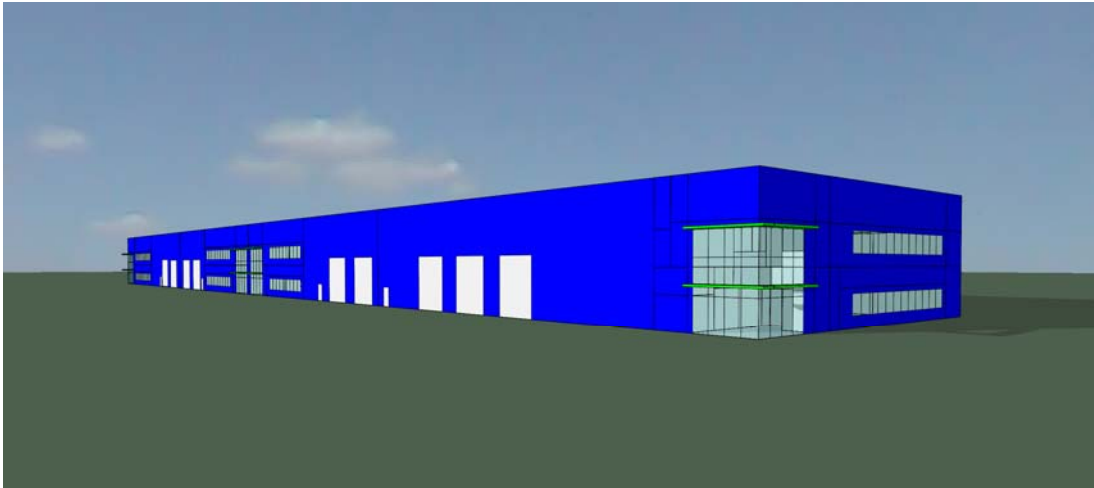
All energy calculations undertaken as part of this report have been carried out using the SBEM calculation methodology (v5.6.b.0), in accordance with the requirements of Building Regulations Part L2A (2013), using IES Apache software as the interface tool (v7.0.13).



IES Building Model – Unit 1 South/West Elevations



IES Building Model – Units 2-4 North/West Elevations



IES Building Model – Units 5-8 North/West Elevations



IES Building Model – Unit 9 North Elevations



IES Building Model – Retail Unit West Elevations

3.2 Future Fit-Out Allowances

3.2.1 Industrial Units

As part of the developers works the following building areas will be constructed as shell only:

- Warehouse areas
- Undercroft areas beneath 1st floor offices

For the purposes of this report and the energy assessment calculations the warehouse areas will be treated as 'Speculative Industrial Process' areas, and the undercroft areas will be treated as 'Open Plan Office' areas.

For these areas the following future servicing allowances have been made in the calculations in accordance with the conventions of Building Regulations Part L2A 2013:

- Heating & lighting to the Warehouse areas
- Undercrofts to be fitted out as office to the same specification as the offices above.

Full details of these allowances are defined in **green** in Appendix 1.

3.2.2 Retail Foodstore

The developers works are limited to the building shell however in line with building regulations the calculations within this report are based on a fully fitted out building. Where applicable data provided by the retail foodstore tenant has been used in the calculations, all future design data is detailed in **green** in Appendix 1.

3.3 Calculation Clarifications

3.3.1 Regulated & Un-regulated Energy Uses

Regulated energy uses are those in connection with space heating/cooling, hot water heating, lighting and ventilation.

Un-regulated energy uses are those in connection with the building user process/equipment small power loads.

3.3.2 Carbon Reduction from Air Source Heat Pumps

In the case of the air source heat pump heating/cooling systems the renewable energy contribution is taken for the heating component only. The Carbon savings are calculated based on a comparison of the Carbon emissions from a notional gas fired heating system, with a COP figure of 0.91.

4.0 ENERGY EFFICIENCY, DECENTRALISED ENERGY NETWORKS & RENEWABLE ENERGY

4.1 Reducing Energy Consumption & Carbon Emissions

In order to minimise the energy consumption and carbon emissions from the proposed development the following energy hierarchy of passive and active measures has been adopted:

Passive Measures:

1. Be lean: use less energy
2. Be clean: increase efficiency of energy supply

Active Measures:

3. Be green: use energy from renewable and low carbon sources

4.1.1 Be Lean: Use Less Energy

The following 'Passive' energy enhancement measures have been incorporated into the development proposals in order to reduce energy demands:

U-value of Walls has been improved from the minimum requirements of Part L2A 2013 of 0.35W/m²K to 0.28W/m²K to reduce the energy demands for heating.

U-value of Roofs has been improved from the minimum requirements of Part L2A 2013 of 0.25W/m²K to 0.16W/m²K to reduce the energy demands for heating.

U-value of Windows has been improved from the minimum requirements of Part L2A 2013 of 2.20W/m²K to 1.80W/m²K to reduce the energy demands for heating.

U-value of Roof-lights has been improved from the minimum requirements of Part L2A 2013 of 2.20W/m²K to 1.30W/m²K to reduce the energy demands for heating.

Roof-Light Areas for the industrial units are based on the optimum area for energy efficiency when balancing energy saving through the use of daylight lighting controls against the increase energy demands for heating and the requirements to limit solar overheating. This is calculated to be 13% of the warehouse floor area (excluding undercroft).

Air Permeability has been improved from the minimum requirements of Part L2A 2013 of 10m³/hr/m² to 3.0m³/hr/m² to reduce the energy demands for heating.

Solar Heat Gain Control is achieved through the use of solar control glazing to the industrial units to reduce the need and/or the energy demands for artificial cooling.

Daylight efficiency has been achieved by ensuring a balance has been met between solar energy and useful daylight.

Building Layout has been designed to maximise the use of daylight space where active energy enhancement measures can be utilised.

Thermal mass is achieved through the use of a dense concrete slab between floors.

Adaption to climate change has been considered and space provision for future capacity increase in the buildings heating/cooling systems.

A number of passive design elements are deemed to be out of the design teams' control, these include:

- Site location
- Site weather
- Microclimate
- Building occupancy type

4.1.2 Be Clean: increase efficiency of energy supply

The following 'Active' energy enhancement measures have been incorporated into the development proposals to reduce energy consumption:

High Efficiency LED Lighting has been specified to reduce lighting energy use.

Warehouse Lighting has been specified with automatic PIR occupancy sensing and daylight dimming controls to reduce lighting energy use.

Office Lighting has been specified with automatic PIR occupancy sensing and daylight dimming controls to reduce lighting energy use.

WC Lighting has been specified with automatic PIR occupancy sensing controls to reduce lighting energy use.

Power Factor Correction has been specified to improve electrical efficiencies by ensuring a power factor no worse than 0.95.

4.1.3 Be Green: use energy from renewable and low carbon sources

The table below identifies which renewable energy technologies are considered feasible for this development.

Technology	Feasible	Reason
Transpired Solar Collectors	No	<ul style="list-style-type: none">• Due to the speculative nature of the development and the uncertainty of the use the of the warehouse it is not suitable for the installation of 'SolarWall' cladding in this instance.

Technology	Feasible	Reason
Photovoltaic Panels (PV)	Yes	<ul style="list-style-type: none"> The buildings have large relatively flat roof areas which would be suitable for PV installations.
Air Source Heating	Yes	<ul style="list-style-type: none"> Air Source Heating is considered a feasible solution for the office heating as part of the office AC system. There are no conflicts with WDC's land use and noise criteria.
Ground Source Heating	No	<ul style="list-style-type: none"> Detailed ground investigations would be required to determine the suitability and size of a ground source heating solution in this location. The cost of a closed loop or open loop borehole system are considered prohibitive for this development. There is insufficient area on-site for a horizontal 'slinky' type solution.
Solar Water Heating	No	<ul style="list-style-type: none"> This is considered a feasible technology however the demand for hot water is a very small proportion of the building's total energy demands and therefore the benefits are extremely limited.
Biomass Heating	No	<ul style="list-style-type: none"> Not considered suitable for use in connection with the proposed heating systems in the office and warehouse area. Air quality & pollution issues associated with the use of biomass. Fuel storage & re-filling requirements are considered difficult to accommodate on site.
Wind Turbines	No	<ul style="list-style-type: none"> Local wind speeds are below those generally recommended for wind turbines to be a viable renewable solution. Given the location of the site the visual and noise impacts from the wind turbines on neighbouring sites are considered prohibitive.
Process Refrigerant Heat Recovery System	Yes	<ul style="list-style-type: none"> The retail foodstore tenant has advised that heat recovered from the process refrigeration system will be utilised to provide heating to the retail area.

4.2 Communal Heating/Cooling & CHP

4.2.1 Communal Heating & Cooling

There are no existing district heating/cooling systems that can be considered for use for this development.

Providing a new communal heating/cooling system to serve the proposed development is not considered feasible in this instance given the speculative nature of the buildings and the uncertainty of future heating and cooling demands.

The infrastructure costs and the ongoing management, service and maintenance obligations to the Landlord are also considered prohibitive on development of this scale.

4.2.2 Communal CHP (Combined Heat & Power)

Combined Heat and Power (CHP) refers to the local simultaneous generation of electricity and heat.

Electricity is generated by an on-site electrical generator, commonly fuelled by gas, liquid fuel or biomass, and heat is recovered from the exhaust gases and cooling systems which is used to provide hot water.

CHP systems are most appropriate and economically viable where there is high heat demands for a large proportion of the day throughout the year i.e. hospitals, hotels, leisure centres or larger mixed used developments. In the case of the proposed development the base heating demand is minimal, comprising hot water for hand washing only, and the demand for space heating will be seasonal.

Due to absence of a substantial and constant heating demand the use of a CHP system is not considered viable in this instance.

4.3 Low/Zero Carbon (LZC) Technologies

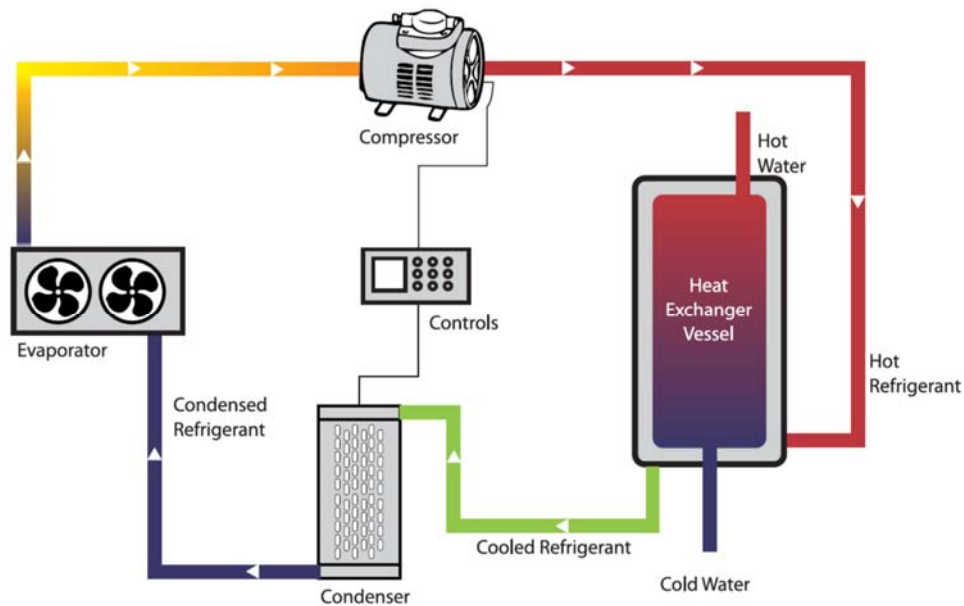
Following the above feasibility assessment the following LZC technologies have been incorporated into the development proposals:

- Process Refrigerant Heat Recovery System to the retail foodstore
- Photovoltaic Array's to the industrial units
- Air Source Heating/Cooling to the office areas in the industrial units

4.3.1 Process Refrigerant Heat Recovery System

Waste heat rejected from process refrigeration and air conditioning systems can be recovered by intercepting it before it is vented to atmosphere by passing hot refrigerant gas through a heat exchanger to deliver heated water at 45-60°C (or more)

The heated water can then be utilised in building heating systems or in domestic hot water generation.



Heat Recovery Circuit Schematic

4.3.2 Heat Recovery System Estimated Energy Savings & Payback Periods

The tables below illustrate the estimated carbon/energy savings and simple payback periods for the Heat Recovery Systems proposed for the sales areas.

For Heat Recovery systems simple payback is determined by calculating the energy costs for heating compared to the energy costs if the same amount of heating were to be provided by a notional gas boiler.

Estimated Carbon Savings	
System	Gas Boiler
Efficiency	91%
Heating Carbon Emissions (kgCO ₂ /yr)	6,493
System	Heat Recovery System
Efficiency	505%
Heating Carbon Emissions (kgCO ₂ /yr)	2,786
Carbon Savings (kgCO ₂ /yr)	3,707
Percentage Savings (%)	57%

Estimated Energy Savings & Simple Payback Periods	
System	Gas Boiler
Efficiency	91%
Heating Energy Consumption (kWh/yr)	30,060
Capital Cost (£)	93,730
Energy Cost (£/yr)	1353
System	Heat Recovery System
Efficiency	505%
Heating Energy Consumption (kWh/yr)	5,368
Capital Cost (£)	96,000
Energy Cost (£/yr)	752
Energy Savings (£/yr)	601
Incentive Payments (£/yr)	0
Simple Payback Period (years)	4

Notes:

1. Costs based on gas charged at a rate of 4.5p/kWh and electricity at a rate of 14p/kWh

4.3.3 Photovoltaic Panels (PV)

Photovoltaic systems convert energy from the sun into electricity through semi-conductor cells. Systems consist of semi-conductor cells connected together and mounted into modules. Modules are connected to an inverter to turn their direct current (DC) output into alternating current (AC) electricity for use in buildings.

Photovoltaics supply electricity to the building they are attached to or to any other load connected to the electricity grid. Excess electricity can be exported back to the Grid when the generated power exceeds the local need.

PV systems require only daylight, not sunlight to generate electricity (although more electricity is produced with more sunlight), so energy can still be produced in overcast or cloudy conditions.

Photovoltaic cells typically come in modular panels which can be floor or roof mounted. Ideally the panels should face between south-east and south-west, at an elevation of about 30-40°. However, in the UK even flat roofs receive 90% of the energy of an optimum system.



Roof Mounted PV Array

Roof mounted photovoltaic panels are considered a feasible technology for this development.

4.3.4 PV Estimated Energy Savings & Payback Periods

For PV systems payback is achieved through (1) Reduced grid electrical energy consumption & (2) Export Tariffs

The table below illustrates the estimated energy savings and payback periods for a suitable system size:

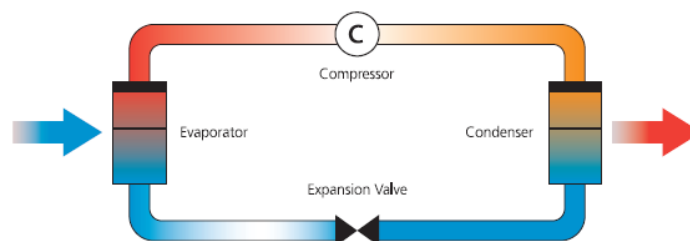
	PV Area (m ²)	Carbon Savings (KgCO ₂ /Yr)	Energy Savings (kWh/Yr)	Capital Cost (£)	Energy Cost Savings (£/yr)	Smart Export Payments (£/yr)	Simple Payback Period (years)
Unit 1	22.00	1763.11	3397.13	3850	237.80	84.93	11.93
Unit 2	6.00	478.42	921.82	1050	64.53	23.05	11.99
Unit 3	6.00	482.36	929.41	1050	65.06	23.24	11.89
Unit 4	6.00	479.11	923.14	1050	64.62	23.08	11.97
Unit 5	5.00	402.37	775.28	875	54.27	19.38	11.88
Unit 6	5.00	400.42	771.53	875	54.01	19.29	11.94
Unit 7	5.00	403.52	777.50	875	54.43	19.44	11.85
Unit 8	17.00	1360.07	2620.55	2975	183.44	65.51	11.95
Unit 9	18.00	2080.10	2781.82	3150	194.73	69.55	11.92

Notes:

1. Annual energy savings taken from BRUKL Output Documents in Appendix 3.
2. Annual energy savings based on an annual PV yield.
3. Capital cost based on £175/m² of PV.
4. Annual energy cost savings based on electricity charged at a rate of 14p/kWh and assumes that 50% of the energy generated will be used and 50% will be exported back into the grid at a Smart Export payment rate of 5.00p/kWh.
5. Simple payback period does not include for fluctuations in electricity prices nor does it include for index linked increases in tariff rates.

