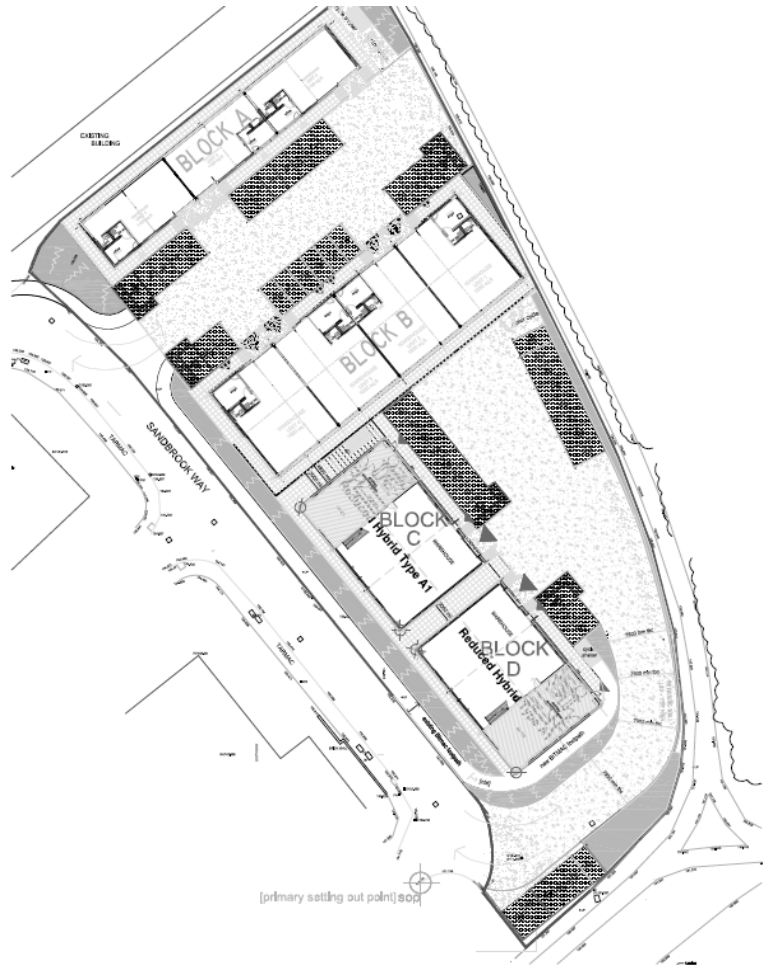


**Energy & Sustainability Report for the
Proposed Industrial Development,
Sandbrook Park,
Rochdale**



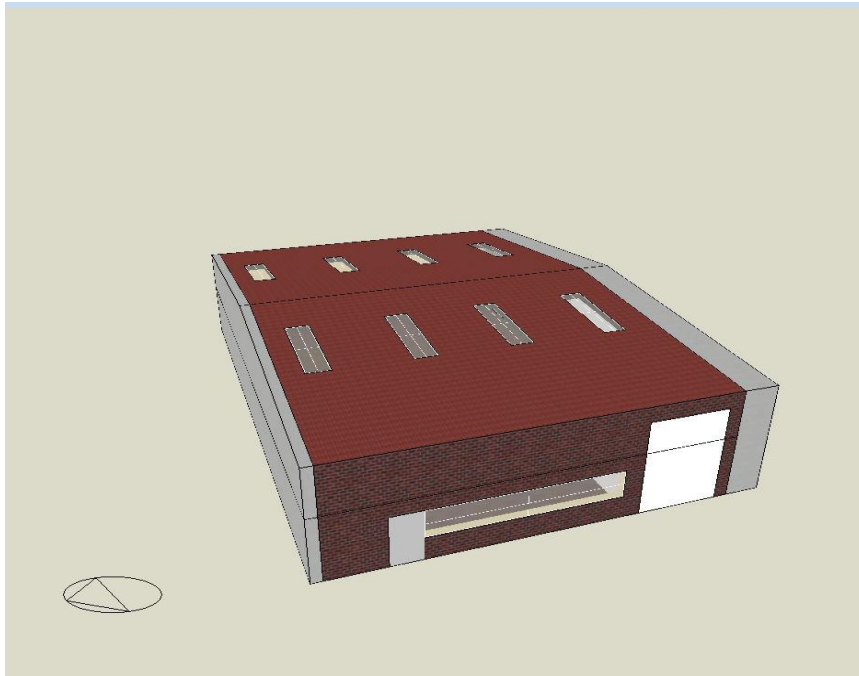
ENERGY RATING SERVICES

REPORT ISSUE STATUS

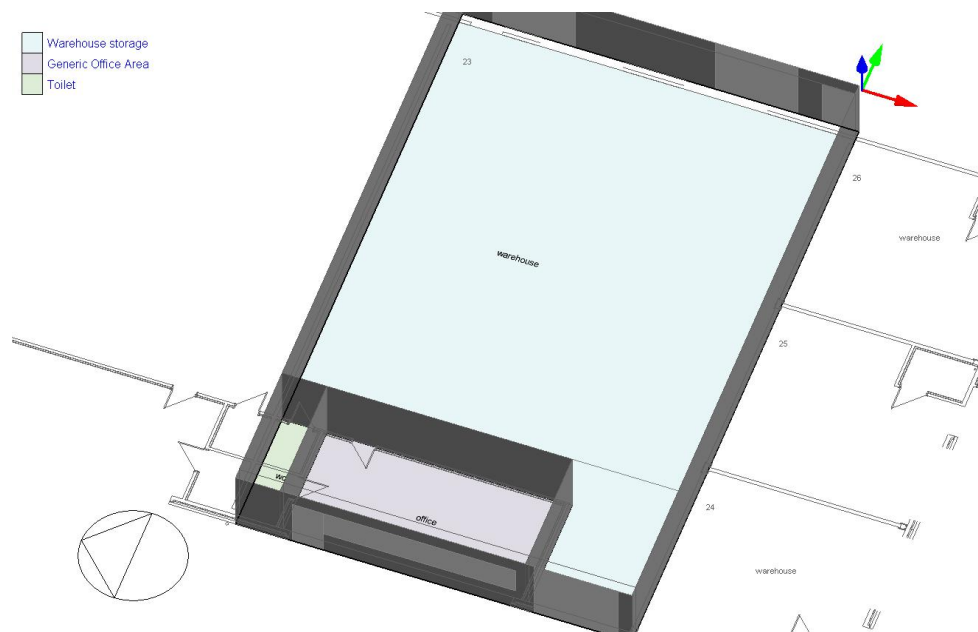
FINAL

May 2024

Indicative Unit Layout



Indicative Floor Plan



CONTENTS

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2.0 INTRODUCTION

- 2.1 Planning policy
- 2.2 Methodology
- 2.3 Energy Assessment

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4.0 PART L BRUKL DOCUMENTS (APPENDIX A)

1.0 EXECUTIVE SUMMARY

Northern Trust Company Limited are proposing the development of new Office (Class B&C) and General Industrial (Class B2& B8) development at Phase 2 of Sandbrook Business Park, Rochdale. There is a planning expectation that an energy assessment will be prepared detailing the impacts of the development in terms of energy consumption, and proposals for reduction by improving the energy efficiency of the development via Low and Zero Carbon technologies.

A key aim in this proposed site is the creation of a sustainable development. The intention is to establish an employment and urban environment of the highest quality with minimal impact on the environment and surrounding community. Detailed below are the key areas we consider essential in the provision of a sustainable development.

BREEAM, (Building Research Establishment Environmental Assessment Method), is now widely accepted as representing best practice in minimising the effects of developments on the environment and economic cost, whilst maximising utility. Throughout the design process we will be using the guidance provided by BREEAM as a benchmark and reference document for consideration throughout.

