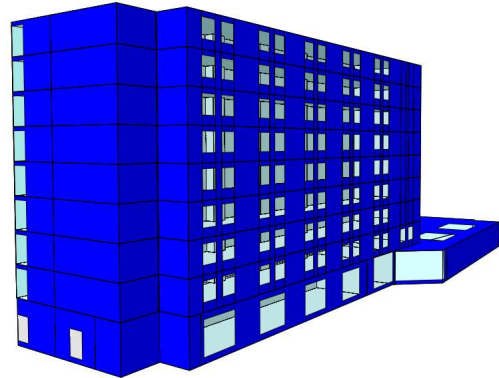


ENERGY STATEMENT REPORT

FOR THE: EXTENSION TO CLAYTON HOTEL MANCHESTER AIRPORT



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1 Introduction

This report has been produced to describe the energy strategy for the proposed Bedroom Block Extension to Clayton Hotel Manchester Airport.

Energy and sustainability is an integral part of Dalata Hotel Group Employers Requirements and the proposed development's design.

The proposed extension will be an 8 storey building generally comprising 216 bedrooms (levels 1 through 8), a ground floor reception area, restaurant, and ancillary spaces.

This report demonstrates how the scheme satisfies national, regional and local planning guidance in relation to sustainability and climate change mitigation / adaption; including Manchester City Council Core Strategy Policy EN6 & Part L Building Regulations.

The report also details the assessment process for incorporating renewable and low or zero carbon (LZC) technologies into the development, whilst outlines the estimated CO₂ savings achieved through integration of passive design, energy efficiency measures and Low and Zero Carbon (LZC) technologies.

The approach taken for the energy assessment using IES software is as follows:

- Calculate baseline CO₂ emissions;
- Integrate measures to reduce energy demand and ensure efficient use of energy;
- Integrate renewable energy technology; and
- Calculate total CO₂ savings and final development CO₂ emissions

2 Energy Strategy Approach

The extension was assessed using the latest version of the IES dynamic thermal modelling software

The extension has been designed to meet sustainability and energy targets which are driven through:

- UK Building Regulations Part L2A – Conservation of fuel and power in new buildings other than dwellings

3 Passive Design and Energy Efficiency

The proposed development will embrace passive design and energy efficiency, providing a reduction in regulated carbon dioxide emissions over the Part L compliance target.

4 Carbon Reduction Targets

Having viewed and assessed Manchester City Council Core Strategy Policy EN6 we assessed the bedroom block extension against achieving a **15%** increase over Building Regulation Part L 2010 carbon emissions.

The reductions will be achieved by a combination of measures, including the following:

Item	Passive Solution	Proposal																								
1	Maximising natural daylight	Natural daylight will be maximised through various methods to be confirmed by architect																								
2	Optimisation of the size and g-value of the glazing to provide a balance between minimising summer heat gain, maximising winter heat gain, and maximising natural daylight.	The glazing has been optimised using the dynamic thermal modelling, in order to provide a balance between minimising summer heat gain (along with external shading), maximising winter heat gain to reduce heating loads, and maximising natural daylight to reduce lighting energy. This has resulted in the g-value of the glazing being set at 0.35.																								
3	Improved fabric 'U' values	<div>The thermal performance of the building fabric will be significantly improved over Part L 2013 minimum requirements as below:</div> <table><tr><th>Fabric</th><th>Part L 2013 U-Value</th><th>Part L 2021 U-Value</th><th>Target U-Value</th></tr><tr><td>Ext. walls</td><td>0.35</td><td>0.26</td><td>0.15</td></tr><tr><td>Floors</td><td>0.25</td><td>0.18</td><td>0.15</td></tr><tr><td>Flat roofs</td><td>0.25</td><td>0.18</td><td>0.16</td></tr><tr><td>External windows</td><td>2.20</td><td>1.60</td><td>1.20 (G-val. 0.35)</td></tr><tr><td>Roof lights</td><td>2.20</td><td>2.20</td><td>1.60</td></tr></table>	Fabric	Part L 2013 U-Value	Part L 2021 U-Value	Target U-Value	Ext. walls	0.35	0.26	0.15	Floors	0.25	0.18	0.15	Flat roofs	0.25	0.18	0.16	External windows	2.20	1.60	1.20 (G-val. 0.35)	Roof lights	2.20	2.20	1.60
Fabric	Part L 2013 U-Value	Part L 2021 U-Value	Target U-Value																							
Ext. walls	0.35	0.26	0.15																							
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External windows	2.20	1.60	1.20 (G-val. 0.35)																							
Roof lights	2.20	2.20	1.60																							
4	Improved air tightness	The target air permeability for the development has been set at 3.0 m³/(h m²) at 50 Pa as compared to the Part L minimum requirement of 10 m³/(h m²) to reduce heat loss in winter																								
5	Minimising heat loss from heating and hot water systems	Heat losses from heating and hot water pipework will be reduced by minimising the length of pipe runs, and by providing a high level of insulation to all parts of the systems																								
6	DHW from high efficiency gas fired boilers and heat pump technology	Consider heat pump and gas fired boiler bivalent solution for hot water generation.																								
7	Variable speed technologies utilised with the Heating and ventilation systems	The heating systems will operate at variable speed to reduce pumping energy																								
8	High efficiency heat recovery technologies utilised with ventilation systems	Mechanical ventilation systems serving the building will be provided with high efficiency heat recovery systems																								
9	Low energy lighting with occupancy and key card controls as appropriate	<div>Energy efficient LED lighting will be used throughout the proposed development. Occupancy and key card control will be used where appropriate.</div> <div>Highly efficient lighting to be specified with luminous efficacy of 120lm/W and 100lm/W for reception area and hotel rooms, respectively.</div>																								
10	BMS Controls systems to monitor and operate the plant and equipment as efficiently as possible	A central Building Management System (BMS) will be provided to operate the plant and systems in the most energy efficient manner.																								
11	Energy efficient equipment/appliances	Where appliances are provided by the operator they will be of an energy efficient type, which generally generate less heat and can help minimise the build-up of heat within the buildings																								

Whilst these are the design standards currently targeted, their achievability will be reviewed through detailed design stages to ensure the overall CO₂ reduction targets are maintained, and to consider any design changes.

5 Renewable Energy

An appraisal of potential on-site renewable energy systems has been undertaken for the proposed extension, with the following technologies considered:

Item	Renewable Technology	Analysis	Recommendation
1	Air source heat pumps	The space heating and cooling demand for the proposed extension is served primarily by A/C system (i.e. Air Source Heat Pump). Bedrooms: Roof mounted condenser & bedroom units utilising HVRF technology including low (GWP) global warming potential and high energy efficiency.	Air source heat pumps shall be utilised for bedroom, restaurant, corridor, foyer and office heating and cooling.
2	Air source heat pumps	The domestic hot water demand for the proposed extension could be served primarily by utilising heat pump technology (i.e. Air Source Heat Pump)	Air source heat pumps shall be evaluated within the detailed design stage for domestic hot water generation in a bivalent solution.
3	Biomass boilers	The space heating demand for the proposed extension is served by A/C system (i.e. Air Source Heat Pump Technology). Biomass systems are better operating as the lead heat source (and not as top up) as it is not suited to operating with variable load. A biomass boiler would also adversely impact on local air quality due to its emissions, and vehicular delivery of fuel would be required resulting in increased traffic movements.	Biomass boilers are therefore not proposed for the development
4	Photovoltaics (PVs)	An active area of 60m ² of photovoltaic panels could generate around 10kW _p to offset CO ₂ emissions.	Photovoltaics shall be evaluated within the detailed design stage for offsetting CO ₂ emissions.
5	Wind Turbines	Wind turbines would have significant, architectural and airport implications, together with potential noise issues.	Wind turbines are therefore not proposed for the development
6	Solar thermal	Solar thermal system could provide a proportion of the hot water load, particularly during the day when demand is relatively low. The system has a high maintenance cost.	Solar thermal is therefore not proposed for the development
7	Ground source heat pumps	Due to the small size of the site, open loop and horizontal closed loop boreholes would not be suitable. The potential capacity of vertical closed loop is limited by the number of borehole that could be provided. A GSHP provides low grade heat which is not suited to the building's main heat demand – domestic hot water.	Ground source heat pumps is therefore not proposed for the development