4.3.5 Air Source Heat Pumps (ASHP)

Split or Multi Split type air conditioning systems are one-to-one systems consisting of one evaporator (fan coil) unit connected to an external condensing unit. Both the indoor and outdoor units are connected through copper tubing and electrical cabling. The indoor part (evaporator) pulls heat out from the surrounding air while the outdoor condensing unit transfers the heat into the environment, this cycle can be reversed to deliver heat to the space. Refrigerant in the heat exchanger absorbs heat from the outside air and evaporates. Vapour is compressed, thereby increasing pressure and vapour temperature. Hot vapour is condensed in the 2nd heat exchanger where heat is rejected. The liquid refrigerant passes back through an expansion valve, to start the cycle again.



ASHP Cycle

Variable refrigerant flow (VRF) is an air-conditioning system configuration where there is one outdoor condensing unit and multiple indoor units. The term variable refrigerant flow refers to the ability of the system to control the amount of refrigerant flowing to the multiple evaporators (indoor units), enabling the use of many evaporators of differing capacities and configurations connected to a single condensing unit. The arrangement provides an individualized comfort control, and simultaneous heating and cooling in different zones.

Air source heat pumps can only be considered as a renewable technology when used in heating mode. Refer to Annex VI of Directive 2009/28/EC for more detail on accounting for energy from heat pumps.



ASHP Outdoor Units

4.3.6 Estimated Carbon Savings & Payback Periods

The tables below illustrate the estimated carbon/energy savings and simple payback periods for the ASHP systems proposed for the office areas in the industrial units.

For ASHP systems simple payback is determined by calculating the energy costs for heating compared to the energy costs if the same amount of heating were to be provided by a notional gas boiler.

Estimated Carbon Savings					
	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
System	Gas Boiler				
Efficiency	91%	91%	91%	91%	91%
Heating Carbon Emissions (kgCO ₂ /yr)	2,025	1,147	790	1,211	1,271
System	Air Source Heat Pump				
Efficiency	350%	350%	350%	350%	350%
Heating Carbon Emissions (kgCO ₂ /yr)	1,257	713	491	756	792
Carbon Savings (kgCO ₂ /yr)	768	434	299	454	479
Percentage Savings (%)	38%	38%	38%	38%	38%

Estimated Carbon Savings					
	Unit 6	Unit 7	Unit 8	Unit 9	
System	Gas Boiler				
Efficiency	91%	91%	91%	91%	
Heating Carbon Emissions (kgCO ₂ /yr)	1,215	1,113	1,516	1,283	
System	Air Source Heat Pump				
Efficiency	350%	350%	350%	350%	
Heating Carbon Emissions (kgCO ₂ /yr)	765	697	955	802	
Carbon Savings (kgCO ₂ /yr)	450	416	561	481	
Percentage Savings (%)	37%	37%	37%	38%	

Estimated Energy Savings & Simple Payback Periods					
	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
System	Gas Boiler				
Efficiency	91%	91%	91%	91%	91%
Heating Energy Consumption (kWh/yr)	9,377	5,310	3,659	5,605	5,883
Capital Cost (£)	14,705	8,713	7,586	9,529	13,515
Energy Cost (£/yr)	421.9	238.9	164.7	252.2	264.7
System	Air Source Heat Pump				
Efficiency	350%	350%	350%	350%	350%
Heating Energy Consumption (kWh/yr)	2,422	1,374	946	1,457	1,526
Capital Cost (£)	16,608	9,840	8,568	10,762	15,264
Energy Cost (£/yr)	339.1	192.3	132.4	204.0	213.7
Energy Savings (£/yr)	82.9	46.6	32.2	48.2	51.0
Incentive Payments (£/yr)	n/a	n/a	n/a	n/a	n/a
Simple Payback Period (years)	23	24	30	26	34

Estimated Energy Savings & Simple Payback Periods					
	Unit 6	Unit 7	Unit 8	Unit 9	
System	Gas Boiler				
Efficiency	91%	91%	91%	91%	
Heating Energy Consumption (kWh/yr)	5,625	5,151	7,018	5,940	
Capital Cost (£)	12,784	11,645	12,028	12,623	
Energy Cost (£/yr)	253.1	231.8	315.8	267.3	
System	Air Source Heat Pump				
Efficiency	350%	350%	350%	350%	
Heating Energy Consumption (kWh/yr)	1,474	1,343	1,840	1,544	
Capital Cost (£)	14,438	13,152	13,584	14,256	
Energy Cost (£/yr)	206.3	188.0	257.5	216.2	
Energy Savings (£/yr)	46.8	43.8	58.3	51.1	
Incentive Payments (£/yr)	n/a	n/a	n/a	n/a	
Simple Payback Period (years)	35	34	27	32	

Notes:

1. Costs based on gas charged at a rate of 4.5p/kWh and electricity at a rate of 14p/kWh

5.0 RESULTS SUMMARY

5.1 Building Regulations Part L2A 2013 - Criterion 1

The calculated **TER/BER** for the buildings 'As Designed' is as follows:

Unit	TER (kgCO ₂ /m ² /yr)	BER (kgCO ₂ /m ² /yr)	CO ₂ Emission Compliance
1	23.4	20.3	PASS
2	23.1	20.7	PASS
3	21.7	18.8	PASS
4	22.9	20.6	PASS
5	22.0	19.4	PASS
6	21.1	18.1	PASS
7	20.9	17.7	PASS
8	22.1	18.6	PASS
9	23.6	20.2	PASS
Retail Foodstore	31.5	19.4	PASS

Refer to BRUKL output documents in Appendix 2.

5.2 Building Regulations Part L2A 2013 - Criterion 2

The performance of the building fabric and building services proposals are no worse than the design limits set out in the Approved Document. Refer to BRUKL output documents in Appendix 2.

5.3 Building Regulations Part L2A 2013 - Criterion 3

The performance of the buildings against the criterion 3 solar overheating check show that the design is in compliance with the Approved Document. Refer to BRUKL output documents in Appendix 2.

5.5 BREEAM Credits Ene01

The table below shows the corresponding credits that would be achieved under BREEAM Ene01:

Unit	BREEAM Ene01 Credits
1	3
2	2
3	3
4	2
5	3
6	3

Unit	BREEAM Ene01 Credits
7	3
8	3
9	3
Retail Foodstore	0

Refer to BRUKL output documents in Appendix 2.

5.6 Draft Energy Performance Certificate (EPC) Rating

The predicted Energy Performance Certificate (EPC) Rating for the buildings are as follows:

Unit	EPC Rating
1	A (24)
2	A (24)
3	A (23)
4	A (25)
5	A (24)
6	A (23)
7	A (22)
8	A (23)
9	A (24)
Retail Foodstore	A (18)

Refer to Appendix 3 for a copy of the draft EPC certificate.

APPENDIX 1 – Building & M&E Design Data

Items highlighted in **green** denote future fit-out allowances.

BUILDING DATA

<u>Building Address</u>	-	Crest Road, High Wycombe
<u>SBEM Weather File</u>	-	London
<u>Building Form & Orientation</u>	-	As PRC Planning Issue drawings
<u>SBEM Building Type</u>	-	B2-B7 General Industrial
	-	A1/A2 Retail/Financial & Professional Services
<u>U-Values</u>		
External Walls	-	0.28 W/m ² K
Roof	-	0.16 W/m ² K
Exposed Floor	-	0.25 W/m ² K
Windows/Curtain Walling	-	1.80 W/m ² K (average inc. frame)
Spandrel Panels	-	1.80 W/m ² K (average inc. frame)
Roof-lights	-	1.30 W/m ² K
Personnel Doors	-	2.20 W/m ² K (average inc. frame)
Loading Bay Doors	-	1.50 W/m ² K (average inc. frame)
<u>Glazing Data</u>		
<u>Industrial Units</u>		
Type	-	Pilkington Suncool 66/33
g-Value	-	36%
Light Transmission Value	-	66%
<u>Retail Foodstore</u>		
Low Level Glazing	-	Clear Double Glazing
South E Façade High Level Glazing	-	Pilkington Optifloat Grey 42/56 (Lt 0.42 / g 0.56)
General Glazing	-	Clear Double Glazing
<u>Rooflight Data</u>		
Area	-	13% of Warehouse Floor Area (exc. Undercroft)
g-value	-	0.55
Light Transmittance	-	58%
<u>Air Permeability</u>	-	3.0m ³ /hr/m ²

M&E SYSTEM DATA

Future Warehouse Heating (HVAC System 1)

System Type	-	Flued Forced-Convection Air Heaters
Heat Source	-	Air Heater
Fuel	-	Natural Gas
Heating Seasonal Efficiency	-	91%
System Sub-Metered	-	Yes
'Out of Range' Meter Monitoring	-	No

Core Area Radiator Heating System (HVAC System 2)

System Type	-	Central Heating using Radiators
Heat Source	-	LTHW Combination Boiler
Fuel	-	Natural Gas
Seasonal Efficiency	-	91%
Variable Speed Pump	-	No
System Sub-Metered	-	Yes
'Out of Range' Meter Monitoring	-	No

Office Heating/Cooling System (HVAC System 3)

System Type	-	Split or Multi-Split
Heating/Cooling Generator	-	Air Source Heat Pump
Fuel	-	Electricity
Heating COP	-	3.5
Cooling EER/SEER	-	3.2/5.0
System Sub-Metered	-	Yes
'Out of Range' Meter Monitoring	-	No

Secondary Stairwell Heating (HVAC System 4)

System Type	-	Local Room Heater - Unfanned
Heat Source	-	Room Heater
Fuel	-	Electricity
Heating Seasonal Efficiency	-	100%
System Sub-Metered	-	No
'Out of Range' Meter Monitoring	-	No

Domestic Hot Water System

Generator Type	-	Office LTHW Combination Boiler
Fuel Type	-	Natural Gas
Generator Seasonal Efficiency	-	91%

Lighting Systems

Lighting Sub-metered	-	Yes
Out of Range Meter Monitoring	-	No

Retail Foodstore Process Refrigerant Heat Recovery Heating System (HVAC System 5)

System Type	-	Central Heating Using Water: Convectors
Heat Source	-	Air Source Heat Pump
Fuel	-	Electricity
Heating Seasonal Efficiency	-	505%
System SFP	-	1.37 W/l/s
Pump Control	-	Variable speed differential sensor across pump
System Sub-Metered	-	Yes
Out of Range Meter Monitoring	-	No

Retail Foodstore Domestic Hot Water Heating

Generator Type	-	Instantaneous Hot Water Heaters
Fuel	-	Electricity
Generator Seasonal Efficiency	-	100%

Retail Foodstore Lighting Systems

Lighting Sub-metered	-	Yes
Out of Range Meter Monitoring	-	Yes

<u>Electric Power Factor</u>	-	>0.95
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PV Annual Yield

Unit 1	-	3397.13 kWh/yr
Unit 2	-	921.82 kWh/yr
Unit 3	-	929.41 kWh/yr
Unit 4	-	923.14 kWh/yr
Unit 5	-	775.28 kWh/yr
Unit 6	-	771.53 kWh/yr
Unit 7	-	777.50 kWh/yr
Unit 8	-	2620.55 kWh/yr
Unit 9	-	2781.82 kWh/yr

ROOM DATA

Room Ref	Room	NCM Activity	HVAC System	Mechanical Ventilation					Lighting					Comments
				Supply or Extract	Type	Heat Recovery Efficiency (%)	Air Flow Rate (l/s)	SFP (W/l/s)	Lighting Level (lux)	Lighting Energy (W/m ² /100 lux)	Lighting Control	Daylight Control	Parasitic Power (W/m ²)	
	Unit 1													
01.00.01	Lobby	Circulation	2	-	-	-	-	-	312	1.72	Local Manual	-	-	
01.00.02	Lift		-	-	-	-	-	-	-	-	-	-	-	
01.00.03	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
01.00.04	Dis WC	Toilet	2	Extract	Local	-	50	0.3	241	2.16	Auto On/Off	-	0.1	
01.00.05	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
01.00.06	Cupboard	Cupboard	2	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
01.00.07	Cupboard	Cupboard	2	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
01.00.08	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	Dimmable	0.1	
01.00.09	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	-	0.1	
01.00.10	Stair	Circulation area	4	-	-	-	-	-	139	5.51	Auto On/Off	-	0.1	
01.00.11	Warehouse	Industrial process area	1	-	-	-	-	-	300	60lm/W	Auto On/Off	Dimmable	0.1	
01.02.01	Lobby	Circulation	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
01.02.02	Lift		-	-	-	-	-	-	-	-	-	-	-	
01.02.03	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
01.02.04	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
01.02.05	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
01.02.06	Shower	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
01.02.07	Cupboard	Cupboard	2	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
01.02.08	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	Dimmable	0.1	
01.02.09	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	-	0.1	
01.02.10	Stair	Circulation area	4	-	-	-	-	-	139	5.51	Auto On/Off	-	0.1	
01.02.11	Cupboard	Cupboard	3	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
	Unit 2													
02.00.01	Lobby	Circulation area	2	-	-	-	-	-	312	1.72	Local Manual	-	-	
02.00.02	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
02.00.03	Dis WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
02.00.04	Dis SHW	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
02.00.05	Cupboard	Cupboard	3	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
02.00.06	Cupboard	Cupboard	3	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
02.00.07	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	Dimmable	0.1	
02.00.08	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	-	0.1	
02.00.09	Warehouse	Industrial process area	1	-	-	-	-	-	300	60lm/W	Auto On/Off	Dimmable	0.1	
02.01.01	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Local Manual	-	-	
02.01.02	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
02.01.03	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
02.01.04	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
02.01.05	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	Dimmable	0.1	
02.01.06	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	-	0.1	

Room Ref	Room	NCM Activity	HVAC System	Mechanical Ventilation					Lighting					Comments
				Supply or Extract	Type	Heat Recovery Efficiency (%)	Air Flow Rate (l/s)	SFP (W/l/s)	Lighting Level (lux)	Lighting Energy (W/m²/100 lux)	Lighting Control	Daylight Control	Parasitic Power (W/m²)	
	Unit 3													
03.00.01	Lobby	Circulation area	2	-	-	-	-	-	312	1.72	Local Manual	-	-	
03.00.02	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
03.00.03	Dis WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
03.00.04	Dis SHW	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
03.00.05	Cupboard	Cupboard	3	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
03.00.06	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	Dimmable	0.1	
03.00.07	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	-	0.1	
03.00.08	Warehouse	Industrial process area	1	-	-	-	-	-	300	60lm/W	Auto On/Off	Dimmable	0.1	
03.01.01	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Local Manual	-	-	
03.01.02	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
03.01.03	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
03.01.04	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
03.01.05	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	Dimmable	0.1	
03.01.06	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	-	0.1	
	Unit 4													
04.00.01	Lobby	Circulation area	2	-	-	-	-	-	312	1.72	Local Manual	-	-	
04.00.02	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
04.00.03	Dis WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
04.00.04	Dis SHW	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
04.00.05	Cupboard	Cupboard	3	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
04.00.06	Cupboard	Cupboard	3	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
04.00.07	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	Dimmable	0.1	
04.00.08	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	-	0.1	
04.00.09	Warehouse	Industrial process area	1	-	-	-	-	-	300	60lm/W	Auto On/Off	Dimmable	0.1	
04.01.01	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Local Manual	-	-	
04.01.02	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
04.01.03	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
04.01.04	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
04.01.05	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	Dimmable	0.1	
04.01.06	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	-	0.1	
	Unit 5													
05.00.01	Lobby	Circulation	2	-	-	-	-	-	312	1.72	Local Manual	-	-	
05.00.02	Lift		-	-	-	-	-	-	-	-	-	-	-	
05.00.03	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
05.00.04	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
05.00.05	Dis SHW	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
05.00.06	Dis WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
05.00.07	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	Dimmable	0.1	
05.00.08	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	-	0.1	
05.00.09	Warehouse	Industrial process area	1	-	-	-	-	-	300	60lm/W	Auto On/Off	Dimmable	0.1	
05.00.10	Cupboard	Cupboard	1	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	

