

Logicor Park

Rose Kiln Court, Reading

ENERGY EFFICIENCY STATEMENT

REVISION D

15/05/2023

Submitted to **Redwood (Light Industrial) Propco Sarl**

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Audit sheet

Revision	Date	Description	Prepared	Reviewed
A	03/04/2023	Issue for comment	MR	PP
B	05/04/2023	Revised incorporating design team comments	MR	PP
C	26/04/2023	Revised to reflect updated targeted KPI	MR	PP
D	15/05/2023	Revised to reflect updated targeted KPI	MR	PP

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Contents

AUDIT SHEET..... 2

CONTENTS..... 3

1. EXECUTIVE SUMMARY 4

2. PROPOSED DEVELOPMENT 6

 2.1 SITE DESCRIPTION 6

3. BUILDING REGULATIONS AND PLANNING POLICIES 10

 3.1 APPROVED DOCUMENT PART L 2021.....10

 3.2 MINIMUM ENERGY EFFICIENCY STANDARDS 10

 3.3 READING BOROUGH COUNCIL 11

4. ENERGY STRATEGY 14

 4.1 PASSIVE DESIGN MEASURES 15

 4.2 SYSTEM EFFICIENCY 15

 4.3 LOW AND ZERO CARBON TECHNOLOGIES.....18

5. CONCLUSIONS 19

APPENDIX A – PART L DESIGN SPECIFICATION 20

APPENDIX B – DRAFT BRUKL CERTIFICATES.....21

1. Executive summary

This Energy Efficiency Statement has been prepared by MYA Consultancy Services to accompany a planning application for the Logikor Park development. The Project is located on Rose Kiln Court in Reading, RG2 0BY, just South on the central hub of the town and sits alongside the A33.

The proposed development includes the Demolition of the existing Class E(g)(i) (Office) building and the construction of three buildings for Class E(g)(iii) (Light Industrial) / Class B2 (General Industrial) / Class B8 (Storage or Distribution) uses, including the provision of a new substation, parking, landscaping, and associated works.

This Statement identifies how the proposed development will address the energy and CO₂ emission reduction policies set out by the corresponding UK Building Regulations Part L2 2021 and local policies. The Reading Borough Council Local Plan (November 2019) and the associated Sustainable Design and Construction SPD (December 2019) sets out policies CC2, CC4 and H5 that include energy related aspects that this Statement seeks to address.

Energy demand reduction will be prioritised followed by providing energy-efficient services and allowing for on-site renewables where appropriate.

In addition to meeting the required planning obligations, the Proposed Development is targeting the following key performance energy indicators:

- Compliance with Part L 2021
- EPC 'A' rating per unit
- BREEAM 'Excellent' rating

The recent release of UK Building Regulations Part L has now recognised the decarbonisation of the UK grid (see Figure 1) and therefore developments supplied by electricity are now more advantageous where traditionally gas-fuelled alternatives are penalised from a carbon perspective. For consistent energy use, carbon reductions would also likely continue to improve as the UK grid continues to decarbonise.

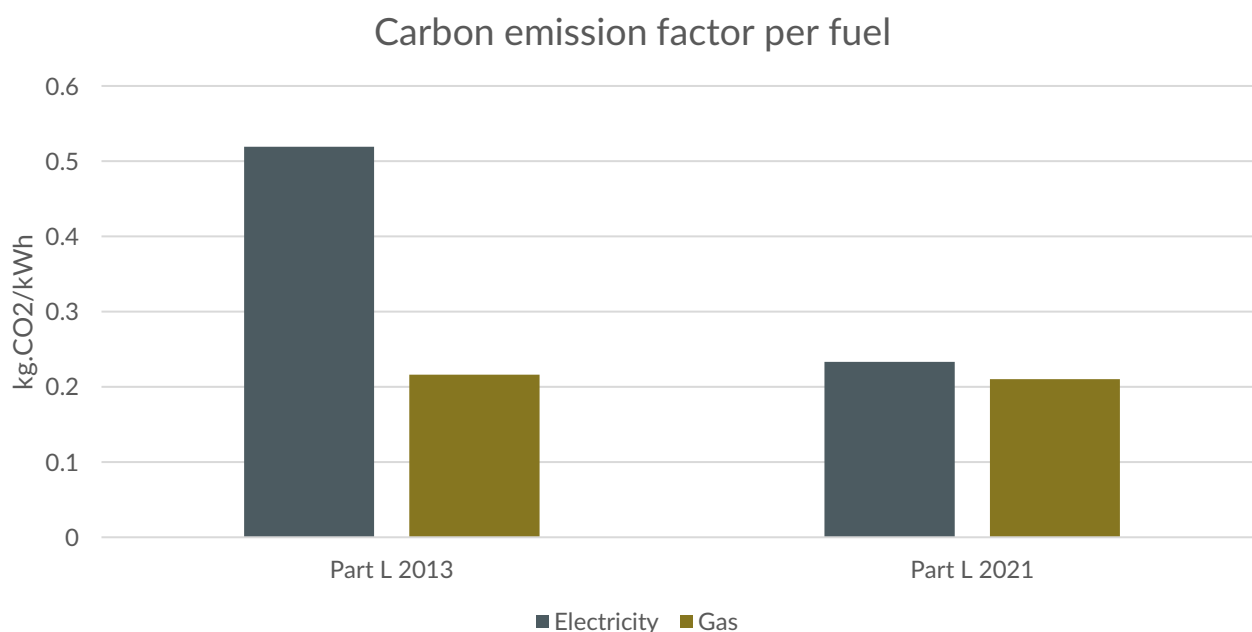


Figure 1: Pre- and post-Part L 2021 regulations – Carbon emission factors

The proposed energy strategy was demonstrated to deliver a 47.2% reduction in regulated carbon emissions and a regulated energy reduction of 49.3%, thereby demonstrating not only a route to compliance to Part L 2021, but a significant saving beyond this.

The scheme was also shown to provide a 43.4% reduction in the combined heating and cooling demand of the building, highlighting a substantial saving via passive measures before system efficiencies and renewable technologies are accounted for.

Finally, all units were shown to achieve an EPC 'A' rating and each block achieve a minimum of 5No. credits for Ene01 under BREEAM. These performance indicators were based upon an assumed fit-out specification for the shell industrial/warehouse areas and would need to be considered as part of any Tenant fit-out agreement for BREEAM purposes. The EPC is indicative only and will be subject to the first fit-out of tenant areas and where any of the performance specification stated within this statement appendix cannot be achieved it would be the responsibility of the contractor to demonstrate that the EPC 'A' could still be achieved with any proposed fit out.

Table 1: Logicor Park, Rose Kiln Court – KPI Summary

	Regulated demand savings (%)	Regulated energy savings (%)	Regulated carbon savings (%)	PV annual yield (kWh per annum)	EPC (per unit)	BREEAM Ene01 credits
Block A	45.3%	56.5%	53.9%	8,511	A	>5
Block B	40.7%	38.0%	36.8%	2,756	A	>5
Block C	43.1%	49.2%	47.0%	11,340	A	>5
Site	43.4%	49.3%	47.2%	22,607	-	-

