Final Sustainability and Energy Statement

Gym Building, Reading Link Retail Park, Reading

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Appendix 1 – BRUKL Output Document

1.0 Executive Summary

This Final Sustainability and Energy Statement has been prepared in response to Condition 7 imposed on the planning consent (231077) for the erection of a 1,780 sq m unit for use as a gym with mezzanine level at Reading Link Retail Park, Rose Kiln Lane, Reading.

Condition 7 says;

Prior to first occupation of the development hereby approved, a copy of the final sustainability assessment as required by condition 6 has been submitted to and approved in writing by the Local Planning Authority, demonstrating that the development has attained the standard set out in the Interim BREEAM Certificate or alternative standard as approved under condition 6.

A Sustainability and Energy Statement, dated 3rd October 2024 was submitted and approved in response to Condition 6. That Statement was based on the construction specification and measures being implemented on site at that time.

This Final Sustainability and Energy confirms that the standards set out in the earlier Statement have been achieved.

It is not proposed to seek compliance with BREEAM but this Statement demonstrates how the proposal meets the requirements of Policy CC2.

Policy CC2: Sustainable Design and Construction says;

Proposals for new development, including the construction of new buildings and the redevelopment and refurbishment of existing building stock, will be acceptable where the design of buildings and site layouts use energy, water, minerals, materials and other natural resources appropriately, efficiently and with care and take account of the effects of climate change.

The site is located in a sustainable location close to existing facilities and infrastructure and will provide a facility to meet local need.

Throughout the design process, the applicant and design team members have given careful consideration to the sustainability issues relating to the site, and how these can be enhanced in a marketable and feasible manner. As a result, this Statement demonstrates that the development meets relevant sustainability criteria and in a number of areas exceeds them.

The carbon emissions have been estimated by using a detailed BRUKL calculation, which has been prepared for the proposal.

An air source heat pump has been installed into the building, which provides all space heating and hot water. Comfort cooling is not proposed.

The application has been supported by various other specialist reports and this Statement uses the detail within those reports to inform the Sustainability and Energy Statement.

The key sustainability findings can be summarised as;

- Reduction in carbon dioxide emissions compared to the maximum permissible by the Building Regulations (Part L – 2013 – the version applicable to the development) through energy efficiency measures;
- A total reduction in (TER) carbon dioxide emissions of **31%** from energy efficiency and energy efficient mechanical and electrical services including the installation of an air source heat pump;
- High standards of environmental construction with compliance to the Considerate Constructors Scheme, a Site Waste Management Plan and other construction management principles.

2.0 Introduction

2.1 Context

2.1.1 Bluesky Unlimited has been commissioned by Sorbon Estates to prepare a Final Sustainability and Energy Statement in response to Condition 7 imposed on the planning consent (231077) for the erection of a 1,780 sq m unit for use as a gym with mezzanine level at Reading Link Retail Park, Rose Kiln Lane, Reading.

Condition 7 says;

Prior to first occupation of the development hereby approved, a copy of the final sustainability assessment as required by condition 6 has been submitted to and approved in writing by the Local Planning Authority, demonstrating that the development has attained the standard set out in the Interim BREEAM Certificate or alternative standard as approved under condition 6.

2.1.2 This Final Statement has been prepared to demonstrate how the development has met the requirements of Policy CC2.

2.2 Preamble

2.2.1 Costs for sustainable initiatives and strategies are reducing through improvements in technology, design techniques and construction methods. Utility prices continue to rise and individuals and organisations are starting to value the more intangible benefits associated with 'sustainability'. A greater awareness is becoming apparent about the need for sustainable environments and building owners and occupiers are starting to demand these. A large part of designing sustainably is to do with addressing global warming through energy efficient design and using tools such as life-cycle assessments to maintain the balance between longevity and cost.

2.2.2 Sustainable development is a core principle throughout the proposed development.

3.0 Assessment Methodology and Targets

3.1 Methodology

3.1.1 The methodology involves completing a detailed policy review of current and emerging national and local policy relating to sustainability to provide a specific policy context for the assessment.