This is beneficial to the site as it will achieve a level of 'sustainability' and by doing so will take into account the effect upon the environment, society and long term economy.

A development of this nature makes a statement to the outside world regarding the importance of the consideration of 'Sustainability'. It may be used to attract companies that wish to advertise their 'green' credentials, and in this way add a premium to rental income, along with savings on expenditure on heating, lighting and water.

The direct environmental impact of the development will be mitigated where possible through sensitive site management and waste recycling. The local environment will be improved; the scheme will follow a planting schedule which will increase the ecological value of the site.

Recycled aggregates will be used to reduce the need for quarrying, and recycling will be encouraged with the provision of recyclable waste storage.

The offices areas will be designed for optimum occupant comfort and safety. They will benefit from high levels of natural daylight, and all offices will have good views out. Thermal comfort has been a priority and calculations have been undertaken to ensure that the occupied areas do not suffer from excessive solar gain.

Heating and lighting layout and controls will be designed to offer maximum flexibility for differing requirements. Lighting levels will be designed in accordance with CIBSE 'Best Practice' guidance, and the building will be entirely naturally ventilated. The benefits of these measures are twofold; higher occupant comfort and productivity and reduced running costs. Confirmation that the proposed buildings achieve the criteria laid down by Building Regulations Part L2 are attached to this report. All new structures have been assessed using the SBEM (Simplified Building Energy Model) interface software to confirm that they will conform.