Room Ref	Room	NCM Activity	HVAC System	Mechanical Ventilation					Lighting					Comments
				Supply or Extract	Type	Heat Recovery Efficiency (%)	Air Flow Rate (l/s)	SFP (W/l/s)	Lighting Level (lux)	Lighting Energy (W/m ² /100 lux)	Lighting Control	Daylight Control	Parasitic Power (W/m ²)	
05.01.01	Lobby	Circulation	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
05.01.02	Lift		-	-	-	-	-	-	-	-	-	-	-	
05.01.03	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
05.01.04	Dis SHW	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
05.01.05	Cupboard	Cupboard	2	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
05.01.06	Cupboard	Cupboard	2	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
05.01.07	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
05.01.08	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	Dimmable	0.1	
05.01.09	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	-	0.1	
05.01.10	Cupboard	Cupboard	1	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
	Unit 6													
06.00.01	Lobby	Circulation area	2	-	-	-	-	-	312	1.72	Local Manual	-	-	
06.00.02	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
06.00.03	Dis WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
06.00.04	Dis SHW	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
06.00.05	Cupboard	Cupboard	3	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
06.00.06	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	Dimmable	0.1	
06.00.07	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	-	0.1	
06.00.08	Warehouse	Industrial process area	1	-	-	-	-	-	300	60lm/W	Auto On/Off	Dimmable	0.1	
06.01.01	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Local Manual	-	-	
06.01.02	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
06.01.03	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
06.01.04	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
06.01.05	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	Dimmable	0.1	
06.01.06	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	-	0.1	
	Unit 7													
07.00.01	Lobby	Circulation area	2	-	-	-	-	-	312	1.72	Local Manual	-	-	
07.00.02	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
07.00.03	Dis WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
07.00.04	Dis SHW	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
07.00.05	Cupboard	Cupboard	3	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
07.00.06	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	Dimmable	0.1	
07.00.07	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	-	0.1	
07.00.08	Warehouse	Industrial process area	1	-	-	-	-	-	300	60lm/W	Auto On/Off	Dimmable	0.1	
07.01.01	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Local Manual	-	-	
07.01.02	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
07.01.03	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
07.01.04	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
07.01.05	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	Dimmable	0.1	
07.01.06	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	-	0.1	

Room Ref	Room	NCM Activity	HVAC System	Mechanical Ventilation					Lighting					Comments
				Supply or Extract	Type	Heat Recovery Efficiency (%)	Air Flow Rate (l/s)	SFP (W/l/s)	Lighting Level (lux)	Lighting Energy (W/m²/100 lux)	Lighting Control	Daylight Control	Parasitic Power (W/m²)	
	Unit 8													
08.00.01	Lobby	Circulation	2	-	-	-	-	-	312	1.72	Local Manual	-	-	
08.00.02	Lift		-	-	-	-	-	-	-	-	-	-	-	
08.00.03	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
08.00.04	Dis WC	Toilet	2	Extract	Local	-	50	0.3	241	2.16	Auto On/Off	-	0.1	
08.00.05	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
08.00.06	Cupboard	Cupboard	2	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
08.00.07	Cupboard	Cupboard	3	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
08.00.08	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	Dimmable	0.1	
08.00.09	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	-	0.1	
08.00.10	Stair	Circulation area	4	-	-	-	-	-	139	5.51	Auto On/Off	-	0.1	
08.00.11	Warehouse	Industrial process area	1	-	-	-	-	-	300	60lm/W	Auto On/Off	Dimmable	0.1	
08.02.01	Lobby	Circulation	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
08.02.02	Lift		-	-	-	-	-	-	-	-	-	-	-	
08.02.03	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
08.02.04	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
08.02.05	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
08.02.06	Shower	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
08.02.07	Cupboard	Cupboard	2	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
08.02.08	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	Dimmable	0.1	
08.02.09	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	-	0.1	
08.02.10	Stair	Circulation area	4	-	-	-	-	-	139	5.51	Auto On/Off	-	0.1	
	Unit 9													
09.00.01	Lobby	Circulation	2	-	-	-	-	-	312	1.72	Local Manual	-	-	
09.00.02	Lift		-	-	-	-	-	-	-	-	-	-	-	
09.00.03	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
09.00.04	Dis SHW	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
09.00.05	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
09.00.06	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
09.00.07	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	Dimmable	0.1	
09.00.08	Undercroft	Office	3	Supply	Zonal	70	-	1.1	400	60lm/W	Auto On/Off	-	0.1	
09.00.09	Cupboard	Cupboard	1	-	-	-	-	-	109	13.31	Auto On/Off	-	0.1	
09.00.10	Warehouse	Industrial process area	1	-	-	-	-	-	300	60lm/W	Auto On/Off	Dimmable	0.1	
09.01.01	Lobby	Circulation	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
09.01.02	Lift		-	-	-	-	-	-	-	-	-	-	-	
09.01.03	Lobby	Circulation area	2	-	-	-	-	-	197	2.82	Auto On/Off	-	0.1	
09.01.04	Cupboard	Cupboard	2	-	-	-	-	-	262	3.2	Auto On/Off	-	0.1	
09.01.05	Cupboard	Cupboard	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
09.01.06	WC	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
09.01.07	Shower	Toilet	2	Extract	Local	-	25	0.3	262	3.2	Auto On/Off	-	0.1	
09.01.08	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	Dimmable	0.1	
09.01.09	Office	Office	3	Supply	Zonal	70	-	1.1	443	1.14	Auto On/Off	-	0.1	

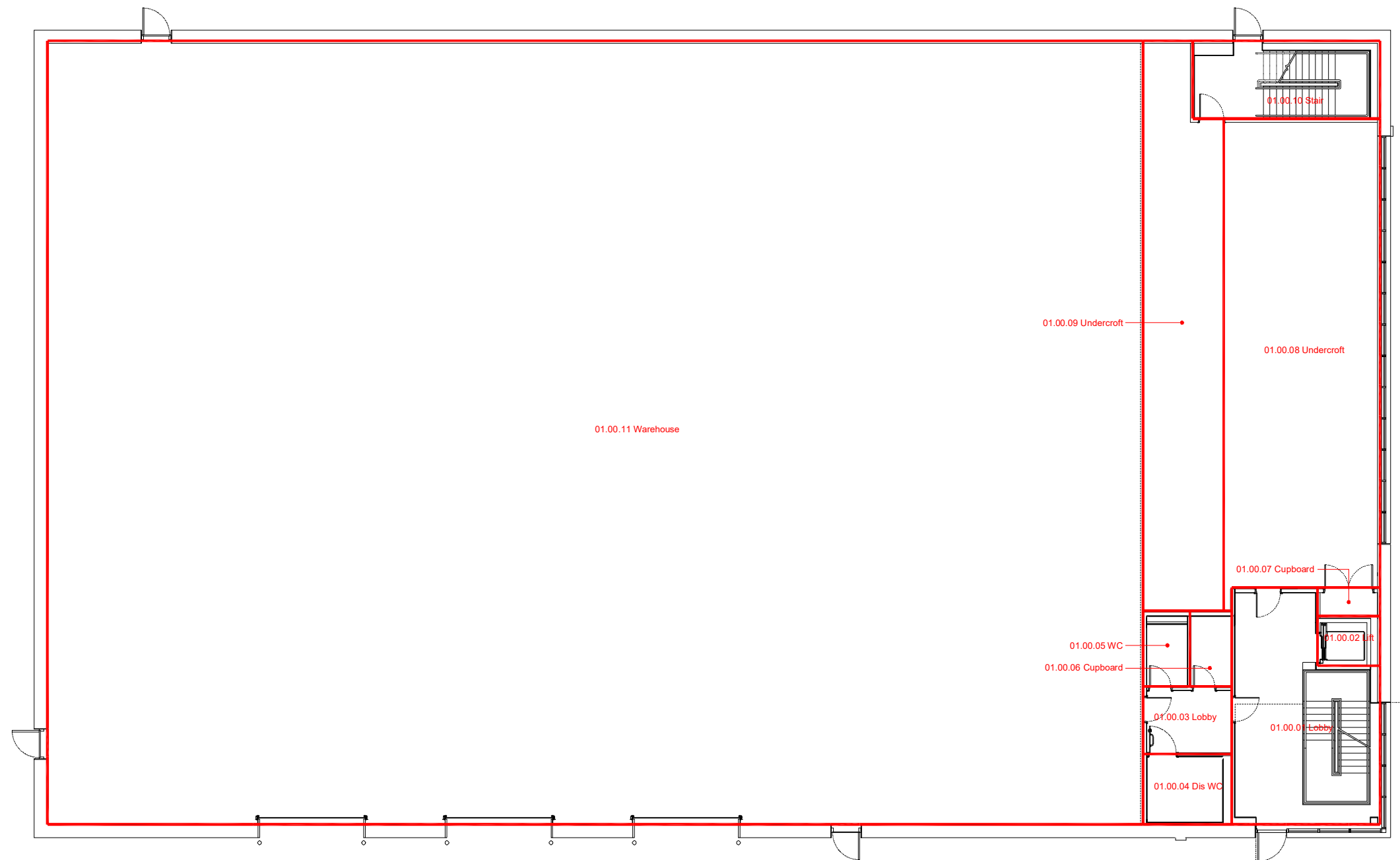
Items highlighted in **green** denote future fit-out allowances.

[illegible]

Items highlighted in **green** denote future fit-out allowances.