6 Calculating Regulated CO₂ Emissions

The strategy considers a baseline, which has been defined for the commercial (non-residential) building on the site, as follows:

The commercial development has been modelled using Integrated Environmental Solutions (IES), Virtual Environment software 2022.4.1.0 (VE Compliance 7.0.20.0). This software can create a dynamic thermal model of the building, using ApacheSim to calculate the building's loads, energy consumption, and resulting CO₂ emissions. This software calculates the Building CO₂ Emissions Rate (BER) and Notional Target Emission Rate (TER) using the Building Regulations 2021 methodology based on the National Calculation Methodology (NCM).

7 Energy Models

IES calculates regulated energy consumption i.e. energy uses considered under Part L 2021, for example heating, cooling, domestic hot water (DHW), and electricity for lighting, pumps and fans. Unregulated energy consumption includes all energy not considered under Part L, for example, gas for catering, small power, lifts and external lighting. An IES model was created for all spaces with assigned occupancy profiles to estimate the energy consumption and associated carbon emissions.

An estimation of energy consumption has been calculated using the results from IES to provide a total development carbon footprint.

8 Baseline Predicted Energy Demand and CO₂ Emissions

The IES models have been run to calculate the resulting energy consumption and CO₂ emissions considering the passive design and energy efficiency measures detailed within the previous section.

	IES VE Compliance	
	Predicted Density per Annum	Predicted Value per Annum (Model Area 8293m ²)
Energy Usage	142.0340 kWh/m ²	1177.89 MWh
CO ₂ Emissions	19.5925 kgCO ₂ /m ²	162.48 tCO ₂

9 Demand Reduction

An assessment has been carried out to determine how unregulated energy and carbon dioxide emissions can be reduced through the use of energy efficient appliances and equipment, controls, good management practice, etc.

The table below details energy usage and associated CO₂ emissions following demand reduction:

	Total Primary Energy Usage (kWh/m2)	Total CO2 Emissions (kgCO2/m2)
2010		
Target Building Regulations (2010)	N/A	58.6
Actual Building (2010 compliance)	N/A	35.6
Percentage improvement over 2010 compliance	N/A	39.24%
Comments	Planning compliance criteria of greater than 15% CO2 reduction over 2010 compliance is met	
2021		
Target Building Regulations (2021)		22.8167
Actual Building (2021 compliance)	142.034	19.5925
Percentage improvement over 2021 compliance	N/A	14.13%
Comments	Part L 2021 compliance is met	

Note: Carbon emission factors change depending on Part L compliance year.

It is expected that the proposed development will provide a 14.13% reduction in unregulated carbon dioxide emissions over the baseline.

A summary of the energy assessment calculations following demand reduction is provided in Section 5.

It is expected that the energy demand reduction will be achieved by a combination of measures including those detailed below.

10 Hotel In-Use Energy Efficiency Measures

10.1 Hotel Equipment / Small Power

The hotel operator will be encouraged to reduce energy demand and associated carbon dioxide emissions to achieve the CIBSE good practice benchmarks.

It is expected that the energy demand reduction will be achieved by a combination of measures including those detailed below.

- Energy efficient TVs, minibars and other equipment to be used in the guestrooms.
- Energy efficient comms/ IT equipment to be used.

10.2 Office Equipment / Small Power

The office occupier will be encouraged to reduce energy demand and associated carbon dioxide emissions to achieve the CIBSE good practice benchmarks.

It is expected that the energy demand reduction will be achieved by a combination of measures including those detailed below:

- Energy efficient TVs, white goods and other equipment to be used.
- Energy efficient desktop PCs, laptops, screens etc to be used.
- Encourage staff to switch off equipment when not in use.

10.3 Water Consumption / Water Efficiency

Within the scheme we have incorporated measures to minimise water use.