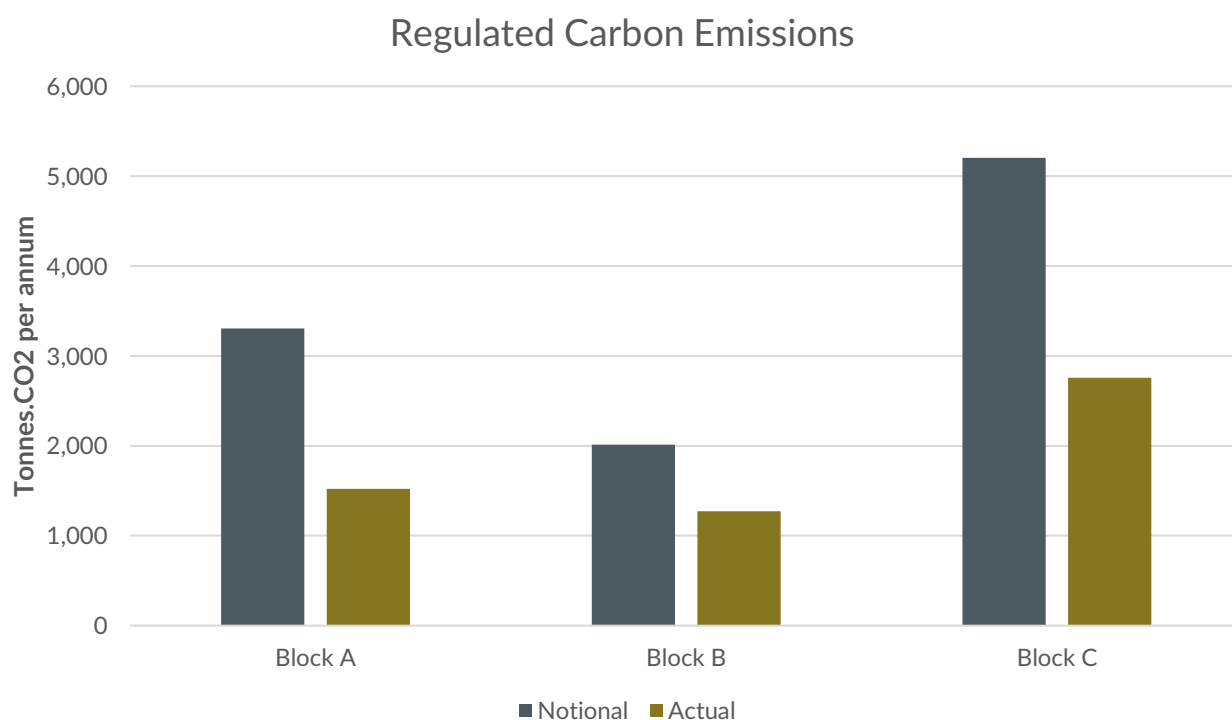


Figure 2: Logicor Park, Rose Kiln Court – Part L 2021 results

2. Proposed Development

Logicor Park is to include the demolition of the existing Class E(g)(i) (Office) building and the construction of 3No. buildings for a potential mix of Class E(g)(iii) (Light Industrial) / Class B2 (General Industrial) / Class B8 (Storage or Distribution) uses, including the provision of a new substation, parking, landscaping, and associated works. The proposed development intends to utilise a greater proportion of the site area and enhance the use of the available transport links.

Each of the blocks is to be treated as shell & core, with a combined total of 8no. units to let and approx. 33,150 ft of gross internal area of floor space separated between each block as following:

Table 2: Block-by-block parameters

	No. units	Total GIA (ft ²)
Block A	3	9,350
Block B	1	7,500
Block C	4	16,300

Each unit will comprise a mix of speculative warehouse/industrial space and a mezzanine office level alongside associated ancillary spaces such as circulation and toilets. The site is being developed on a shell and core basis, therefore Savills have produced a performance specification indicating a proposed route to meeting key performance metrics and in accordance with the National Calculation Methodology 2021 and BREEAM conventions, assumed services and performance have been allowed for to assess likely performance against the key indicators.

2.1 Site description

The Project is located on Rose Kiln Court in Reading, RG2 0BY, just South on the central hub of the town. The site is bounded by the A33, running north to south along the eastern boundary of the site, and Rose Kiln Lane to the west. Low-level residences are located directly north across the Holy Brook waterway and large retail parks across each of the roads from the south-west to the east.

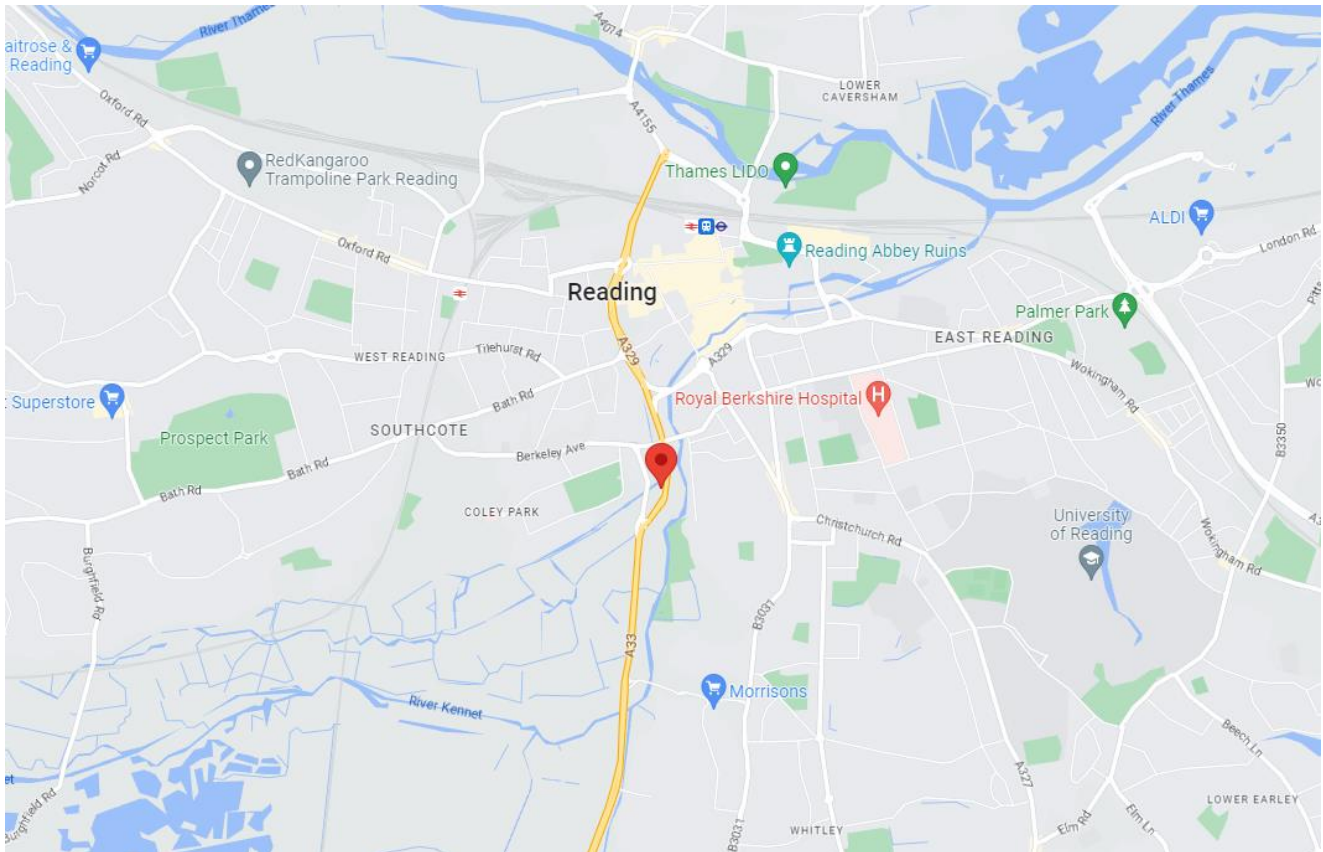


Figure 3: Site location (Source: Google)



Figure 4: 3D satellite view from south of existing site (Source: Google)



Figure 5: Proposed site layout



Figure 6: Example of typical unit layout (Block A). Areas highlighted in blue are shell only.

