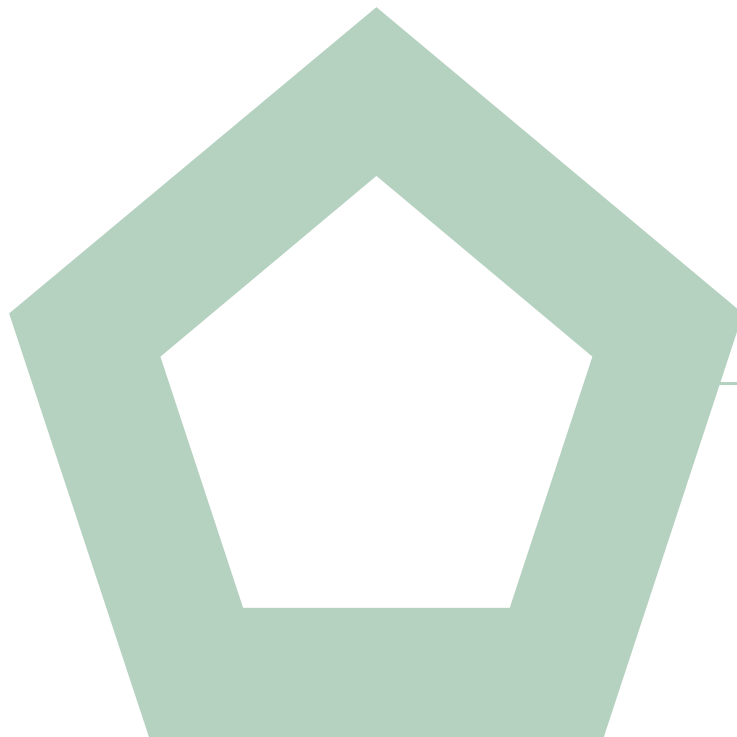


St John's Campus. Manchester. HBD.

SUSTAINABILITY
STAGE 3 REPORT
ENERGY STRATEGY AND PART L2021 COMPLIANCE
REVISION P02 – 25 SEPTEMBER 2023



STAGE 3

Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
00	09/06/2022	Draft issue for comment.	J. Daoud	B Elrick	J. Ford
01	14/06/2022	Stage 2 Issue.	J. Daoud	V. Wall	J. Ford
P01	17/03/2023	Stage 3 Report	K. Krasowska	T. Smith	J. Nuttall
P02	25/09/2023	Updated description of development	V. Wall	T. Smith	J. Nuttall

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Executive summary

1.1 Development description

This energy strategy has been prepared on behalf of Henry Boot Developments in support of the proposed St John's Campus office development in Manchester - hereafter referred to as the Proposed Development.

This project involves, “*demolition of the existing buildings and structures and the erection of a 16-storey office building (Use Class E(g)), with flexible ground floor uses (Use Class E), rooftop amenity space and works to facilitate public realm improvements.*”

The proposals seek to demolish the existing on-site buildings and structures to deliver a 16-storey office building plus rooftop amenity space of sustainable construction and high quality design. The building will offer flexible office accommodation which will meet the needs of a range of tenants and also provide ground floor commercial uses which will activate the ground floor frontage creating a unique arrival experience.

The proposed development is described fully in the Design and Access Statement prepared by EPR Architects and presented on the application drawings. The application proposals have been developed in consultation with Manchester City Council (“MCC”) Officers and other key stakeholders.

The site comprises a 4-storey building formerly occupied by The Manchester College. The building is of red brick construction with areas of glazing and panelling. The building is bound by Gartside Street to the south east, New College Street to the north east, New Quay Street to the south west and an existing NCP car park to the north west. Vacant possession of the building is anticipated in December 2022.

This strategy summarises the relevant regulatory and planning policies and sets out how the development will address and achieve the relevant policy targets. The strategy responds to the UK planning and regulatory framework, and specifically to the Manchester Core Strategy policy documentation.

1.2 Energy strategy summary

Passive design and energy efficiency measures will provide the cornerstone to the energy demand and CO₂ emission reduction achieved for the proposed development.

The baseline scenario, which each step of the energy hierarchy will be compared against, is established by the Part L Target Emission Rate for a notional building specification.

1.3 National drivers - Approved Document Part L of the Building Regulations

Part L of the Building Regulations is the mechanism by which government is driving reductions in the regulated CO₂ emissions from new buildings. The assessment of the proposed development against policy targets has been carried out using Building Regulations Part L 2021 methodology.

1.4 Planning Policy

The Manchester Core Strategy Policy EN6 states that all other non-residential developments over 1,000m² will be expected as a minimum to meet the following targets (*unless this can be shown not to be viable*):

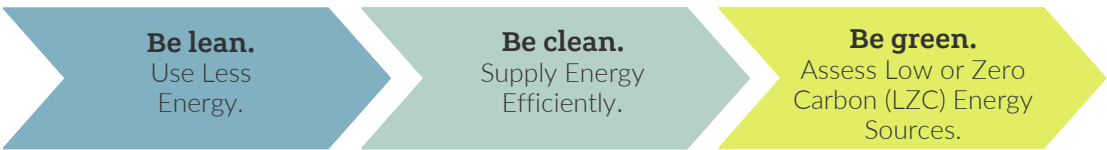
Target	% Minimum Requirement
Target 1; Network Development Area	CHP / District heating anchor or connection or where not feasible a 15% increase on Part L 2010
Target 2; Electricity Intense Buildings	+ 10% increase on Part L 2010
Target 3; Micro Generation Area	+ 15% increase on Part L 2010

Table 1 CO₂ Emission Reduction Targets, Manchester Core Strategy

The Current Manchester Core Strategy 2012 requires the building to use BREEAM, but does not stipulate a rating. This project is targeting BREEAM UK Offices New Construction 2018 rating of Excellent (shell and core).

1.5 Approach

The design approach, in respect to minimising carbon emissions from the development, aligns with the best practise guidelines adopted by the Local Planning Authority in their Core Strategy policies. This policy states that Lean, Clean and Green energy savings should be considered sequentially.



Energy Hierarchy

	St John's Campus
Be Lean	A fabric first approach and energy efficiency building services will be utilised to reduce carbon emissions and energy demand through best practice passive design measures.
Be Clean	CHP would offer very little benefit in terms of carbon emission reduction and further loses any value as the grid decarbonises. Therefore, CHP has not been considered.
Be Green	Use of ASHPs and incorporation of PVs for the development is anticipated to significantly reduce energy consumption and carbon emissions in operation by generation zero carbon electricity onsite.
	Overall reduction in regulated carbon emissions is 22.5% over current building regulations target.

Energy Strategy Compliance Overview.

The energy strategy indicates that the Proposed Development achieves a reduction, over the Part L 2021 baseline, of 22.5%. As such, meets Policy EN6 within the Manchester Core Strategy document. The proposed energy strategy in this report ties in closely with Manchester City Councils carbon zero 2028 / 2038 targets.

Whilst the development demonstrates that the local policies are met i.e. carbon reduction targets over Part L 2010, the design has evolved to focus on operational energy, embodied carbon and health & wellbeing. In recent years, focus has shifted away from metrics such as regulated carbon emissions (Part L) to be more focussed on real world outcomes and operational energy.

1. Introduction

This strategy has been prepared on behalf of Henry Boot Developments in support of the proposed St John’s Campus office development in Manchester - hereafter referred to as the Proposed Development.

The project involves, “demolition of the existing buildings and structures and the erection of a 16-storey office building (Use Class E(g)), with flexible ground floor uses (Use Class E), rooftop amenity space and works to facilitate public realm improvements.”



Figure 1 Visualisation of the Proposed Development

This strategy summarises the relevant regulatory and planning policies applicable to the development and sets out how the development will address and achieve the relevant policy targets.

Manchester has recently set an ambitious target to be a ‘zero carbon city’ by 2038, with new development to be zero carbon by 2028. Whilst the shorter-term target is not included in current policy, the Proposed Development is expected to support these ambitions through incorporation of low carbon and renewable energy instead of fossil fuels.

Manchester Core Strategy (2012 – 2027) states within Policy EN6 that applications for commercial developments exceeding 1,000m² will be expected to achieve a minimum +10% increase on Part L 2010 and residential developments a minimum 15% increase on Part L 2010. Since the publication of the Core Strategy document, Approved Document Part L has since been updated in 2013, and again in 2021. Broadly speaking, compliance with Part L 2013 required a 9% reduction in carbon emissions compared to Part L 2010. A new non-domestic building built to ADL 2021 standards will deliver a 27% reduction in CO₂ emissions on average across the new non-domestic building mix relative to ADL 2013, and a new domestic building will deliver a 31% reduction.

1.1 Proposed Development

The proposed site is currently occupied by The Manchester College; a four-storey building constructed over 20 years ago during the very early development of the Spinningfields masterplan in central Manchester. Since then, the fabric of the city has been evolved due to large investments in favour of high-rise commercial buildings. As a result, the area has been reinvented as a new central business district for the city with many low-rise buildings being replaced due to high demand and increasing buildable area. The site is situated within proximity to the Media City Salford development which includes new office, retail, leisure, retail and public realm spaces.

St John’s Campus will be comprised of 17 storeys which provide speculative office space. The floor plate has been designed to allow conversion into two separate tenanted spaces. The development will host spacious lounge areas and a café on the ground floor as well as cycling storage and changing facilities in the basement. The plant rooms, dedicated to building services and systems, will be distributed between the basement and the rooftop. Moreover, the rooftop will host a temporary events space open to tenants.

This document, which outlines the energy strategy, will consider the façade performance to find the balance between unwanted solar gain, beneficial solar gain and daylight access.

The table below details the indicative areas of the Proposed Development. This table excludes ancillary areas and circulation spaces.

Table 2 Indicative areas schedule

Space use	GIA (m ²)
Office	19,024
Retail	250
Cycle Amenities	209

For plan-making this means that:

- a) plans should positively seek opportunities to meet the development needs of their area, and be sufficiently flexible to adapt to rapid change;*
- b) strategic policies should, as a minimum, provide for objectively assessed needs for housing and other uses, as well as any needs that cannot be met within neighbouring areas, unless:*
 - i. the application of policies in this Framework that protect areas or assets of particular importance provides a strong reason for restricting the overall scale, type or distribution of development in the plan area ; or*
 - ii. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole.*

For decision-taking this means:

- a) approving development proposals that accord with an up-to-date development plan without delay; or*
- b) where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless:*
 - i. the application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the development proposed; or*
 - ii. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole.”*

In respect of energy policy contained within the NPPF, paragraph 155 sets out that:

“To help increase the use and supply of renewable and low carbon energy and heat, plans should:

- a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);*
- b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and*
- c) identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.”*

3. National Grid Decarbonisation

Future projections.

The Future Energy Scenarios (FES) document, produced by the National Grid, discusses how the UK's energy landscape is changing. The FES 2021 makes projections of how the mix of generation in the grid is likely to change between now and 2050 – the year by which the Climate Change Act 2008 set the target of reducing the UK's CO₂ emissions by 80% from 1990 levels. This target has now been revised to be Net Zero in light of the Committee on Climate Change's recent report and the declaration of a Climate Emergency.

The latest version, FES 2021, discusses these projections in four scenarios and Figure 2 combines these future trajectories with the actual carbon intensity of the National Grid over the past 13 years. The reported emissions associated with electricity generation have fallen steeply since 2012 and in three cases, the FES 2021 scenarios see carbon factors trending towards zero by the early 2030s. This is on the basis that FES 2021 have deemed it necessary to offset other industries such as freight, shipping and aviation, which will be unable to reduce their carbon emissions to zero. Offsetting the emissions of other industries will involve Carbon Capture and Storage (CCS) technologies on a significant scale in order for the UK as a nation to meet net zero carbon by 2050. It is important to note that CCS technology is not currently commercially demonstrated at a large scale, but the FES 2021 studies are useful as future forecasts.