3.1.2 Furthermore a review of good practice methods and techniques relating to sustainability has been made.

3.1.3 The key aspects of sustainability are addressed under the following headings and these form the structure of this assessment.

- Climate change
- Place making
- Transport
- Ecology
- Resources
- Business
- Buildings

3.1.4 The set of targets the site will achieve is set out in section 3.2 below. The subsequent sections propose strategies for meeting the targets and for the development to become an example of good practice, which delivers a sustainable building by addressing social, economic and environmental drivers.

3.1.5 The energy strategy uses a BRUKL calculation in order to estimate the total site emissions and has allowed different specifications and technologies to be tested.

Emission Factors

3.1.6 The CO_2 emission factors, where applicable, used throughout this report have been taken from the Building Regulation Approved Document L – 2013, which is the edition of the Regulations applicable to the building.

	kg CO_2/kWh
Mains gas	0.216
Grid supplied and displaced electricity	0.519

3.2 Targets

Schedule of Sustainability Requirements

3.2.1 The following targets have been crafted to enable compliance with current Building Regulations as well as National and Local planning policy. All targets have been achieved.

3.2.2 The numbering in the table relates to the chapters in this Sustainability and Energy Statement.

Schedule of Sustainability Requirements		
Ref	**Description of Target**	**Target/Scope**
5.0	**Climate Change**	
	Peak run-off rates are no greater for the developed site than it was for the pre-development site.	Whole Site
	All surface water generated has been attenuated and treated using SuDS prior to discharge into the existing mains surface water sewer.	Whole Site

Schedule of Sustainability Requirements		
Ref	**Description of Target**	**Target/ Scope**
7.0	**Transport and Movement**	
	A new pedestrian link has been provided from the site to the wider pedestrian network.	Whole site
	Cycle parking has been provided at a ratio of 1 space per 6 staff and 1 space per 40 sqm of accommodation. A total of 47 cycle parking spaces are provided.	Whole Site

Schedule of Sustainability Requirements		
	Description of Target	**Target/ Scope**
9.0	**Resources**	
	All materials in buildings are A+, A or B rated according to The Green Guide to Specification, unless deemed impractical or otherwise prescribed.	Whole Site
	All timber for basic elements has been obtained from appropriately certified legal sources. In addition, 80% of building element timber has been procured from sustainably certified forests.	Whole Site

Schedule of Sustainability Requirements		
Ref	**Description of Target**	**Target/ Scope**
10.0	**Buildings**	
	Carbon dioxide emissions have been reduced (based on Part L – 2013) through energy efficiency, low-carbon and renewable technologies	The building
	All internal lighting is provided using dedicated low energy fittings.	The building
	The completed building fabric has achieved an air leakage rates of no greater than 5.0 $m^3/hr/m^2$.	5.0 $m^3/hr/m^2$ for the building.

Schedule of Sustainability Requirements		
Ref		**Target/ Scope**
11.0	**Construction Process and Site Management**	
	The scheme has been registered with the Considerate Constructors Scheme and formal certification achieved. A score of 24 or more points (minimum of at least 5 in each section) has been achieved in the CCS independent site monitors audit.	CCS score of 24 (Min) across site
	Waste arising from site has been monitored and segregated into at least five waste streams for recycling throughout the construction period.	Construction Site
	Water consumption on site has been monitored monthly and compared with agreed KPIs throughout the duration of construction.	Construction Site
	All temporary timber (site hoardings, formwork, and scaffold boards) has come from FSC, CSA, SFI or PEFC sources, or re-used timber.	Construction Site

4.0 Proposal

4.1 Planning permission has been granted for the following;

Unit Type	Floor Area
	m^2
Gym Building with mezzanine level	1,780
	1,780

Environmental Considerations

5.0 Climate Change

5.1 Flooding

5.1.1 Climate change projection predicts a decrease in annual rainfall in the South East of England by up to 10% with significantly wetter winters (between 15-20% more winter rain) and an increase in frequency of severe weather. Drier summers may lead to increased flash flooding when sudden storms cause rapid run off over dry ground. Recent research suggests the number of people at risk of localised urban flooding in England could increase fourfold due to climate change.