ZONE PLAN

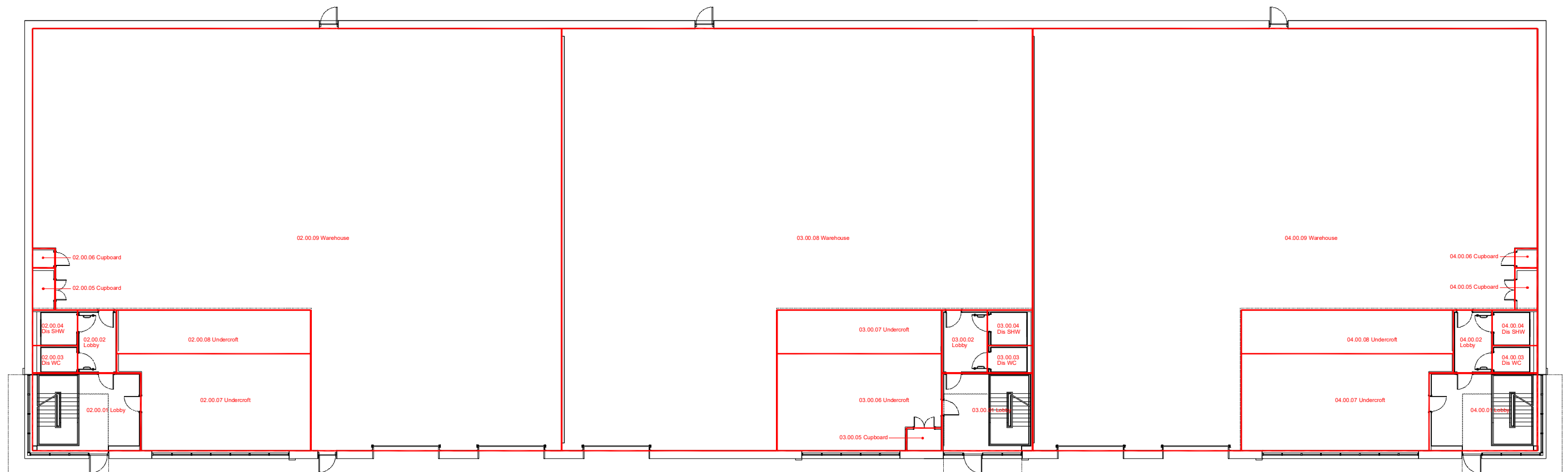
Unit 1 – Ground Floor



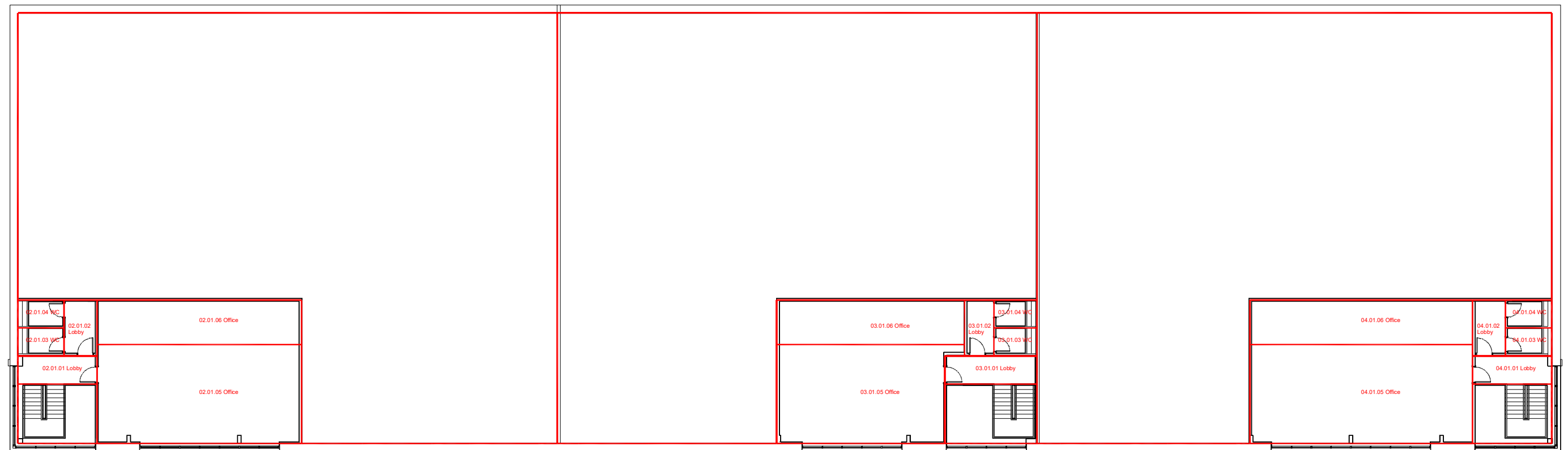
Unit 1 – First Floor



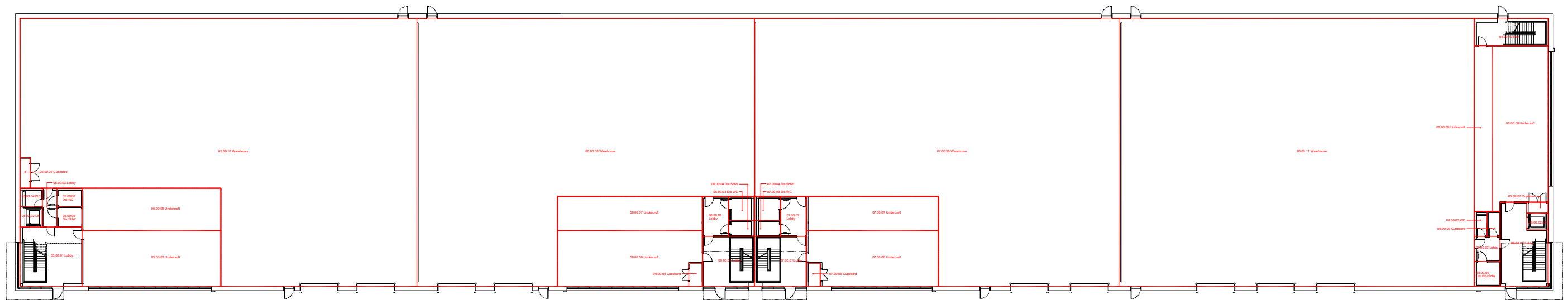
Units 2-4 – Ground Floor



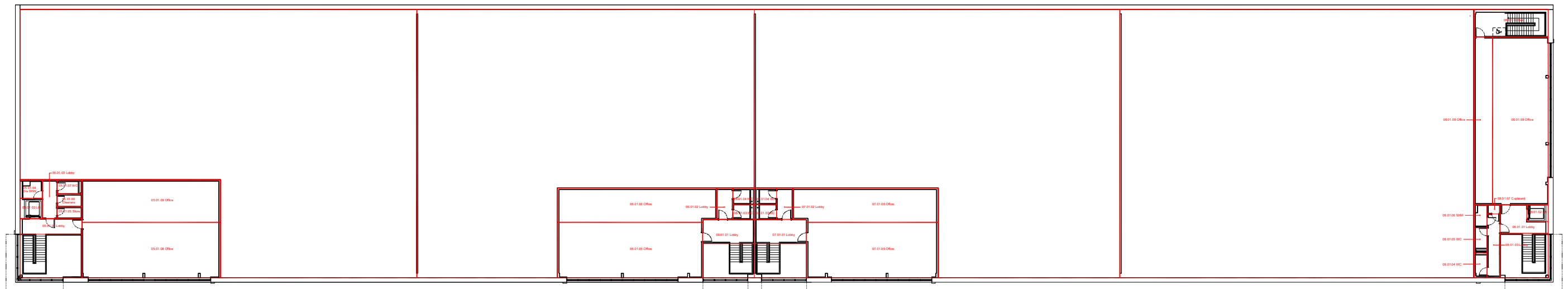
Units 2-4 – First Floor



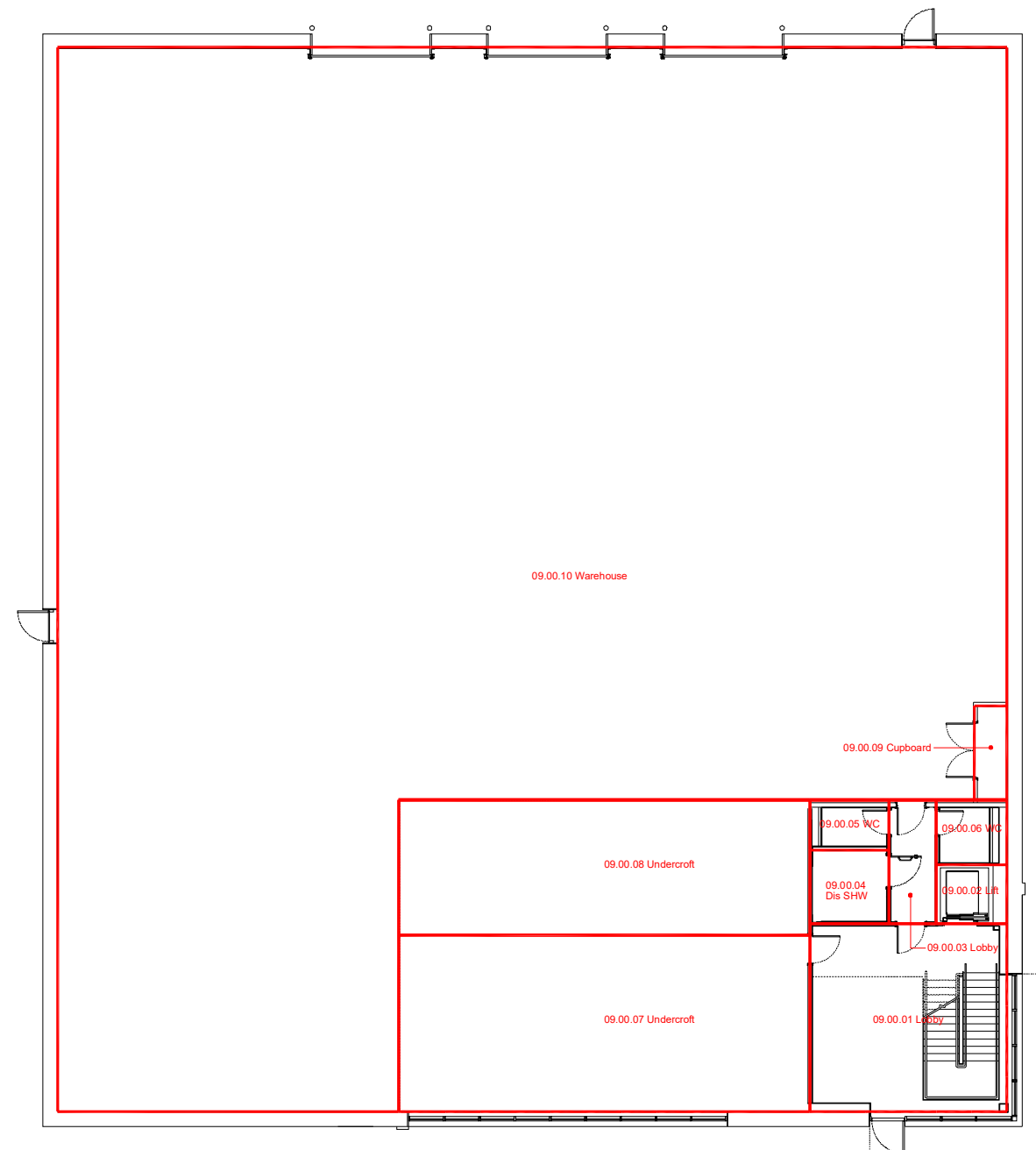
Units 5-8 – Ground Floor



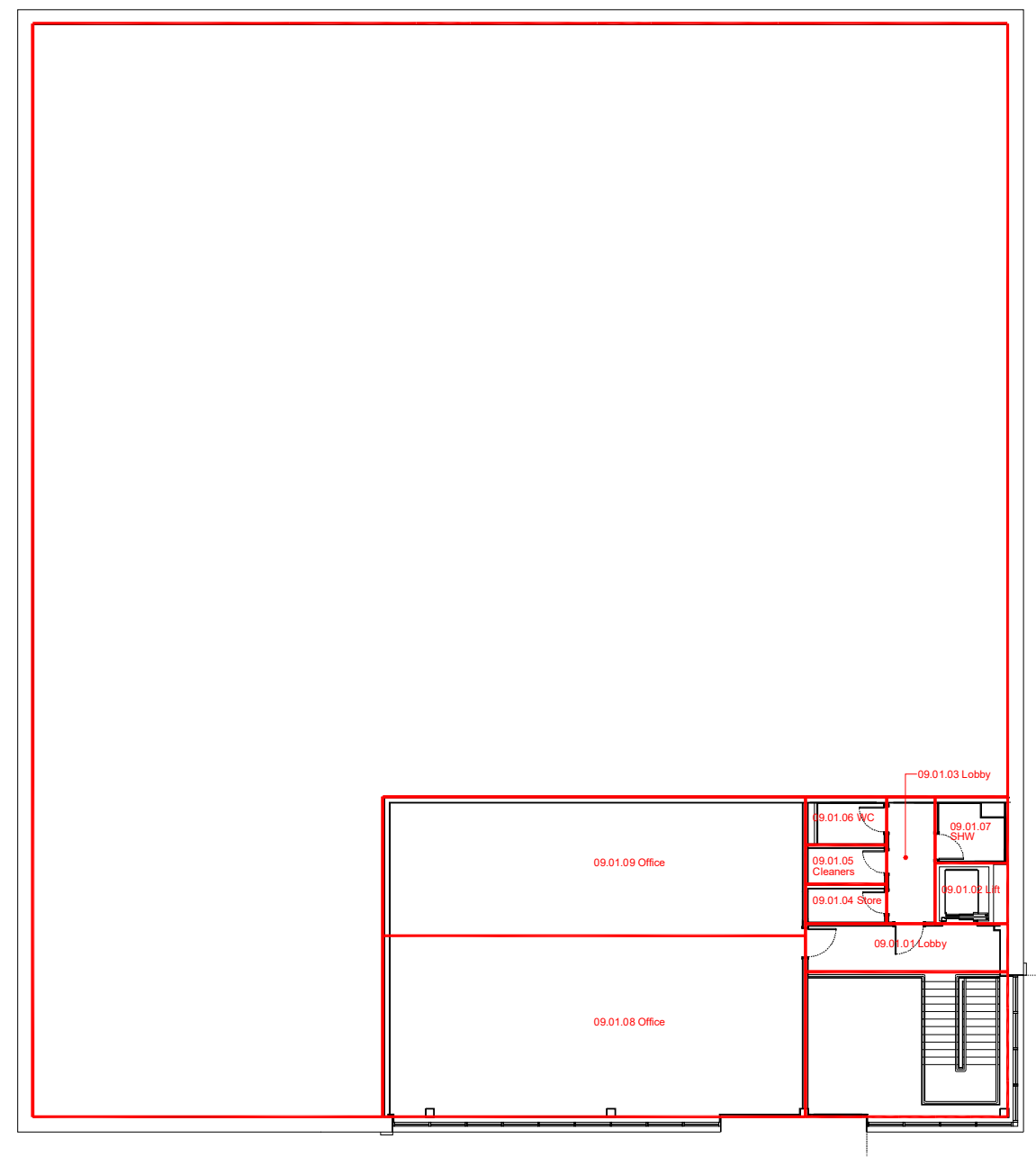
Units 5-8 – First Floor



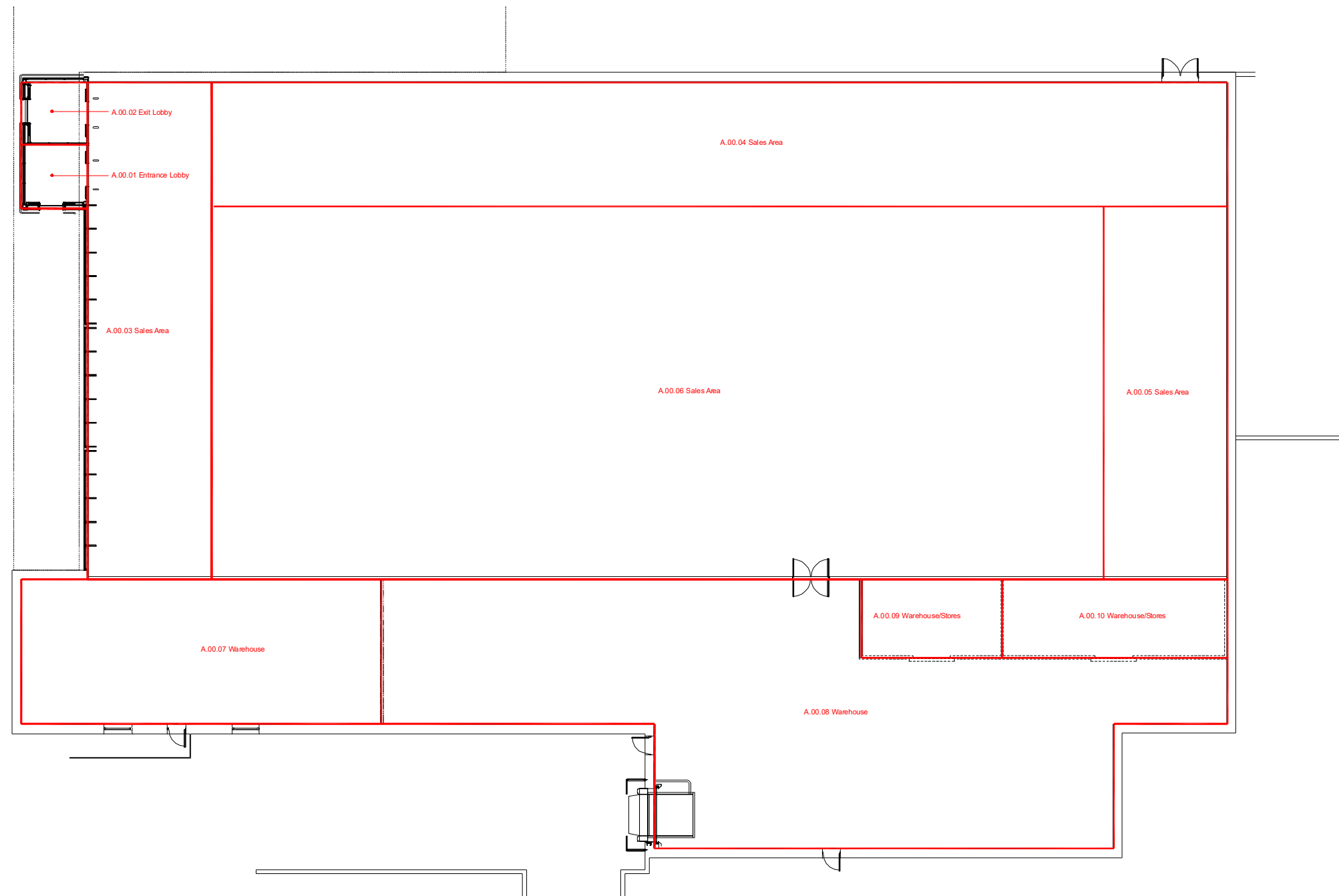
Unit 9 – Ground Floor



Unit 9 – First Floor



Retail Foodstore



APPENDIX 2 – BRUKL Output Documents

Project name

Unit 1**As designed**

Date: Fri May 21 12:39:42 2021

Administrative information

Building Details

Address: Unit 1, Bartley Wood, Hook,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Shepherd Brombley Partnership

Telephone number: 01962 832656

Address: Unit 22 Basepoint Business Centre, 1 Winnall Valley Road, Winchester, SO23 0LD

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	23.4
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	23.4
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	20.3
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	Surface where the maximum value occurs*
Wall**	0.35	0.28	0.28	04000008:Surf[1]
Floor	0.25	0.25	0.25	04000008:Surf[0]
Roof	0.25	0.16	0.16	04000006:Surf[2]
Windows***, roof windows, and rooflights	2.2	1.34	1.8	04000007:Surf[1]
Personnel doors	2.2	2.2	2.2	0400000A:Surf[2]
Vehicle access & similar large doors	1.5	1.5	1.5	04000006:Surf[3]
High usage entrance doors	3.5	1.8	1.8	0100001E:Surf[8]

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

* There might be more than one surface where the maximum U-value occurs.

** 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.

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	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

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- LTHW Radiator Heating S2

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.2	0	-
Standard value	0.91*	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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- AC Office Htg & Clg S3

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.2	0	0	0.7
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- Electric Heating S4

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	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

4- Warehouse Heating S1

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0	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

1- LTHW Radiator Heating S2

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.91	-
Standard value	0.9*	N/A
* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.		