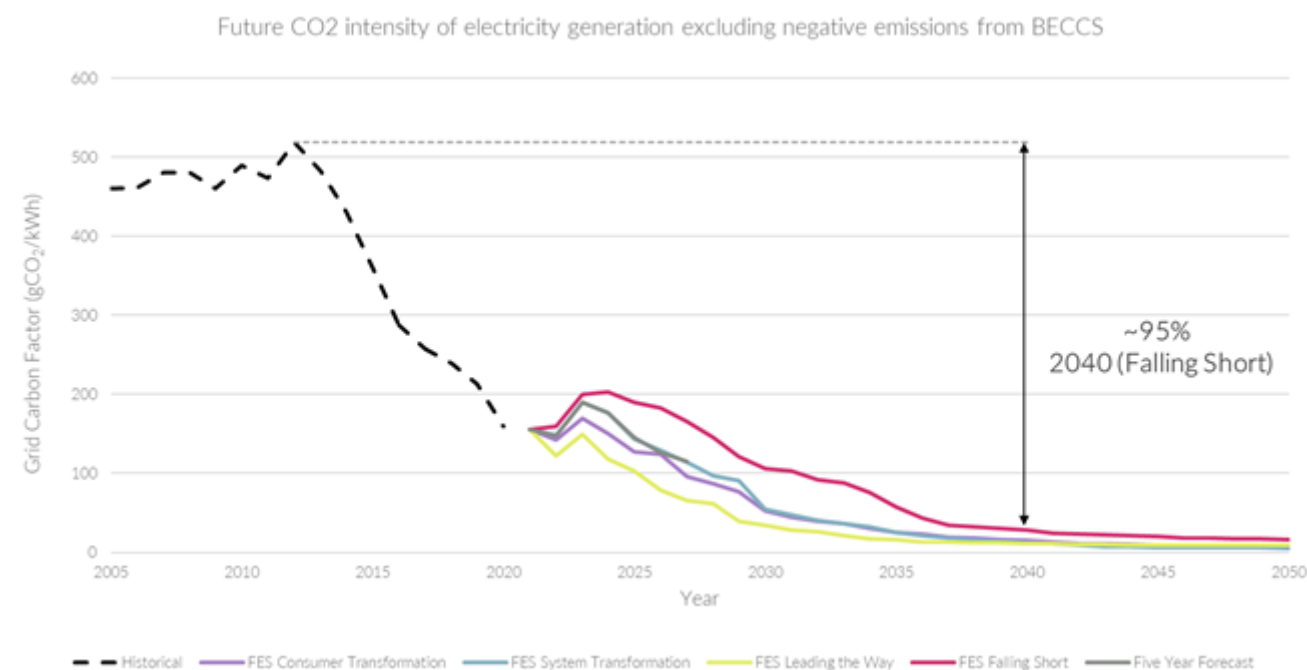


Figure 2: Historic and future projected carbon factor for the National Grid. 8% transmission and distribution losses are included. Sources: BEIS Green Book (historic carbon factors); National Grid Future Energy Scenarios (FES) 2022 (future projected carbon factors).

As a response to the decarbonisation trend, the latest Building Regulations (ADL 2021) include a significantly reduced carbon emission factor for grid electricity of 0.136 kgCO₂/kWh (SAP10.2) compared to 0.519 kgCO₂/kWh used in ADL 2013. This reduction reflects the increased contribution of renewable energy into the national mix of electricity generation. In 2020, renewable sources accounted for 43% of the electricity generated in the UK, up from 24.4% in 2016 (Ofgem).

Historic progress.

Figure 3 shows how the mix of generation technologies serving the National Grid, as well as the associated carbon factor, has varied between 2012 and 2018 based on the mix of generation techniques serving the National Grid over this six-year period.

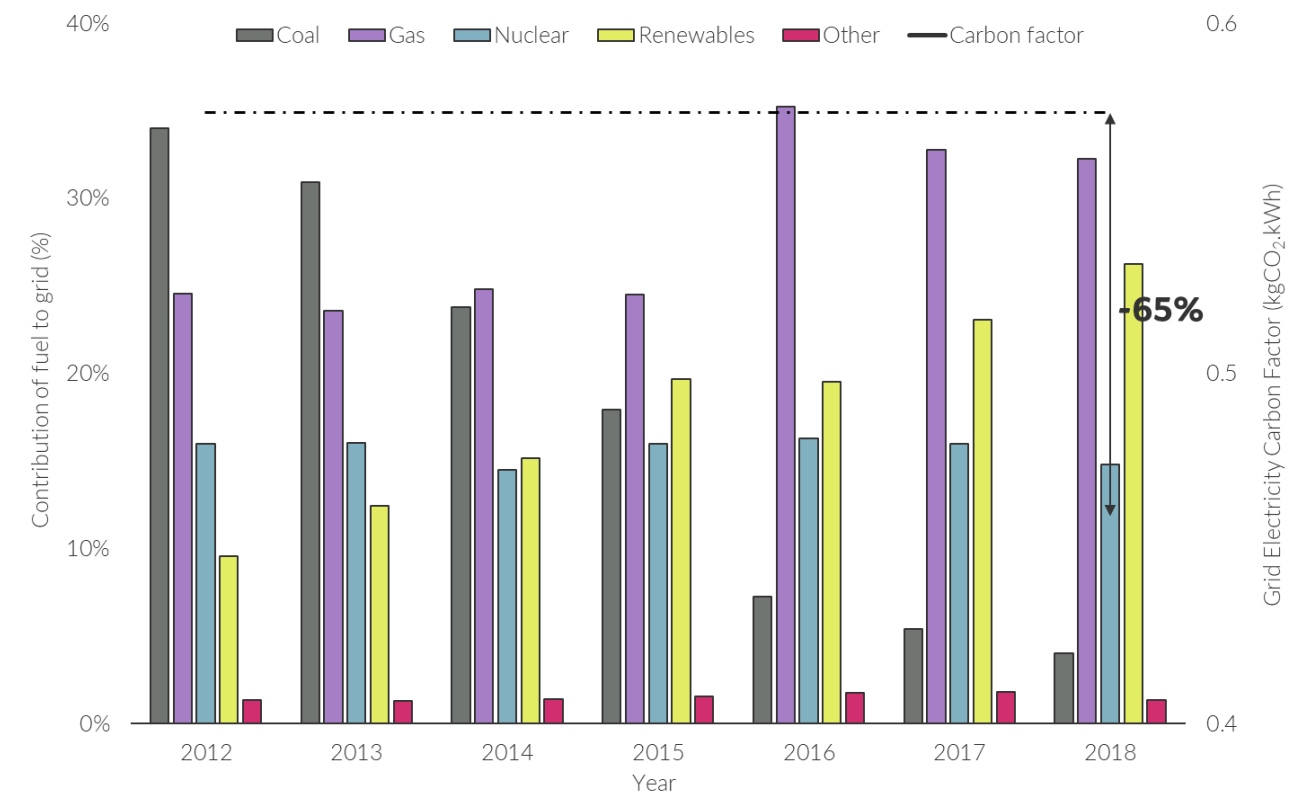


Figure 3: Historic mix of generation methods and associated carbon factor for the National Grid. 8% transmission and distribution losses are included. Sources: electricityinfo.org (generation mix); BEIS Green Book (historic carbon factors).

4. Assessment Methodology

The following is a summary of the data used and inputs / assumption made for simulation geometry modelling.

4.1 Site Context

The site is located in Spinningfields and sits between Deansgate and Salford.

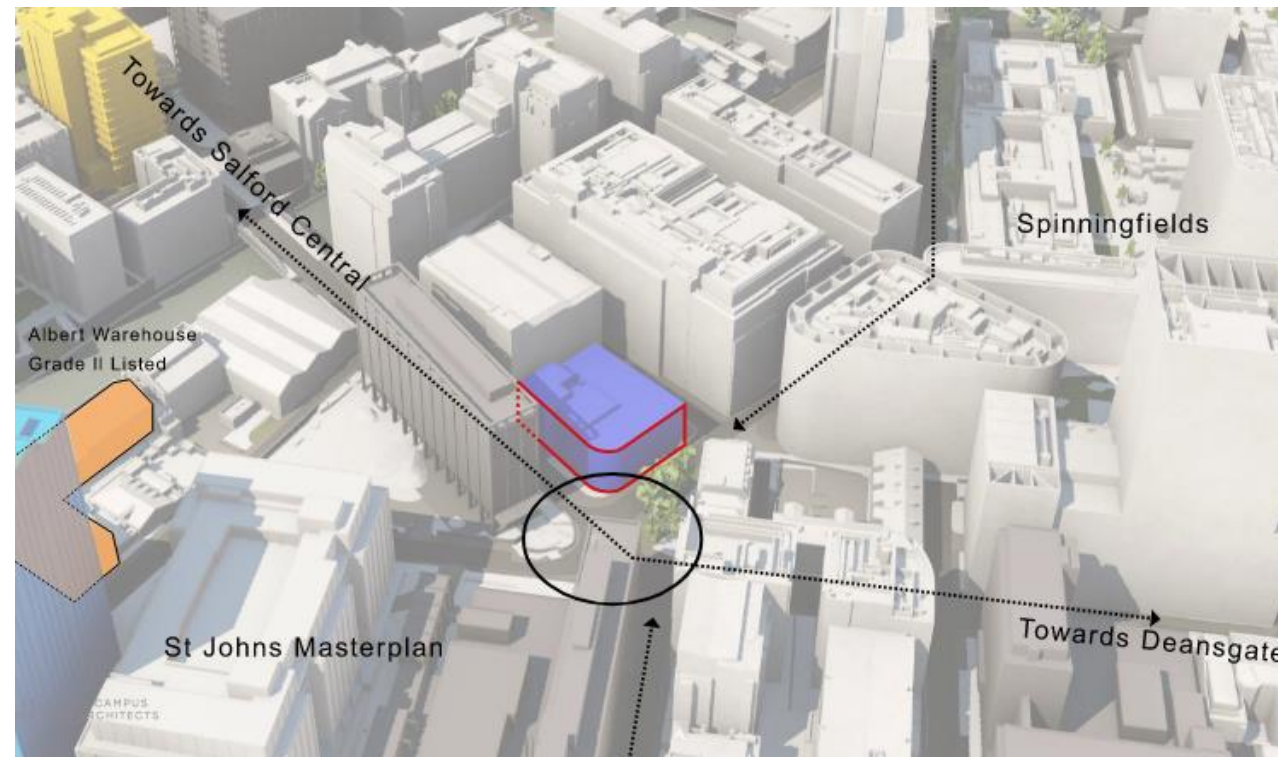


Figure 4: Location of the St John's Campus existing site and building with respect to the surrounding area.

4.2 Site location and weather data

A building's thermal performance is its response to external environmental conditions. The more dependant a building is on passive features to achieve acceptable internal comfort, the more important the use of external weather information becomes.

Climate data is assigned to the virtual environment of the dynamic model to simulate external weather conditions that are likely to occur. Thermal comfort calculations require the simulation to be tested against Chartered Institute of Building Services Engineers (CIBSE) Design Summer Year (DSY) climate data to best assess how spaces will perform during a year with hot summer conditions.

The UK Meteorological Office (MO) collects weather data at stations across the UK. Climate variables measured at hourly intervals include air temperatures, wind speed and direction and air pressure amongst various other characteristics.

CIBSE licenses the historic weather data from the MO for 14 locations in the United Kingdom: Belfast, Birmingham, Cardiff, Edinburgh, Glasgow, Leeds, London (3 sites), Manchester, Newcastle, Norwich, Nottingham, Plymouth, Southampton and Swindon.

The weather variables are synthesised into 2 types of CIBSE weather file:

- **Design Summer Year (DSY): 2006 and 2016**
The DSY is a single continuous year rather than a composite one made up from average months. The DSY is used for overheating analysis.
- **Test Reference Year (TRY): 2006 and 2016**
The TRY is composed of 12 separate months of data each chosen to be the most average month from the collected data. The TRY is used for operational energy analysis and for compliance with the UK Building Regulations (Part L).

A Manchester CIBSE weather file exists therefore following the standardised methodology behind the Part L requirements, this weather was used.

4.3 Architectural drawings

The geometry used to assess the proposed development was determined by the following information received.

We understand that minor updates to architectural drawings and models may have been made since the below issued documents, this list simply details the information our models have been developed from.

Table 3: Architectural Information.

Block	Information type	Document Package	Data Type	Date Received
Block A	Revit model	11383-EPR-ZZ-ZZ-M3-A-Central.rvt 11383-EPR-ZZ-ZZ-M3-A-Facade.rvt	.rvt	28/01/2023

4.3.1 Dynamic Simulation Model.

Based on the information above a series of Dynamic Simulation Models were created to undertake appropriate assessments on the proposed design.

Integrated Environmental Solutions Virtual Environment (IESve) is an approved Dynamic Simulation Model (DSM) software package that has the capabilities of enabling the user to create a virtual representation of a building.

Models built in the IESve have been used to consider compliance with Approved Document Part L2 2021 using the National Calculation Methodology alongside the assessment of operational energy consumption.

One of the DSM models, with simplified versions of the surrounding buildings (as appropriate) is displayed below.