Internal water consumption will be minimised by introducing a number of measures such as water efficient taps and showerheads, water saving appliances, automatic shut off valves and flow restrictors in the communal areas.

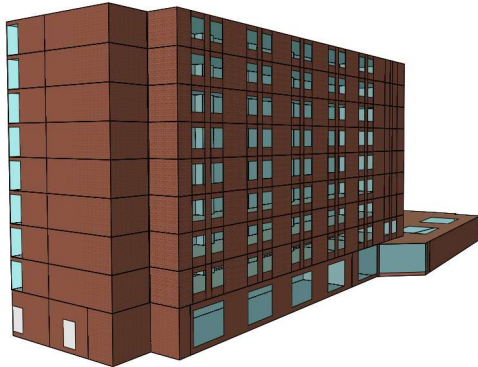
A leak detection system will be installed, monitoring the mains water supply between the water meter and the building.

Measures such as water efficient sanitary ware will be incorporated to maximise BREEAM water credits.

10.4 Monitoring Energy Use

Within the scheme we have incorporated monitoring of energy use (Electricity, gas & water) enabling the hotel to target reducing their energy use.

Metering to be provided in line with Part L and BREEAM requirements.



11 Appendices

11.1 BRUKL 2021

See attached.

Project name

Clayton Hotel Extension

As designed

Date: Wed Jun 21 13:01:18 2023

Administrative information

Building Details

Address: Manchester Airport, Outwood Ln, Manchester, M90 4HL

Certifier details

Name: Patrick McCaul Environmental Consulting Engineers Ltd**Telephone number:** 0044 (0) 28 8225 1155**Address:** Bankmore Business Park, Bankmore Road, Omagh, BT79 0BE

Certification tool

Calculation engine: SBEM**Calculation engine version:** v6.1.e.0**Interface to calculation engine:** Virtual Environment**Interface to calculation engine version:** v7.0.20**BRUKL compliance module version:** v6.1.e.1**Foundation area [m²]:** 829.33The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	22.82
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	19.59
Target primary energy rate (TPER), kWh _{PE} /m ² annum	177.81
Building primary energy rate (BPER), kWh _{PE} /m ² annum	142.03
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	0.15	0.15	L0000000_W3
Floors	0.18	0.15	0.15	L0000000_F
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.16	0.16	L0000000F_C
Windows** and roof windows	1.6	1.2	1.2	L0000000_W3_O0
Rooflights***	2.2	1.6	1.6	L0000014_C_O0
Personnel doors^	1.6	-	-	No external personnel doors
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

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

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

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

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

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

Air permeability	Limiting standard	This building
m ³ /(h.m ²) at 50 Pa	8	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	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- HVRF PURY-EP350YNW-A

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.1	8.4	-	-	-
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					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

2- DHW HP / Gas Boiler

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.14	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

1- SYST0002-DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	0
Standard value	N/A	N/A

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

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
L0 VOID		95	-	-
L0 STAIRS LOBBY		95	-	-
L0 LINEN & FURNITURE STORE		95	-	-
L0 MEETING ROOM (01)		95	-	-
L0 COMMS ROOM		95	-	-
L0 LUGGAGE STORE		95	-	-
L0 ENTRANCE LOBBY		95	-	-
L0 GUEST LIFTS		95	-	-
L0 STAIRS (01)		95	-	-
L1 STAIRS		95	-	-
L1 GUEST LIFTS		95	-	-
L1 LIFT LOBBY		95	-	-
L1 EAST ENSUITE BEDROOMS		95	-	-
L1 WEST ENSUITE BEDROOMS		95	-	-
L1 CORRIDOR		95	-	-
L0 FIREFIGHTING LOBBY		95	-	-
L0 FIREFIGHTING LIFT		95	-	-