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
01.00.04 Dis WC		0.3	-	-	-	-	-	-	-	-	-	N/A
01.00.05 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
01.00.08 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
01.00.09 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
01.01.04 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
01.01.05 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
01.01.06 SHW		0.3	-	-	-	-	-	-	-	-	-	N/A
01.01.08 Office		-	-	-	1.1	-	-	-	-	-	-	N/A
01.01.09 Office		-	-	-	1.1	-	-	-	-	-	-	N/A

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
01.00.03 Lobby		-	76	-	49
01.00.04 Dis WC		-	90	-	48
01.00.05 WC		-	74	-	44
01.00.06 Cupboard		34	-	-	67
01.00.07 Cupboard		34	-	-	38
01.00.08 Undercroft		60	-	-	1065
01.00.09 Undercroft		60	-	-	666
01.00.10 Stair		-	47	-	165
01.00.11 Warehouse		60	-	-	9777
01.01.01 Lobby		-	68	-	76
01.01.03 Lobby		-	78	-	69
01.01.04 WC		-	92	-	36
01.01.05 WC		-	93	-	35
01.01.06 SHW		-	92	-	36
01.01.07 Cupboard		34	-	-	29
01.01.08 Office		130	-	-	579
01.01.09 Office		133	-	-	299
01.01.10 Stair		-	33	-	165
01.01.11 Cupboard		19	-	-	83
01.00.01 Lobby		-	134	-	240

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
01.00.06 Cupboard	N/A	N/A
01.00.07 Cupboard	N/A	N/A
01.00.08 Undercroft	NO (-46.6%)	NO
01.00.09 Undercroft	NO (-25.5%)	NO
01.00.11 Warehouse	NO (-11.3%)	NO
01.01.07 Cupboard	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
01.01.08 Office	NO (-49.4%)	NO
01.01.09 Office	NO (-82.1%)	NO
01.01.11 Cupboard	N/A	N/A

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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
Area [m ²]	1778.6	1778.6
External area [m ²]	5033.4	5033.4
Weather	SWI	SWI
Infiltration [m ³ /hm ² @ 50Pa]	3	7
Average conductance [W/K]	1641.58	1639.9
Average U-value [W/m ² K]	0.33	0.33
Alpha value* [%]	10.4	10

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

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
100	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 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/m²]

	Actual	Notional
Heating	37.68	46.87
Cooling	1.39	1.12
Auxiliary	1.81	1.1
Lighting	18.91	20.85
Hot water	4.32	4.32
Equipment*	33.23	33.23
TOTAL**	64.11	74.26

* 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	1.91	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	138.32	170.12
Primary energy* [kWh/m ²]	123.46	133.94
Total emissions [kg/m ²]	20.3	23.4

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	233.6	0	81.1	0	0	0.8	0	1	0
Notional	319.1	0	102.8	0	0	0.86	0	---	---
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	82.7	87.7	7	6.9	5.8	3.26	3.55	3.5	5
Notional	69.9	75	7.6	5.5	2.8	2.56	3.79	---	---
[ST] Flued forced-convection air heaters, [HS] Air heater, [HFT] Natural Gas, [CFT] Electricity									
Actual	103.1	0	36.3	0	0	0.79	0	0.91	0
Notional	160.3	0	51.6	0	0	0.86	0	---	---
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	409.6	0	140.1	0	6.7	0.81	0	0.91	0
Notional	312.2	0	100.6	0	5.4	0.86	0	---	---
[ST] No Heating or Cooling									
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]	= 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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.28	04000008:Surf[1]
Floor	0.2	0.25	04000008:Surf[0]
Roof	0.15	0.16	04000006:Surf[2]
Windows, roof windows, and rooflights	1.5	1.01	04000006:Surf[1]
Personnel doors	1.5	2.2	0400000A:Surf[2]
Vehicle access & similar large doors	1.5	1.5	04000006:Surf[3]
High usage entrance doors	1.5	1.8	0100001E:Surf[8]
U _{i-Typ} = Typical individual element U-values [W/(m²K)] U _{i-Min} = Minimum individual element U-values [W/(m²K)]			
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3

Project name

Unit 2

As designed

Date: Fri May 21 14:08:24 2021

Administrative information

Building Details

Address: Unit 2, Bartley Wood, Hook,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Shepherd Brombley Partnership

Telephone number: 01962 832656

Address: Unit 22 Basepoint Business Centre, 1 Winnall Valley Road, Winchester, SO23 0LD

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	23.1
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	23.1
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	20.7
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	Surface where the maximum value occurs*
Wall**	0.35	0.28	0.28	0100001F:Surf[16]
Floor	0.25	0.25	0.25	0100001F:Surf[32]
Roof	0.25	0.16	0.16	01000000:Surf[8]
Windows***, roof windows, and rooflights	2.2	1.39	1.8	0100001F:Surf[0]
Personnel doors	2.2	2.2	2.2	01000000:Surf[1]
Vehicle access & similar large doors	1.5	1.5	1.5	01000000:Surf[2]
High usage entrance doors	3.5	1.8	1.8	0100001F:Surf[2]

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

* There might be more than one surface where the maximum U-value occurs.

** 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.

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	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

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- LTHW Radiator Heating S2

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.2	0	-
Standard value	0.91*	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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- AC Office Htg & Clg S3

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.2	0	0	0.7
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- Warehouse Heating S1

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0	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

1- LTHW Radiator Heating S2

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.91	-
Standard value	0.9*	N/A
* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.		

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
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		Zone	Standard
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1			
02.00.03 Dis WC	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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
02.00.04 Dis SHW		0.3	-	-	-	-	-	-	-	-	-	N/A
02.00.07 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
02.00.08 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
02.01.03 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
02.01.04 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
02.01.05 Office		-	-	-	1.1	-	-	-	-	-	-	N/A
02.01.06 Office		-	-	-	1.1	-	-	-	-	-	-	N/A

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
02.00.01 Lobby		-	127	-	173
02.00.02 Lobby		-	76	-	52
02.00.03 Dis WC		-	76	-	40
02.00.04 Dis SHW		-	68	-	52
02.00.05 Cupboard		34	-	-	53
02.00.06 Cupboard		34	-	-	24
02.00.07 Undercroft		60	-	-	628
02.00.08 Undercroft		60	-	-	361
02.00.09 Warehouse		60	-	-	5589
02.01.01 Lobby		-	70	-	45
02.01.02 Lobby		-	85	-	38
02.01.03 WC		-	76	-	40
02.01.04 WC		-	76	-	40
02.01.05 Office		131	-	-	376
02.01.06 Office		137	-	-	169

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
02.00.05 Cupboard	N/A	N/A
02.00.06 Cupboard	N/A	N/A
02.00.07 Undercroft	NO (-56.1%)	NO
02.00.08 Undercroft	NO (-78.3%)	NO
02.00.09 Warehouse	NO (-10%)	NO
02.01.05 Office	NO (-62.5%)	NO
02.01.06 Office	NO (-78.2%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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
Area [m ²]	991.2	991.2
External area [m ²]	2621.9	2621.9
Weather	SWI	SWI
Infiltration [m ³ /hm ² @ 50Pa]	3	7
Average conductance [W/K]	905.72	873.8
Average U-value [W/m ² K]	0.35	0.33
Alpha value* [%]	10.39	10

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

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
100	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 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/m²]

	Actual	Notional
Heating	38.25	42.33
Cooling	1.22	1
Auxiliary	2.29	1.51
Lighting	19.25	22.02
Hot water	4.37	4.37
Equipment*	33.83	33.83
TOTAL**	65.39	71.23

* 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	0.93	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	137.91	157.87
Primary energy* [kWh/m ²]	122.67	134.15
Total emissions [kg/m ²]	20.7	23.1

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	78.9	73.5	6.7	5.8	5.9	3.26	3.55	3.5	5
Notional	91.8	64	10	4.7	2.8	2.56	3.79	---	---
[ST] Flued forced-convection air heaters, [HS] Air heater, [HFT] Natural Gas, [CFT] Electricity									
Actual	99.9	0	35.2	0	0	0.79	0	0.91	0
Notional	138.6	0	44.7	0	0	0.86	0	---	---
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	446.1	0	152.6	0	6.5	0.81	0	0.91	0
Notional	339.7	0	109.5	0	5.1	0.86	0	---	---
[ST] No Heating or Cooling									
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]	= 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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U_{i-Typ}	U_{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.28	0100001F:Surf[16]
Floor	0.2	0.25	0100001F:Surf[32]
Roof	0.15	0.16	01000000:Surf[8]
Windows, roof windows, and rooflights	1.5	1.01	01000000:Surf[7]
Personnel doors	1.5	2.2	01000000:Surf[1]
Vehicle access & similar large doors	1.5	1.5	01000000:Surf[2]
High usage entrance doors	1.5	1.8	0100001F:Surf[2]
U_{i-Typ} = Typical individual element U-values [W/(m ² K)]			U_{i-Min} = Minimum individual element U-values [W/(m ² K)]
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	3

Project name

Unit 3

As designed

Date: Fri May 21 14:18:15 2021

Administrative information

Building Details

Address: Unit 3, Bartley Wood, Hook,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Shepherd Brombley Partnership

Telephone number: 01962 832656

Address: Unit 22 Basepoint Business Centre, 1 Winnall Valley Road, Winchester, SO23 0LD

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	21.7
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	21.7
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	18.8
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	Surface where the maximum value occurs*
Wall**	0.35	0.28	0.28	04000010:Surf[0]
Floor	0.25	0.25	0.25	04000010:Surf[19]
Roof	0.25	0.16	0.16	04000010:Surf[18]
Windows***, roof windows, and rooflights	2.2	1.3	1.8	04000010:Surf[1]
Personnel doors	2.2	2.2	2.2	04000005:Surf[2]
Vehicle access & similar large doors	1.5	1.5	1.5	04000005:Surf[0]
High usage entrance doors	3.5	1.8	1.8	04000010:Surf[3]

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

* There might be more than one surface where the maximum U-value occurs.

** 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.

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	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

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- LTHW Radiator Heating S2

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.2	0	-
Standard value	0.91*	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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- AC Office Htg & Clg S3

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.2	0	0	0.7
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- Warehouse Heating S1

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0	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

1- LTHW Radiator Heating S2

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.91	-
Standard value	0.9*	N/A
* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.		

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
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		Zone	Standard
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1			
03.00.03 Dis WC	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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
03.00.04 Dis SHW		0.3	-	-	-	-	-	-	-	-	-	N/A
03.00.06 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
03.00.07 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
03.01.03 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
03.01.04 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
03.01.05 Office		-	-	-	1.1	-	-	-	-	-	-	N/A
03.01.06 Office		-	-	-	1.1	-	-	-	-	-	-	N/A

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
03.00.01 Lobby		-	144	-	144
03.00.02 Lobby		-	72	-	61
03.00.03 Dis WC		-	76	-	40
03.00.04 Dis SHW		-	68	-	52
03.00.05 Cupboard		34	-	-	45
03.00.06 Undercroft		60	-	-	584
03.00.07 Undercroft		60	-	-	289
03.00.08 Warehouse		60	-	-	4994
03.01.01 Lobby		-	68	-	53
03.01.02 Lobby		-	97	-	30
03.01.03 WC		-	76	-	40
03.01.04 WC		-	76	-	40
03.01.05 Office		131	-	-	309
03.01.06 Office		139	-	-	160

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
03.00.05 Cupboard	N/A	N/A
03.00.06 Undercroft	NO (-58.3%)	NO
03.00.07 Undercroft	NO (-81.5%)	NO
03.00.08 Warehouse	NO (-10.5%)	NO
03.01.05 Office	NO (-67.4%)	NO
03.01.06 Office	NO (-83.4%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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
Area [m ²]	876.8	876.8
External area [m ²]	2106.9	2106.9
Weather	SWI	SWI
Infiltration [m ³ /hm ² @ 50Pa]	3	7
Average conductance [W/K]	673.86	672.32
Average U-value [W/m ² K]	0.32	0.32
Alpha value* [%]	10.4	10

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

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
100	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 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/m²]

	Actual	Notional
Heating	28.94	35.31
Cooling	1.22	0.89
Auxiliary	2.39	1.61
Lighting	19.69	22.51
Hot water	4.35	4.35
Equipment*	33.77	33.77
TOTAL**	56.59	64.67

* 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	1.06	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	108.27	132.26
Primary energy* [kWh/m ²]	112.31	126.3
Total emissions [kg/m ²]	18.8	21.7

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	62.5	75.5	5.3	5.9	6	3.26	3.55	3.5	5
Notional	76.8	58.5	8.3	4.3	2.9	2.56	3.79	---	---
[ST] Flued forced-convection air heaters, [HS] Air heater, [HFT] Natural Gas, [CFT] Electricity									
Actual	80.1	0	28.2	0	0	0.79	0	0.91	0
Notional	117.8	0	37.9	0	0	0.86	0	---	---
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	273.6	0	93.6	0	6.6	0.81	0	0.91	0
Notional	247.9	0	79.9	0	5.3	0.86	0	---	---
[ST] No Heating or Cooling									
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]	= 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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-typ}	U _{i-min}	Surface where the minimum value occurs*
Wall	0.23	0.28	04000010:Surf[0]
Floor	0.2	0.25	04000010:Surf[19]
Roof	0.15	0.16	04000010:Surf[18]
Windows, roof windows, and rooflights	1.5	1.01	04000005:Surf[4]
Personnel doors	1.5	2.2	04000005:Surf[2]
Vehicle access & similar large doors	1.5	1.5	04000005:Surf[0]
High usage entrance doors	1.5	1.8	04000010:Surf[3]
U _{i-typ} = Typical individual element U-values [W/(m²K)]			U _{i-min} = Minimum individual element U-values [W/(m²K)]
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3

Project name

Unit 4

As designed

Date: Fri May 21 14:26:02 2021

Administrative information**Building Details**

Address: Unit 4, Bartley Wood, Hook,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Shepherd Brombley Partnership

Telephone number: 01962 832656

Address: Unit 22 Basepoint Business Centre, 1 Winnall Valley Road, Winchester, SO23 0LD

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	22.9
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	22.9
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	20.6
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	Surface where the maximum value occurs*
Wall**	0.35	0.28	0.28	02000000:Surf[16]
Floor	0.25	0.25	0.25	02000000:Surf[32]
Roof	0.25	0.16	0.16	02000008:Surf[8]
Windows***, roof windows, and rooflights	2.2	1.41	1.8	02000000:Surf[0]
Personnel doors	2.2	2.2	2.2	02000008:Surf[4]
Vehicle access & similar large doors	1.5	1.5	1.5	02000008:Surf[1]
High usage entrance doors	3.5	1.8	1.8	02000000:Surf[2]

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

* There might be more than one surface where the maximum U-value occurs.

** 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.

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	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

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- LTHW Radiator Heating S2

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.2	0	-
Standard value	0.91*	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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- AC Office Htg & Clg S3

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.2	0	0	0.7
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- Warehouse Heating S1

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0	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

1- LTHW Radiator Heating S2

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.91	-
Standard value	0.9*	N/A
* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.		

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
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		Zone	Standard
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1			
04.00.03 Dis WC	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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
04.00.04 Dis SHW		0.3	-	-	-	-	-	-	-	-	-	N/A
04.00.07 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
04.00.08 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
04.01.03 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
04.01.04 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
04.01.05 Office		-	-	-	1.1	-	-	-	-	-	-	N/A
04.01.06 Office		-	-	-	1.1	-	-	-	-	-	-	N/A

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
04.00.01 Lobby		-	127	-	173
04.00.02 Lobby		-	76	-	52
04.00.03 Dis WC		-	76	-	40
04.00.04 Dis SHW		-	68	-	52
04.00.05 Cupboard		34	-	-	53
04.00.06 Cupboard		34	-	-	24
04.00.07 Undercroft		60	-	-	692
04.00.08 Undercroft		60	-	-	391
04.00.09 Warehouse		60	-	-	5245
04.01.01 Lobby		-	70	-	45
04.01.02 Lobby		-	85	-	38
04.01.03 WC		-	76	-	40
04.01.04 WC		-	76	-	40
04.01.05 Office		131	-	-	409
04.01.06 Office		136	-	-	184

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
04.00.05 Cupboard	N/A	N/A
04.00.06 Cupboard	N/A	N/A
04.00.07 Undercroft	NO (-54.7%)	NO
04.00.08 Undercroft	NO (-77%)	NO
04.00.09 Warehouse	NO (-11.2%)	NO
04.01.05 Office	NO (-60.7%)	NO
04.01.06 Office	NO (-77.1%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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
Area [m ²]	961.6	961.6
External area [m ²]	2515.3	2515.3
Weather	SWI	SWI
Infiltration [m ³ /hm ² @ 50Pa]	3	7
Average conductance [W/K]	874.38	838.63
Average U-value [W/m ² K]	0.35	0.33
Alpha value* [%]	10.45	10

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

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
100	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 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/m²]

	Actual	Notional
Heating	36.07	39.41
Cooling	1.41	1.17
Auxiliary	2.48	1.61
Lighting	19.6	22.57
Hot water	4.38	4.38
Equipment*	34.44	34.44
TOTAL**	63.94	69.14

* 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	0.96	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	135.22	152.16
Primary energy* [kWh/m ²]	122.42	133.32
Total emissions [kg/m ²]	20.6	22.9

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	76.5	75.5	6.5	5.9	5.9	3.26	3.55	3.5	5
Notional	87.3	67.1	9.5	4.9	2.9	2.56	3.79	---	---
[ST] Flued forced-convection air heaters, [HS] Air heater, [HFT] Natural Gas, [CFT] Electricity									
Actual	98.1	0	34.5	0	0	0.79	0	0.91	0
Notional	134.2	0	43.3	0	0	0.86	0	---	---
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	401.5	0	137.4	0	6.5	0.81	0	0.91	0
Notional	298	0	96	0	5.1	0.86	0	---	---
[ST] No Heating or Cooling									
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]	= 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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-typ}	U _{i-min}	Surface where the minimum value occurs*
Wall	0.23	0.28	02000000:Surf[16]
Floor	0.2	0.25	02000000:Surf[32]
Roof	0.15	0.16	02000008:Surf[8]
Windows, roof windows, and rooflights	1.5	1.01	02000008:Surf[7]
Personnel doors	1.5	2.2	02000008:Surf[4]
Vehicle access & similar large doors	1.5	1.5	02000008:Surf[1]
High usage entrance doors	1.5	1.8	02000000:Surf[2]
U _{i-typ} = Typical individual element U-values [W/(m²K)]			U _{i-min} = Minimum individual element U-values [W/(m²K)]
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3

Project name

Unit 5

As designed

Date: Fri May 21 16:36:14 2021

Administrative information

Building Details

Address: Unit 5, Bartley Wood, Hook,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Shepherd Brombley Partnership

Telephone number: 01962 832656

Address: Unit 22 Basepoint Business Centre, 1 Winnall Valley Road, Winchester, SO23 0LD

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	22
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	22
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	19.4
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	Surface where the maximum value occurs*
Wall**	0.35	0.28	0.28	0200002D:Surf[16]
Floor	0.25	0.25	0.25	0200002D:Surf[34]
Roof	0.25	0.16	0.16	01000000:Surf[8]
Windows***, roof windows, and rooflights	2.2	1.35	1.8	0200002D:Surf[0]
Personnel doors	2.2	2.2	2.2	01000000:Surf[3]
Vehicle access & similar large doors	1.5	1.5	1.5	01000000:Surf[1]
High usage entrance doors	3.5	1.8	1.8	0200002D:Surf[2]

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

* There might be more than one surface where the maximum U-value occurs.