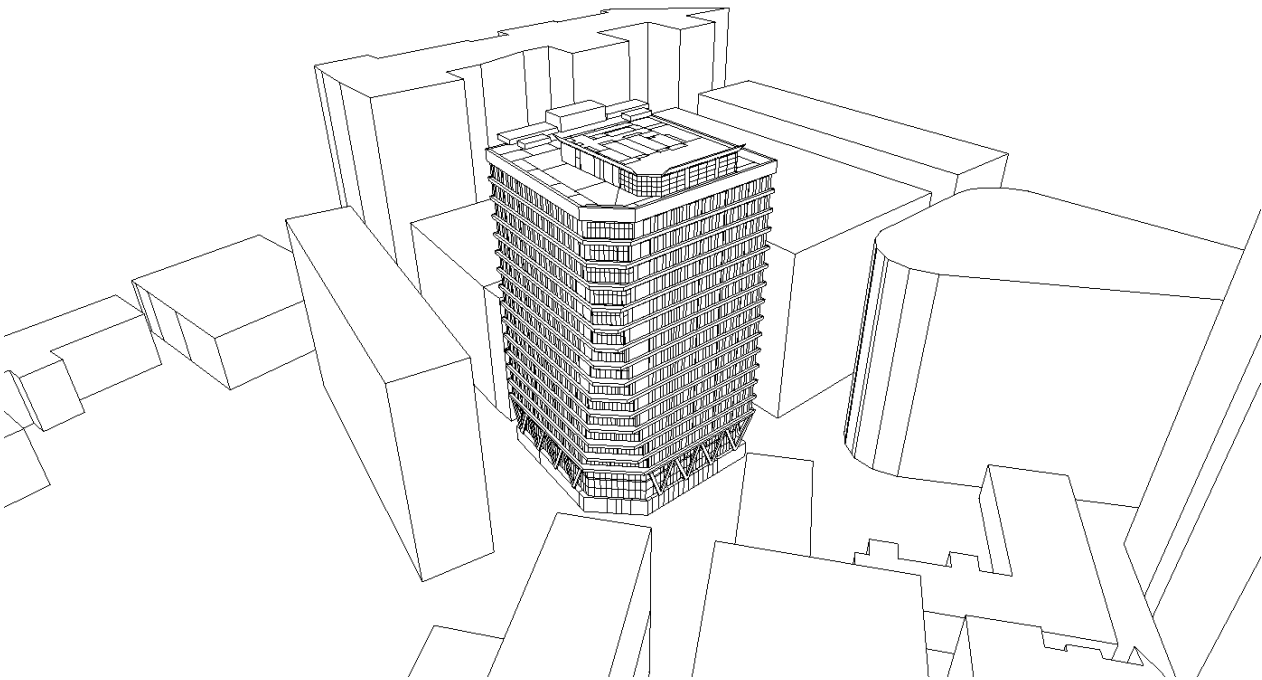


Figure 5: DSM Model Image.

4.4 Building Fabric Specification

Optimising the development's fabric is seen to be the most robust and effective way to improve energy efficiency and in turn reduce carbon emissions whilst also impacting thermal comfort.

The performance of the envelope i.e., material performance is unlikely to deteriorate significantly with time and therefore the benefits of these measures will continue at a similar performance for the duration of their installation. The current values used are as indicated by the architects and the fabric performance parameters are detailed below.

Table 4 Fabric Performance.

Parameter	Non-Domestic
Fabric Air Permeability (m ³ /m ² .h @ 50Pa)	2.00
External Wall U-value (W/m ² .K)	0.15
Party Wall U-value (W/m ² .K)	1.80
Exposed Floor U-value (W/m ² .K)	0.12
Floor/ceiling (W/m ² .K)	1.00
Exposed Roof U-value (W/m ² .K)	0.12
Glazing U-value (W/m ² .K) (glazed doors / windows)	1.20
Glazing g-value	0.40
Solid Door (W/m ² K)	1.20
Thermal bridges	Heat loss through thermal bridges to be minimised as far as reasonably possible during construction. The model assumes alpha value of 25%.

5. Energy Strategy

In order to develop the energy strategy, a ‘baseline’ case is created which aligns with notional building specification as per Building Regulations Part L2 2021.

The baseline case helps to inform the benefit of low and zero carbon technologies – which are implemented in the ‘clean’ and ‘green’ stages.

5.1 Baseline Case

	Fabric performance The baseline case utilises the same fabric performance as the Building Regulations Part L2A ‘notional’ building; - External Walls; 0.26W/m²K - Exposed Floors; 0.22W/m²K - Roof; 0.18W/m²K - External Glazing; 1.60W/m²K - Air permeability; 5.00m³/hr.m² @ 50Pa
	Space heating & cooling For non- domestic developments, the notional building according to 2021 Building Regulations specified the same system and fuel as actual building with efficiencies as per NCM Modelling Guide 2021 Table 7, as follows: - Heat pump SCOP=264% - Direct electric SCOP=134% Cooling is assumed to be electrically powered. In air-conditioning mode, the Notional building will have a cooling SSEER of 4.4.
	Mechanical ventilation The use of heat recovery is used throughout the office development. Recovering heat from the extract air can help reduce annual heating energy considerably with no impact on the air quality of the incoming fresh air. The air handling plant will have efficient fan motors and will be designed with low static fan pressures to help reduce the energy consumption associated with delivering fresh air into the building. All assumptions regarding auxiliary energy for notional building can be found on p.21 of NCM Modelling Guide 2021.
	Lighting The internal lighting design incorporates the use of high efficiency LED lighting combined with daylight linking (where applicable). The use of presence and absence detection prevents the internal lighting being ‘on’ when the occupied spaces are not occupied. The efficient lighting design also help to drive down the cooling energy consumption. The illuminance level used for the general lighting in the Notional building is determined by the illuminance values for the activity type in the NCM Activity Database and the design illuminance for the Actual building or higher, if specified in actual building.

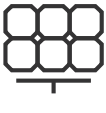
	Domestic hot water (DHW) system Domestic hot water is supplied via point-of-use (POU) in the offices and electric domestic hot water (DHW) heaters with 1200 litres of storage allowed for basement areas respectively in the base case scenario. - Electric system- SCOP= 100%
	Photovoltaic Panels The notional building in Building Regulations Part L2021 includes PV panels. The amount of area covered by PV in baseline case can be reduced by proportion of space heating demand covered in actual building by ASHP. This adds benefit for the proposed building over baseline. The Notional building’s PV array is specified as follows: - South orientation, - 30° pitch from the horizontal - ‘no or very little over-shading’ - ‘strongly ventilated or forced ventilated modules’

Table 5 Baseline Case Building Performance Parameters

Baseline Case Results

Figure 6 shows the energy demand for Proposed Development – using the baseline case.

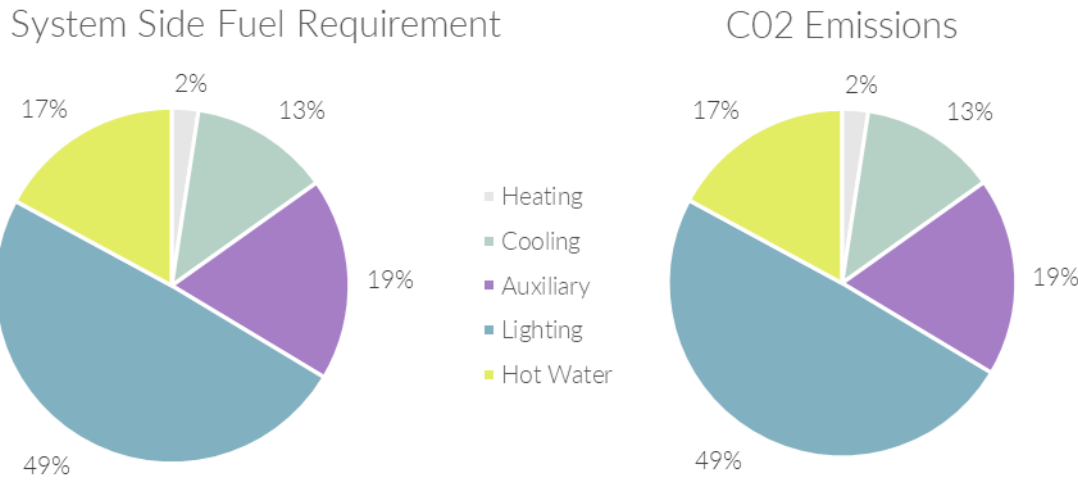


Figure 6 Baseline energy demand and emissions

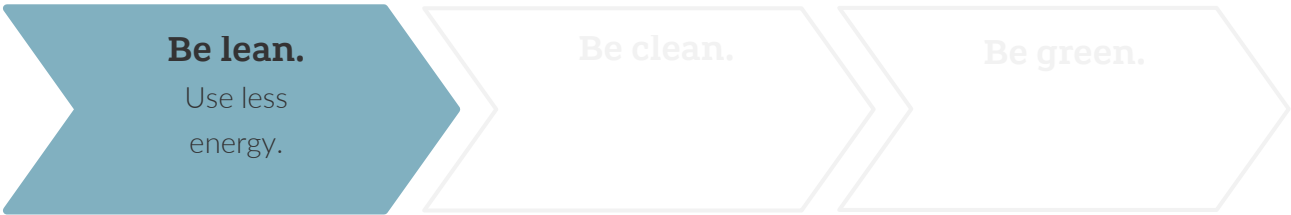
Targeting the following elements will help drive down and improve the buildings carbon emissions.

- Improved thermal envelope; targeting external walls and air tightness
- Improved air handling plant; reducing specific fan powers and associated controls
- Improved lighting systems; higher efficiency light fittings and controls

As a result of improving the above elements there will be knock on consequences i.e., reduced cooling demand due to improved lights, increased cooling loads due to retention of internal heat gains i.e., reduced heat loss.

5.2 Be Lean

Passive design and energy efficiency measures form the basis for the reduction in overall energy demand and carbon emissions for the proposed development. This energy strategy aims to reduce the energy demand initially by optimising the envelope and building services within the development.



Passive design and energy efficient features.

Passive design measures are those which reduce the demand for energy within buildings, without consuming energy in the process.

These are the most robust and effective measures for reducing CO₂ emissions as the performance of these solutions, such as façade insulation, are unlikely to deteriorate significantly with time, or be subject to change by future property owners. In this sense, it is possible to have confidence that the benefits these measures will continue at a similar level for the duration of their installation.

	Fabric performance A 'fabric first' approach has been taken in order to reduce the energy demand and CO₂ emissions from the proposed development. The overriding objective for the façade design of each building will be to achieve the optimum balance between providing natural daylighting benefits to reduce the use of artificial lighting, the provision of passive solar heating to limit the need for space heating in winter and limiting summertime solar gains to reduce space cooling demands. See Table 7 opposite.
	Mechanical ventilation The use of heat recovery is used throughout the office development. Recovering heat from the extract air can help reduce annual heating energy considerably with no impact on the air quality of the incoming fresh air. The air handling plant will have efficient fan motors and will be designed with low static fan pressures to help reduce the energy consumption associated with delivering fresh air into the building.
	Lighting The internal lighting design incorporates the use of high efficiency LED lighting combined with daylight linking (where applicable). The use of presence and absence detection prevents the internal lighting being 'on' when the occupied spaces are not occupied. The efficient lighting design also help to drive down the cooling energy consumption.

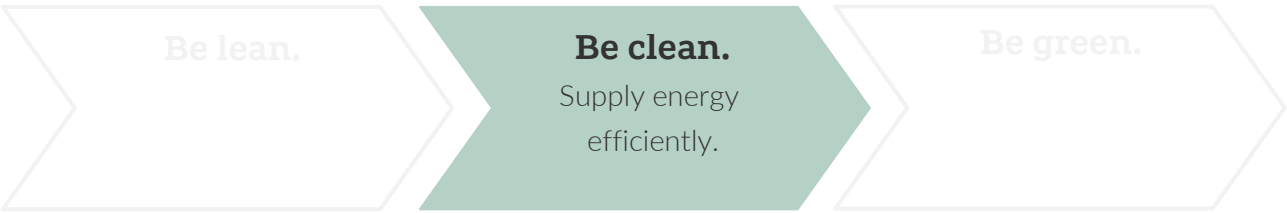
Table 6 Passive Design Measures

Table 7 Fabric Performance

Parameter	'Standard Building' Part L 2021 – Notional	'Proposed Building' Target Initial
Fabric Air Permeability (m ³ /m ² .h at 50Pa)	5.00	2.00
External Wall U-value (W/m ² .K)	0.26	0.15
Ground Floor U-value (W/m ² .K)	0.22	0.12
Roof U-value (W/m ² .K)	0.18	0.12
Door U-value (W/m ² .K)	1.90	1.20
Glazing (External Windows / Glazed doors) (g-value)	0.40	0.40
Glazing light transmittance (inclusive of External Windows / Glazed doors / External and Internal Atrium Glazing)	71%	71%

5.3 Be Clean

This stage of the energy hierarchy refers to the use of heat networks which typically consists of Combined Heat and Power (CHP) to provide carbon emission reductions. A CHP system consists of an engine, usually gas fired, which generates thermal energy and electrical energy – which is fed into the development.



Due to the development being electrically led the utilisation of technology such as CHP would offer very little benefit in terms of carbon emission reduction. Furthermore, due to grid decarbonisation, the carbon emission benefit of gas fired CHP will diminish as the national grid continues to decarbonise.