3. Building Regulations and Planning Policies

This section summarises the drivers for sustainable and low carbon design required for planning that may affect the scheme. The proposed development is designed to target compliance with the required planning strategies and policies as follows:

- Approved Document Part L 2021
- Minimum Energy Efficiency Standards
- Reading Borough Council
 - Local Plan (Nov 2019)
 - Sustainable Design and Construction SPD (Dec 2019)
- BREEAM New Construction – ‘Excellent’ rating

3.1 Approved Document Part L 2021

Part L 2021 requires new buildings to demonstrate compliance with the requirements of regulations 24, 25, 25B 26, 26C, 27 and 27C of the Building Regulations 2010. The document took effect on 15th June 2022 and is therefore applicable to planning application or initial notices submitted after this date (or buildings where the work has not started before 15th June 2023).

The primary intent of the document is to reduce energy and carbon use in buildings and contains a number of criteria related to aiding this intent. The main metric to demonstrate compliance with Part L 2021 is to assess the building in accordance with the associated National Calculation Methodology 2021. Using a standardised approach for the building usage, and common weather data based upon the site location, then from the proposed design (commonly referred to as Actual building) it is compared a Target (or Notional building) with the same layout but minimum levels of fabric and service efficiencies.

Provided that the Actual building demonstrates both an energy use (kWh/m² per annum) and a carbon emissions rate (kg.CO₂/m² per annum) lower than the Notional building, then this will meet the primary requirements of Part L. Energy Performance Certificates are generated in a similar manner but compared to a Reference building of different fabric performance, system selections and efficiencies.

Note due to its standardised approach and use of regulated energy only (e.g. this doesn't include small power loads, etc.), models prepared via the National Calculation Methodology are for the purposes of demonstrating compliance with Part L and are unlikely to be representative of the actual energy use of the building. A separate calculation in accordance with appropriate industry guidance (e.g. CIBSE TM54, etc.) would be recommended to deliver energy outputs more reflective of the actual predicted usage of the building.

3.2 Minimum Energy Efficiency Standards

The Energy Act 2011 sets out provisions for new domestic and non-domestic energy efficiency regulations which came into force 1st April 2018 for England and Wales. Such regulations will place an obligation on landlords of property with EPCs that fall below a minimum requirement to make energy efficiency improvements before being let. Secondary legislation enabling these obligations on landlords has been enacted through the Energy Efficiency Regulations 2015.

The Government released The Energy Efficiency (Private Rented Property) (England and Wales) Regulations 2015 Minimum Energy Efficiency Standards (MEES) which stated that as of 1st April 2018, landlords of privately rented property in England or Wales must ensure that their properties each at least an EPC of E before granting a new tenancy to new or existing tenants. These requirements will apply to all private rented properties in England and Wales, even when there has been no change in tenancy agreements from 1st April 2023 for non-domestic properties.

Following this the Government issued a consultation, entitled The Non-Domestic Private Rented Sector Minimum Energy Efficiency Standards (ND PRS MEES) – The Future Trajectory to 2030. This document outlines the UK government's desire to drive property efficiency standards to reduce energy use by 20% by 2030. The requirements are for a phased implementation of an Energy Performance Certificate (EPC) rating of B by 2030, with and EPC C by 2027 set as an interim milestone. To enforce this there is an introduction of two-year compliance windows. The 'compliance window' will begin with the requirement for landlords to present a valid EPC. For EPC C, the Government proposes the compliance window should be 2025-2027, and for EPC B 2028-2030.

There is a move away from enforcing at the point of let. Acknowledging that this has not worked well in practice, because non-domestic buildings are often rented in a shell and core state. To be compliant at the point of let, landlords either have to install measures that will be immediately replaced, or tenants will have to pay for installations before they legally become the tenant. The proposed consultation seeks to address the issue by moving enforcement and compliance away from the point of let. Landlords will still be required to hold a valid EPC when looking to rent out property, but for the purposes of meeting MEES, all non-domestic rented buildings are likely to need to achieve an EPC C by 2027 and EPC B by 2030, regardless of when they are let, subject to confirmation from the Government.

As each of the units at Logisor Park are proposed to be served via their own independent heating system, an EPC per unit will be required. The scheme is proposing to target an EPC 'A' rating for each unit to ensure that that units can be let or sold without restriction due to MEES for at least the duration of a valid certificate (i.e. currently 10 years).

3.3 Reading Borough Council

Reading Borough Council adopted the most recent local plan in November 2019 and is to guide development within Reading up to 2036.

The Local Plan has a number of key aims, including:

- a) Supporting the Council's commitment to work towards achieving a carbon neutral reading by 2030 following the declaration of a climate emergency in 2019.
- b) enabling delivery of affordable housing;
- c) providing the employment space and supporting infrastructure to make sure that Reading continues to be an attractive place in which to work;
- d) protecting and improving Reading's historic legacy

While a number of policies highlight the role of sustainable design and construction, there are a number of relevant policies addressed in this document associated with energy and carbon reduction as noted below.

Reading Borough Council also published the supplementary planning document Sustainable Design and Construction in December 2019 to assist developers with more detailed guidance in meeting these planning obligations.

Policy CC2: Sustainable Design and Construction

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.

To meet these requirements:

- All major non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Excellent' standards, where possible;
- All minor non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Very Good' standard as a minimum;
- All non-residential development or conversions to residential should incorporate water conservation measures so that predicted per capita consumption does not exceed the appropriate levels set out in the applicable BREEAM standard. Both residential and non-residential development should include recycling greywater and rainwater harvesting where systems are energy and cost effective.

As the scheme is defined as a major non-residential development, a target of BREEAM 'Excellent' has been incorporated into the key performance targets. Refer to the Sustainability Statement for further detail on BREEAM and the proposed route to an 'Excellent' rating.

In relation to energy, this specifically mandates a minimum target of 4no. credits under the credit Ene01: Reduction of energy use and carbon emissions. The number of credits will be dependent upon the building's performance under Part L 2021, notably how much of saving can be made in the proposed design versus a target, or Notional, building in the following areas:

- Demand – The combined heating and cooling demand of the building. As this is calculated before accounts of system selection and/or renewable technologies, it rewards passive design measures such as improved insulation and increased air tightness.
- Energy – This accounts for system selection and efficiencies as well as appropriate controls. Buildings tend to perform well with heat pumps with high coefficients of performance, high efficiency LED lighting with presence and/or daylighting control.
- Carbon – This takes into account the fuel type associated with supplying the energy to the building. With Part L recognising the decarbonisation of the UK grid, all-electric buildings are likely to perform well when compared to other fuel sources such as gas.

As the BREEAM pre-assessment is targeting a minimum of 5no. credits under Ene01, this represents a 25% improvement beyond the minimum requirements for an 'Excellent' rating.

Policy CC3: Adaptation to climate change

All developments will demonstrate how they have been designed to incorporate measures to adapt to climate change. The following measures shall be incorporated into development:

- *Wherever possible, new buildings shall be orientated to maximise the opportunities for both natural heating and ventilation and reducing exposure to wind and other elements;*
- *Proposals involving both new and existing buildings shall demonstrate how they have been designed to maximise resistance and resilience to climate change for example by including measures such as solar shading, thermal mass, heating and ventilation of the building and appropriately coloured materials in areas exposed to direct sunlight, green and brown roofs, green walls, etc;*
- *Use of trees and other planting, where appropriate as part of a landscape scheme, to provide shading of amenity areas, buildings and streets and to help to connect habitat, designed with native plants that are carefully selected, managed and adaptable to meet the predicted changed climatic conditions; and*
- *All development shall minimise the impact of surface water runoff from the development in the design of the drainage system, and where possible incorporate mitigation and resilience measures for any increases in river flooding levels as a result of climate change.*

Logicor Park has integrated a number of passive measures including enhanced fabric performance, air tightness, solar control and natural ventilation to maximise resistance and resilience to climate change where feasible. Refer to the Passive Design Measures section of this report for further detail.