** 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.

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	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

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- LTHW Radiator Heating S2

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.2	0	-
Standard value	0.91*	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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- AC Office Htg & Clg S3

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.2	0	0	0.7
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- Warehouse Heating S1

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0	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

1- LTHW Radiator Heating S2

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.91	-
Standard value	0.9*	N/A
* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.		

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
05.00.04 WC		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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
05.00.05 Dis SHW		0.3	-	-	-	-	-	-	-	-	-	N/A
05.00.06 Dis WC		0.3	-	-	-	-	-	-	-	-	-	N/A
05.00.07 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
05.00.08 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
05.01.04 Dis SHW		0.3	-	-	-	-	-	-	-	-	-	N/A
05.01.06 Cleaners		0.3	-	-	-	-	-	-	-	-	-	N/A
05.01.07 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
05.01.08 Office		-	-	-	1.1	-	-	-	-	-	-	N/A
05.01.09 Office		-	-	-	1.1	-	-	-	-	-	-	N/A

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
05.00.01 Lobby		-	122	-	230
05.00.03 Lobby		-	91	-	37
05.00.04 WC		-	75	-	40
05.00.05 Dis SHW		-	69	-	50
05.00.06 Dis WC		-	72	-	45
05.00.07 Undercroft		60	-	-	891
05.00.08 Undercroft		60	-	-	689
05.00.09 Cupboard		34	-	-	53
05.00.10 Warehouse		60	-	-	7859
05.01.01 Lobby		-	67	-	63
05.01.03 Lobby		-	91	-	37
05.01.04 Dis SHW		-	75	-	40
05.01.05 Store		22	-	-	51
05.01.06 Cleaners		21	-	-	55
05.01.07 WC		-	83	-	34
05.01.08 Office		130	-	-	455
05.01.09 Office		131	-	-	349

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
05.00.07 Undercroft	NO (-46.2%)	NO
05.00.08 Undercroft	NO (-87%)	NO
05.00.10 Warehouse	NO (-10.5%)	NO
05.01.08 Office	NO (-46.1%)	NO
05.01.09 Office	NO (-87%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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
Area [m ²]	1435.7	1435.7
External area [m ²]	3636.2	3636.2
Weather	SWI	SWI
Infiltration [m ³ /hm ² @ 50Pa]	3	7
Average conductance [W/K]	1197.96	1171.74
Average U-value [W/m ² K]	0.33	0.32
Alpha value* [%]	10.43	10

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

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
100	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 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/m²]

	Actual	Notional
Heating	31.92	37.29
Cooling	1.42	1.33
Auxiliary	2.56	1.73
Lighting	18.83	21.73
Hot water	4.43	4.43
Equipment*	34.27	34.27
TOTAL**	59.16	66.52

* 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	0.54	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	118.97	142.37
Primary energy* [kWh/m ²]	114.51	127.58
Total emissions [kg/m ²]	19.4	22

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	56.5	81.9	4.8	6.4	6.1	3.26	3.55	3.5	5
Notional	57.6	82.1	6.3	6	2.9	2.56	3.79	---	---
[ST] Flued forced-convection air heaters, [HS] Air heater, [HFT] Natural Gas, [CFT] Electricity									
Actual	90.5	0	31.9	0	0	0.79	0	0.91	0
Notional	128.2	0	41.3	0	0	0.86	0	---	---
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	346.6	0	118.6	0	6.9	0.81	0	0.91	0
Notional	295.4	0	95.2	0	5.6	0.86	0	---	---
[ST] No Heating or Cooling									
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]	= 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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.28	0200002D:Surf[16]
Floor	0.2	0.25	0200002D:Surf[34]
Roof	0.15	0.16	01000000:Surf[8]
Windows, roof windows, and rooflights	1.5	1.01	01000000:Surf[7]
Personnel doors	1.5	2.2	01000000:Surf[3]
Vehicle access & similar large doors	1.5	1.5	01000000:Surf[1]
High usage entrance doors	1.5	1.8	0200002D:Surf[2]
U _{i-Typ} = Typical individual element U-values [W/(m²K)] U _{i-Min} = Minimum individual element U-values [W/(m²K)]			
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3

Project name

Unit 6

As designed

Date: Fri May 21 16:47:49 2021

Administrative information

Building Details

Address: Unit 6, Bartley Wood, Hook,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Shepherd Brombley Partnership

Telephone number: 01962 832656

Address: Unit 22 Basepoint Business Centre, 1 Winnall Valley Road, Winchester, SO23 0LD

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	21.1
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	21.1
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	18.1
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	Surface where the maximum value occurs*
Wall**	0.35	0.28	0.28	04000010:Surf[16]
Floor	0.25	0.25	0.25	04000010:Surf[17]
Roof	0.25	0.16	0.16	04000005:Surf[7]
Windows***, roof windows, and rooflights	2.2	1.3	1.8	04000010:Surf[0]
Personnel doors	2.2	2.2	2.2	04000005:Surf[2]
Vehicle access & similar large doors	1.5	1.5	1.5	04000005:Surf[0]
High usage entrance doors	3.5	1.8	1.8	04000010:Surf[2]

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

* There might be more than one surface where the maximum U-value occurs.

** 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.

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	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

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- LTHW Radiator Heating S2

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.2	0	-
Standard value	0.91*	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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- AC Office Htg & Clg S3

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.2	0	0	0.7
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- Warehouse Heating S1

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0	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

1- LTHW Radiator Heating S2

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.91	-
Standard value	0.9*	N/A
* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.		

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
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		Zone	Standard
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1			
06.00.03 Dis WC	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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
06.00.04 Dis SHW		0.3	-	-	-	-	-	-	-	-	-	N/A
06.00.06 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
06.00.07 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
06.01.03 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
06.01.04 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
06.01.05 Office		-	-	-	1.1	-	-	-	-	-	-	N/A
06.01.06 Office		-	-	-	1.1	-	-	-	-	-	-	N/A

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
06.00.01 Lobby		-	135	-	162
06.00.02 Lobby		-	70	-	67
06.00.03 Dis WC		-	76	-	40
06.00.04 Dis SHW		-	65	-	61
06.00.05 Cupboard		34	-	-	54
06.00.06 Undercroft		60	-	-	897
06.00.07 Undercroft		60	-	-	586
06.00.08 Warehouse		60	-	-	6676
06.01.01 Lobby		-	68	-	53
06.01.02 Lobby		-	70	-	67
06.01.03 WC		-	76	-	40
06.01.04 WC		-	65	-	61
06.01.05 Office		130	-	-	476
06.01.06 Office		133	-	-	293

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
06.00.05 Cupboard	N/A	N/A
06.00.06 Undercroft	NO (-48.4%)	NO
06.00.07 Undercroft	NO (-85.8%)	NO
06.00.08 Warehouse	NO (-10.3%)	NO
06.01.05 Office	NO (-53.1%)	NO
06.01.06 Office	NO (-86%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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
Area [m ²]	1244.4	1244.4
External area [m ²]	2847	2847
Weather	SWI	SWI
Infiltration [m ³ /hm ² @ 50Pa]	3	7
Average conductance [W/K]	928.86	928.54
Average U-value [W/m ² K]	0.33	0.33
Alpha value* [%]	10.46	10

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

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
100	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 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/m²]

	Actual	Notional
Heating	25.47	31.93
Cooling	1.59	1.51
Auxiliary	2.33	1.44
Lighting	18.95	22.35
Hot water	4.43	4.43
Equipment*	34.84	34.84
TOTAL**	52.76	61.67

* 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	0.62	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	103.6	129.89
Primary energy* [kWh/m ²]	107.02	123.04
Total emissions [kg/m ²]	18.1	21.1

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	57.2	82.9	4.9	6.5	6	3.26	3.55	3.5	5
Notional	62.5	84.3	6.8	6.2	2.9	2.56	3.79	---	---
[ST] Flued forced-convection air heaters, [HS] Air heater, [HFT] Natural Gas, [CFT] Electricity									
Actual	80.7	0	28.4	0	0	0.79	0	0.91	0
Notional	116	0	37.4	0	0	0.86	0	---	---
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	199.2	0	68.1	0	6.2	0.81	0	0.91	0
Notional	206.1	0	66.4	0	4.7	0.86	0	---	---
[ST] No Heating or Cooling									
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]	= 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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-typ}	U _{i-min}	Surface where the minimum value occurs*
Wall	0.23	0.28	04000010:Surf[16]
Floor	0.2	0.25	04000010:Surf[17]
Roof	0.15	0.16	04000005:Surf[7]
Windows, roof windows, and rooflights	1.5	1.01	04000005:Surf[6]
Personnel doors	1.5	2.2	04000005:Surf[2]
Vehicle access & similar large doors	1.5	1.5	04000005:Surf[0]
High usage entrance doors	1.5	1.8	04000010:Surf[2]
U _{i-typ} = Typical individual element U-values [W/(m²K)]			U _{i-min} = Minimum individual element U-values [W/(m²K)]
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3

Project name

Unit 7

As designed

Date: Fri May 21 17:05:47 2021

Administrative information**Building Details**

Address: Unit 7, Bartley Wood, Hook,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Shepherd Brombley Partnership

Telephone number: 01962 832656

Address: Unit 22 Basepoint Business Centre, 1 Winnall Valley Road, Winchester, SO23 0LD

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	20.9
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	20.9
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	17.7
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	Surface where the maximum value occurs*
Wall**	0.35	0.28	0.28	06000000:Surf[16]
Floor	0.25	0.25	0.25	06000000:Surf[17]
Roof	0.25	0.16	0.16	06000006:Surf[7]
Windows***, roof windows, and rooflights	2.2	1.27	1.8	06000000:Surf[0]
Personnel doors	2.2	2.2	2.2	06000006:Surf[1]
Vehicle access & similar large doors	1.5	1.5	1.5	06000006:Surf[0]
High usage entrance doors	3.5	1.8	1.8	06000000:Surf[2]

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

* There might be more than one surface where the maximum U-value occurs.

** 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.

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	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

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- LTHW Radiator Heating S2

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.2	0	-
Standard value	0.91*	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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- AC Office Htg & Clg S3

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.2	0	0	0.7
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- Warehouse Heating S1

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0	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

1- LTHW Radiator Heating S2

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.91	-
Standard value	0.9*	N/A
* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.		

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
07.00.03 Dis WC		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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
07.00.04 Dis SHW		0.3	-	-	-	-	-	-	-	-	-	N/A
07.00.06 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
07.00.07 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
07.01.03 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
07.01.04 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
07.01.05 Office		-	-	-	1.1	-	-	-	-	-	-	N/A
07.01.06 Office		-	-	-	1.1	-	-	-	-	-	-	N/A

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
07.00.01 Lobby		-	135	-	162
07.00.02 Lobby		-	70	-	67
07.00.03 Dis WC		-	76	-	40
07.00.04 Dis SHW		-	65	-	61
07.00.05 Cupboard		34	-	-	54
07.00.06 Undercroft		60	-	-	815
07.00.07 Undercroft		60	-	-	535
07.00.08 Warehouse		60	-	-	7395
07.01.01 Lobby		-	68	-	53
07.01.02 Lobby		-	70	-	67
07.01.03 WC		-	76	-	40
07.01.04 WC		-	65	-	61
07.01.05 Office		130	-	-	433
07.01.06 Office		133	-	-	267

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
07.00.05 Cupboard	N/A	N/A
07.00.06 Undercroft	NO (-48.4%)	NO
07.00.07 Undercroft	NO (-86%)	NO
07.00.08 Warehouse	NO (-11.2%)	NO
07.01.05 Office	NO (-53.5%)	NO
07.01.06 Office	NO (-86.3%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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
Area [m ²]	1317.8	1317.8
External area [m ²]	3081	3081
Weather	SWI	SWI
Infiltration [m ³ /hm ² @ 50Pa]	3	7
Average conductance [W/K]	989.49	997.9
Average U-value [W/m ² K]	0.32	0.32
Alpha value* [%]	10.38	10

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

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
100	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 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/m²]

	Actual	Notional
Heating	26.22	33.71
Cooling	1.37	1.27
Auxiliary	2.07	1.3
Lighting	18.53	21.6
Hot water	4.44	4.44
Equipment*	34.06	34.06
TOTAL**	52.63	62.31

* 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	0.59	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	101.46	130.84
Primary energy* [kWh/m ²]	104.99	121.46
Total emissions [kg/m ²]	17.7	20.9

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	57.3	83.1	4.9	6.5	6	3.26	3.55	3.5	5
Notional	64.1	82	7	6	2.9	2.56	3.79	---	---
[ST] Flued forced-convection air heaters, [HS] Air heater, [HFT] Natural Gas, [CFT] Electricity									
Actual	81.1	0	28.6	0	0	0.79	0	0.91	0
Notional	119.3	0	38.5	0	0	0.86	0	---	---
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	199	0	68.1	0	6.2	0.81	0	0.91	0
Notional	207.2	0	66.7	0	4.7	0.86	0	---	---
[ST] No Heating or Cooling									
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]	= 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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.28	06000000:Surf[16]
Floor	0.2	0.25	06000000:Surf[17]
Roof	0.15	0.16	06000006:Surf[7]
Windows, roof windows, and rooflights	1.5	1.01	06000006:Surf[6]
Personnel doors	1.5	2.2	06000006:Surf[1]
Vehicle access & similar large doors	1.5	1.5	06000006:Surf[0]
High usage entrance doors	1.5	1.8	06000000:Surf[2]
U _{i-Typ} = Typical individual element U-values [W/(m²K)]			U _{i-Min} = Minimum individual element U-values [W/(m²K)]
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3

Project name

Unit 8

As designed

Date: Mon May 24 12:17:22 2021

Administrative information

Building Details

Address: Unit 8, Bartley Wood, Hook,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Shepherd Brombley Partnership

Telephone number: 01962 832656

Address: Unit 22 Basepoint Business Centre, 1 Winnall Valley Road, Winchester, SO23 0LD

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	22.1
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	22.1
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	18.6
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	Surface where the maximum value occurs*
Wall**	0.35	0.28	0.28	04000006:Surf[16]
Floor	0.25	0.25	0.25	04000006:Surf[34]
Roof	0.25	0.16	0.16	04000004:Surf[9]
Windows***, roof windows, and rooflights	2.2	1.34	1.8	04000006:Surf[0]
Personnel doors	2.2	2.2	2.2	04000004:Surf[3]
Vehicle access & similar large doors	1.5	1.5	1.5	04000004:Surf[1]
High usage entrance doors	3.5	1.8	1.8	04000006:Surf[2]

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

* There might be more than one surface where the maximum U-value occurs.