	Combined heat and power (CHP) Due the proposed changes to the carbon emission factors in future revisions of Part L – the use of Combined Heat and Power (CHP) is likely to offer a 'negative benefit' within the next five years and therefore has not been explored as part of the energy strategy.
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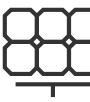
Table 8 Clean Energy Supply

5.4 Be Green

The final step of the energy hierarchy explores the feasibility of Low and Zero Carbon (LZC) technologies to allow for the production of renewable energy onsite in order to offer a further reduction in carbon emissions.

Table 9 Examples of Low and Zero Carbon Technology

	Be lean. Be clean. Be green. Assess 'low or zero carbon' (LZC) energy sources.
	Energy from Waste Energy from waste (EfW) is the process of generating electricity and/or heat from the primary treatment and processing of waste usually by incineration. It is generally placed higher in the waste hierarchy than throwing waste into landfill as described above. Further, where an EfW facility is in place to generate electricity, with heat generation essentially a by-product, it can be considered a low carbon heat source. Suitability to proposed development: Although a low carbon heat source, Energy from Waste systems usually operate on a large scale rather than on a single building basis. Furthermore, since EfW is not yet ubiquitous across the country and is not yet available in Manchester, Connection to this EfW district heat network (DHN) is not deemed a solution for the proposed development. Therefore, Energy from Waste is currently not proposed for the development.
	Air source heat pumps Air source heat pumps (ASHP) use thermodynamic principles to convert heat from the air into useable heat within the building. Unlike some other sources of renewable energy, heat pumps do require energy (typically electricity or gas) to pump and compress refrigerant through the system. However, under the Renewable Energy Directive 2009/28/EC they are classified as renewable technologies provided that the final energy output significantly exceeds the primary energy input required to drive the heat pump. ASHP need to be located externally with access to the ambient air, typically at roof level. They can typically operate at an efficiency of around 350% when delivering heating for space conditioning. Suitability to proposed development: Air source heat pumps use the air temperature to reject to and extract heat from to provide energy within the building. The ability of the heat pump to transfer heat from the outside air to the building depends on the outdoor temperature. As this temperature drops the ability of the heat pump to absorb heat also drops. In the UK external ambient temperatures do not historically drop to levels that would make air-to-air heat pumps unviable. In this way Air Source Heat Pumps (ASHP) technology could potentially be used to provide heating and/or hot water to the office development. The use of this technology fits well with grid decarbonisation. Therefore, this technology is proposed for the development.

	Ground Source Heat Pumps (GSHPs) GSHPs work similarly to ASHP, except they extract heat from the ground. GSHPs are best suited to developments with a balanced heating and cooling load, to avoid long-term heating or cooling of the ground /ground water and associated decreased efficiency of the heat pump. Suitability to proposed development: There will be a relatively small cooling demand for the proposed building, as a mechanical ventilation strategy has been taken to cool and ventilate the rooms. In addition, the groundworks for a GSHP system are significant, and would require higher costs and effort than the proposed connection to low carbon local district, overall making this option unsuitable. Therefore, this technology is not proposed for the development.
	Photovoltaics Photovoltaic (PV) panels harness energy from sunlight and convert this into useful energy in the form of electricity. A PV system requires sufficient roof space for the system array to be installed and function effectively. Suitability to proposed development: Although photovoltaic panels are a convenient and affordable renewable energy source, they require a significant amount of roof space to accommodate a substantial number of panels. Often, roof space can cause conflict of interest between the necessity to provide plant space, PV panels or social spaces. In this specific case, 150 m² of roof space has been dedicated to PV panels with plant area accommodated on top level and in the basement. Therefore, the PV panels have been proposed for the development as 'Be Green' measure.
	Solar thermal Solar Thermal Panels are similar to PV Panels in that they harness energy from solar energy. This technology however converts solar energy into thermal energy that can offset the demand on hot water generation systems. Suitability to proposed Development: Often, solar PVs would be prioritised over solar thermal panels since the electrical output from PV panels will be more suitable for implementation. However, in this case, neither technology can be considered because the roof space has been dedicated to building services which take priority as they provide the fundamental functions of the building. Therefore, solar thermal is not proposed for the development.

	Wind turbine For efficient operation and to yield high energy output, wind turbines require a consistent flow of air to generate electricity using wind energy. Suitability to proposed development: The proposed development is located within a dense urban environment. Therefore, the wind flow profile is erratic and consequently is not conducive to high annual yields from a turbine. Moreover, mounting wind turbines on the roof of the building could result in unacceptable vibration and resonance being felt within occupied spaces. The turbines are also likely to generate noise which may be a nuisance to neighbouring buildings. Therefore, given the complexities of installing this technology, the use of wind turbines is not proposed at the proposed development.
	Biomass Biomass boilers burn wood fuel or other bio-fuel sources to generate heat. These boilers can operate at high efficiencies, comparable to condensing gas boilers. However, they require a large fuel store to maintain continuous operation during the winter months. As such, area take for such plant is high. Furthermore, fuel deliveries in city-centre locations can prove difficult and security of fuel supply is an important consideration. Suitability to proposed development: The reasons listed above alongside high maintenance implications and air quality implications mean that biomass boilers are not considered a suitable technology for the scheme. Therefore, given the implications associated, the use of biomass boiler technology is not proposed at the proposed development.

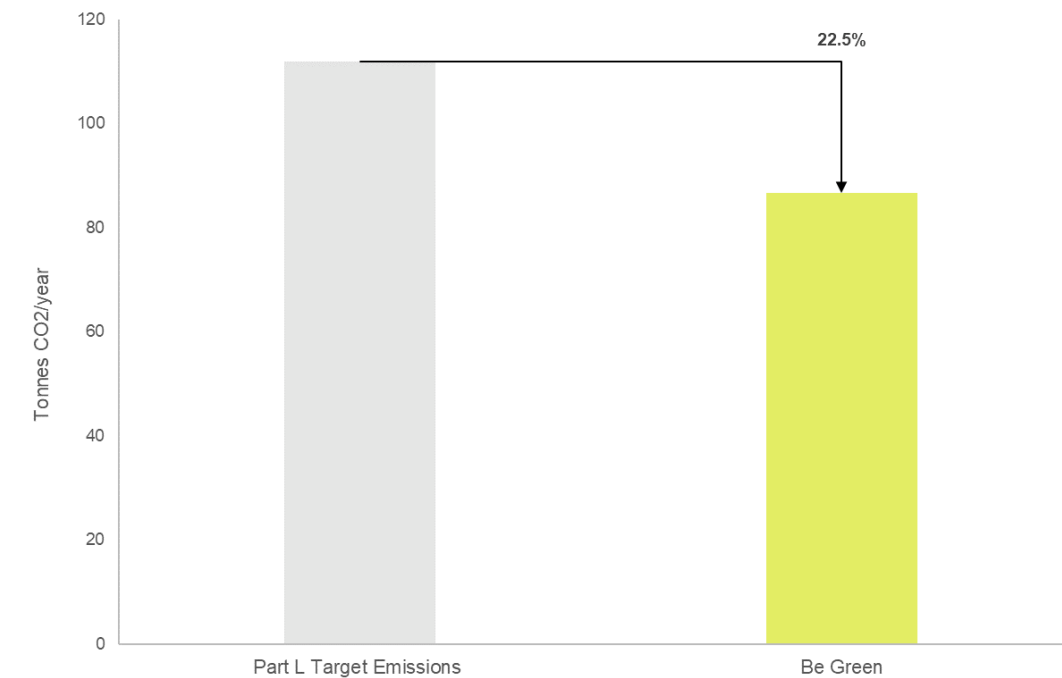


Figure 8 Baseline and Green; regulated carbon emission reduction

The combination of passive design, the use of ASHPs and generation of renewable energy results in a 22.5% reduction in annual regulated carbon dioxide emissions compared to the Part L 2013 baseline. If observed independently, the PV panels contribute 3% towards the improvement above Part L standards. The overall results surpass Policy EN6 within the Manchester City Core Strategy documentation.

Be Green Results

Utilising Air Source Heat Pumps (ASHP) and Photovoltaic (PV) panels to provide space heating and cooling as well as generate energy provides a significant reduction in regulated carbon emissions.

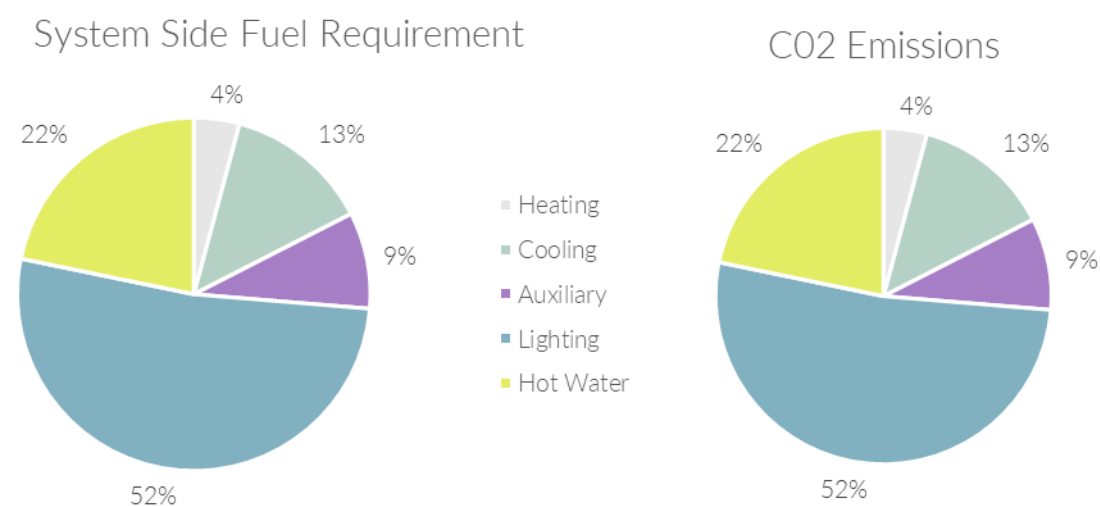


Figure 7 Be Green Energy demand and emissions

6. Conclusion

This energy strategy has been prepared on behalf of Henry Boot Developments in support of the proposed St John’s Campus office development in Manchester - hereafter referred to as the Proposed Development.

This strategy summarises the relevant regulatory and planning policies and sets out how the development will address and achieve the relevant policy targets. The strategy responds to the UK planning and regulatory framework, and specifically to the Manchester Core Strategy policy documentation.

6.1 Planning Policy

The Manchester Core Strategy Policy EN6 states that for all developments over 1,000m² will be expected as a minimum to meet the following targets (*unless this can be shown not to be viable*):

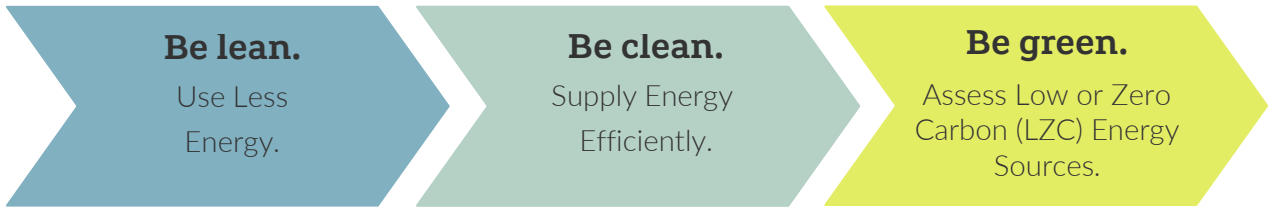
Target	% Minimum Requirement
Target 1; Network Development Area	CHP / District heating anchor or connection or where not feasible a 15% increase on Part L 2010
Target 2; Electricity Intense Buildings	+ 10% increase on Part L 2010
Target 3; Micro Generation Area	+ 15% increase on Part L 2010

Table 10 CO₂ Emission Reduction Targets, Manchester Core Strategy

Manchester Core Strategy (2012 – 2027) states within Policy EN6 that applications for commercial developments exceeding 1,000m² will be expected to achieve a minimum +10% increase on Part L 2010 and residential developments a minimum 15% increase on Part L 2010. Since the publication of the Core Strategy document, Approved Document Part L has since been updated in 2013, and again in 2021. Broadly speaking, compliance with Part L 2013 required a 9% reduction in carbon emissions compared to Part L 2010. A new non-domestic building built to ADL 2021 standards will deliver a 27% reduction in CO₂ emissions on average across the new non-domestic building mix relative to ADL 2013, and a new domestic building will deliver a 31% reduction.

6.2 Approach

This report evaluates the Proposed Development against the energy hierarchy; be lean, be clean and be green.



Be Lean

The building fabric performance and engineering systems have been optimised in order to use less energy prior to the inclusion or consideration of Low and Zero Carbon (LZC) technology.