Due to the proposed use of the site and requirement for appropriate logistics of deliveries, the layout and size of the warehouses are constrained to increase utility of the available space.

Other items related to landscape and surface water runoff are outside the scope of this document. Refer to the associated Sustainability Statement for further information.

Policy CC4: Decentralised energy

In meeting the sustainability requirements of this plan, developments of the sizes set out below shall demonstrate how consideration has been given to securing energy for the development from a decentralised energy source.

Any development of more than 20 dwellings and/ or non-residential development of over 1,000 sq m shall consider the inclusion of decentralised energy provision, within the site, unless it can be demonstrated that the scheme is not suitable, feasible or viable for this form of energy provision.

Where there is existing decentralised energy provision present within the vicinity of an application site, further developments of 10 dwellings or more or non-residential development of 1,000 sq m or more will be expected to link into the existing decentralised energy network or demonstrate why this is not feasible.

As the scheme is defined as a major non-residential development of over 1,000m², consideration of decentralised energy provision must be made.

4. Energy strategy

The energy strategy for Logicor Park has been developed in accordance with the guidance for energy efficiency as stated within the Reading Borough Council Sustainable Design and Construction SPD. This outlines an approach to prioritise passive measures (e.g. fabric enhancements, solar control etc.), before selecting efficient systems and renewable technologies to reduce both energy demand and carbon emissions.

In order to regulated carbon emissions, the figures within this section have been produced via dynamic thermal model built using IES Virtual Environment (Version 2022.3.0.0), shown in Figure 7. This calculation engine has been approved to undertake calculation in accordance with the National Calculation Methodology and produce valid BRUKL certificates for demonstrating compliance with Part L 2021. This model was built using the drawings provided by Webb Gray Architects on 29th March 2023, as submitted with the planning application, and the heating, ventilation and air conditioning (HVAC) and lighting strategy provided by Savills.

The site is being developed on a shell and core basis, therefore Savills have produced a performance specification indicating a proposed route to meeting key performance metrics. The occupying tenant will be responsible for the detailed design of the speculative area of the warehouse/industrial unit (blue area highlighted in Figure 6) and in accordance with the National Calculation Methodology 2021 and BREEAM conventions, assumed services and performance have been allowed for to assess likely performance against the key indicators. The Contractor shall be responsible for the final selections and ensuring that the key performance metrics are achieved.

These results should be supported by revised calculations as the design develops, at a minimum prior to submission to Building Control for the final design prior to construction and upon first-fit out.

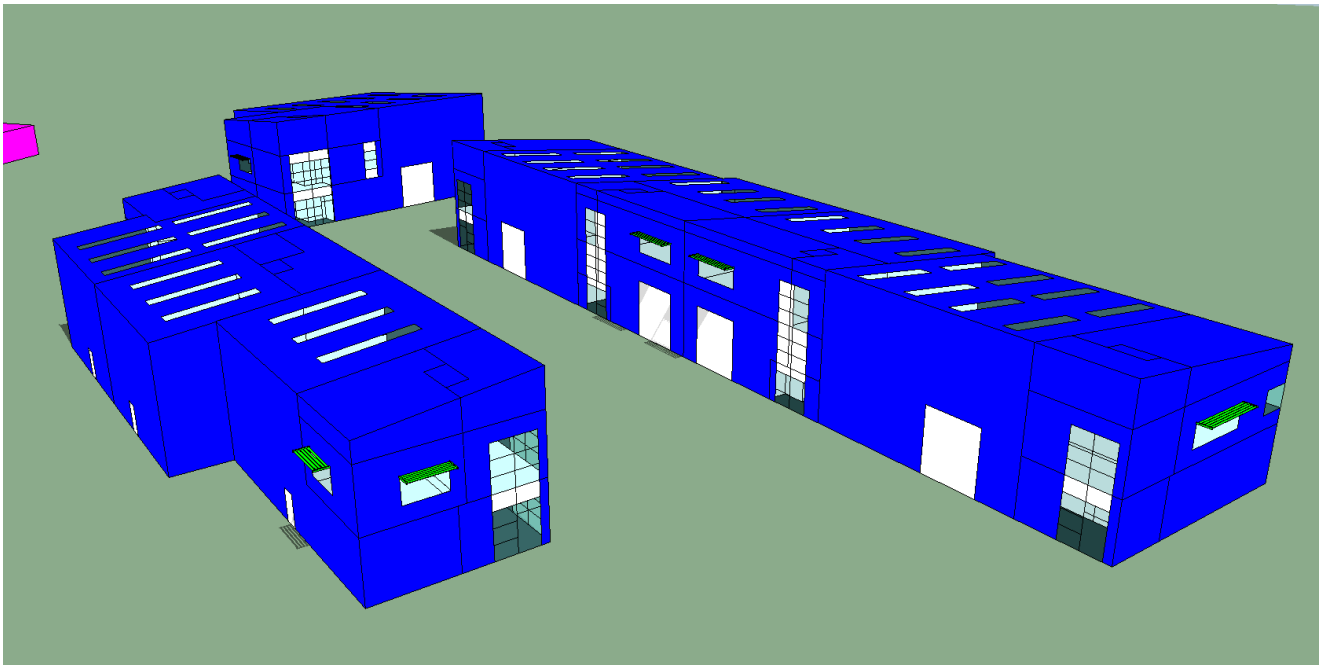


Figure 7: 3D dynamic thermal model of Logicor Park (Source: IES Virtual Environment)

4.1 Passive design measures

The following passive design measures are proposed within Logikor Park to minimise the energy demand:

- Enhanced U-values across the building envelope to reduce heat loss/gain (see Table 3).
- Compact form to maximise efficiency of operational services.
- The internal layout will be designed to ensure good daylight access for occupied spaces.
- Rooflights over shell spaces to encourage use of natural light and reduce reliance on energy intensive artificial light. These are recommended to be provided with high-performance U-values and low g-value to reduce excessive heat loss while limiting excessive solar gains.
- Insulation to the internal walls and floors separating conditioned spaces (i.e. offices, toilets) from unconditioned/frost-protected spaces (i.e. warehouse/industrial unit, circulation) to limit hidden heat losses from one internal space to another.
- Solar control will be considered to glazing on all elevations to limit solar gains
- Natural ventilation has been proposed for the office spaces to provide sufficient fresh air. Consideration will need to be given to passive ventilation methods to prevent excessive heat loss/gain during low and high periods of external temperature when heating and cooling is required.

Table 3 shows proposed U-values compared to maximum allowable under Building Regulations and Notional building U-values, with the proposed design of Logikor Park demonstrating an improvement beyond the minimum buildings regulation on most elements.

4.2 System efficiency

Heating, ventilation and air conditioning

High efficiency VRF systems have been proposed to heat and cool for the occupied office areas to condition the space. SCOP and SEER values upwards of 3.50 kW/kW and 5.00 kW/kW are available on the market and should be used to reduce the electrical demand of the heating/cooling loads required for the building. It is in the interest of the end user to seek high performance systems to reduce the electricity demand and operational cost of the building.

Shell areas of warehouse areas are untreated spaces and circulation areas to be provided with frost protection only. These are anticipated to likely be used for low energy demand space usages with vehicle access doors frequently open. Therefore a position of encouraging no conditioned services in these areas as a starting point is proposed.

Toilets are proposed to have direct electric rads with extract ventilation and with instantaneous hot water.

Lighting Design

It is proposed that dedicated energy efficient light fittings will be installed throughout the development with appropriate controls to limit unnecessary usage where possible.