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
L0 FIREFIGHTING STAIRS		95	-	-
L1 FIREFIGHTING LIFT		95	-	-
L1 FIREFIGHTING LOBBY		95	-	-
L1 FIREFIGHTING STAIRS		95	-	-
L1 LINEN STORE		95	-	-
L1 COMMS ROOM		95	-	-
L2 STAIRS		95	-	-
L2 GUEST LIFTS		95	-	-
L2 LIFT LOBBY		95	-	-
L2 EAST ENSUITE BEDROOMS		95	-	-
L2 WEST ENSUITE BEDROOMS		95	-	-
L2 CORRIDOR		95	-	-
L2 FIREFIGHTING LIFT		95	-	-
L2 FIREFIGHTING LOBBY		95	-	-
L2 FIREFIGHTING STAIRS		95	-	-
L2 LINEN STORE		95	-	-
L2 COMMS ROOM		95	-	-
L3 STAIRS		95	-	-
L3 GUEST LIFTS		95	-	-
L3 LIFT LOBBY		95	-	-
L3 EAST ENSUITE BEDROOMS		95	-	-
L3 WEST ENSUITE BEDROOMS		95	-	-
L3 CORRIDOR		95	-	-
L3 FIREFIGHTING LIFT		95	-	-
L3 FIREFIGHTING LOBBY		95	-	-
L3 FIREFIGHTING STAIRS		95	-	-
L3 LINEN STORE		95	-	-
L3 COMMS ROOM		95	-	-
L4 STAIRS		95	-	-
L4 GUEST LIFTS		95	-	-
L4 LIFT LOBBY		95	-	-
L4 EAST ENSUITE BEDROOMS		95	-	-
L4 WEST ENSUITE BEDROOMS		95	-	-
L4 CORRIDOR		95	-	-
L4 FIREFIGHTING LIFT		95	-	-
L4 FIREFIGHTING LOBBY		95	-	-
L4 FIREFIGHTING STAIRS		95	-	-
L4 LINEN STORE		95	-	-
L4 COMMS ROOM		95	-	-
L5 STAIRS		95	-	-
L5 GUEST LIFTS		95	-	-
L5 LIFT LOBBY		95	-	-
L5 EAST ENSUITE BEDROOMS		95	-	-

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
L5 WEST ENSUITE BEDROOMS		95	-	-
L5 CORRIDOR		95	-	-
L5 FIREFIGHTING LIFT		95	-	-
L5 FIREFIGHTING LOBBY		95	-	-
L5 FIREFIGHTING STAIRS		95	-	-
L5 LINEN STORE		95	-	-
L5 COMMS ROOM		95	-	-
L6 STAIRS		95	-	-
L6 GUEST LIFTS		95	-	-
L6 LIFT LOBBY		95	-	-
L6 EAST ENSUITE BEDROOMS		95	-	-
L6 WEST ENSUITE BEDROOMS		95	-	-
L6 CORRIDOR		95	-	-
L6 FIREFIGHTING LIFT		95	-	-
L6 FIREFIGHTING LOBBY		95	-	-
L6 FIREFIGHTING STAIRS		95	-	-
L6 LINEN STORE		95	-	-
L6 COMMS ROOM		95	-	-
L7 STAIRS		95	-	-
L7 GUEST LIFTS		95	-	-
L7 LIFT LOBBY		95	-	-
L7 EAST ENSUITE BEDROOMS		95	-	-
L7 WEST ENSUITE BEDROOMS		95	-	-
L7 CORRIDOR		95	-	-
L7 FIREFIGHTING LIFT		95	-	-
L7 FIREFIGHTING LOBBY		95	-	-
L7 FIREFIGHTING STAIRS		95	-	-
L7 LINEN STORE		95	-	-
L7 COMMS ROOM		95	-	-
L8 STAIRS		95	-	-
L8 GUEST LIFTS		95	-	-
L8 LIFT LOBBY		95	-	-
L8 EAST ENSUITE BEDROOMS		95	-	-
L8 WEST ENSUITE BEDROOMS		95	-	-
L8 CORRIDOR		95	-	-
L8 FIREFIGHTING LIFT		95	-	-
L8 FIREFIGHTING LOBBY		95	-	-
L8 FIREFIGHTING STAIRS		95	-	-
L8 LINEN STORE		95	-	-
L8 COMMS ROOM		95	-	-
RL		95	-	-
L0 MALE WC		95	-	-
L0 FEMALE WC		95	-	-