With regard to running costs this development will be designed to be extremely efficient energy wise; not only will the development be designed to meet the Part L2 standards for the conservation of fuel and power but will exceeded them. This improvement may be measured in smaller energy bills for the end user.

We have augmented this report with thermal models which indicate the annual and monthly energy requirements for each building type, along with evidence to prove that the carbon emissions meet and better the requirements of Part L2.

The twofold drive for smaller bills and a smaller environmental impact will be reflected in the design of water fittings. These will incorporate low flush toilets, spray or aerated flow taps and automatic shut-off to the toilet blocks when they are unoccupied.

Taking account of the increasing drive for us all to use more public transport and reduced dependency on the use of the private car, cycling will be encouraged with the possibility for covered cycle parking.

By striving to achieve the criteria set out previously demonstrates a strong commitment to the environment, and the community both in the global and local sense, and ensures the provision of a premium space designed to be efficient and comfortable beyond that of the standard development. The table below demonstrates the predicted CO₂ emissions for the proposed development.

The energy hierarchy of incorporating passive energy design measures, energy efficiency and Low Carbon energy technologies will form part of the design of the building in order to maximise opportunities for reducing the energy demands and CO₂ emissions related to the development.

The site's resources and the building's heat and power loads were assessed to establish which technologies might be suitable for integration into the building:

1. Air Source Heat Pump Heating plant will be considered for use on the site as a viable L2C technology specifically serving offices.
2. LED light fittings with intelligent controls will be considered for inclusion to reduce the base energy loads.
3. Energy metering and sub metering will be included as described within Approved Document Part L2.
4. Building air tightness will be improved over the requirement of Approved Document Part L2a of 10m³/hr/m² @ 50Pa to 5m³/hr/m².

By striving to achieve the criteria set out previously demonstrates a strong commitment to the environment, and the community both in the global and local sense, and ensures the provision of a premium space designed to be efficient and comfortable beyond that of the standard development.

2.0 INTRODUCTION

This sustainability and energy statement summarises the measures proposed to reduce the energy demand and CO₂ emissions from the new Sandbrook Park Development, Rochdale and sets out how the policies on energy and CO₂ new development have been addressed.

The report provides information relating to:

- The sustainability measures that have been incorporated into the design of the building in order ensure a sustainable and environmentally development;
- The energy efficiency measures that have been incorporated into the design of the building in order to reduce the energy consumption of the site; and
- The low carbon technologies that will be installed

2.1 Planning Policy

Rochdale Metropolitan Borough Council is following the policies to ensure that developments in the region are in line with its overall energy and sustainability requirements and are summarised as follows –

Local Development Framework

“New developments will be expected to:

Adhere to the 'energy hierarchy' as outlined in policy G2, being designed in such a way that ensures that buildings require the minimum amount of energy to function over their lifetime;

Reduce CO₂ emissions through the use of renewable and low carbon decentralised energy technologies and networks. This will be through both on-site provision in new developments and through connection to local networks, taking into account the processes and target framework outlined in policy G2”

2.2 Methodology (Renewable and LZC Energy)

The methodology used to complete the energy assessment for the scheme has been based upon the benchmark and improvement factors as detailed in Building Regulations Part L2a using approved SBEM (simplified building energy model) software with Designbuilder / EnergyPlus interface.

- 2.2.1 A proposed building model has been completed which details Part L compliance.
 - 2.2.2 Model all Energy and CO₂ saving impact using SBEM (Simplified Building Energy Modelling Software) with output documents detailed. Refer to Table 1a & 1b.
 - 2.2.3 Assess feasibility of all available renewable energy technologies for site suitability with relevant comments within Section 3.
-

TABLE 1a

	CO2 Emissions Summary Kg/Co2/m2/annum		
	Notional Building	Actual Building	
Block A Unit 1	3.07	2.97	
Block A Unit 2	3.07	2.97	
Block A Unit 3	3.07	2.97	
Block B Unit 1	2.64	2.52	
Block B Unit 2	2.64	2.52	
Block B Unit 3	2.64	2.52	
Block B Unit 4	2.64	2.52	
Block C Unit A1	3.6	3.54	
Block D Unit A1	3.6	3.54	

TABLE 1b

	Energy Consumption by end-use Summary Kw/hrs/m2/annum		
	Notional Building	Actual Building	
Block A Unit 1	32.17	32.05	
Block A Unit 2	32.17	32.05	
Block A Unit 3	32.17	32.05	
Block B Unit 1	27.86	27.25	
Block B Unit 2	27.86	27.25	
Block B Unit 3	27.86	27.25	
Block B Unit 4	27.86	27.25	
Block C Unit A1	37.93	37.85	
Block D Unit A1	37.93	37.85	

2.3 Energy Assessment

The following LZC technologies have been considered for use in the Proposed Industrial Development at Sandbrook Park, Rochdale.