5.1.2 Sustainable drainage involves the provision of surface water drainage systems that slow down the run off rate to rivers/watercourses and aquifers, thus conserving water as a natural resource.

5.1.3 A Flood Risk Assessment and Drainage Strategy Report has been prepared by Price Myers and accompanies the application. The Environment Agency indicative floodplain map shows that the site is located in Flood Zone 1, and is regarded as an area with a low probability of flooding, i.e., of less than 1 in 1000 annual probability of flooding from river or sea.

5.1.4 The EA Guidance requires surface water run-off to be managed as close to its source as possible. The use of infiltration systems requires a 5m offset from structures and a 2m offset from boundaries. There is insufficient space for soakaways on site, therefore, infiltration systems have not been proposed.

5.1.5 The surface water run-off has been attenuated within a below ground attenuation tank and the discharge restricted to 2.5l/s via a Hydrobrake device into the existing surface water sewer. The tank has been designed to attenuate run-off for all storms up to and including the 1 in 100-year storm event plus 40% climate change.

5.2 Surface Water Management

5.2.1 Consideration has been given to the use of grey water recycling. However, the internal infrastructure required would add considerable complexity to the construction. In addition the occupiers' resistance to the appearance of the recycled water and the cost of systems does not currently make them a viable option. They have therefore not been included in the proposed development.

6.0 Place Making

6.1 Efficient Use of Land

6.1.1 Building intensification, where appropriate, is a key objective of Government policy in order to meet the requirements for new buildings, whilst limiting pressure on green field sites. The use, design and layout of the building is appropriate to the location.

6.2 Design Process

6.2.1 High quality design is an integral element to sustainable development, both of internal and external spaces and some key elements, which have been considered within the detailed design of the site and building have included the following:

- Resource efficiency;
- Safety;
- Adequate daylight and minimum overlooking;
- Provision of outside spaces;
- Flexible and functional use of accommodation;
- Aesthetically pleasing.

6.3 Passive Solar Gain and Daylighting

6.3.1 The energy required for space heating and lighting can be reduced by using the orientation, form and fenestration to make the most use of passive solar gain.

6.3.2 The building has been designed with full height glazing to the ground and mezzanine levels on the southeast orientated, front elevation. The arrangement therefore maximises the benefit of natural daylighting and winter solar gain.

6.4 Adaptability

6.4.1 Whilst the proposed use of the building is as a gym, the portal design and self-supporting mezzanine allow for the future adaptability for other uses.

6.5 Safety and Security

6.5.1 The scheme has followed Secured by Design principles, which puts the gym users and staff safety at the forefront.

7.0 Transport and Movement

The application site is located in the south-west corner of Reading Link Retail Park which currently accommodates 6 occupied retail units comprising circa. 7,014m2 retail floor space. The retail park is accessed from Rose Kiln Lane.

7.1 Public Transport

7.1.1 The nearest bus stop to the application site is located approximately 650 metres to the north on the A4 Berkeley Avenue accessible in an average walk time of 8 minutes. The bus stops are served by Route 11 (Bronze). The route operates between Coley Park and Reading town centre on a 20-minute frequency Monday – Saturday and half hourly on Sunday.

7.1.2 Additional bus services are available from Reading town centre offering onward connections to various destinations such as Thatcham, Wokingham, Bracknell, Newbury, Theale and Tilehurst.

7.1.3 Reading railway station is located 1.4km to the north of the application site and is easily accessible by foot or by cycle. Reading Railway Station is the second busiest interchange station outside London after Birmingham New Street. Direct destinations include Wokingham, Bracknell, Newbury, Guildford and Oxford.

7.2 Pedestrian and Cycle

7.2.1 Local to the application site, lit footways are provided along both sides of Rose Kiln Lane. Pedestrian access points are provided from the footway to the retail park. A new pedestrian link has been provided between the site and the existing footway network. The route provides a designated pedestrian route, identified by a change in surface colour, which runs through the car park and link to the existing footway at the retail park access road.