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
L0 ACCESSIBLE WC		95	-	-
L0 MEETING ROOM (02)		95	-	-
L0 RECEPTION / LOUNGE		95	80	1.688
L0 ITALIAN KITCHEN / BAR		95	80	1.875
L0 KITCHEN		95	-	-

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?
L0 VOID	NO (-30.9%)	NO
L0 STAIRS LOBBY	N/A	N/A
L0 LINEN & FURNITURE STORE	NO (-81.5%)	NO
L0 MEETING ROOM (01)	NO (-75.8%)	NO
L0 COMMS ROOM	N/A	N/A
L0 LUGGAGE STORE	NO (-65.4%)	NO
L0 ENTRANCE LOBBY	YES (+191.4%)	NO
L0 GUEST LIFTS	N/A	N/A
L0 STAIRS (01)	NO (-64.2%)	NO
L1 STAIRS	N/A	N/A
L1 GUEST LIFTS	N/A	N/A
L1 LIFT LOBBY	N/A	N/A
L1 EAST ENSUITE BEDROOMS	NO (-54.1%)	NO
L1 WEST ENSUITE BEDROOMS	NO (-41.3%)	NO
L1 CORRIDOR	NO (-86.1%)	NO
L0 FIREFIGHTING LOBBY	NO (-21.2%)	NO
L0 FIREFIGHTING LIFT	N/A	N/A
L0 FIREFIGHTING STAIRS	YES (+26.6%)	NO
L1 FIREFIGHTING LIFT	N/A	N/A
L1 FIREFIGHTING LOBBY	NO (-55.9%)	NO
L1 FIREFIGHTING STAIRS	YES (+11.6%)	NO
L1 LINEN STORE	N/A	N/A
L1 COMMS ROOM	N/A	N/A
L2 STAIRS	NO (-9.6%)	NO
L2 GUEST LIFTS	N/A	N/A
L2 LIFT LOBBY	N/A	N/A
L2 EAST ENSUITE BEDROOMS	NO (-54.1%)	NO
L2 WEST ENSUITE BEDROOMS	NO (-41.3%)	NO
L2 CORRIDOR	N/A	N/A
L2 FIREFIGHTING LIFT	N/A	N/A
L2 FIREFIGHTING LOBBY	NO (-55.9%)	NO
L2 FIREFIGHTING STAIRS	YES (+11.6%)	NO
L2 LINEN STORE	N/A	N/A
L2 COMMS ROOM	N/A	N/A
L3 STAIRS	NO (-9.6%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L3 GUEST LIFTS	N/A	N/A
L3 LIFT LOBBY	N/A	N/A
L3 EAST ENSUITE BEDROOMS	NO (-54.1%)	NO
L3 WEST ENSUITE BEDROOMS	NO (-41.3%)	NO
L3 CORRIDOR	N/A	N/A
L3 FIREFIGHTING LIFT	N/A	N/A
L3 FIREFIGHTING LOBBY	NO (-55.9%)	NO
L3 FIREFIGHTING STAIRS	YES (+11.6%)	NO
L3 LINEN STORE	N/A	N/A
L3 COMMS ROOM	N/A	N/A
L4 STAIRS	NO (-9.6%)	NO
L4 GUEST LIFTS	N/A	N/A
L4 LIFT LOBBY	N/A	N/A
L4 EAST ENSUITE BEDROOMS	NO (-54.1%)	NO
L4 WEST ENSUITE BEDROOMS	NO (-41.3%)	NO
L4 CORRIDOR	N/A	N/A
L4 FIREFIGHTING LIFT	N/A	N/A
L4 FIREFIGHTING LOBBY	NO (-55.9%)	NO
L4 FIREFIGHTING STAIRS	YES (+11.6%)	NO
L4 LINEN STORE	N/A	N/A
L4 COMMS ROOM	N/A	N/A
L5 STAIRS	NO (-9.6%)	NO
L5 GUEST LIFTS	N/A	N/A
L5 LIFT LOBBY	N/A	N/A
L5 EAST ENSUITE BEDROOMS	NO (-54.1%)	NO
L5 WEST ENSUITE BEDROOMS	NO (-41.3%)	NO
L5 CORRIDOR	N/A	N/A
L5 FIREFIGHTING LIFT	N/A	N/A
L5 FIREFIGHTING LOBBY	NO (-55.9%)	NO
L5 FIREFIGHTING STAIRS	YES (+11.6%)	NO
L5 LINEN STORE	N/A	N/A
L5 COMMS ROOM	N/A	N/A
L6 STAIRS	NO (-9.6%)	NO
L6 GUEST LIFTS	N/A	N/A
L6 LIFT LOBBY	N/A	N/A
L6 EAST ENSUITE BEDROOMS	NO (-54.1%)	NO