1. Air Source Heat Pump (ASHP) Heating plant.
2. LED Lighting and Controls Installation
3. Improved Fabric and glazing U-values
4. Improved air permeability testing
5. Low Carbon ventilation extract fans

3.0 SUSTAINABILITY TECHNOLOGIES

The following report outlines the proposed sustainable technologies that are considered most suitable for incorporation within the proposed scheme and shall be further explored during design development in conjunction with the Architectural team.

This report has been produced in order to identify the early thoughts on the sustainable design options that can be brought into the scheme to benefit the project. The design options are preliminary at this stage and shall be formalised as the design process continues. However, early consideration of the options available at a very early stage of the project, before the building shape, form and orientation have been finalised is crucial to ensure that the maximum efficiency is achieved from the installed systems.

The report seeks to identify the possible technologies that could be used for sustainability within the development. All relevant sources are mentioned and commented upon.

Where items are considered viable then the text under each heading is appropriately worded.

LOW ENERGY LIGHTING & LIGHTING CONTROLS

The use of artificial lighting rarely threatens visual comfort; there is no comfort incentive to turn lights off. The result is that light switching performance is very poor especially in non-domestic buildings. This can be exacerbated by light switches not being easily accessible, or luminaires being wired in large groups not corresponding to daylight distribution or patterns of occupancy. Automatic systems which detect daylight illuminance levels can replace the need for manual switching. Studies have shown that annual lighting energy is typically reduced by 30-40%. However fully automatic lighting control systems can cause annoyance to the occupants.

To reduce energy consumption artificial lighting can be designed with the following approach:

- Light fittings are zoned in small groups that corresponded to daylight distribution and patterns of occupancy.
 - Task lighting should be provided where high levels of luminance are required locally. This may allow background lighting to be reduced.
 - Lights that are manually switched should be easily located.
 - Lights may be switched through a daylight controls system. The luminance is monitored and lights are dimmed or switched off by a photocell. Dimming controls save more energy than on/off controls.
-

-
- Lights may be switched on/off by a PIR or other occupancy detection device. This method of control will switch the lights off after a period of time has elapsed during which no movement is sensed. The time delay is set to suit the activities undertaken in the space.

Lighting installations will need to comply with L2 requirements and will use LED lamp sources and appropriate control gear.

NATURAL DAYLIGHTING

Buildings designed to maximise use of daylighting will decrease the need for artificial lighting.

One of the most significant energy-saving measures in buildings is the innovative use of daylight to provide artificial lighting needs. Daylighting design should ensure that distribution is relatively even from window to interior. Dark patches need to be avoided for occupants to feel comfortable with the lights turned off.

The penetration of daylight is dependant upon the ratio of room height to depth. If a building is greater than 12m deep, the inner central zone will need to be permanently artificially lit. Furthermore the intermediate zone between 3m and 6m will be day lit for fewer hours than the outer zone. A double height space will allow useful penetration of daylight up to 12m assuming that the window height is close to that of the wall. Energy savings are possible from generous floor to ceiling lights.

The energy balance of the glazed envelope leads to a shallow optimum for glazing ratios from 25% upwards according to the glazing type and orientation. Glazing ratios in excess of 50% will increase the risk of overheating and should be avoided.

For this scheme full LED lighting control with passive and daylight switching will be considered.

HEATING DESIGN / AIR SOURCE HEAT PUMPS

Air source heat pumps are more efficient than oil, gas, and electric resistance heating in mild climates but they are less efficient than ground source heat pumps because a ground source heat pump draws energy from the ground which is warmer than the external air in winter. However, air source heat pumps are cheaper to install than ground source heat pumps as they avoid the cost of installing a ground loop. An air source heat pump is a type of heat pump which uses the outside air as a heat source or heat sink to heat or cool an interior space. Domestic hot water storage can also be provided.

A heat pump uses the refrigeration process and transfers low temperature energy to a refrigeration loop, compresses the refrigerant to a high temperature, and transfers this heat to the hot water and heating distribution system, or, in the summer, removes it from the home. A heat pump transfers energy in the form of heat from a cooler location to a warmer location. Systems normally range from a single 4kW unit to multiple units with a single controller producing around 300kW.