7.2.2 The existing infrastructure links the application site to nearby residential areas, bus stops and to the town centre. The town centre is located 1.0km north of the site which has an extensive network of pedestrianised streets which provide direct access to the railway station and the main bus interchange.

7.2.3 The A33 Reading Relief Road is a designated cycle route with shared footway/cycleway provision linking the application site to the station and town centre with access to various Reading cycle routes, providing access to all areas of the town and suburbs can be obtained.

7.2.4 Cycle parking has been provided in accordance with RBC's parking requirements. The standards require 1 space per 6 staff plus 1 space per 40 sqm. Based on the proposal, this equates to a total of 47 spaces, (including 2 spaces for staff - based on up to 11 staff being on site at any one time). There is sufficient space within the site to accommodate the required cycle parking provision,

7.3 Parking

7.3.1 Car parking for the proposed gym is shared across the existing retail park car park. The development results in a net loss of 47 car parking spaces but the Transport Assessment Addendum, which accompanied the application demonstrated that there is sufficient capacity within the existing car park to accommodate the demand for parking generated by the proposed gym without resulting in any overspill parking on to the public highway.

8.0 Ecology and Landscaping

8.1.1 Landscape design and the presence of nature are critical to the quality of our urban environment and their role is not only to make places look greener but also fundamentally to influence the form of the development.

8.1.2 Holy Brook Local Wildlife Site is situated adjacent to the northern border of the development site. Holy Brook Local Wildlife Site (LWS) is approximately 4.5km in length and is comprised of a number of different sites which have been combined into one designation.

8.1.3 The LWS contains tree species such as alder and willow along the riverbanks and within these riparian habitats the ground and aquatic flora species include reed sweet-grass *Glyceria maxima*, hemlock water dropwort *Oenanthe crocata* and occasional water dock *Rumex hydrolapathum*. Notable invertebrates have been recorded within the LWS and water voles *Arvicola amphibius* have been recorded within the central and western sections of the river. Both red and amber listed species of birds including house sparrow *Passer domesticus* and mute swan *Cygnus olor* have been recorded.

8.1.4 The development proposals included construction works 5.5m away from the river and associated riparian habitat. Therefore, mitigation measures have been implemented in order to reduce any risk to the LWS. Full details are provided in the Ecological Assessment (EA) prepared by David Archer Associates and which accompanied the submission.

8.1.5 The habitats present within the application site that have been impacted by the proposals are not suitable for rare and notable invertebrates. The area of scrub and tall ruderal habitat within the north east corner of the site provides some suitability for reptiles. However, this area of the site appears to be highly disturbed from human presence and is fairly small and patchy in nature. It is therefore considered unlikely that reptiles will be present on site. No signs of water voles were noted within the stretch of river adjacent to the site.

8.1.6 Suitable habitat for foraging and commuting bats was recorded within the north east corner of the site, which includes scattered trees, tall ruderals and scrub habitat. Recommendations have been set out in the EA to mitigate against any impacts.

9.0 Resources

9.1 Materials

9.1.1 The Green Guide to Specification is a simple guide for design professionals. The guide provides environmental impact, cost and replacement interval information for a wide range of commonly used building specifications over a notional 60-year building life. The construction will target the use of materials that are A+, A or B rated, unless otherwise agreed or deemed impractical.

9.1.2 Preference has been given to the use of local materials & suppliers where viable to reduce the transport distances and to support the local economy. A full evaluation of these suppliers has been undertaken.

9.1.3 In addition, timber has been sourced, certified by PEFC or an equivalent approved certification body and all site timber used within the construction process has been recycled.

9.2 Pollution

9.2.1 All insulation materials have a zero-ozone depleting potential.

9.2.2 There are no CO_2 or NOx emissions from the site because all services have been provided using electrical systems.

9.3 Noise

9.3.1 The building has been designed and constructed to reduce sound transmission. An Acoustic Assessment Report was been prepared by Pulsar Acoustics and the recommendations have been implemented.