Be Clean

The be clean step of the energy hierarchy refers to the use of ‘clean energy supply’. This includes, but is not limited to, the use of Combined Heat and Power (CHP) and District Heat Networks. Because the majority of the building’s energy is electrically fuelled i.e., chillers, fans, pumps and lighting the benefit of connecting or using a CHP system is limited. Given that the national grid is continually decarbonising, the use of gas systems are less preferential over electrically fuelled systems.

Be Green

The final step of the energy hierarchy is to utilise low and zero carbon technology. The energy strategy identified that the use of Air Source Heat Pumps (ASHP) in combination with energy generating PV panels can provide a substantial reduction in regulated carbon dioxide emissions.

Energy Strategy

Combining efficient fabric design and efficiency building services systems provides the following regulated carbon emission results;

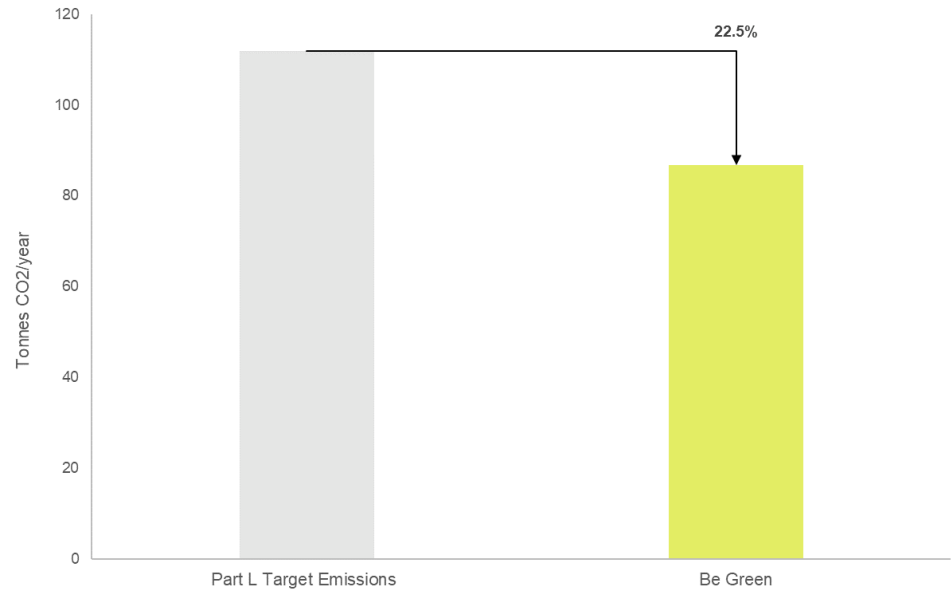


Figure 9 Energy Strategy summary- Building Emission Rate

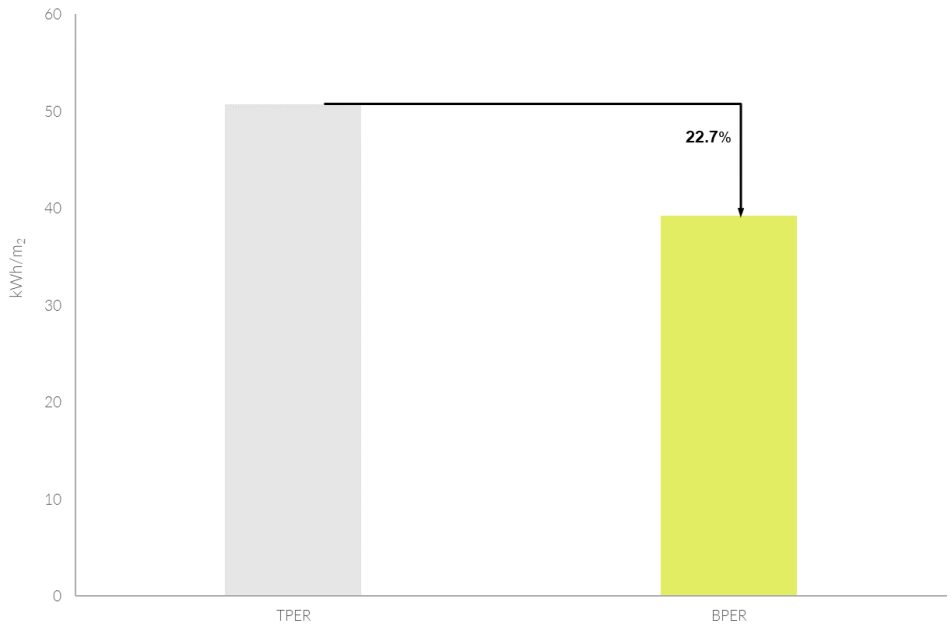


Figure 10 Energy strategy summary- Building Primary Energy Rate

6.3 Compliance

The energy strategy indicates that the Proposed Development achieves a 22.5% reduction over the Part L 2021 baseline and as such meets Policy EN6 within the Manchester Core Strategy document.

The decarbonisation of the grid has resulted in the carbon intensity of mains gas being higher than for electricity, and therefore strengthening the argument that building services strategies moving forward should be electric led.

The proposed energy strategy in this report reflects this philosophy and ties in closely with Manchester City Councils carbon zero 2028 / 2038 targets.

Appendix A – Grid decarbonisation.

Future projections.

The Future Energy Scenarios (FES) document, produced by the National Grid, discusses how the UK's energy landscape is changing. The FES 2021 makes projections of how the mix of generation in the grid is likely to change between now and 2050 – the year by which the Climate Change Act 2008 set the target of reducing the UK's CO₂ emissions by 80% from 1990 levels. This target has now been revised to be Net Zero in light of the Committee on Climate Change's recent report and the declaration of a Climate Emergency.

The latest version, FES 2021, discusses these projections in four scenarios and Figure 11 combines these future trajectories with the actual carbon intensity of the National Grid over the past 13 years. The reported emissions associated with electricity generation have fallen steeply since 2012 and in three cases, the FES 2021 scenarios see carbon factors trending towards zero by the early 2030s. This is on the basis that FES 2021 have deemed it necessary to offset other industries such as freight, shipping and aviation, which will be unable to reduce their carbon emissions to zero. Offsetting the emissions of other industries will involve Carbon Capture and Storage (CCS) technologies on a significant scale in order for the UK as a nation to meet net zero carbon by 2050. It is important to note that CCS technology is not currently commercially demonstrated at a large scale, but the FES 2021 studies are useful as future forecasts.

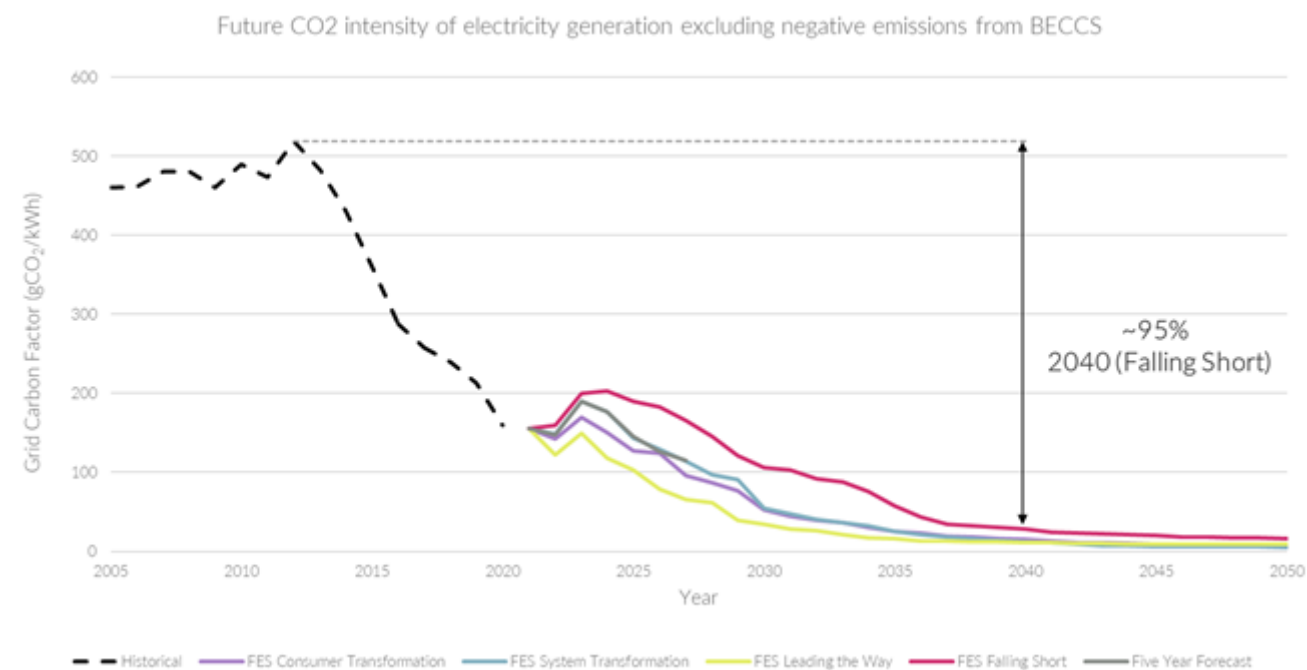


Figure 11: Historic and future projected carbon factor for the National Grid. 8% transmission and distribution losses are included. Sources: BEIS Green Book (historic carbon factors); National Grid Future Energy Scenarios (FES) 2022 (future projected carbon factors).

As a response to the decarbonisation trend, the latest Building Regulations (ADL 2021) include a significantly reduced carbon emission factor for grid electricity of 0.136 kgCO₂/kWh (SAP10.2) compared to 0.519 kgCO₂/kWh used in ADL 2013. This reduction reflects the increased contribution of renewable energy into the national mix of electricity generation. In 2020, renewable sources accounted for 43% of the electricity generated in the UK, up from 24.4% in 2016 (Ofgem).

Historic progress.

Figure 12 shows how the mix of generation technologies serving the National Grid, as well as the associated carbon factor, has varied between 2012 and 2018 based on the mix of generation techniques serving the National Grid over this six-year period.

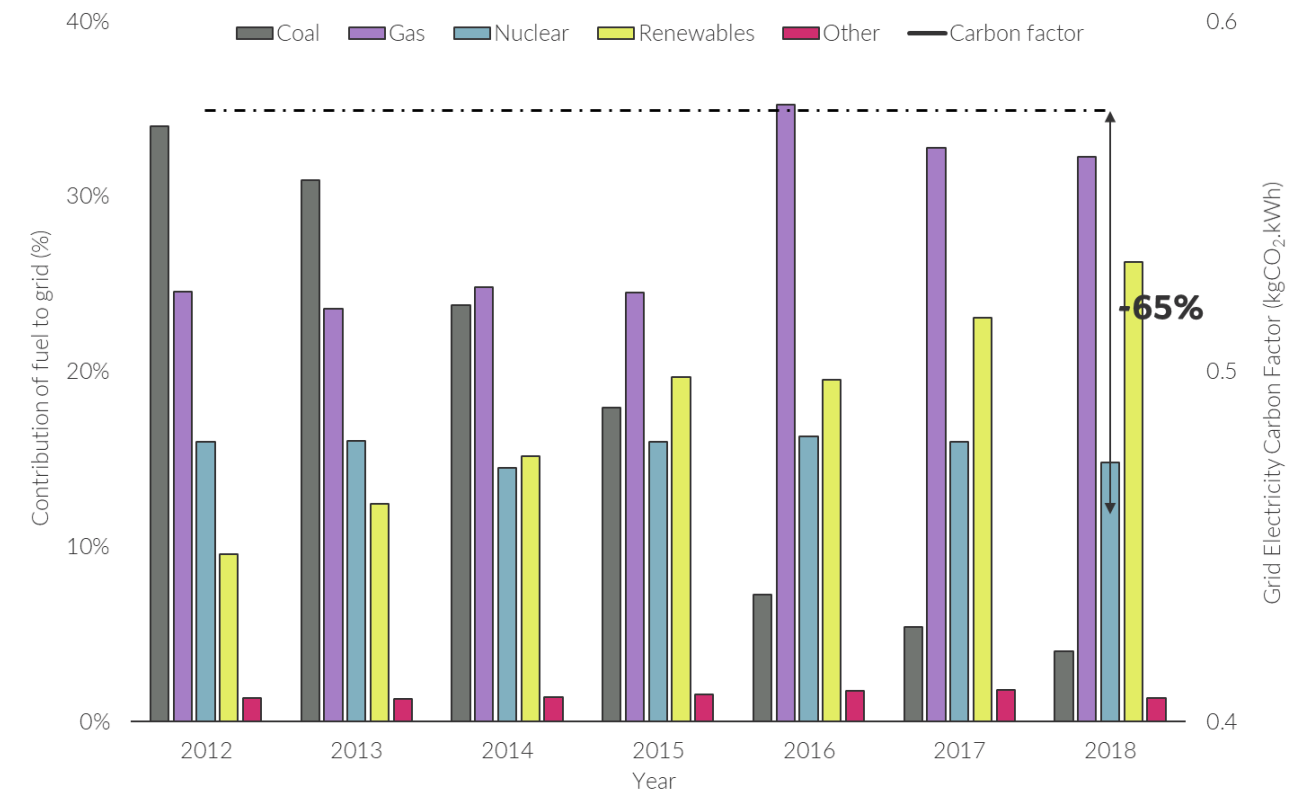


Figure 12: Historic mix of generation methods and associated carbon factor for the National Grid. 8% transmission and distribution losses are included. Sources: electricityinfo.org (generation mix); BEIS Green Book (historic carbon factors).