Advantages

- Reduced Carbon Emissions.
- Lower Heating Costs.
- Utilises approximately 25% - 35% of the electricity of a standard electrically heating system for the same amount of heating, reducing utility bills.
- This typical efficiency compares to 70-95% for a fossil fuel powered gas boiler.
- Few moving parts, reducing maintenance requirements.
- As an electric system, no flammable or potentially asphyxiating fuel is used at the point of heating, reducing the potential danger to users, and removing the need to obtain gas or fuel supplies (except for electricity).
- May be used to heat air, or water.
- The same system may be used as a cooler in summer, as well as a heater in winter.
- Can be utilised in conjunction with Underfloor Heating Installations, Solar Panel Technology and other Eco Friendly Heating & Hot water systems.

In the outdoor unit the refrigerant meets the outdoor air in the evaporator (heat exchanger). The air is drawn through the evaporator by a fan located on side of the Air Source Heat Pump. The refrigerant, which is in a liquid state absorbs free energy from the air and evaporates in this process. A sensor in the expansion valve ensures that the liquid refrigerant collects the correct amount of the 'free energy' before the refrigerant (now in a gas state) is led into the compressor. The compressor increases the pressure of the refrigerant. The temperature of the vapour reaches approximately 100°C. The warm gas is then led into the condenser. The condenser is the heat pump's heat emitting part. In the condenser, which is a fully brazed heat exchanger in stainless steel, the refrigerant (gas state) meets the water from the heating system (radiators and/or floor coils). When the warm gas is cooled by the circulating heating water, it condenses into a liquid state.

Energy is emitted in this process to the heating system or the hot water. After the condenser, the refrigerant, which is now in liquid form, continues through a drying filter. The drying filter is used to collect any moisture in the system. After the filter it continues on to an expansion valve. The refrigerant pressure is lowered in the expansion valve. This also causes the temperature to drop. When the refrigerant has left the valve and passes the evaporator it changes to vapour again. This completes the refrigerant circuit. The expansion valve is equipped with a sensor (bulb) just before the compressor. The sensor controls the amount of fluid entering the evaporator.

Applications

Air source heat pumps do not incur any ground works cost for the installation and laying of pipe. The cost of ground works can be significant for ground source heat pumps. Air Source Heat Pumps provide a low cost solution for space heating and hot water. Return on investment against oil and LPG heating systems can take as little as five years. Air Source Heat Pumps are also suitable for hot water and comfort cooling for both domestic and commercial use.

- Residential Dwellings
 - Multi-Apartment Dwellings
 - Multi-Story Dwellings & Apartments
 - Office Space
 - Health facilities
 - Commercial
 - Public Sector Buildings
 - Warehouse Space
-

-
- Swimming Pools
 - Leisure Centres
 - Indoor Arenas

Air source heat pumps also provide hot water from a pressurised system up to temperatures of 55°C which is suitable for domestic and business requirements. It may be appropriate to couple traditional heating technology to an air source heat pump to boost temperatures above 55°C. The fan intake system (outdoor air handling unit) is fixed to the outside of a building and requires no annual maintenance.

Air source heat pumps take energy from the air and raise it to a higher temperature, using a process which is similar to a reverse refrigeration process. For commercial and large spaces a row or bank of air source heat pumps (air handling units) will be required along with internal heat pump and pressured hot water tank for water supply. This system which uses no external pipes and most of the working elements reside within the building. The air handling unit draws air across the water-anti freeze solution and transfers this energy into the refrigerant. The refrigerant boils and the gases from this are compressed to produce temperatures in excess of 100°C. This part of the process mirrors a ground source heat pump. Air source heat pumps can be used where land space is restricted. Air sourced heat pumps can be used for room heating using the same distribution system as a ground source heat pump or a traditional system.

Air source heat pumps have no major parts outside exposed to the elements, the organ's compressor and circulation pumps are all internal. The intake fan is the only feature which is external and kept at optimum working temperature with the support of an internal defrost cycle system ensuring operation in all seasons. The internal defrost system uses the hot water collected by the air source heat pump as opposed to direct electric. Air source heat pumps should last for over 20 years with low maintenance requirements.

Air to air heat pumps Split and multi-split including variable refrigerant flow life cycle costs / emissions.

Split and multi-split heat pumps are products in which the refrigeration system is an assembly of two or more factory-made components to form a discrete, matched functional unit. This means that the indoor space occupied by the heat pump is minimised.

They may be single-split type – one outdoor unit connected to one indoor unit,

or multi split units – where an outdoor unit is connected to two or more indoor units. The outdoor and indoor units are connected by refrigerant piping.

VRF units are multisplit products where the output can be varied to match the load by varying the flow of refrigerant. VRF units typically may have 20 or more indoor units. The majority of air source heat pump products are single-split units (reversible single-split air conditioners).

Products sold in the UK have a wide range of efficiencies, ranging from 220% to over 500%, or COP of 2.2 to over 5.