9.4 Construction waste

9.4.1 A Site Waste Management Plan has been prepared which has monitored and reported on waste generated on site, which were defined into waste groups.

9.4.2 The Plan set targets to promote resource efficiency in accordance with guidance from WRAP, Envirowise, BRE and DEFRA.

9.4.3 The overarching principle of waste management has been that waste has been treated or disposed of within the region where it has produced.

9.4.4 Construction operations generate waste materials as a result of general handling losses and surpluses. These wastes have been reduced through appropriate selection of the construction methods, good site management practices and spotting opportunities to avoid creating unnecessary waste.

9.4.5 A Construction Strategy has been developed, which has explored a number of issues, some of which are set out below:

- Proper handling and storage of all materials to avoid damage.
- Efficient purchasing arrangements to minimise over ordering.
- Segregation of construction waste to maximise potential for reuse/recycling.
- Suppliers who collect and reuse/recycle packaging materials

9.5 Waste and Recycling

9.5.1 Operational waste and recycling has been considered in the proposed development in the following way:

- External space is provided for storing recyclable materials, for collection by the Authority or private contractors, within the boundary of the site;
- The external space for recyclable material is of sufficient size to accord with Local Authority procedures;
- Internal storage for recyclables has been provided.

10.0 Buildings

10.1 Energy use and CO_2 emissions statement

10.1.1 Introduction

10.1.1.1 The building has been designed and constructed to reduce energy demand and carbon dioxide emissions. The objective has been to reduce the energy demand to an economic minimum by making investment in the parts of the building that have the greatest impact on energy demand and are the most difficult and costly to change in the future, namely the building fabric.

10.1.1.2. Once a cost-effective structure has been designed, renewable and low carbon technologies have been installed to provide heat and electricity.

10.1.1.3 The following hierarchy has been followed:

- Lean reduce demand and consumption
- Clean increase energy efficiency
- Green provide low carbon renewable energy sources

10.1.2 Methodology

Design

10.1.2.1 The energy performance of a building is affected by the building design, its construction and its use. Whilst occupant behaviour is beyond the remit of this statement, better design and construction methods can significantly reduce the life cycle emissions of a building and assist the occupant to reduce consumption.

Passive solar gain and Daylighting

10.1.2.2 Passive measures include allowing for natural ventilation and exposed thermal mass coupled with high levels of insulation, air tightness and the control of solar gain.

10.1.2.3 The building has been designed with full height glazing to the ground and mezzanine levels on the southeast orientated, front elevation. The arrangement therefore maximises the benefit of natural daylighting and winter solar gain.

Building Envelope (Be Lean)

10.1.2.4 U-values of the building envelope must meet Building Regulations Part L (2013) standards with further improvements to U-values reducing the heating requirements.

10.1.2.5 The building has been built using a framed structure with insulated cladding.

10.1.2.6 The following U-values have been calculated for the building elements;

Element	Proposed
	W/m²K
Ground Floor	**0.15**
Exposed Floor	**0.20**
External Walls	**0.26**
Roof	**0.18**
Windows and Glazed Doors	**1.40**

'g' Value for Glazing	**0.50**

Air Leakage

10.1.2.7 Large amounts of heat are lost in winter through air leakage from a building (also referred to as infiltration of air permeability) often through poor sealing of joints and openings in the building

10.1.2.8 The air tightness standard for the building has achieved a permeability of less than 5.0 $m^3/hr/m^2$.

Thermal Bridging

10.1.2.9 The significance of Thermal Bridging, as a potentially major source of fabric heat losses, is increasingly understood. Improving the U-values for the main building fabric without accurately addressing the Thermal Bridging is no longer an option and will not achieve the fabric energy efficiency and energy and CO_2 reduction targets set out in this strategy.

10.1.2.10 The thermal details for the building have been modelled using the Kingspan modelled psi values.

Ventilation

10.1.2.11 As a result of increasing thermal efficiency and air tightness, Building Regulations Approved Document F18 addresses the possibility of overheating and poor air quality. The windows to the building are openable and cross ventilation is provided. Intermittent mechanical extract ventilation is used in all wet rooms.