These controls would include:

- Presence detection via passive infrared units in the offices, toilets and circulation
- Daylight dimming and constant illuminance in the office and warehouse/industrial shell areas*

*The site is being developed on a shell and core basis, therefore Savills have produced a performance specification indicating a proposed route to meeting key performance metrics. The occupying tenant will be responsible for the detailed design of the speculative area of the warehouse/industrial unit but it is a key requirement in achieving the performance metrics that daylight dimming will be included in the tenant fit-out specification.

Table 3: Comparison of fabric performance

External element	Minimum Building Regulations (W/m ² K)	Notional (W/m ² K)	Logicor Park (W/m ² K)	% Improvement over minimum building regs
Opaque				
External walls	0.26	0.18 (side-lit) 0.26 (top-lit)	0.26	-
Internal walls - Separating conditioned from unconditioned	-	-	0.26	-
Ground/exposed floors - Warehouse	0.18	0.15	0.15	16.7%
Ground/exposed floors - Office	-	-	0.15	-
Roofs	0.16	0.15 (side-lit) 0.18 (top-lit)	0.16	-
Doors - Personnel (opaque)	1.60	1.90	1.40	12.5%
Doors - Dock leveller doors and level access doors (opaque)	1.30	1.30	1.00	23.1%
Transparent				
External windows	1.60	1.40	1.20	25%
Rooflights	2.20	2.10	1.30	40.1%
Doors - Personnel (transparent)	1.60	1.90	1.40	12.5%
Curtain walling*	1.60	1.40	1.50	6.3%

*Combined U-value of transparent, opaque and framing elements

Decentralised heating

Element Energy was commissioned by Reading Borough Council to undertake a heat mapping and energy masterplanning study for Reading town centre. Four clusters were identified as shown within Figure 8. Logicor Park is situated to the south of the highlighted 'Old Civic building area' and outside the potential zone proposed for potential development. It is therefore the design team's understanding that there are therefore no existing district heat networks in the near proximity of the site.

In addition, the required heating load is anticipated to be relatively small in relation to the size of the site due to its usage as noted previously and hot water heating will primarily be limited to the small amount of occupied office spaces. Due to the lack of financial feasibility associated with the large distance to a future potential location in combination with the minimal heating demand it is not suggested to explore a connection to any of these identified clusters.

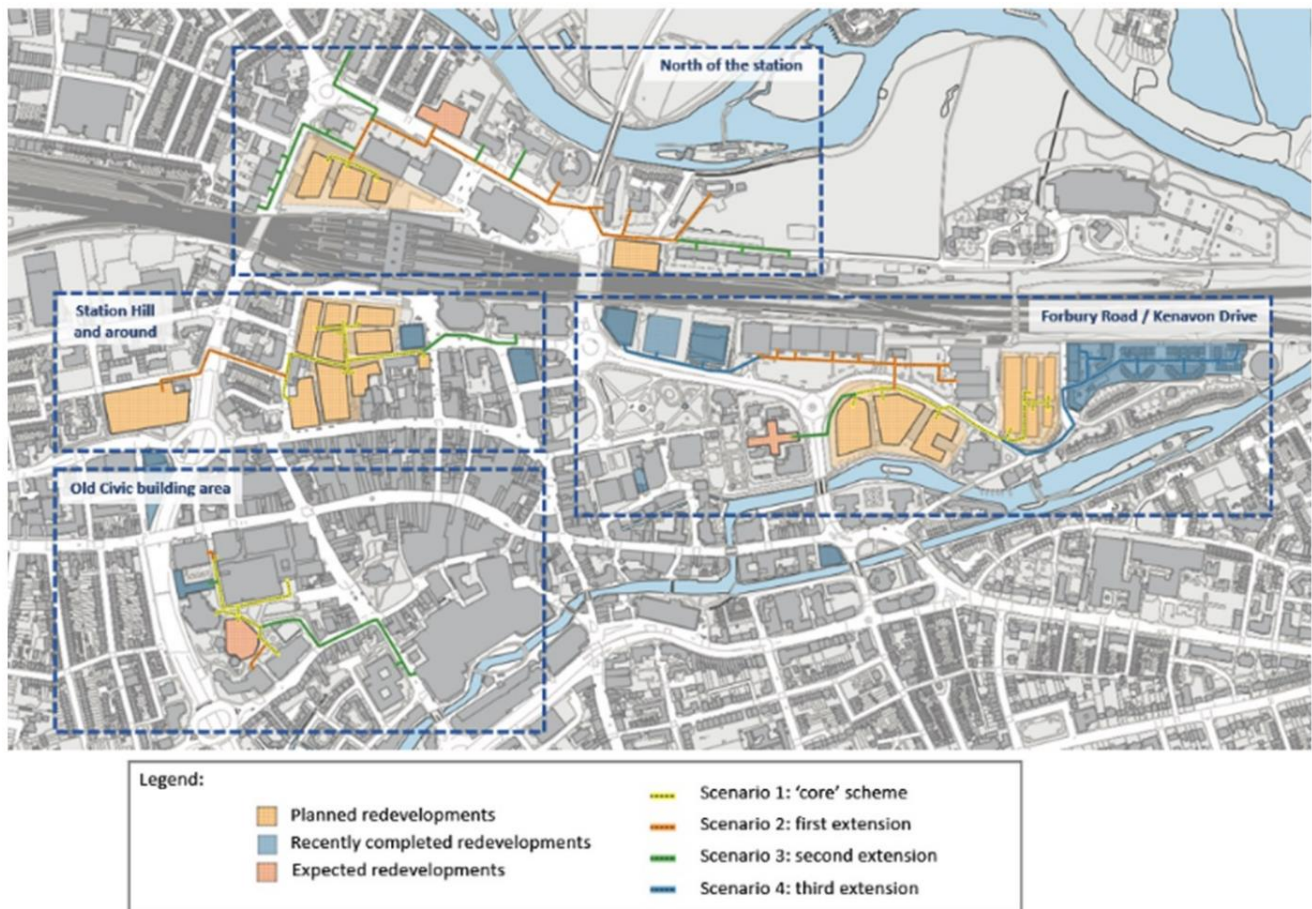


Figure 8: Four identified clusters for proposed district heating schemes (Source: Element Energy via Reading Borough Council Sustainable Design and Construction SPD, Dec 2019)

Combining the space heating and hot water demands of each building into a combined single network can offer a greater pool of energy, however, it is subject to higher investment costs associated with the increased pipe and duct lengths and limited flexibility. It may be extremely difficult to control due to anticipated fluctuating demand and relatively low demand, as well as the additional losses to maintain temperatures between the buildings.

4.3 Low and zero carbon technologies

With only cooling proposed for the office areas and a small space heating and hot water load requirement, finding an efficient low-carbon technology to deal with these small loads is a focal point of the energy strategy. This means that systems such as biomass boilers, local CHP are not financially feasible as their investment costs significantly outweigh their payback and the latter typically requires a constant base load to be a viable option.

As a result and combined with a carbon incentive to move towards an electric lead strategy, a variable refrigerant flow system utilising air source heat pumps combined with a photovoltaic array on each block roof has been proposed for Rose Kiln Court. Further detail can be found below.

Variable Refrigerant Flow (VRF)

VRF technology can provide an effective energy reduction contribution to the buildings heating and cooling requirement. Heat energy is extracted / discharged from / to the air. The advantage over Ground Source Heat Pump (GSHP) technology is that there are no large areas of land required and no groundwork required, providing a simpler, significantly cheaper installation. High coefficients of performance (COPs) can be expected. However, they tend to fluctuate due to the ever-changing air temperatures. This technology is certainly feasible, the relatively small footprint required for the external condenser units has minimal impact on the surroundings and can be quite easily installed on site, potentially at the rear of each building.

VRF systems are powered by electricity, enabling the new buildings to be fuelled by 100% electrical energy and offer a large reduction in energy usage over direct electric systems with an COP ranging between 2.5 - 4 vs a direct electric system which at best, can offer a COP of 1.