ECA-specified energy saving split or multi-split products must have a COP that exceeds a set minimum value. There is also a required minimum cooling efficiency or Energy Efficiency Ratio (EER)⁷. Fuel savings from an ETL air source heat pump compared to a typical non-specified product are around 15% to 20%.

Using an ETL-listed air source heat pump to provide space heating instead of a gas boiler can reduce carbon emissions by about 45%. For a VRF product the potential savings are greater although percentage savings are similar.

Below are examples of predicted running costs for various sized installations based on a 25 year life expectancy.

- a) By providing space heating from an ETL air source single-split heat pump (heating capacity 7kW) with an annual running cost of £175, rather than a gas boiler with an annual running cost of £220, the potential annual savings are calculated as:

• £45	x 25 year	£1,125.00
• 6,410kWh	x 25 year	160,250kw/hr
• 0.7 tonnes CO2.	x 25 year	17.5 tonnes CO2

- b) By installing an ETL air source single-split heat pump (heating capacity 7kW, cooling capacity 6kW) at a capital cost of £3,300 and an annual running cost of £260, rather than a non-specified product with a capital cost of £3,100 and an annual running cost of £325, the potential annual savings are calculated as:

• £65	x 25 year	£1,625.00
• 780kWh	x 25 year	19,500kw/hr
• 0.3 tonnes CO2	x 25 year	7.5 tonnes CO2

- c) By installing an ETL-listed air source VRF heat pump (heating capacity 40kW, cooling capacity 35kW) at a capital cost of £36,500 and an annual running cost of £1,450, rather than a non-specified product with a capital cost of £33,500 and an annual running cost of £1,815, the potential annual savings are calculated as:

• £365	x 25 year	£9,125.00
• 4,210kWh	x 25 year	105,250 kw/hr
• 1.8 tonnes CO2.	x 25 year	45 tonnes CO2

- d) By providing space heating from an ETL-listed VRF heat pump (heating capacity 40kW) with an annual running cost of £965, rather than a gas boiler with an annual running cost of £1,105, the potential annual savings are calculated as:

• £1,250	x 25 year	£31,250.00
• 36,925 kWh	x 25 year	923,125 kw/hr
• 4.4 tonnes CO2.	x 25 year	110 tonnes CO2

7 The EER is the cooling output of the heat pump in kW divided by the effective power input in kW at a specified operating condition.

8 Assuming the ETL heat pump has COP 3.8 and EER 3.5 and the non listed product has COP 3.0 and EER 2.8.

9 Assuming the ETL heat pump has COP 3.8 and the gas boiler has an efficiency of 90%.

10 Assuming the ETL heat pump has COP 3.9 and EER 3.6 and the non-listed product has COP 3.1 and EER 2.9.

ASHP will be considered for use in all units with office areas.

BUILDING MANAGEMENT SYSTEM & ENERGY METERING

Effective controls are essential to obtain the best possible performance from low energy design features. Personal preferences for degrees of comfort can vary and studies have shown that there is an important psychological element to comfort. A high degree of personal control over the immediate environment may lessen sensitivity to occasional overheating in summer. Manual controls should be user friendly and easily accessible and simple to operate.

The use of intelligent controls can play an important role to ensure that all the plant and equipment operates at maximum efficiency. Control systems can provide logging and alarm functions to indicate quickly to the building operator if there are problems with equipment that may lead to lesser efficiencies.

Appropriate set-point temperatures should be allowed to provide comfort conditions within the building zones with local personal set point adjustment controls. The controls shall allow the building to be zoned to suit different usage patterns whether that be time or type of activity. The controls should also be zoned to take account of building orientation and the potential for solar gains.

Intelligent optimum start controls to adjust warm up period for intermittently occupied spaces allow the space to be up to temperature at the time of occupation whilst providing energy saving. The intelligent controls are capable of self learning from patterns of previous use.

The use of energy metering throughout the building and logging can allow energy managers to review the use of energy, heat, electricity and water for zones where usage is above the mean pattern. Building occupants can be schooled on methods of reducing energy and water usage.

Metering will be installed to suit the requirements of L2.

WATER EFFICIENCY

The UK depends on a reliable supply of clean water. Water supply infrastructure is expensive and requires long lead times. The UK cannot simply rely on drawing more water from existing sources to underpin its growth. Attention needs to be paid to reducing water demand and reducing losses through leakage.

Water is a valuable and unpredictable source. Metering of water is expanding and Utility Bills are ever increasing due to the increasing cost of cleaning the water to human consumption standards and waste management.