Appendix B: Software Details

Compliance software and procedure

The proposed St John’s Campus development has been assessed using the National Calculation Methodology to demonstrate compliance with Approved Document Part L2, 2021.

Part L2 Non-domestic

Integrated Environmental Solutions Virtual Environment (IESve) is an approved Dynamic Simulations Modelling (DSM) software package which has the capabilities of enabling the user to create a virtual representation of a building. The results presented in this report for the Non-residential aspects were calculated using the approved compliance software IESve 2022 (v2022.2.0.0).

The IESve models were drawn using information provided by the relevant architects.

IESve modelling disclaimer

The calculations produced by Hoare Lea have been carried out with the information provided by the architects to determine whether the proposed development can achieve compliance with Approved Document Part L2 of the Building Regulations.

It should be noted that the data generated by this work is obtained using approved calculations and computer simulations. These simulations are the best means of predicting the performance of the buildings at this stage. Full certainty can only be achieved by measuring the performance of the building and associated systems after a period of use.

The actual energy usage for the buildings once occupied may vary from the calculated values submitted to Building Control. These differences will occur due to several variable parameters between the modelled building and the actual building. Such differences will include the hours, levels of occupancy, how the plant is used and the design criteria with regards to how the rooms are environmentally controlled.

Whilst the simulations have been undertaken in good faith using reasonable skill and care, Hoare Lea can take no responsibility for differences between the computer simulations and the actual performance of the completed buildings due to the inherent complexity and variability of the physics in a building and its environment.

Appendix C: Input Parameters

Heating, Cooling and Ventilation systems

The table below details the systems associated with each space type:

System summary

	VRF - Zone 1 (offices)	VRF- Zone 2 (offices)	Landlord VRF	L16 Event VRF	DX_Local MVHR	Electric Panel Heaters
System type	Variable Refrigerant flow	Variable Refrigerant flow	Variable Refrigerant flow	Variable Refrigerant flow	Split or multi-split	Other local room heater-unfanned
Heating source	ASHP	ASHP	ASHP	ASHP	ASHP	Direct or storage electric heater
Heating fuel	Elec	Elec	Elec	Elec	Elec	Elec
Heating efficiency	3.92	3.92	3.92	4.95	-	1.00
Cooling System type	ASHP	ASHP	ASHP	ASHP	ASHP	-
Cooling Fuel	Elec	Elec	Elec	Elec	Elec	-
Cooling Seasonal Energy Efficiency Ratio (SEER)	6.73	6.98	6.73	7.47	8.0	-
Cooling Nominal Energy Efficiency Ratio (EER)	3.92	4.02	3.92	4.74	4.5	-
Ductwork Leakage tested	Yes - Class B	Yes - Class B	Yes - Class B	Yes- Class B	Yes - Class B	Yes - Class B
AHU CEN Leakage Standards	Class L3	Class L3	Class L3	Class L3	Class L3	Class L3
AHU Specific Fan Power	AHU 01-04= 1.6 W/l/s	AHU 01-04= 1.6 W/l/s	AHU 05= 1.6 W/l/s MVHR 1-3= 1.9 W/l/s	AHU 07= 1.44 W/l/s	AHU 05= 1.6 W/l/s	AHU 05-06= 1.44 W/l/s
Pump Type	Variable speed multiple pressure sensors	Variable speed multiple pressure sensors	Variable speed multiple pressure sensors	Variable speed multiple pressure sensors	-	-
System Metering	Yes	Yes	Yes	Yes	Yes	Yes
Out of Range warning	Yes	Yes	Yes	Yes	Yes	Yes
Ventilation Type	Central Balanced A/C Mech	Central Balanced A/C Mech	Central Balanced A/C Mech	Central Balanced A/C Mech	Central Balanced A/C Mech	Central Balanced A/C Mech
Heat Recovery	Thermal Wheel	Thermal Wheel	Thermal Wheel	Thermal Wheel	Thermal Wheel	Thermal Wheel
Seasonal Efficiency	AHU 01-04= 75%	AHU 01-04= 75%	AHU 05=75% MVHR 1-3=80%	AHU 07= 75%	AHU 05= 75%	AHU 05-06= 75%
Variable Heat Recovery Efficiency	No	No	No	No	No	No
System Controls	Central Time Control Optimum Start/Stop Local Temp Control Weather Compensation	Central Time Control Optimum Start/Stop Local Temp Control Weather Compensation	Central Time Control Optimum Start/Stop Local Temp Control Weather Compensation	Central Time Control Optimum Start/Stop Local Temp Control Weather Compensation	Central Time Control Optimum Start/Stop Local Temp Control Weather Compensation	Central Time Control Optimum Start/Stop Local Time Control Weather Compensation
Demand Controlled Ventilation (DCV)	Demand Control based on Gas sensors	Demand Control based on Gas sensors	Demand Control based on Gas sensors	Demand Control based on Gas sensors	-	-

	VRF - Zone 1 (offices)	VRF- Zone 2 (offices)	Landlord VRF	L16 Event VRF	DX_Local MVHR	Electric Panel Heaters
DCV Airflow Regulation	Speed Control	Speed Control	Speed Control	Speed Control	-	-
Zones served	Tenant offices- Zone 1	Tenant offices- Zone 2	GF Landlord areas (Entrance Lobby/Amenity/Indicative Retail) Circulation/ Lift lobbies (building core)	L16 Events space L16 Phone booths	IT Comms	Changing Showers Stores Ablution/ Contemplation Management Office/ Staff Welfare GF Circulation/ Lift lobbies (building core) Staircases
Heating Radiant Fraction	0.20	0.20	0.20	0.20	0.00	0.00
Cooling Radiant Fraction	0.00	0.00	0.00	0.00	0.00	0.00

Air Handling Units (AHU): Ventilation Specific Fan Powers (SFPs)

Zones	AHU ref	SFP (W/l/s)	Minimum heat recovery efficiency (heating/cooling)
Tenant Offices	AHU 01-04	1.60	75%
WCs Showers Changing facilities Circulation/ Lift lobby IT Comms Room Store	AHU 05-06	1.44	75%
L16 Events L16 Phone booths	AHU 07	1.44	75%

Table 8.3: Ventilation Specific Fan Powers

Mechanical Ventilation with Heat Recovery Units (MVHR): Ventilation Specific Fan Powers (SFPs)

Zones	AHU ref	SFP (W/l/s)	Minimum heat recovery efficiency (heating/cooling)
Entrance Lobby/Amenity/Indicative Retail Management office/ staff rooms Ablution/ Contemplation	MVHR 1-3	1.90	80%

Local Extracts: Specific Fan Powers (SFPs)

Zones	SFP (W/l/s)
Basement cycle store and plant	0.5

Domestic Hot Water Systems

5_DHW_Office (Point Of Use)	
Generator	Electric Instantaneous Seasonal efficiency: 100%
Storage	Storage volume: 15l Storage losses: 0.016 kWh/l/day

5_DHW_Basement (Shower System)	
Generator	Electric Instantaneous Seasonal efficiency: 98%
Storage	Storage volume: 1200 litre Storage losses: 0.0058 kWh/l/day
Secondary Circulation	Circulation losses: 7.0 W/m Loop Length: 42m Time Switch: No

Photovoltaic Panels Yield

21,551 kWh/yr

Lighting Parameters.

Table 1 shows the target installed power densities and lighting controls for each space. The values are specified as an average for these space types.

Lighting loads have been set at the W/m²/100 lux shown below. It is considered that this lighting level is achievable but needs to be confirmed at the next Stage.

Table 11 Lighting Installed Power Densities and Controls per Space Type

Zone type	NCM Lux	Design Lux (If different)	Installed Power Density (W/m²/100 lux)	Light Output Ratio (LOR)	Constant illuminance control	Lighting Controls *	Photoelectric (Daylight) Control	Total Parasitic Power (W/m²)	Time Switch	Display lamps (lm/W)
Ablution/ Contemplation	300	-	3.31	1.0	No	Manual On- Auto Off	None	0.1	-	-
Changing facilities	50	200	TBD**	1.0	No	Auto On – Off	None	0.1	Yes	-
Circulation/Lift Lobby	100	200 (GF only)	TBD**	1.0	No	Auto On – Off	None	0.1	Yes	-
Core Offices	400	500	1.2	1.0	Yes	Manual On- Auto Off	None	0.1	-	-
Entrance Lobby/Amenity/Indicative Retail	200	300	TBD**	1.0	No	Auto On – Off	None	0.1	Yes	default
Events space	300	-	TBD**	1.0	Yes	Manual On- Auto Off	Yes, dimming	0.1	-	-
IT Comms Room	200	-	2.05	1.0	No	None	None	-	-	-
Management Office/ Staff Welfare	400	300	1.47	1.0	No	Manual On- Auto Off	None	0.1	-	-
Perimeter Offices	400	500	1.2	1.0	Yes	Manual On- Auto Off	Yes, dimming	0.1	-	-
Phone Booths	300	100	7.08	1.0	No	None	None	-	-	-
Plant	200	300	Basement-2.05 GF- 2.48 L16-1.96	1.0	No	None	None	-	-	-
Showers	100	200	TBD**	1.0	No	Auto On – Off	None	0.1	Yes	
Stairs	100	-	3.46	1.0	No	Auto On – Off	None	0.1	Yes	-
Store	50	200	B. Cycle Store-TBD** B. Store- 1.55 GF Bin Store- 3.39	1.0	No	None	None	-	-	-
WCs	200	-	TBD**	1.0	No	Auto On – Off	None	0.1	-	-

*Lighting Controls are defined as follows:

Auto On – Auto Off: Specifies presence detection sensors within the space which automatically switches lighting on when occupants are detected and switches lighting off when the space is detected to be unoccupied.

Manual On – Auto Off: Specifies absence detection sensors within the space. Lighting is required to be manually switched on. Automatically switches lighting off when the space is detected to be unoccupied.

**TBD values are to be determined as design progresses- assumed as per NCM Activity Template

Photoelectric (Daylight) Control: Yes – Dimming/Standalone*: Where this has been specified the following profile has been assumed is the IES model **ramp(e1,0,1,400,0.2)**

This formula modulates the lighting gain as a function of the illuminance on the working plane, e1. The value of the profile falls from 1 at zero illuminance to 0.2 at illuminance 400 lux, thereafter, remaining constant at this value.

The value 0.2 represents the fraction of the space’s lighting gain which is not subject to daylight control. The illuminance e1 has been computed using the link to Radiance for each zone.

Appendix D: BRUKL document

Project name

St Johns Campus

As designed

Date: Fri Mar 17 14:07:24 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.18

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.18

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

Foundation area [m²]: 1329.49The 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	4.62
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	3.58
Target primary energy rate (TPER), kWh/m ² annum	50.7
Building primary energy rate (BPER), kWh/m ² annum	39.18
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	00000008:Surf[0]
Floors	0.18	0.12	0.12	GF000000C:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.12	0.12	01000001:Surf[6]
Windows** and roof windows	1.6	1.2	1.2	00000018:Surf[1]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	1.2	1.2	GF000000C:Surf[1]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
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	2

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- St John - Bin store/plant/Stairs Electric panel heaters NV

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0	-	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

2- St John - General Circulation Electric panel heaters, AHU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0	0	0.75
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					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

3- St John - landlord VRF - AHU (s+e)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.92	6.73	0	1.6	0.75
Standard value	2.5*	N/A	N/A	2^	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.					
^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

4- St John - MEP - DX - AHU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	8	0	0	0.75
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.					