A smaller system like a heat pump can be beneficiary as it requires relatively low investment based on the setting. The planned site conditions and the uncertainty of occupancy rates make individual Air Source Heat Pump for each unit a much safer alternative than a Ground Source Heat Pump that would limit the flexibility, adaptability and variable demand of the site.

The Coefficient of Performance (COP) of a combined heating and cooling ASHP is low when supplying the higher temperatures required for DHW. Dedicated hot water ASHPs can provide higher flow temperatures with improved CoPs and could be provided, but due to the low hot water demand anticipated, selecting the ASHP for space heating only and reducing the supply temperature would allow a higher efficiency unit to be selected.

Photovoltaics (PV)

PV panels generate electricity that can be used directly on-site or exported back to the grid to provide direct carbon offset to an electrically fuelled energy strategy, reinforcing the drive towards net-zero carbon. PV panels are therefore the preferred renewable generation technology for Logikor Park to be used in combination with the localised heat pump arrangement and to complement the electric led system.

Photovoltaic panels are a well suited low-carbon technology for the site. The available roof space is subject to changes in roof-mounted equipment size and their access routes as well as the provision of roof lights above each of the warehouse/industrial units. The abundance of roof space is the most efficient location for PV system placement as the blocks do not provide cross-shading and the impact of shading from trees is anticipated to be limited due to most being located to the north of the site. The exact space allowance will be determined in further design stages pending future design development for roof lights, plant space, access and maintenance zones, plant replacement requirements and shading to determine the usable area for PVs. Photovoltaic panels can also be mounted on top of roof greenery such as sedum or another light plantation.

A PV array system with a combined total annual yield of 22,607 kWh is proposed for installation on rooftops. For the purposes of EPC, it has been assumed that the electricity generated on each block roof is equally distributed and fed into the individual meter of each unit. Deviation from this strategy should be discussed and agreed with the BREEAM Assessor, Building Control and the relevant body with which the EPC will be lodged to ensure that the benefits of the PV are fully realised for every unit.

5. Conclusions

This Statement has identified a route to demonstrating how the proposed development will address the energy and carbon emission reduction policies set out by the corresponding UK Building Regulations and local planning policies, as well as the Client aspirations for sustainable building design.

In summary, Logicor Park is targeting the following key performance energy indicators:

- Compliance with Part L 2021
- EPC 'A' rating per unit
- 5no. minimum credits under Ene01 for BREEAM 'Excellent' rating per block. To be assessed under the BREEAM UK New Construction v6 scheme.

The release of the most recent UK Building Regulations Part L in June 2022 have now recognised the decarbonisation of the UK grid and therefore developments supplied by electricity are now more advantageous where traditionally gas-fuelled alternatives are penalised from a carbon perspective. For consistent energy use, carbon reductions would also likely continue to improve as the UK grid continues to decarbonise. The scheme is proposing an electric-led strategy to maximise this potential via the use of ASHP and photovoltaic arrays.

The proposed energy strategy was demonstrated to deliver a 47.2% reduction in regulated carbon emissions and a regulated energy reduction of 49.3%, thereby demonstrating not only a route to compliance to Part L 2021, but a significant saving beyond this.

The scheme was also shown to provide a 43.4% reduction in the combined heating and cooling demand of the building, highlighting a substantial saving via passive measures before system efficiencies and renewable technologies are accounted for.

Finally, all units were shown to achieve an EPC 'A' rating and each block achieve a minimum of 5No. credits for Ene01 under BREEAM. These performance indicators were based upon an assumed fit-out specification for the shell industrial/warehouse areas and would need to be considered as part of any Tenant fit-out agreement for BREEAM purposes. The EPC is indicative only and will be subject to the first fit-out of tenant areas and where any of the performance specification stated within this statement appendix can not be achieved it would be the responsibility of the contractor to demonstrate that the EPC 'A' could still be achieved with any proposed fit out.

Table 4: Logicor Park, Rose Kiln Court – KPI Summary

	Regulated demand savings (%)	Regulated energy savings (%)	Regulated carbon savings (%)	PV annual yield (kWh per annum)	EPC (per unit)	BREEAM Ene01 credits
Block A	45.3%	56.5%	53.9%	8,511	A	>5
Block B	40.7%	38.0%	36.8%	2,756	A	>5
Block C	43.1%	49.2%	47.0%	11,340	A	>5
Site	43.4%	49.3%	47.2%	22,607	-	-

Appendix A – Part L Design Specification

Project Name	Rose Kiln Court
Project Reference	SVL-001
Title	Part L Design Parameters



Revision	Date	Author	Description
0	15/03/2023	MR	Base design paramters (subject to design team review)
1	29/03/2023	MR	Updated design parameters from design team and proposed route to revised KPI
2	26/04/2023	MR	Updated design parameters from design team and proposed route to revised KPI
3	12/05/2023	MR	Additional LZCT parameters included
4	15/05/2023	MR	Updated design parameters from design team and proposed route to revised KPI

Weather data

Site location	Reading
Weather data file	Swindon TRY

Fabric

Opaque (inc. repeating thermal bridging)	U-value (W/m2K)
External walls	0.18
Internal walls - Separating conditioned from unconditioned	0.26
Ground/exposed floors - Warehouse	0.15
Ground/exposed floors - Office	0.15
Roofs	0.16
Doors - Personnel (opaque)	1.40
Doors - Dock leveller doors and level access doors (opaque)	1.00

Transparent (inc. framing)	U-value (W/m2K)	G-value	Light transmittance	Frame factor
External windows	1.20	0.40	60%	10%
Rooflights	1.30	0.28	55%	15%
Pedestrian Doors (transparent)	1.40	0.40	60%	10%

Transparent (inc. framing)	U-value (W/m2K)	G-value	Light transmittance	Frame factor
Transparent panels	1.50	0.40	60%	10%
Opaque panels	1.50	-	-	10%

Air leakage	Air permeability (m3/m2.hr @ 50 Pa)
Target Air permeability	3

HVAC strategy

Room type	Shell/Core	Heating	Cooling	Ventilation	Ventilation rate
Warehouse	Shell	-	-	Natural	-
Office	Core	VRF	VRF	Natural	-
Stairs	Core	Frost protection only*	-	Natural	-
Toilets	Core	Elec radi	-	Remote extract	6 AC/hr

*Frost protection - Part L calc assumes not heated for occupancy purposes

Lighting strategy

Room type	Design illuminance (lux)	Power density (W/m2/100lux)	PIRs	Daylight control	Constant illuminance	Parasitic Power (W/m2)	Display lighting
Warehouse/Industrial process area	100/200	1.25	-	Yes	Yes	0.1	No
Office	300	1.33	Presence detection	Yes	Yes	0.1	No
Stairs	100	4.00	Presence detection	Yes	No	0.1	No
Toilets	200	3.00	Presence detection	-	No	0.1	No

Heating/Cooling Plant

System	VRF	Elec radi
Heating efficiency	350%	100%
Cooling efficiency	500%	
Fuel source	Electricity	Electricity

Ventilation

Ventilation unit	Specific fan power (W/l/s)
Remote extract fan	0.50

DHW

System name	Instantaneous hot water with small storage
Heating system	Direct electric
Heat source fuel	Electricity
Seasonal efficiency	100%
Generator heat type	Instantaneous hot water
Storage (l)	No Storage
Storage losses (kWh/(l.day))	-

Building management systems

Separate metering for HVAC	Yes
Separate metering for lighting	Yes
Smart BEMS with out-of-range warnings	No
Power factor correction	No