L6 WEST ENSUITE BEDROOMS	NO (-41.3%)	NO
L6 CORRIDOR	N/A	N/A
L6 FIREFIGHTING LIFT	N/A	N/A
L6 FIREFIGHTING LOBBY	NO (-55.9%)	NO
L6 FIREFIGHTING STAIRS	YES (+11.6%)	NO
L6 LINEN STORE	N/A	N/A
L6 COMMS ROOM	N/A	N/A
L7 STAIRS	NO (-9.5%)	NO
L7 GUEST LIFTS	N/A	N/A
L7 LIFT LOBBY	N/A	N/A
L7 EAST ENSUITE BEDROOMS	NO (-54.1%)	NO
L7 WEST ENSUITE BEDROOMS	NO (-41.3%)	NO
L7 CORRIDOR	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L7 FIREFIGHTING LIFT	N/A	N/A
L7 FIREFIGHTING LOBBY	NO (-55.9%)	NO
L7 FIREFIGHTING STAIRS	YES (+11.6%)	NO
L7 LINEN STORE	N/A	N/A
L7 COMMS ROOM	N/A	N/A
L8 STAIRS	NO (-9.6%)	NO
L8 GUEST LIFTS	N/A	N/A
L8 LIFT LOBBY	N/A	N/A
L8 EAST ENSUITE BEDROOMS	NO (-54.1%)	NO
L8 WEST ENSUITE BEDROOMS	NO (-41.3%)	NO
L8 CORRIDOR	N/A	N/A
L8 FIREFIGHTING LIFT	N/A	N/A
L8 FIREFIGHTING LOBBY	NO (-55.9%)	NO
L8 FIREFIGHTING STAIRS	YES (+11.6%)	NO
L8 LINEN STORE	N/A	N/A
L8 COMMS ROOM	N/A	N/A
RL	N/A	N/A
L0 MALE WC	NO (-10.1%)	NO
L0 FEMALE WC	YES (+4.6%)	NO
L0 ACCESSIBLE WC	N/A	N/A
L0 MEETING ROOM (02)	YES (+0.5%)	NO
L0 RECEPTION / LOUNGE	YES (+100.3%)	NO
L0 ITALIAN KITCHEN / BAR	YES (+5%)	NO
L0 KITCHEN	YES (+6.4%)	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?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	8293.5	8293.5
External area [m ²]	6778.6	6778.6
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	2159.94	2934.63
Average U-value [W/m ² K]	0.32	0.43
Alpha value* [%]	35.58	20.8

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

Building Use

% Area Building Type

Retail/Financial and Professional Services
 Restaurants and Cafes/Drinking Establishments/Takeaways
 Offices and Workshop Businesses
 General Industrial and Special Industrial Groups
 Storage or Distribution

100 Hotels

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	9.67	16.44
Cooling	3.3	4.83
Auxiliary	0.21	0.25
Lighting	7.14	7.47
Hot water	90.03	105.2
Equipment*	17.36	17.36
TOTAL**	110.35	134.17

* 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
<i>Displaced electricity</i>	<i>0</i>	<i>0</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	214.64	232.67
Primary energy [kWh _{PE} /m ²]	142.03	177.81
Total emissions [kg/m ²]	19.59	22.82

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	140	74.6	9.7	3.3	0	4.02	6.28	4.1	8.4
Notional	156.2	76.5	16.4	4.8	0	2.64	4.4	----	----

Key to terms

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