5- St John - Toilets Electric panel heaters

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0	-	0.75
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					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

6- St John - Office Z1 VRF - AHU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.92	6.73	0	1.6	0.75
Standard value	2.5*	N/A	N/A	2^	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.					
^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

7- St John - Office Z2 VRF - AHU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.92	6.98	0	1.6	0.75
Standard value	2.5*	N/A	N/A	2^	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.					
^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

8- St John - Changing Electric panel heaters, AHU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0	0	0.75
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					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

9- St John - Basement Cycle/ Plant Electric panel heaters with local extract

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0	-	-
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					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

10- St John - Shower Electric panel heaters

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0	0	0.75
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					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

11- St John - Store Electric panel heaters

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	0.75
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					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

12- St John - Office Electric panel heaters MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	0	0.8
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					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

13- St John - landlord VRF - MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.92	6.73	0	1.6	0.8
Standard value	2.5*	N/A	N/A	2^	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.					
^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

14- St John - Abl/Cont Electric panel heaters MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0	-	0.8
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					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

15- St John - L16 Events VRF - AHU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.95	7.47	0	1.6	0.75
Standard value	2.5*	N/A	N/A	2^	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.					
^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

"No HWS in project, or hot water is provided by HVAC system"

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
00-Circulation	-	-	-	1.4	-	-	-	-	-	-	-	N/A
00-Circulation	-	-	-	1.4	-	-	-	-	-	-	-	N/A
00-Main Comms Room	-	-	-	1.4	-	-	-	-	-	-	-	N/A
01-Acc WC 1	-	-	-	1.4	-	-	-	-	-	-	-	N/A
01-Circulation	-	-	-	1.6	-	-	-	-	-	-	-	N/A
01-Circulation	-	-	-	1.6	-	-	-	-	-	-	-	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	
01-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A	
01-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A	
01-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A	
01-WC 1	-	-	-	1.4	-	-	-	-	-	-	N/A	
01-WC 2	-	-	-	1.4	-	-	-	-	-	-	N/A	
01-WC 3	-	-	-	1.4	-	-	-	-	-	-	N/A	
01-WC 4	-	-	-	1.4	-	-	-	-	-	-	N/A	
01-WC 5	-	-	-	1.4	-	-	-	-	-	-	N/A	
01-WC 6	-	-	-	1.4	-	-	-	-	-	-	N/A	
01-WC 7	-	-	-	1.4	-	-	-	-	-	-	N/A	
01-WC 8	-	-	-	1.4	-	-	-	-	-	-	N/A	
02-Acc WC 1	-	-	-	1.4	-	-	-	-	-	-	N/A	
02-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A	
02-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A	
02-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A	
02-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A	
02-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A	
02-WC 1	-	-	-	1.4	-	-	-	-	-	-	N/A	
02-WC 2	-	-	-	1.4	-	-	-	-	-	-	N/A	
02-WC 3	-	-	-	1.4	-	-	-	-	-	-	N/A	
02-WC 4	-	-	-	1.4	-	-	-	-	-	-	N/A	
02-WC 5	-	-	-	1.4	-	-	-	-	-	-	N/A	
02-WC 6	-	-	-	1.4	-	-	-	-	-	-	N/A	
02-WC 7	-	-	-	1.4	-	-	-	-	-	-	N/A	
02-WC 8	-	-	-	1.4	-	-	-	-	-	-	N/A	
03-Acc WC 1	-	-	-	1.4	-	-	-	-	-	-	N/A	
03-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A	
03-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A	
03-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A	
03-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A	
03-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A	
03-WC 1	-	-	-	1.4	-	-	-	-	-	-	N/A	
03-WC 2	-	-	-	1.4	-	-	-	-	-	-	N/A	
03-WC 3	-	-	-	1.4	-	-	-	-	-	-	N/A	
03-WC 4	-	-	-	1.4	-	-	-	-	-	-	N/A	
03-WC 5	-	-	-	1.4	-	-	-	-	-	-	N/A	
03-WC 6	-	-	-	1.4	-	-	-	-	-	-	N/A	
03-WC 7	-	-	-	1.4	-	-	-	-	-	-	N/A	
03-WC 8	-	-	-	1.4	-	-	-	-	-	-	N/A	
04-Acc WC 1	-	-	-	1.4	-	-	-	-	-	-	N/A	
04-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A	
04-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A	
04-Circulation	-	-	-	1.6	-	-	-	-	-	-	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
04-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
04-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
04-WC 1		-	-	-	1.4	-	-	-	-	-	-	N/A
04-WC 2		-	-	-	1.4	-	-	-	-	-	-	N/A
04-WC 3		-	-	-	1.4	-	-	-	-	-	-	N/A
04-WC 4		-	-	-	1.4	-	-	-	-	-	-	N/A
04-WC 5		-	-	-	1.4	-	-	-	-	-	-	N/A
04-WC 6		-	-	-	1.4	-	-	-	-	-	-	N/A
04-WC 7		-	-	-	1.4	-	-	-	-	-	-	N/A
04-WC 8		-	-	-	1.4	-	-	-	-	-	-	N/A
05-Acc WC 1		-	-	-	1.4	-	-	-	-	-	-	N/A
05-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
05-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
05-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
05-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
05-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
05-WC 1		-	-	-	1.4	-	-	-	-	-	-	N/A
05-WC 2		-	-	-	1.4	-	-	-	-	-	-	N/A
05-WC 3		-	-	-	1.4	-	-	-	-	-	-	N/A
05-WC 4		-	-	-	1.4	-	-	-	-	-	-	N/A
05-WC 5		-	-	-	1.4	-	-	-	-	-	-	N/A
05-WC 6		-	-	-	1.4	-	-	-	-	-	-	N/A
05-WC 7		-	-	-	1.4	-	-	-	-	-	-	N/A
05-WC 8		-	-	-	1.4	-	-	-	-	-	-	N/A
06-Acc WC 1		-	-	-	1.4	-	-	-	-	-	-	N/A
06-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
06-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
06-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
06-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
06-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
06-WC 1		-	-	-	1.4	-	-	-	-	-	-	N/A
06-WC 2		-	-	-	1.4	-	-	-	-	-	-	N/A
06-WC 3		-	-	-	1.4	-	-	-	-	-	-	N/A
06-WC 4		-	-	-	1.4	-	-	-	-	-	-	N/A
06-WC 5		-	-	-	1.4	-	-	-	-	-	-	N/A
06-WC 6		-	-	-	1.4	-	-	-	-	-	-	N/A
06-WC 7		-	-	-	1.4	-	-	-	-	-	-	N/A
06-WC 8		-	-	-	1.4	-	-	-	-	-	-	N/A
07-Acc WC 1		-	-	-	1.4	-	-	-	-	-	-	N/A
07-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
07-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
07-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
07-Circulation		-	-	-	1.6	-	-	-	-	-	-	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
07-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
07-WC 1	-	-	-	1.4	-	-	-	-	-	-	N/A
07-WC 2	-	-	-	1.4	-	-	-	-	-	-	N/A
07-WC 3	-	-	-	1.4	-	-	-	-	-	-	N/A
07-WC 4	-	-	-	1.4	-	-	-	-	-	-	N/A
07-WC 5	-	-	-	1.4	-	-	-	-	-	-	N/A
07-WC 6	-	-	-	1.4	-	-	-	-	-	-	N/A
07-WC 7	-	-	-	1.4	-	-	-	-	-	-	N/A
07-WC 8	-	-	-	1.4	-	-	-	-	-	-	N/A
08-Acc WC 1	-	-	-	1.4	-	-	-	-	-	-	N/A
08-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
08-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
08-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
08-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
08-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
08-WC 1	-	-	-	1.4	-	-	-	-	-	-	N/A
08-WC 2	-	-	-	1.4	-	-	-	-	-	-	N/A
08-WC 3	-	-	-	1.4	-	-	-	-	-	-	N/A
08-WC 4	-	-	-	1.4	-	-	-	-	-	-	N/A
08-WC 5	-	-	-	1.4	-	-	-	-	-	-	N/A
08-WC 6	-	-	-	1.4	-	-	-	-	-	-	N/A
08-WC 7	-	-	-	1.4	-	-	-	-	-	-	N/A
08-WC 8	-	-	-	1.4	-	-	-	-	-	-	N/A
09-Acc WC 1	-	-	-	1.4	-	-	-	-	-	-	N/A
09-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
09-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
09-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
09-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
09-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
09-WC 1	-	-	-	1.4	-	-	-	-	-	-	N/A
09-WC 2	-	-	-	1.4	-	-	-	-	-	-	N/A
09-WC 3	-	-	-	1.4	-	-	-	-	-	-	N/A
09-WC 4	-	-	-	1.4	-	-	-	-	-	-	N/A
09-WC 5	-	-	-	1.4	-	-	-	-	-	-	N/A
09-WC 6	-	-	-	1.4	-	-	-	-	-	-	N/A
09-WC 7	-	-	-	1.4	-	-	-	-	-	-	N/A
09-WC 8	-	-	-	1.4	-	-	-	-	-	-	N/A
10-Acc WC 1	-	-	-	1.4	-	-	-	-	-	-	N/A
10-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
10-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
10-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
10-Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
10-Circulation	-	-	-	1.6	-	-	-	-	-	-	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
10-WC 1		-	-	-	1.4	-	-	-	-	-	-	N/A
10-WC 2		-	-	-	1.4	-	-	-	-	-	-	N/A
10-WC 3		-	-	-	1.4	-	-	-	-	-	-	N/A
10-WC 4		-	-	-	1.4	-	-	-	-	-	-	N/A
10-WC 5		-	-	-	1.4	-	-	-	-	-	-	N/A
10-WC 6		-	-	-	1.4	-	-	-	-	-	-	N/A
10-WC 7		-	-	-	1.4	-	-	-	-	-	-	N/A
10-WC 8		-	-	-	1.4	-	-	-	-	-	-	N/A
11-Acc WC 1		-	-	-	1.4	-	-	-	-	-	-	N/A
11-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
11-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
11-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
11-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
11-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
11-WC 1		-	-	-	1.4	-	-	-	-	-	-	N/A
11-WC 2		-	-	-	1.4	-	-	-	-	-	-	N/A
11-WC 3		-	-	-	1.4	-	-	-	-	-	-	N/A
11-WC 4		-	-	-	1.4	-	-	-	-	-	-	N/A
11-WC 5		-	-	-	1.4	-	-	-	-	-	-	N/A
11-WC 6		-	-	-	1.4	-	-	-	-	-	-	N/A
11-WC 7		-	-	-	1.4	-	-	-	-	-	-	N/A
11-WC 8		-	-	-	1.4	-	-	-	-	-	-	N/A
12-Acc WC 1		-	-	-	1.4	-	-	-	-	-	-	N/A
12-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
12-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
12-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
12-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
12-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
12-WC 1		-	-	-	1.4	-	-	-	-	-	-	N/A
12-WC 2		-	-	-	1.4	-	-	-	-	-	-	N/A
12-WC 3		-	-	-	1.4	-	-	-	-	-	-	N/A
12-WC 4		-	-	-	1.4	-	-	-	-	-	-	N/A
12-WC 5		-	-	-	1.4	-	-	-	-	-	-	N/A
12-WC 6		-	-	-	1.4	-	-	-	-	-	-	N/A
12-WC 7		-	-	-	1.4	-	-	-	-	-	-	N/A
12-WC 8		-	-	-	1.4	-	-	-	-	-	-	N/A
13-Acc WC 1		-	-	-	1.4	-	-	-	-	-	-	N/A
13-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
13-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
13-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
13-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
13-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
13-WC 1		-	-	-	1.4	-	-	-	-	-	-	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
13-WC 2		-	-	-	1.4	-	-	-	-	-	-	N/A
13-WC 3		-	-	-	1.4	-	-	-	-	-	-	N/A
13-WC 4		-	-	-	1.4	-	-	-	-	-	-	N/A
13-WC 5		-	-	-	1.4	-	-	-	-	-	-	N/A
13-WC 6		-	-	-	1.4	-	-	-	-	-	-	N/A
13-WC 7		-	-	-	1.4	-	-	-	-	-	-	N/A
13-WC 8		-	-	-	1.4	-	-	-	-	-	-	N/A
14-Acc WC 1		-	-	-	1.4	-	-	-	-	-	-	N/A
14-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
14-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
14-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
14-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
14-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
14-WC 1		-	-	-	1.4	-	-	-	-	-	-	N/A
14-WC 2		-	-	-	1.4	-	-	-	-	-	-	N/A
14-WC 3		-	-	-	1.4	-	-	-	-	-	-	N/A
14-WC 4		-	-	-	1.4	-	-	-	-	-	-	N/A
14-WC 5		-	-	-	1.4	-	-	-	-	-	-	N/A
14-WC 6		-	-	-	1.4	-	-	-	-	-	-	N/A
14-WC 7		-	-	-	1.4	-	-	-	-	-	-	N/A
14-WC 8		-	-	-	1.4	-	-	-	-	-	-	N/A
15-Acc WC 1		-	-	-	1.4	-	-	-	-	-	-	N/A
15-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
15-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
15-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
15-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
15-Circulation		-	-	-	1.6	-	-	-	-	-	-	N/A
15-WC 1		-	-	-	1.4	-	-	-	-	-	-	N/A
15-WC 2		-	-	-	1.4	-	-	-	-	-	-	N/A
15-WC 3		-	-	-	1.4	-	-	-	-	-	-	N/A
15-WC 4		-	-	-	1.4	-	-	-	-	-	-	N/A
15-WC 5		-	-	-	1.4	-	-	-	-	-	-	N/A
15-WC 6		-	-	-	1.4	-	-	-	-	-	-	N/A
15-WC 7		-	-	-	1.4	-	-	-	-	-	-	N/A
15-WC 8		-	-	-	1.4	-	-	-	-	-	-	N/A
B1-Acc Changing		-	-	-	1.4	-	-	-	-	-	-	N/A
B1-AHU Plant		-	-	-	-	-	0.5	-	-	-	-	N/A
B1-Cold Water Tank Room Plant		-	-	-	-	-	0.5	-	-	-	-	N/A
B1-Cycle Store		-	-	-	-	-	0.5	-	-	-	-	N/A
B1-Dry Change		-	-	-	1.4	-	-	-	-	-	-	N/A
B1-Dry Change		-	-	-	1.4	-	-	-	-	-	-	N/A
B1-Lift Lobby		-	-	-	1.4	-	-	-	-	-	-	N/A
B1-Rainwater Plant		-	-	-	-	-	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
00-WC 5	-	-	-	1.4	-	-	-	-	-	-	N/A
00-Circulation	-	-	-	1.4	-	-	-	-	-	-	N/A
00-Circulation	-	-	-	1.4	-	-	-	-	-	-	N/A
00-Circulation	-	-	-	1.4	-	-	-	-	-	-	N/A
B1-Changing	-	-	-	1.4	-	-	-	-	-	-	N/A
B1-Changing	-	-	-	1.4	-	-	-	-	-	-	N/A
B1-Changing	-	-	-	1.4	-	-	-	-	-	-	N/A
B1-Sprinkler Plant	-	-	-	-	-	0.5	-	-	-	-	N/A
B1-Wet Riser Plant	-	-	-	-	-	0.5	-	-	-	-	N/A
B1-Non Binary Changing	-	-	-	1.4	-	-	-	-	-	-	N/A
16-Circulation	-	-	-	1.4	-	-	-	-	-	-	N/A
16-WC	-	-	-	1.4	-	-	-	-	-	-	N/A
16-Acc WC	-	-	-	1.4	-	-	-	-	-	-	N/A
16-WC	-	-	-	1.4	-	-	-	-	-	-	N/A
16-Acc WC	-	-	-	1.4	-	-	-	-	-	-	N/A
16-Circulation	-	-	-	1.4	-	-	-	-	-	-	N/A
16-Circulation	-	-	-	1.4	-	-	-	-	-	-	N/A
16-Circulation	-	-	-	1.4	-	-	-	-	-	-	N/A