LZCT

Photovoltaics	Response	Comments
Are photovoltaics included?	Yes	
Annual yield targeted (MWh)	22,607 kWh/annum (Site)	8,511 kWh/annum (Block A) 2,756 kWh/annum (Block B) 11,340 kWh/annum(Block C)
Panel area (m2)	160 (Site)	20 per unit
Orientation (° from North)	291 (Unit A); 347(Unit B);	
Inclination (° from horizontal)	69 (Unit C)	
Panel efficiency (%)	18*	

*Indicative only, yield is key deliverable

LZCT Costs

ASHP (VRF) - Capital cost	Mitsubishi Electric - QUO-5555-383921/0
ASHP (VRF) - Maintenance cost	£10 per kWp per annum
Photovoltaics - Capital cost	£1000 per kWp
Photovoltaics - Maintenance cost	~30p per kWp per annum

Unit prices

Gas price (p/kWh)	7.024
Electricity price (p/kWh)	19.36

Energy prices from Department for Energy Security & Net Zero (30th March 2022) - Annual data for 2022

Fuel carbon intensity

Natural gas (kg.CO2/kWh)	0.210
Electricity (kg.CO2/kWh) - Monthly variation	0.111 - 0.163

NCM Modelling Guide 2021

Appendix B – Draft BRUKL Certificates

Project name

Shell and Core

Rose Kiln Court - Block A (B2)

As designed

Date: Mon May 15 13:05:56 2023

Administrative information

Building Details

Address: Reading,

Certifier details

Name: MYA Consultancy Services

Telephone number:

Address: 274 Northdown Road, Margate, CT9 2PT

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.19

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.19

BRUKL compliance module version: v6.1.e.0

Foundation area [m²]: 83.29The 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	3.58
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	1.65
Target primary energy rate (TPER), kWh _{PE} /m ² annum	37.58
Building primary energy rate (BPER), kWh _{PE} /m ² annum	16.36
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	0.26	0.26	01000003:Surf[7]
Floors	0.18	0.15	0.15	01000003:Surf[17]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.16	0.16	BL000003:Surf[3]
Windows** and roof windows	1.6	1.42	1.5	01000003:Surf[0]
Rooflights***	2.2	1.3	1.3	BL000003:Surf[0]
Personnel doors^	1.6	1.4	1.4	01000003:Surf[5]
Vehicle access & similar large doors	1.3	1	1	BL000003:Surf[4]
High usage entrance doors	3	-	-	No high usage entrance doors in building

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	3

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- Direct elec rads with extract - Circulation

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.3	-	-
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- VRF - Office

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	5	0	-	-
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- DHW - Unit A1

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

2- DHW - Unit A2

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

3- DHW - Unit A3

	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		
A-01-00-WC (Dis)		-	-	0.5	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
A-01-01-WC	-	-	0.5	-	-	-	-	-	-	-	N/A
A-02-00-WC (Dis)	-	-	0.5	-	-	-	-	-	-	-	N/A
A-02-01-WC	-	-	0.5	-	-	-	-	-	-	-	N/A
A-03-00-WC (Dis)	-	-	0.5	-	-	-	-	-	-	-	N/A
A-03-01-WC	-	-	0.5	-	-	-	-	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
A-01-00-Stair	NO
A-01-00-Unit A1	YES
A-01-00-WC (Dis)	NO
A-01-01-Office	NO
A-01-01-Stairs	NO
A-01-01-WC	NO
A-02-00M-Stairs	NO
A-02-00-Stairs	NO
A-02-00-Unit A2	YES
A-02-00-WC (Dis)	NO
A-02-01-Office	NO
A-02-01-Stairs	NO
A-02-01-WC	NO
A-03-00-Stairs	NO
A-03-00-Unit A3	YES
A-03-00-WC (Dis)	NO
A-03-01-Office	NO
A-03-01-Stairs	NO
A-03-01-WC	NO

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
A-01-00-Stair		103	-	-
A-01-00-Unit A1		148	-	-
A-01-00-WC (Dis)		262	-	-
A-01-01-Office		133	-	-
A-01-01-Stairs		103	-	-
A-01-01-WC		302	-	-
A-02-00M-Stairs		85	-	-
A-02-00-Stairs		99	-	-
A-02-00-Unit A2		152	-	-
A-02-00-WC (Dis)		198	-	-
A-02-01-Office		138	-	-
A-02-01-Stairs		106	-	-

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
A-02-01-WC		302	-	-
A-03-00-Stairs		102	-	-
A-03-00-Unit A3		145	-	-
A-03-00-WC (Dis)		276	-	-
A-03-01-Office		143	-	-
A-03-01-Stairs		103	-	-
A-03-01-WC		302	-	-

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?
A-01-00-Unit A1	NO (-39%)	NO
A-01-01-Office	NO (-61.5%)	NO
A-02-00-Unit A2	NO (-33.5%)	NO
A-02-01-Office	NO (-17.3%)	NO
A-03-00-Unit A3	NO (-0%)	NO
A-03-01-Office	NO (-84.6%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	923.1	923.1
External area [m ²]	2702.2	2702.2
Weather	SWI	SWI
Infiltration [m ³ /hm ² @ 50Pa]	3	5
Average conductance [W/K]	827.74	873.13
Average U-value [W/m ² K]	0.31	0.32
Alpha value* [%]	26.3	10

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

Building Use

% Area Building Type

	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
100	General Industrial and Special Industrial Groups
	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	5.92	10.83
Cooling	0.19	0.59
Auxiliary	0.56	0.64
Lighting	9.35	10.44
Hot water	3.41	3.24
Equipment*	30.6	30.6
TOTAL **	19.44	25.75

* 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	9.22	0.79
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>9.22</i>	<i>0.79</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	53.29	97.44
Primary energy [kWh _{PE} /m ²]	16.36	37.58
Total emissions [kg/m ²]	1.65	3.58

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] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	277.8	16	23.7	1.3	0	3.26	3.55	3.5	5
	Notional	431.1	64.5	43.1	3.9	0	2.78	4.63	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	303.7	0	84.3	0	20.7	1	0	1	0
	Notional	789	0	155.4	0	23.6	1.41	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

Project name

Shell and Core

Rose Kiln Court - Block B (B2)

As designed

Date: Mon May 15 13:18:22 2023

Administrative information

Building Details

Address: Reading,

Certifier details

Name: MYA Consultancy Services

Telephone number:

Address: 274 Northdown Road, Margate, CT9 2PT

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.19

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.19

BRUKL compliance module version: v6.1.e.0

Foundation area [m²]: 62.73The 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	2.91
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	1.84
Target primary energy rate (TPER), kWh _{PE} /m ² annum	30.56
Building primary energy rate (BPER), kWh _{PE} /m ² annum	18.96
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	0.26	0.26	BL000005:Surf[0]
Floors	0.18	0.15	0.15	BL000005:Surf[12]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.16	0.16	BL000008:Surf[9]
Windows** and roof windows	1.6	1.42	1.5	BL000005:Surf[1]
Rooflights***	2.2	1.3	1.3	BL000008:Surf[0]
Personnel doors^	1.6	1.4	1.4	BL000005:Surf[6]
Vehicle access & similar large doors	1.3	1	1	BL000008:Surf[16]
High usage entrance doors	3	-	-	No high usage entrance doors in building
U _{a-Limit} = Limiting area-weighted average U-values [W/(m ² K)] U _{a-Calc} = Calculated area-weighted average U-values [W/(m ² K)] U _{i-Calc} = Calculated maximum individual element U-values [W/(m ² K)] * Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows. ** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position. ^ For fire doors, limiting U-value is 1.8 W/m ² K 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	3

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- Direct elec rads with extract - Circulation

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.3	-	-
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- VRF - Office

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	5	0	-	-
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- DHW - Unit B1