Lighting

10.1.2.12 Throughout the building natural lighting has been optimised.

10.1.2.13 LED lighting has been used throughout and all light fittings have lamps with a minimum luminous efficacy of 100 light source lumens per circuit-watt. Occupancy sensors have been used in all viable areas (Staircores).

Space Heating and Hot Water

10.1.2.14 An air source heat pump provides space heating to the building. The BRUKL calculation is based on a unit with a coefficient of performance of 350% and with an EER efficiency of 500%.

10.1.3 Establishing Carbon Dioxide Emissions

10.1.3.1 A BRUKL calculation has been prepared for the building and is attached as Appendix 1. The building has been built to a shell and core standard and the BRUKL calculation attached is relevant for this stage in construction

10.1.3.2 The following table summarises the results from the BRUKL Output Document.

Gym	CO_2 TER (Notional)	CO_2 BER (Actual)
	kg $CO_2/m^2/yr$	kg $CO_2/m^2/yr$
Emissions	**35.5**	**24.5**

Total Carbon Dioxide Emissions

10.1.3.3. Using the above information the total emissions from the proposed development following the energy efficiency measures detailed can be calculated as follows:

	TER CO_2	BER CO_2
	kg/year	kg/year
Totals	**66,350**	**45,791**

10.1.3.4. The reduction in total CO_2 emissions as a result of the energy efficiency measures and low carbon and renewable technologies incorporated into the building is assessed as **20,559 kg CO_2 per year,** which equates to a reduction in emissions of :

- **30.99%**

10.2 Water use statement

10.2.1 In the South East of England, water demand exceeds the volume licensed for abstraction, with the shortfall being met from ground water. In excess of 20% of the UK's water is used domestically with over 50% of this used for flushing WCs and washing (source: Environment Agency). The majority of this comes from drinking quality standard or potable water.

10.2.2 The amount of potable water used within buildings can be reduced by using fixed fittings, which reduce water use in WC's and to taps and showers. Greywater harvesting systems are not proposed.

10.2.3 Throughout the design process for the development the following have been implemented as part of the proposal:

- Reductions in the use of water within the buildings, including the use of waterless urinals;
- Suitability of sustainable drainage systems;
- Reduction of water use in construction.

10.2.4 Water efficient devices have been fully evaluated, and installed, wherever possible. The specification of such devices has been considered and each appliance has been subject to an evaluation based on technical performance, cost and market appeal, together with compliance with the water use regulations.

11.0 Construction Process and Site Management

11.1 Where best practice guidance is available dealing with construction methods and standards these have been adopted.

11.2 The effects of construction can be divided into two sections;

- those related to the materials used on site
- those related to the construction process

Considerate Constructors

11.3 The site has been registered with the Considerate Constructors Scheme, which addresses both limiting the effect on the community and the effects on the environment. The Applicant is committed to demonstrate best site management practices. The CC scheme monitors the contractor's performance against the eight point Code for Considerate Practice. There is a commitment to score in excess of 24 points.

11.4 To ensure good relations with the local community, the Applicant has kept local people informed of works, which might affect them, and provided a method for comments, complaints and required remedial action to be communicated to the developer.

Construction Site Impacts

11.5 Site management procedures have been put in place to monitor water consumption and all site timber used in construction has been sourced from certified suppliers.

12.0 Conclusion

12.1 This Statement demonstrates that the proposed development has provided a highly sustainable development in terms of its economic, social and environmental sustainability.

12.2 Throughout the construction process, the applicant and construction team have given careful consideration to the sustainability issues relating to the site, and how these could be enhanced in a marketable and feasible manner. As a result, this Statement demonstrates that the building meets relevant sustainability criteria set out in the Sustainability and Energy Statement, dated 3rd October 2024.

12.3 The Statement also describes the responsibilities that the applicant, designers and consultant and construction team have in delivering sustainability measures that will contribute to, meet and/or exceed the objectives and targets set out above.