The design and specification of products for the development shall include water saving methods to aid the reduction of water consumption. Methods implemented to reduce the water consumption may include:

- 1. Water leak detection systems to monitor wasteful consumption caused by leaks can be avoided.**
 - 2. Reduced toilet cistern sizes and the use of dual flush.**
 - 3. Installation of water efficient taps.**
 - 4. Installation of sub-metering to monitor water consumption.**
-

Appendix A

Sample Part L BRUKL Output Documents

Project name

Hybrid A1

As designed

Date: Fri May 10 13:29:33 2024

Administrative information

Building Details

Address: Sandbrook Way, ROCHDALE, OL11 1LQ

Certifier details

Name: James McSorley

Telephone number: 07812 345153

Address: , ,

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.2.0

BRUKL compliance module version: v6.1.e.1

Foundation area [m²]: 43.33The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	3.6
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	3.54
Target primary energy rate (TPER), kWh _{pe} /m ² annum	37.93
Building primary energy rate (BPER), kWh _{pe} /m ² annum	37.85
Do the building's emission and primary energy rates exceed the targets?	BER ≤ TER BPER ≤ TPER

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

Fabric element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	First surface with maximum value
Walls*	0.26	0.25	0.25	Block 1 - wc_W_10
Floors	0.18	0.18	0.22	Block 1 - wc_C_4
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.16	0.16	Block 2 - office_R_3
Windows** and roof windows	1.6	1.53	1.8	Block 1 - reception_G_13
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	-	-	No external personnel doors
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

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

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

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

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

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

Air permeability	Limiting standard	This building
m ³ /(h.m ²) at 50 Pa	8	5

Building services

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

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

1- elec panel

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

2- elec

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.35	5	-	-	-
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

1- Project DHW

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

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
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 balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

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	2.3	2	0.5	0.5	0.4	1			
Block 1 - wc	0.2	-	-	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value		95	80	0.3
Block 1 - warehouse 1		251	-	-
Block 2 - stair circ		495	-	-
Block 1 - wc		354	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
	Standard value	95	80	0.3
Block 1 - office		237	-	-
Block 1 - reception		268	-	-
Block 2 - office		252	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Block 1 - warehouse 1	NO (-48.6%)	NO
Block 1 - office	NO (-51.6%)	YES
Block 1 - reception	NO (-27.8%)	YES
Block 2 - office	NO (-48.4%)	YES

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	313.8	313.8
External area [m ²]	1425.3	1425.3
Weather	MAN	MAN
Infiltration [m ³ /hm ² @ 50Pa]	5	4
Average conductance [W/K]	409.21	447.19
Average U-value [W/m ² K]	0.29	0.31
Alpha value* [%]	17.32	39.03

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

Building Use

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	9.31	9.73
Cooling	1.46	1.9
Auxiliary	0.11	0.21
Lighting	10.14	14.16
Hot water	3.74	3.74
Equipment*	34.52	34.52
TOTAL**	24.75	29.74

* 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	4.41
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>4.41</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	318.06	374.99
Primary energy [kWh _{PE} /m ²]	37.85	37.93
Total emissions [kg/m ²]	3.54	3.6

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] No Heating or Cooling									
Actual	305.2	20	0	0	0	0	0	0	0
Notional	406.7	27.5	0	0	0	0	0	----	----
[ST] Other local room heater - unfanned, [HS] Room heater, [HFT] Electricity, [CFT] Natural Gas									
Actual	487.3	0	169.2	0	7.8	0.8	0	1	0
Notional	239.8	85.6	49.7	0	15.6	1.34	0	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	255.3	46.6	17.5	3.6	0	4.05	3.55	4.35	5
Notional	214.9	75.2	22.6	4.8	0	2.64	4.4	----	----

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

Project name

Block A Unit

As designed

Date: Fri May 10 14:20:07 2024

Administrative information

Building Details

Address: Sandbrook Park, ROCHDALE,

Certifier details

Name: James McSorley

Telephone number: 07812 345153

Address: , ,

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.2.0

BRUKL compliance module version: v6.1.e.1

Foundation area [m²]: 8.87The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	3.07
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	2.97
Target primary energy rate (TPER), kWh _{pe} /m ² annum	32.17
Building primary energy rate (BPER), kWh _{pe} /m ² annum	32.05
Do the building's emission and primary energy rates exceed the targets?	BER ≤ TER BPER ≤ TPER

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

Fabric element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	First surface with maximum value
Walls*	0.26	0.25	0.25	Block 5 - wc_1_W_6
Floors	0.18	0.18	0.18	Block 5 - wc_1_S_3
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	-	-	No heat loss flat roofs
Windows** and roof windows	1.6	1.4	1.4	Block 5 - office_G_11
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	-	-	No external personnel doors
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

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

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

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

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

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

Air permeability	Limiting standard	This building
m ³ /(h.m ²) at 50 Pa	8	5

Building services

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

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

1- elec

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.5	5	-	-	-
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

1- Project DHW

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

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
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 balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter
NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.	