	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			
B-01-00-WC (Dis)	-	-	0.5	-	-	-	-	-	-	-	-	N/A
B-01-01-WC	-	-	0.5	-	-	-	-	-	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
B-01-00-Stairs	NO
B-01-00-Unit B1	YES
B-01-00-WC (Dis)	NO
B-01-01-Office	NO
B-01-01-Stairs	NO
B-01-01-WC	NO

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
B-01-00-Stairs		107	-	-
B-01-00-Unit B1		129	-	-
B-01-00-WC (Dis)		248	-	-
B-01-01-Office		119	-	-
B-01-01-Stairs		107	-	-
B-01-01-WC		302	-	-

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?
B-01-00-Unit B1	NO (-35.5%)	NO
B-01-01-Office	NO (-63.9%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	692.3	692.3
External area [m ²]	2129.6	2129.6
Weather	SWI	SWI
Infiltration [m ³ /hm ² @ 50Pa]	3	5
Average conductance [W/K]	577.99	620.59
Average U-value [W/m ² K]	0.27	0.29
Alpha value* [%]	25.84	10

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

Building Use

% Area Building Type

	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
100	General Industrial and Special Industrial Groups
	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	4.36	7.88
Cooling	0.15	0.48
Auxiliary	0.27	0.31
Lighting	7.38	8.29
Hot water	3.95	3.76
Equipment*	32.79	32.79
TOTAL **	16.12	20.72

* 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	3.98	0.4
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>3.98</i>	<i>0.4</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	45.59	76.92
Primary energy [kWh _{PE} /m ²]	18.96	30.56
Total emissions [kg/m ²]	1.84	2.91

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] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	239	11.5	20.4	0.9	0	3.26	3.55	3.5	5
	Notional	348.4	47.1	34.8	2.8	0	2.78	4.63	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	267	0	74.2	0	21.9	1	0	1	0
	Notional	813.9	0	160.3	0	25	1.41	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

Project name

Shell and Core

Rose Kiln Court - Block C (B2)

As designed

Date: Mon May 15 13:26:15 2023

Administrative information

Building Details

Address: Reading,

Certifier details

Name: MYA Consultancy Services

Telephone number:

Address: 274 Northdown Road, Margate, CT9 2PT

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.19

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.19

BRUKL compliance module version: v6.1.e.0

Foundation area [m²]: 151.14The 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	3.17
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	1.68
Target primary energy rate (TPER), kWh _{PE} /m ² annum	33.33
Building primary energy rate (BPER), kWh _{PE} /m ² annum	16.93
Do the building's emission and primary energy rates exceed the targets?	BER ≤ TER BPER ≤ TPER

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

Fabric element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	First surface with maximum value
Walls*	0.26	0.26	0.26	C0000000:Surf[7]
Floors	0.18	0.15	0.15	C0000000:Surf[9]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.16	0.16	C0000017:Surf[10]
Windows** and roof windows	1.6	1.39	1.5	C0000000:Surf[2]
Rooflights***	2.2	1.3	1.3	C0000017:Surf[2]
Personnel doors^	1.6	1.4	1.4	C0000000:Surf[5]
Vehicle access & similar large doors	1.3	1	1	C0000017:Surf[11]
High usage entrance doors	3	-	-	No high usage entrance doors in building

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	3

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- Direct elec rads with extract - Circulation

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.3	-	-
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- VRF - Office

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	5	0	-	-
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- DHW - Unit C1

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

2- DHW - Unit C2

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

3- DHW - Unit C3

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

4- DHW - Unit C4

	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		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
C-01-00-WC (Dis)	-	-	0.5	-	-	-	-	-	-	-	N/A
C-01-01-WC	-	-	0.5	-	-	-	-	-	-	-	N/A
C-02-00-WC (Dis)	-	-	0.5	-	-	-	-	-	-	-	N/A
C-02-01-WC	-	-	0.5	-	-	-	-	-	-	-	N/A
C-03-00-WC (Dis)	-	-	0.5	-	-	-	-	-	-	-	N/A
C-03-01-WC	-	-	0.5	-	-	-	-	-	-	-	N/A
C-04-00-WC (Dis)	-	-	0.5	-	-	-	-	-	-	-	N/A
C-04-01-WC	-	-	0.5	-	-	-	-	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
C-01-00-Stairs	NO
C-01-00-Unit C1	YES
C-01-00-WC (Dis)	NO
C-01-01-Office	NO
C-01-01-Stairs	NO
C-01-01-WC	NO
C-02-00M-Stairs	NO
C-02-00-Stairs	NO
C-02-00-Unit C2	YES
C-02-00-WC (Dis)	NO
C-02-01-Office	NO
C-02-01-Stairs	NO
C-02-01-WC	NO
C-03-00M-Stairs	NO
C-03-00-Stairs	NO
C-03-00-Unit C3	YES
C-03-00-WC (Dis)	NO
C-03-01-Office	NO
C-03-01-Stairs	NO
C-03-01-WC	NO
C-04-00-Stairs	NO
C-04-00-Unit C4	YES
C-04-00-WC (Dis)	NO
C-04-01-Office	NO
C-04-01-Stairs	NO
C-04-01-WC	NO

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
C-01-00-Stairs		106	-	-
C-01-00-Unit C1		134	-	-

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
C-01-00-WC (Dis)		269	-	-
C-01-01-Office		125	-	-
C-01-01-Stairs		107	-	-
C-01-01-WC		302	-	-
C-02-00M-Stairs		94	-	-
C-02-00-Stairs		96	-	-
C-02-00-Unit C2		140	-	-
C-02-00-WC (Dis)		203	-	-
C-02-01-Office		127	-	-
C-02-01-Stairs		112	-	-
C-02-01-WC		302	-	-
C-03-00M-Stairs		94	-	-
C-03-00-Stairs		96	-	-
C-03-00-Unit C3		140	-	-
C-03-00-WC (Dis)		203	-	-
C-03-01-Office		127	-	-
C-03-01-Stairs		112	-	-
C-03-01-WC		302	-	-
C-04-00-Stairs		106	-	-
C-04-00-Unit C4		134	-	-
C-04-00-WC (Dis)		269	-	-
C-04-01-Office		125	-	-
C-04-01-Stairs		107	-	-
C-04-01-WC		302	-	-

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?
C-01-00-Unit C1	NO (-4.2%)	NO
C-01-01-Office	NO (-24.3%)	NO
C-02-00-Unit C2	NO (-34.6%)	NO
C-02-01-Office	NO (-70.1%)	NO
C-03-00-Unit C3	NO (-34.5%)	NO
C-03-01-Office	NO (-70.5%)	NO
C-04-00-Unit C4	NO (-4.2%)	NO
C-04-01-Office	NO (-34.9%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	1641.1	1641.1
External area [m ²]	4250.3	4250.3
Weather	SWI	SWI
Infiltration [m ³ /hm ² @ 50Pa]	3	5
Average conductance [W/K]	1242.19	1333.52
Average U-value [W/m ² K]	0.29	0.31
Alpha value* [%]	26.23	10

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

Building Use

% Area Building Type

	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
100	General Industrial and Special Industrial Groups
	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	5.01	8.69
Cooling	0.19	0.62
Auxiliary	0.4	0.45
Lighting	8.33	9.64
Hot water	3.68	3.49
Equipment*	31.76	31.76
TOTAL **	17.61	22.89

* 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	6.91	0.72
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>6.91</i>	<i>0.72</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	47.03	82.64
Primary energy [kWh _{PE} /m ²]	16.93	33.33
Total emissions [kg/m ²]	1.68	3.17

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] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	232.7	14.7	19.8	1.1	0	3.26	3.55	3.5	5
	Notional	348.3	62.3	34.8	3.7	0	2.78	4.63	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	323.2	0	89.8	0	20.3	1	0	1	0
	Notional	771.2	0	151.9	0	23.2	1.41	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