** 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.

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	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

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- LTHW Radiator Heating S2

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.2	0	-
Standard value	0.91*	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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- AC Office Htg & Clg S3

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.2	0	0	0.7
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- Electric Heating S4

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	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

4- Warehouse Heating S1

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0	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

1- LTHW Radiator Heating S2

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.91	-
Standard value	0.9*	N/A
* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.		

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
08.00.04 Dis WC/SHW		0.3	-	-	-	-	-	-	-	-	-	N/A
08.00.05 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
08.00.08 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
08.00.09 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
08.01.08 Office		-	-	-	1.1	-	-	-	-	-	-	N/A
08.01.09 Office		-	-	-	1.1	-	-	-	-	-	-	N/A
08.01.06 SHW		0.3	-	-	-	-	-	-	-	-	-	N/A
08.01.04 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
08.01.05 WC		0.3	-	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
08.00.01 Lobby		-	125	-	217
08.00.03 Lobby		-	80	-	42
08.00.04 Dis WC/SHW		-	95	-	39
08.00.05 WC		-	86	-	32
08.00.06 Cupboard		34	-	-	55
08.00.07 Cupboard		34	-	-	40
08.00.08 Undercroft		60	-	-	1001
08.00.09 Undercroft		60	-	-	393
08.00.10 Stair		-	77	-	133
08.00.11 Warehouse		60	-	-	8459
08.01.08 Office		130	-	-	549
08.01.10 Stair		-	63	-	133
08.01.09 Office		140	-	-	183
08.01.06 SHW		-	88	-	29
08.01.07 Cupboard		34	-	-	20
08.01.04 WC		-	86	-	32
08.01.05 WC		-	86	-	32
08.01.03 Lobby		-	91	-	54
08.01.01 Lobby		-	67	-	67

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
08.00.07 Cupboard	N/A	N/A
08.00.08 Undercroft	NO (-46.6%)	NO
08.00.09 Undercroft	NO (-58.1%)	NO
08.00.11 Warehouse	NO (-11.1%)	NO
08.01.08 Office	NO (-50.4%)	NO
08.01.09 Office	NO (-56.4%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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
Area [m ²]	1541.5	1541.5
External area [m ²]	3901.4	3901.4
Weather	SWI	SWI
Infiltration [m ³ /hm ² @ 50Pa]	3	7
Average conductance [W/K]	1303.49	1321.8
Average U-value [W/m ² K]	0.33	0.34
Alpha value* [%]	10.43	10

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

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
100	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 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/m²]

	Actual	Notional
Heating	33.78	41.82
Cooling	1.09	1.1
Auxiliary	1.85	1.18
Lighting	17.86	20.15
Hot water	4.65	4.3
Equipment*	32.94	32.94
TOTAL**	59.23	68.56

* 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	2.6	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	120.56	152.91
Primary energy* [kWh/m ²]	116.02	125.32
Total emissions [kg/m ²]	18.6	22.1

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	222	0	77.1	0	0	0.8	0	1	0
Notional	377.7	0	121.7	0	0	0.86	0	---	---
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	70.9	75.4	6	5.9	6	3.26	3.55	3.5	5
Notional	65.4	81.3	7.1	6	2.9	2.56	3.79	---	---
[ST] Flued forced-convection air heaters, [HS] Air heater, [HFT] Natural Gas, [CFT] Electricity									
Actual	89.5	0	31.5	0	0	0.79	0	0.91	0
Notional	132.6	0	42.7	0	0	0.86	0	---	---
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	349.8	0	119.6	0	7	0.81	0	0.91	0
Notional	291.8	0	94	0	5.7	0.86	0	---	---
[ST] No Heating or Cooling									
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]	= 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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-typ}	U _{i-min}	Surface where the minimum value occurs*
Wall	0.23	0.28	04000006:Surf[16]
Floor	0.2	0.25	04000006:Surf[34]
Roof	0.15	0.16	04000004:Surf[9]
Windows, roof windows, and rooflights	1.5	1.01	04000004:Surf[8]
Personnel doors	1.5	2.2	04000004:Surf[3]
Vehicle access & similar large doors	1.5	1.5	04000004:Surf[1]
High usage entrance doors	1.5	1.8	04000006:Surf[2]
U _{i-typ} = Typical individual element U-values [W/(m²K)]			U _{i-min} = Minimum individual element U-values [W/(m²K)]
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3

Project name

Unit 9

As designed

Date: Fri May 21 17:54:52 2021

Administrative information**Building Details**

Address: Unit 9, Bartley Wood, Hook,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Shepherd Brombley Partnership

Telephone number: 01962 832656

Address: Unit 22 Basepoint Business Centre, 1 Winnall Valley Road, Winchester, SO23 0LD

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	23.6
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	23.6
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	20.2
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	Surface where the maximum value occurs*
Wall**	0.35	0.28	0.28	08000004:Surf[16]
Floor	0.25	0.25	0.25	08000004:Surf[34]
Roof	0.25	0.16	0.16	08000024:Surf[11]
Windows***, roof windows, and rooflights	2.2	1.35	1.8	08000004:Surf[0]
Personnel doors	2.2	2.2	2.2	08000024:Surf[1]
Vehicle access & similar large doors	1.5	1.5	1.5	08000024:Surf[2]
High usage entrance doors	3.5	1.8	1.8	08000004:Surf[6]

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

* There might be more than one surface where the maximum U-value occurs.

** 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.

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	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

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- LTHW Radiator Heating S2

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.2	0	-
Standard value	0.91*	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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- AC Office Htg & Clg S3

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.2	0	0	0.7
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- Warehouse Heating S1

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0	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

1- LTHW Radiator Heating S2

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.91	-
Standard value	0.9*	N/A
* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.		

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
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		Zone	Standard
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1			
09.00.04 Dis SHW	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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
09.00.05 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
09.00.06 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
09.00.07 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
09.00.08 Undercroft		-	-	-	1.1	-	-	-	-	-	-	N/A
09.01.05 Cleaners		0.3	-	-	-	-	-	-	-	-	-	N/A
09.01.06 WC		0.3	-	-	-	-	-	-	-	-	-	N/A
09.01.07 SHW		0.3	-	-	-	-	-	-	-	-	-	N/A
09.01.08 Office		-	-	-	1.1	-	-	-	-	-	-	N/A
09.01.09 Office		-	-	-	1.1	-	-	-	-	-	-	N/A

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
09.00.01 Lobby		-	122	-	230
09.00.03 Lobby		-	91	-	37
09.00.04 Dis SHW		-	98	-	35
09.00.05 WC		-	77	-	39
09.00.06 WC		-	72	-	44
09.00.07 Undercroft		60	-	-	833
09.00.08 Undercroft		60	-	-	644
09.00.09 Cupboard		34	-	-	51
09.00.10 Warehouse		60	-	-	7377
09.01.01 Lobby		-	68	-	60
09.01.03 Lobby		-	91	-	37
09.01.04 Store		90	-	-	29
09.01.05 Cleaners		-	90	-	29
09.01.06 WC		-	80	-	36
09.01.07 SHW		-	72	-	44
09.01.08 Office		130	-	-	424
09.01.09 Office		132	-	-	325

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
09.00.07 Undercroft	NO (-61.1%)	NO
09.00.08 Undercroft	NO (-84.9%)	NO
09.00.10 Warehouse	NO (-11%)	NO
09.01.08 Office	NO (-61.1%)	NO
09.01.09 Office	NO (-84.8%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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
Area [m ²]	1350.4	1350.4
External area [m ²]	3708.5	3708.5
Weather	SWI	SWI
Infiltration [m ³ /hm ² @ 50Pa]	3	7
Average conductance [W/K]	1235.25	1208.46
Average U-value [W/m ² K]	0.33	0.33
Alpha value* [%]	10.41	10

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

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
100	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 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/m²]

	Actual	Notional
Heating	40.06	45.52
Cooling	1.15	1.07
Auxiliary	2.37	1.57
Lighting	18.86	21.88
Hot water	4.41	4.41
Equipment*	34.28	34.28
TOTAL**	66.84	74.46

* 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	2.06	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	139.47	165.23
Primary energy* [kWh/m ²]	123.25	137.03
Total emissions [kg/m ²]	20.2	23.6

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	60.9	67	5.2	5.2	6.1	3.26	3.55	3.5	5
Notional	63.8	66.7	6.9	4.9	2.9	2.56	3.79	---	---
[ST] Flued forced-convection air heaters, [HS] Air heater, [HFT] Natural Gas, [CFT] Electricity									
Actual	114.9	0	40.5	0	0	0.79	0	0.91	0
Notional	158.4	0	51.1	0	0	0.86	0	---	---
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	407.4	0	139.4	0	7.4	0.81	0	0.91	0
Notional	332.8	0	107.2	0	6.2	0.86	0	---	---
[ST] No Heating or Cooling									
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]	= 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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U_{i-typ}	U_{i-min}	Surface where the minimum value occurs*
Wall	0.23	0.28	08000004:Surf[16]
Floor	0.2	0.25	08000004:Surf[34]
Roof	0.15	0.16	08000024:Surf[11]
Windows, roof windows, and rooflights	1.5	1.01	08000024:Surf[10]
Personnel doors	1.5	2.2	08000024:Surf[1]
Vehicle access & similar large doors	1.5	1.5	08000024:Surf[2]
High usage entrance doors	1.5	1.8	08000004:Surf[6]
U_{i-typ} = Typical individual element U-values [W/(m ² K)]			U_{i-min} = Minimum individual element U-values [W/(m ² K)]
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	3

Project name

Retail Foodstore

As designed

Date: Wed May 26 14:06:45 2021

Administrative information

Building Details

Address: Retail Foodstore, Bartley Wood, Hook,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Shepherd Brombley Partnership Ltd

Telephone number: Phone

Address: Street Address, City, Postcode

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	31.5
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	31.5
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	19.4
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.28	0.28	00000003:Surf[9]
Floor	0.25	0.25	0.25	00000003:Surf[10]
Roof	0.25	0.16	0.16	00000001:Surf[39]
Windows***, roof windows, and rooflights	2.2	1.78	1.8	00000001:Surf[0]
Personnel doors	2.2	2.2	2.2	00000002:Surf[5]
Vehicle access & similar large doors	1.5	1.5	1.5	00000012:Surf[3]
High usage entrance doors	3.5	1.8	1.8	00000003:Surf[0]

U_a-Limit = Limiting area-weighted average U-values [W/(m²K)]U_a-Calc = Calculated area-weighted average U-values [W/(m²K)]U_i-Calc = Calculated maximum individual element U-values [W/(m²K)]

* There might be more than one surface where the maximum U-value occurs.

** 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.

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	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

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- Convector Heating System (HVAC Sys 1)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	5.05	-	0	0	0.7
Standard value	2.5*	N/A	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- Electric Heating (HVAC Sys 3)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.016
Standard value	1	N/A

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
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	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
A.00.01 Entrance Lobby		-	-	-	1.4	-	-	-	-	-	-	N/A
A.00.02 Exit Lobby		-	-	-	1.4	-	-	-	-	-	-	N/A
A.00.03 Sales Area		-	-	-	1.4	-	-	-	-	-	-	N/A
A.00.04 Sales Area		-	-	-	1.4	-	-	-	-	-	-	N/A
A.00.05 Sales Area		-	-	-	1.4	-	-	-	-	-	-	N/A
A.00.06 Sales Area		-	-	-	1.4	-	-	-	-	-	-	N/A

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
	Standard value	60	60	22
A.00.01 Entrance Lobby	-	66	-	89
A.00.02 Exit Lobby	-	66	-	86
A.00.03 Sales Area	-	57	100	1318
A.00.04 Sales Area	-	57	100	2646
A.00.05 Sales Area	-	57	100	972

General lighting and display lighting		Luminous efficacy [lm/W]		
Zone name		Luminaire	Lamp	Display lamp
	Standard value	60	60	22
A.00.06 Sales Area		-	57	100
A.00.07 Warehouse		42	-	-
A.00.08 Warehouse		42	-	-
A.00.09 Warehouse/Stores		42	-	-
A.00.10 Warehouse/Stores		42	-	-
				General lighting [W]
				6966
				171
				493
				36
				58

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
A.00.03 Sales Area	NO (-5.2%)	NO
A.00.04 Sales Area	NO (-70%)	NO
A.00.05 Sales Area	NO (-92.8%)	NO
A.00.06 Sales Area	NO (-89.3%)	NO
A.00.07 Warehouse	NO (-89.1%)	NO
A.00.08 Warehouse	N/A	N/A
A.00.09 Warehouse/Stores	N/A	N/A
A.00.10 Warehouse/Stores	N/A	N/A

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m ²]	1883.2	1883.2
External area [m ²]	5037.5	5037.5
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	4
Average conductance [W/K]	1391.72	0
Average U-value [W/m ² K]	0.28	0
Alpha value* [%]	12.85	10

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

Building Use

% Area	Building Type
71	A1/A2 Retail/Financial and Professional services A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways B1 Offices and Workshop businesses B2 to B7 General Industrial and Special Industrial Groups
29	B8 Storage or Distribution C1 Hotels C2 Residential Institutions: Hospitals and Care Homes C2 Residential Institutions: Residential schools C2 Residential Institutions: Universities and colleges C2A Secure Residential Institutions Residential spaces D1 Non-residential Institutions: Community/Day Centre D1 Non-residential Institutions: Libraries, Museums, and Galleries D1 Non-residential Institutions: Education D1 Non-residential Institutions: Primary Health Care Building D1 Non-residential Institutions: Crown and County Courts D2 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/m²]

	Actual	Notional
Heating	2.87	2.19
Cooling	0	0
Auxiliary	6.07	3
Lighting	26.93	55.32
Hot water	2.5	2.65
Equipment*	22.89	22.89
TOTAL**	38.37	63.16

* 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

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	46.55	20.13
Primary energy* [kWh/m ²]	114.85	184.02
Total emissions [kg/m ²]	19.4	31.5

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

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: convectors, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	65.3	0	4	0	8.5	4.51	0	5.05	0
Notional	28.3	0	3.1	0	4.2	2.56	0	----	----
[ST] No Heating or Cooling									
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]	= 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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.28	00000003:Surf[9]
Floor	0.2	0.25	00000003:Surf[10]
Roof	0.15	0.16	00000001:Surf[39]
Windows, roof windows, and rooflights	1.5	0.28	00000004:Surf[3]
Personnel doors	1.5	2.2	00000002:Surf[5]
Vehicle access & similar large doors	1.5	1.5	00000012:Surf[3]
High usage entrance doors	1.5	1.8	00000003:Surf[0]
U _{i-Typ} = Typical individual element U-values [W/(m²K)]			U _{i-Min} = Minimum individual element U-values [W/(m²K)]
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3

APPENDIX 3 – Draft EPC Certificates

Energy Performance Certificate

Non-Domestic Building



Unit 1, Bartley Wood
Hook

Certificate Reference Number:
5363-6378-0893-8396-2720

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 0-25

B 26-50

C 51-75

D 76-100


E 101-125

F 126-150

G Over 150

Less energy efficient

Net zero CO₂ emissions

**24**

This is how energy efficient the building is.

Technical information

Main heating fuel:	Natural Gas
Building environment:	Heating and Natural Ventilation
Total useful floor area (m ²):	1778.550
Building complexity:	Level 5
Building emission rate (kgCO ₂ /m ² per year):	20.26
Primary energy use (kWh/m ² per year):	123.46

Benchmarks

Buildings similar to this one could have ratings as follows:

28	If newly built
73	If typical of the existing stock

Administrative information

This is an Energy Performance Certificate as defined in the Energy Performance of Buildings Regulations 2012 as amended.