12.4 The key sustainability findings can be summarised as;

- Reduction in carbon dioxide emissions compared to the maximum permissible by the Building Regulations (Part L – 2013 – the version applicable to the development) through energy efficiency measures;
- A total reduction in (TER) carbon dioxide emissions of **31%** from energy efficiency and energy efficient mechanical and electrical services including the installation of an air source heat pump;
- High standards of environmental construction with compliance to the Considerate Constructors Scheme, a Site Waste Management Plan and other construction management principles.

Appendix 1 – BRUKL Output Document

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name **Shell and Core**

Reading Link Retail Park

As designed

Date: Mon Sep 30 13:55:49 2024

Administrative information

Building Details

Address: Unit D4, JD Gyms, Reading Link Retail Park, Rose Kiln Lane, Reading, RG2

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: iSBEM

Interface to calculation engine version: v5.6.b

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

Certifier details

Name: Aaron Perry

Telephone number: -

Address: Suite 210 Watermoor Point, Watermoor Road, Cirencester, GL7 1LF

Criterion 1: The calculated CO_2 emission rate for the building must not exceed the target

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	35.5
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	35.5
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	24.5
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	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.26	0.26	"z01 - GF Gym Area/se"
Floor	0.25	0.15	0.2	"z04 - Mezzanine Gym Area/fi.1"
Roof	0.25	0.18	0.18	"z04 - Mezzanine Gym Area/c"
Windows***, roof windows, and rooflights	2.2	1.4	1.4	"z01 - GF Gym Area/se/g"
Personnel doors	2.2	-	-	"No external personnel doors"
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [W/(m²K)]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [W/(m²K)]
$U_{i\text{-}Calc}$ = 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	5

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	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- ASHP System

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	5	-	-	-
Standard value	2.5*	2.6	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* 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- From Main System

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	-
Standard value	N/A	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

Shell and core configuration

Zone	Assumed shell?
z02 - GF East Stairwell	YES
z03 - GF South Stairwell	YES
z05 - Mezzanine East Stairwell	YES
z06 - Mezzanine South Stairwell	YES
z01 - GF Gym Area	YES
z04 - Mezzanine Gym Area	YES

General lighting and display lighting

	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
z02 - GF East Stairwell	-	100	-	108
z03 - GF South Stairwell	-	100	-	97
z05 - Mezzanine East Stairwell	-	100	-	119
z06 - Mezzanine South Stairwell	-	100	-	109
z01 - GF Gym Area	-	100	-	1935
z04 - Mezzanine Gym Area	-	100	-	1966

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?
z01 - GF Gym Area	NO (-78.4%)	NO
z04 - Mezzanine Gym Area	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?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	1869	1869
External area [m²]	2988	2988
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	5	3
Average conductance [W/K]	650.84	1220.98
Average U-value [W/m²K]	0.22	0.41
Alpha value* [%]	9.32	10.86

* 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
	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
100	**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	24.8	39.73
Cooling	11.88	15.99
Auxiliary	0	0
Lighting	10.4	14.23
Hot water	0.1	0.13
Equipment*	81.47	81.47
TOTAL**	**47.19**	**70.08**

* 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 & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	492.06	538.42
Primary energy* [kWh/m²]	144.87	209.76
Total emissions [kg/m²]	24.5	35.5

* 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] No Heating or Cooling										
	Actual	247.4	236.1	0	0	0	0	0	0	0
	Notional	272.9	394.3	0	0	0	0	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	323.8	168.8	26.2	12.5	0	3.43	3.74	3.5	5
	Notional	367.1	164.1	42	16.9	0	2.43	2.7	----	----

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	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.26	"z01 - GF Gym Area/se"
Floor	0.2	0.15	"z01 - GF Gym Area/f"
Roof	0.15	0.18	"z04 - Mezzanine Gym Area/c"
Windows, roof windows, and rooflights	1.5	1.4	"z01 - GF Gym Area/se/g"
Personnel doors	1.5	-	"No external personnel doors"
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = 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	5