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	2.3	2	0.5	0.5	0.4	1			
Block 5 - wc 1	0.2	-	-	-	-	-	-	-	-	-	-	N/A
Block 5 - wc	0.2	-	-	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value		95	80	0.3
Block 5 - warehouse		233	-	-
Block 5 - wc 1		760	-	-
Block 5 - wc		559	-	-
Block 5 - office		359	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Block 5 - warehouse	NO (-22.5%)	NO
Block 5 - wc 1	N/A	N/A
Block 5 - wc	N/A	N/A
Block 5 - office	NO (-23%)	YES

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	102.5	102.5
External area [m ²]	439.2	439.2
Weather	MAN	MAN
Infiltration [m ³ /hm ² @ 50Pa]	5	5
Average conductance [W/K]	129.01	151.74
Average U-value [W/m ² K]	0.29	0.35
Alpha value* [%]	24.21	53.77

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

Building Use

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	4.45	4.42
Cooling	0.34	0.73
Auxiliary	0.34	0.68
Lighting	12.24	15.6
Hot water	3.69	3.69
Equipment*	31.24	31.24
TOTAL**	21.06	25.12

* 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	3.68
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>3.68</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	303	487.8
Primary energy [kWh _{PE} /m ²]	32.05	32.17
Total emissions [kg/m ²]	2.97	3.07

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] No Heating or Cooling									
Actual	296.8	15.9	0	0	0	0	0	0	0
Notional	527.8	58.7	0	0	0	0	0	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	258.8	16.7	17.1	1.3	1.3	4.19	3.55	4.5	5
Notional	161.8	44.7	17	2.8	2.6	2.64	4.4	----	----

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

Project name

Block B Unit

As designed

Date: Fri May 10 14:33:54 2024

Administrative information

Building Details

Address: Sandbrook Way, ROCHDALE, OL11 1LQ

Certifier details

Name: James McSorley

Telephone number: 07812 345153

Address: , ,

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.2.0

BRUKL compliance module version: v6.1.e.1

Foundation area [m²]: 5.23The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	2.64
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	2.52
Target primary energy rate (TPER), kWh _{pe} /m ² annum	27.86
Building primary energy rate (BPER), kWh _{pe} /m ² annum	27.25
Do the building's emission and primary energy rates exceed the targets?	BER ≤ TER BPER ≤ TPER

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

Fabric element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	First surface with maximum value
Walls*	0.26	0.25	0.25	Block 1 - office_P_5
Floors	0.18	0.18	0.18	Block 1 - office_S_3
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	-	-	No heat loss flat roofs
Windows** and roof windows	1.6	1.4	1.4	Block 1 - office_G_9
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	-	-	No external personnel doors
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

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

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

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

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

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

Air permeability	Limiting standard	This building
m ³ /(h.m ²) at 50 Pa	8	5

Building services

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

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

1- elec

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.5	5	-	-	-
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

1- Project DHW

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

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
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 balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter
NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.	

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	2.3	2	0.5	0.5	0.4	1			
Block 1 - wc	0.2	-	-	-	-	-	-	-	-		-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
Standard value	95	80	0.3
Block 1 - warehouse 1	242	-	-
Block 1 - office	384	-	-
Block 1 - wc	705	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Block 1 - warehouse 1	NO (-53.7%)	NO
Block 1 - office	NO (-28.8%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Block 1 - wc	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	153.1	153.1
External area [m ²]	477.8	477.8
Weather	MAN	MAN
Infiltration [m ³ /hm ² @ 50Pa]	5	5
Average conductance [W/K]	130.32	165.66
Average U-value [W/m ² K]	0.27	0.35
Alpha value* [%]	75.62	43.35

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

Building Use

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	2.44	2.04
Cooling	0.15	0.36
Auxiliary	0.1	0.2
Lighting	11.2	13.75
Hot water	4.05	4.05
Equipment*	30.63	30.63
TOTAL**	17.94	20.4

* 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	1.79
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>1.79</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	287.86	331.18
Primary energy [kWh _{PE} /m ²]	27.25	27.86
Total emissions [kg/m ²]	2.52	2.64

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] No Heating or Cooling									
Actual	268.7	8.8	0	0	0	0	0	0	0
Notional	282.1	59	0	0	0	0	0	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	359.5	19.1	23.8	1.5	1	4.19	3.55	4.5	5
Notional	189.2	55.2	19.9	3.5	2	2.64	4.4	----	----

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