Assessment Software: Virtual Environment v7.0.13 using calculation engine ApacheSim v7.0.13

Property Reference:

Assessor Name: Shepherd Brombley Partnership

Assessor Number: LCEA206039

Accreditation Scheme: CIBSE Certification Limited

Assessor Qualifications: NOS5

Employer/Trading Name: Trading Name

Employer/Trading Address: Trading Address

Issue Date: 21 May 2021

Valid Until: 20 May 2031 (unless superseded by a later certificate)

Related Party Disclosure: Not related to the owner

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report: 9025-3025-5162-8483-2003

About this document and the data in it

This document has been produced following an energy assessment undertaken by a qualified Energy Assessor, accredited by CIBSE Certification Limited. You can obtain contact details of the Accreditation Scheme at www.cibsecertification.com.

A copy of this certificate has been lodged on a national register as a requirement under the Energy Performance of Buildings Regulations 2012 as amended. It will be made available via the online search function at www.ndepcregister.com. The certificate (including the building address) and other data about the building collected during the energy assessment but not shown on the certificate, for instance heating system data, will be made publicly available at www.opendatacommunities.org.

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Opportunity to benefit from a Green Deal on this property

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To find out how you could use Green Deal finance to improve your property please call 0300 123 1234.

Energy Performance Certificate

Non-Domestic Building



Unit 2, Bartley Wood
Hook

Certificate Reference Number:
2628-6817-7590-5946-9991

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



Net zero CO₂ emissions

A 0-25

**24**

This is how energy efficient the building is.

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

Less energy efficient

Technical information

Main heating fuel:	Natural Gas
Building environment:	Heating and Natural Ventilation
Total useful floor area (m ²):	991.150
Building complexity:	Level 5
Building emission rate (kgCO ₂ /m ² per year):	20.66
Primary energy use (kWh/m ² per year):	122.67

Benchmarks

Buildings similar to this one could have ratings as follows:

- 27** If newly built
- 73** If typical of the existing stock

Administrative information

This is an Energy Performance Certificate as defined in the Energy Performance of Buildings Regulations 2012 as amended.

Assessment Software: Virtual Environment v7.0.13 using calculation engine ApacheSim v7.0.13

Property Reference:

Assessor Name: Shepherd Brombley Partnership

Assessor Number: LCEA206039

Accreditation Scheme: CIBSE Certification Limited

Assessor Qualifications: NOS5

Employer/Trading Name: Trading Name

Employer/Trading Address: Trading Address

Issue Date: 21 May 2021

Valid Until: 20 May 2031 (unless superseded by a later certificate)

Related Party Disclosure: Not related to the owner

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report: 6129-9452-0191-3170-2972

About this document and the data in it

This document has been produced following an energy assessment undertaken by a qualified Energy Assessor, accredited by CIBSE Certification Limited. You can obtain contact details of the Accreditation Scheme at www.cibsecertification.com.

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Energy Performance Certificate

Non-Domestic Building



Unit 3, Bartley Wood
Hook

Certificate Reference Number:
8810-2738-3862-8160-2172

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



Net zero CO₂ emissions

A 0-25

**23**

This is how energy efficient the building is.

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

Less energy efficient

Technical information

Main heating fuel:	Natural Gas
Building environment:	Heating and Natural Ventilation
Total useful floor area (m ²):	876.810
Building complexity:	Level 5
Building emission rate (kgCO ₂ /m ² per year):	18.75
Primary energy use (kWh/m ² per year):	112.31

Benchmarks

Buildings similar to this one could have ratings as follows:

- 27** If newly built
- 71** If typical of the existing stock

Administrative information

This is an Energy Performance Certificate as defined in the Energy Performance of Buildings Regulations 2012 as amended.

Assessment Software: Virtual Environment v7.0.13 using calculation engine ApacheSim v7.0.13

Property Reference:

Assessor Name: Shepherd Brombley Partnership

Assessor Number: LCEA206039

Accreditation Scheme: CIBSE Certification Limited

Assessor Qualifications: NOS5

Employer/Trading Name: Trading Name

Employer/Trading Address: Trading Address

Issue Date: 21 May 2021

Valid Until: 20 May 2031 (unless superseded by a later certificate)

Related Party Disclosure: Not related to the owner

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report: 2545-2309-2417-8179-3510

About this document and the data in it

This document has been produced following an energy assessment undertaken by a qualified Energy Assessor, accredited by CIBSE Certification Limited. You can obtain contact details of the Accreditation Scheme at www.cibsecertification.com.

A copy of this certificate has been lodged on a national register as a requirement under the Energy Performance of Buildings Regulations 2012 as amended. It will be made available via the online search function at www.ndepcregister.com. The certificate (including the building address) and other data about the building collected during the energy assessment but not shown on the certificate, for instance heating system data, will be made publicly available at www.opendatacommunities.org.

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Energy Performance Certificate

Non-Domestic Building



Unit 4, Bartley Wood
Hook

Certificate Reference Number:
5117-5272-1986-0904-6528

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



Less energy efficient

Net zero CO₂ emissions

25

This is how energy efficient the building is.

Technical information

Main heating fuel:	Natural Gas
Building environment:	Heating and Natural Ventilation
Total useful floor area (m ²):	961.570
Building complexity:	Level 5
Building emission rate (kgCO ₂ /m ² per year):	20.58
Primary energy use (kWh/m ² per year):	122.42

Benchmarks

Buildings similar to this one could have ratings as follows:

- 27** If newly built
- 73** If typical of the existing stock

Administrative information

This is an Energy Performance Certificate as defined in the Energy Performance of Buildings Regulations 2012 as amended.

Assessment Software: Virtual Environment v7.0.13 using calculation engine ApacheSim v7.0.13

Property Reference:

Assessor Name: Shepherd Brombley Partnership

Assessor Number: LCEA206039

Accreditation Scheme: CIBSE Certification Limited

Assessor Qualifications: NOS5

Employer/Trading Name: Trading Name

Employer/Trading Address: Trading Address

Issue Date: 21 May 2021

Valid Until: 20 May 2031 (unless superseded by a later certificate)

Related Party Disclosure: Not related to the owner

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report: 3852-9426-6460-1080-9236

About this document and the data in it

This document has been produced following an energy assessment undertaken by a qualified Energy Assessor, accredited by CIBSE Certification Limited. You can obtain contact details of the Accreditation Scheme at www.cibsecertification.com.

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Energy Performance Certificate

Non-Domestic Building



Unit 5, Bartley Wood
Hook

Certificate Reference Number:
2446-1489-0177-3208-6346

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



Net zero CO₂ emissions



24

This is how energy efficient the building is.



Less energy efficient

Technical information

Main heating fuel:	Natural Gas
Building environment:	Heating and Natural Ventilation
Total useful floor area (m ²):	1435.700
Building complexity:	Level 5
Building emission rate (kgCO ₂ /m ² per year):	19.42
Primary energy use (kWh/m ² per year):	114.51

Benchmarks

Buildings similar to this one could have ratings as follows:

27 If newly built

71 If typical of the existing stock

Administrative information

This is an Energy Performance Certificate as defined in the Energy Performance of Buildings Regulations 2012 as amended.

Assessment Software: Virtual Environment v7.0.13 using calculation engine ApacheSim v7.0.13

Property Reference:

Assessor Name: Shepherd Brombley Partnership

Assessor Number: LCEA206039

Accreditation Scheme: CIBSE Certification Limited

Assessor Qualifications: NOS5

Employer/Trading Name: Trading Name

Employer/Trading Address: Trading Address

Issue Date: 21 May 2021

Valid Until: 20 May 2031 (unless superseded by a later certificate)

Related Party Disclosure: Not related to the owner

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report: 6926-6631-3097-8840-5642

About this document and the data in it

This document has been produced following an energy assessment undertaken by a qualified Energy Assessor, accredited by CIBSE Certification Limited. You can obtain contact details of the Accreditation Scheme at www.cibsecertification.com.

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Energy Performance Certificate

Non-Domestic Building

HM Government

Unit 6, Bartley Wood
Hook

Certificate Reference Number:
3120-1096-3844-7938-7856

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



Net zero CO₂ emissions

A 0-25

23

This is how energy efficient the building is.

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

Less energy efficient

Technical information

Main heating fuel:	Natural Gas
Building environment:	Heating and Natural Ventilation
Total useful floor area (m ²):	1244.390
Building complexity:	Level 5
Building emission rate (kgCO ₂ /m ² per year):	18.05
Primary energy use (kWh/m ² per year):	107.02

Benchmarks

Buildings similar to this one could have ratings as follows:

27 If newly built

71 If typical of the existing stock

Administrative information

This is an Energy Performance Certificate as defined in the Energy Performance of Buildings Regulations 2012 as amended.

Assessment Software: Virtual Environment v7.0.13 using calculation engine ApacheSim v7.0.13

Property Reference:

Assessor Name: Shepherd Brombley Partnership

Assessor Number: LCEA206039

Accreditation Scheme: CIBSE Certification Limited

Assessor Qualifications: NOS5

Employer/Trading Name: Trading Name

Employer/Trading Address: Trading Address

Issue Date: 21 May 2021

Valid Until: 20 May 2031 (unless superseded by a later certificate)

Related Party Disclosure: Not related to the owner

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report: 8734-5654-7803-3205-3597

About this document and the data in it

This document has been produced following an energy assessment undertaken by a qualified Energy Assessor, accredited by CIBSE Certification Limited. You can obtain contact details of the Accreditation Scheme at www.cibsecertification.com.

A copy of this certificate has been lodged on a national register as a requirement under the Energy Performance of Buildings Regulations 2012 as amended. It will be made available via the online search function at www.ndepcregister.com. The certificate (including the building address) and other data about the building collected during the energy assessment but not shown on the certificate, for instance heating system data, will be made publicly available at www.opendatacommunities.org.

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Energy Performance Certificate

Non-Domestic Building



Unit 7, Bartley Wood
Hook

Certificate Reference Number:
2862-1169-6337-9196-0009

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



Net zero CO₂ emissions

A 0-25

**22**

This is how energy efficient the building is.

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

Less energy efficient

Technical information

Main heating fuel:	Natural Gas
Building environment:	Heating and Natural Ventilation
Total useful floor area (m ²):	1317.810
Building complexity:	Level 5
Building emission rate (kgCO ₂ /m ² per year):	17.73
Primary energy use (kWh/m ² per year):	104.99

Benchmarks

Buildings similar to this one could have ratings as follows:

- 26** If newly built
- 69** If typical of the existing stock

Administrative information

This is an Energy Performance Certificate as defined in the Energy Performance of Buildings Regulations 2012 as amended.

Assessment Software: Virtual Environment v7.0.13 using calculation engine ApacheSim v7.0.13

Property Reference:

Assessor Name: Shepherd Brombley Partnership

Assessor Number: LCEA206039

Accreditation Scheme: CIBSE Certification Limited

Assessor Qualifications: NOS5

Employer/Trading Name: Trading Name

Employer/Trading Address: Trading Address

Issue Date: 21 May 2021

Valid Until: 20 May 2031 (unless superseded by a later certificate)

Related Party Disclosure: Not related to the owner

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report: 0283-4273-0237-0820-7668

About this document and the data in it

This document has been produced following an energy assessment undertaken by a qualified Energy Assessor, accredited by CIBSE Certification Limited. You can obtain contact details of the Accreditation Scheme at www.cibsecertification.com.

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Energy Performance Certificate

Non-Domestic Building



Unit 8, Bartley Wood
Hook

Certificate Reference Number:
1040-7359-9461-5960-0799

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



Net zero CO₂ emissions

23

This is how energy efficient the building is.

Less energy efficient

Technical information

Main heating fuel:	Natural Gas
Building environment:	Heating and Natural Ventilation
Total useful floor area (m ²):	1541.460
Building complexity:	Level 5
Building emission rate (kgCO ₂ /m ² per year):	18.6
Primary energy use (kWh/m ² per year):	116.02

Benchmarks

Buildings similar to this one could have ratings as follows:

- 27 If newly built
- 72 If typical of the existing stock

Administrative information

This is an Energy Performance Certificate as defined in the Energy Performance of Buildings Regulations 2012 as amended.

Assessment Software: Virtual Environment v7.0.13 using calculation engine ApacheSim v7.0.13

Property Reference:

Assessor Name: Shepherd Brombley Partnership

Assessor Number: LCEA206039

Accreditation Scheme: CIBSE Certification Limited

Assessor Qualifications: NOS5

Employer/Trading Name: Trading Name

Employer/Trading Address: Trading Address

Issue Date: 24 May 2021

Valid Until: 23 May 2031 (unless superseded by a later certificate)

Related Party Disclosure: Not related to the owner

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report: 5909-8970-0436-0240-0685

About this document and the data in it

This document has been produced following an energy assessment undertaken by a qualified Energy Assessor, accredited by CIBSE Certification Limited. You can obtain contact details of the Accreditation Scheme at www.cibsecertification.com.

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Energy Performance Certificate

Non-Domestic Building



Unit 9, Bartley Wood
Hook

Certificate Reference Number:
2395-5663-9175-3370-2633

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



Net zero CO₂ emissions

A 0-25

24

This is how energy efficient the building is.

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

Less energy efficient

Technical information

Main heating fuel:	Natural Gas
Building environment:	Heating and Natural Ventilation
Total useful floor area (m ²):	1350.440
Building complexity:	Level 5
Building emission rate (kgCO ₂ /m ² per year):	20.19
Primary energy use (kWh/m ² per year):	123.25

Benchmarks

Buildings similar to this one could have ratings as follows:

28 If newly built

74 If typical of the existing stock

Administrative information

This is an Energy Performance Certificate as defined in the Energy Performance of Buildings Regulations 2012 as amended.

Assessment Software: Virtual Environment v7.0.13 using calculation engine ApacheSim v7.0.13

Property Reference:

Assessor Name: Shepherd Brombley Partnership

Assessor Number: LCEA206039

Accreditation Scheme: CIBSE Certification Limited

Assessor Qualifications: NOS5

Employer/Trading Name: Trading Name

Employer/Trading Address: Trading Address

Issue Date: 21 May 2021

Valid Until: 20 May 2031 (unless superseded by a later certificate)

Related Party Disclosure: Not related to the owner

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report: 8036-0055-0333-2955-9908

About this document and the data in it

This document has been produced following an energy assessment undertaken by a qualified Energy Assessor, accredited by CIBSE Certification Limited. You can obtain contact details of the Accreditation Scheme at www.cibsecertification.com.

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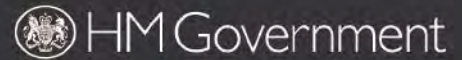
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Energy Performance Certificate

Non-Domestic Building



Retail Foodstore, Bartley Wood
Hook

Certificate Reference Number:

8044-1235-3848-5025-9437

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



Net zero CO₂ emissions



This is how energy efficient the building is.



Less energy efficient

Technical information

Main heating fuel:	Grid Supplied Electricity
Building environment:	Heating and Mechanical Ventilation
Total useful floor area (m ²):	1883.220
Building complexity:	Level 5
Building emission rate (kgCO ₂ /m ² per year):	19.42
Primary energy use (kWh/m ² per year):	114.85

Benchmarks

Buildings similar to this one could have ratings as follows:

29 If newly built

78 If typical of the existing stock

Administrative information

This is an Energy Performance Certificate as defined in the Energy Performance of Buildings Regulations 2012 as amended.

Assessment Software: Virtual Environment v7.0.13 using calculation engine ApacheSim v7.0.13

Property Reference:

Assessor Name: Shepherd Brombley Partnership Ltd

Assessor Number: LCEA206039

Accreditation Scheme: CIBSE Certification Limited

Assessor Qualifications: NOS5

Employer/Trading Name:

Employer/Trading Address:

Issue Date: 26 May 2021

Valid Until: 25 May 2031 (unless superseded by a later certificate)

Related Party Disclosure: Not related to the owner

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report: 9237-5414-7069-5823-8008

About this document and the data in it

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