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
	Standard value	95	80	0.3
00-Bin Store		51	-	-
00-Circulation		64	-	-
00-Circulation		87	-	-
00-HV Switchroom		102	-	-
00-Lift Lobby		50	-	-
00-Main Comms Room		113	-	-
00-Stair		71	-	-
01-Acc WC 1		80	-	-
01-Circulation		60	-	-
01-Circulation		61	-	-
01-Circulation		69	-	-
01-Circulation		56	-	-
01-Circulation		67	-	-
01-Office Core 1		121	-	-
01-Office Core 2		123	-	-
01-Office Core 3		121	-	-
01-Office Core 5		124	-	-
01-Office Core 6		121	-	-
01-Office Core 8		123	-	-
01-Office Core 9		123	-	-
01-Office Perimeter 1		124	-	-

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
01-Office Perimeter 2		124	-	-
01-Office Perimeter 3		124	-	-
01-Office Perimeter 4		124	-	-
01-Office Perimeter 5		131	-	-
01-Office Perimeter 6		124	-	-
01-Office Perimeter 7		124	-	-
01-Office Perimeter 8		124	-	-
01-Office Perimeter 9		124	-	-
01-Office Perimeter 10		126	-	-
01-Office Perimeter 11		131	-	-
01-Office Perimeter 12		124	-	-
01-Office Perimeter 13		124	-	-
01-Office Perimeter 14		124	-	-
01-Office Perimeter 15		121	-	-
01-Office Perimeter 16		121	-	-
01-Office Perimeter 17		121	-	-
01-Office Perimeter 18		127	-	-
01-Office Perimeter 19		124	-	-
01-Office Perimeter 20		124	-	-
01-Office Perimeter 21		132	-	-
01-Stair		61	-	-
01-Stair		62	-	-
01-WC 1		87	-	-
01-WC 2		87	-	-
01-WC 3		87	-	-
01-WC 4		87	-	-
01-WC 5		87	-	-
01-WC 6		87	-	-
01-WC 7		87	-	-
01-WC 8		87	-	-
02-Acc WC 1		80	-	-
02-Circulation		69	-	-
02-Circulation		61	-	-
02-Circulation		60	-	-
02-Circulation		56	-	-
02-Circulation		67	-	-
02-Office Core 1		121	-	-
02-Office Core 2		123	-	-
02-Office Core 3		121	-	-
02-Office Core 5		124	-	-
02-Office Core 6		121	-	-
02-Office Core 8		122	-	-
02-Office Perimeter 1		124	-	-

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
02-Office Perimeter 2		124	-	-
02-Office Perimeter 3		124	-	-
02-Office Perimeter 4		124	-	-
02-Office Perimeter 5		131	-	-
02-Office Perimeter 6		124	-	-
02-Office Perimeter 7		124	-	-
02-Office Perimeter 8		124	-	-
02-Office Perimeter 9		124	-	-
02-Office Perimeter 10		124	-	-
02-Office Perimeter 11		129	-	-
02-Office Perimeter 12		124	-	-
02-Office Perimeter 13		124	-	-
02-Office Perimeter 14		123	-	-
02-Office Perimeter 15		130	-	-
02-Office Perimeter 16		124	-	-
02-Office Perimeter 17		124	-	-
02-Office Perimeter 18		129	-	-
02-Office Perimeter 20		124	-	-
02-Office Perimeter 21		124	-	-
02-Office Perimeter 22		128	-	-
02-Stair		61	-	-
02-Stair		62	-	-
02-WC 1		87	-	-
02-WC 2		87	-	-
02-WC 3		87	-	-
02-WC 4		87	-	-
02-WC 5		87	-	-
02-WC 6		87	-	-
02-WC 7		87	-	-
02-WC 8		87	-	-
03-Acc WC 1		80	-	-
03-Circulation		53	-	-
03-Circulation		69	-	-
03-Circulation		61	-	-
03-Circulation		60	-	-
03-Circulation		56	-	-
03-Office Core 2		123	-	-
03-Office Core 3		121	-	-
03-Office Core 5		124	-	-
03-Office Core 6		121	-	-
03-Office Core 8		123	-	-
03-Office Core 9		121	-	-
03-Office Core 10		121	-	-

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
03-Office Core 12		121	-	-
03-Office Perimeter 1		124	-	-
03-Office Perimeter 2		124	-	-
03-Office Perimeter 3		124	-	-
03-Office Perimeter 4		124	-	-
03-Office Perimeter 5		131	-	-
03-Office Perimeter 6		124	-	-
03-Office Perimeter 7		124	-	-
03-Office Perimeter 8		124	-	-
03-Office Perimeter 9		124	-	-
03-Office Perimeter 10		124	-	-
03-Office Perimeter 11		129	-	-
03-Office Perimeter 12		124	-	-
03-Office Perimeter 13		124	-	-
03-Office Perimeter 14		124	-	-
03-Office Perimeter 15		127	-	-
03-Office Perimeter 16		125	-	-
03-Office Perimeter 17		125	-	-
03-Office Perimeter 22		128	-	-
03-Stair		61	-	-
03-Stair		62	-	-
03-WC 1		87	-	-
03-WC 2		87	-	-
03-WC 3		87	-	-
03-WC 4		87	-	-
03-WC 5		87	-	-
03-WC 6		87	-	-
03-WC 7		87	-	-
03-WC 8		87	-	-
04-Acc WC 1		80	-	-
04-Circulation		67	-	-
04-Circulation		69	-	-
04-Circulation		60	-	-
04-Circulation		61	-	-
04-Circulation		56	-	-
04-Office Core 1		121	-	-
04-Office Core 2		123	-	-
04-Office Core 3		121	-	-
04-Office Core 5		124	-	-
04-Office Core 6		121	-	-
04-Office Core 8		123	-	-
04-Office Core 10		121	-	-
04-Office Core 11		122	-	-

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
04-Office Core 12		122	-	-
04-Office Perimeter 1		124	-	-
04-Office Perimeter 2		124	-	-
04-Office Perimeter 3		124	-	-
04-Office Perimeter 4		124	-	-
04-Office Perimeter 5		131	-	-
04-Office Perimeter 6		124	-	-
04-Office Perimeter 7		124	-	-
04-Office Perimeter 8		124	-	-
04-Office Perimeter 9		124	-	-
04-Office Perimeter 10		124	-	-
04-Office Perimeter 11		129	-	-
04-Office Perimeter 12		124	-	-
04-Office Perimeter 14		124	-	-
04-Office Perimeter 15		127	-	-
04-Office Perimeter 16		125	-	-
04-Office Perimeter 17		125	-	-
04-Office Perimeter 18		128	-	-
04-Office Perimeter 19		124	-	-
04-Office Perimeter 20		124	-	-
04-Stair		62	-	-
04-Stair		61	-	-
04-WC 1		87	-	-
04-WC 2		87	-	-
04-WC 3		87	-	-
04-WC 4		87	-	-
04-WC 5		87	-	-
04-WC 6		87	-	-
04-WC 7		87	-	-
04-WC 8		87	-	-
05-Acc WC 1		80	-	-
05-Circulation		61	-	-
05-Circulation		67	-	-
05-Circulation		69	-	-
05-Circulation		60	-	-
05-Circulation		56	-	-
05-Office Core 3		121	-	-
05-Office Core 5		124	-	-
05-Office Core 6		121	-	-
05-Office Core 9		121	-	-
05-Office Core 10		121	-	-
05-Office Core 11		122	-	-
05-Office Core 12		122	-	-

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
05-Office Perimeter 1		124	-	-
05-Office Perimeter 2		124	-	-
05-Office Perimeter 3		124	-	-
05-Office Perimeter 4		124	-	-
05-Office Perimeter 5		131	-	-
05-Office Perimeter 6		124	-	-
05-Office Perimeter 7		124	-	-
05-Office Perimeter 8		124	-	-
05-Office Perimeter 9		124	-	-
05-Office Perimeter 10		124	-	-
05-Office Perimeter 11		129	-	-
05-Office Perimeter 12		124	-	-
05-Office Perimeter 13		124	-	-
05-Office Perimeter 14		124	-	-
05-Office Perimeter 15		127	-	-
05-Office Perimeter 16		125	-	-
05-Office Perimeter 17		125	-	-
05-Office Perimeter 18		127	-	-
05-Office Perimeter 19		124	-	-
05-Office Perimeter 20		124	-	-
05-Office Perimeter 21		124	-	-
05-Stair		61	-	-
05-Stair		62	-	-
05-WC 1		87	-	-
05-WC 2		87	-	-
05-WC 3		87	-	-
05-WC 4		87	-	-
05-WC 5		87	-	-
05-WC 6		87	-	-
05-WC 7		87	-	-
05-WC 8		87	-	-
06-Acc WC 1		80	-	-
06-Circulation		67	-	-
06-Circulation		56	-	-
06-Circulation		69	-	-
06-Circulation		61	-	-
06-Circulation		60	-	-
06-Office Core 2		123	-	-
06-Office Core 3		121	-	-
06-Office Core 5		124	-	-
06-Office Core 6		121	-	-
06-Office Core 10		121	-	-
06-Office Core 11		122	-	-

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
06-Office Core 12		122	-	-
06-Office Perimeter 1		124	-	-
06-Office Perimeter 2		124	-	-
06-Office Perimeter 3		124	-	-
06-Office Perimeter 4		124	-	-
06-Office Perimeter 5		131	-	-
06-Office Perimeter 6		124	-	-
06-Office Perimeter 7		124	-	-
06-Office Perimeter 8		124	-	-
06-Office Perimeter 9		124	-	-
06-Office Perimeter 10		124	-	-
06-Office Perimeter 11		129	-	-
06-Office Perimeter 12		124	-	-
06-Office Perimeter 13		124	-	-
06-Office Perimeter 14		124	-	-
06-Office Perimeter 16		127	-	-
06-Office Perimeter 17		125	-	-
06-Office Perimeter 18		127	-	-
06-Office Perimeter 19		124	-	-
06-Office Perimeter 20		124	-	-
06-Office Perimeter 21		124	-	-
06-Office Perimeter 22		128	-	-
06-Office Perimeter 115		125	-	-
06-Stair		62	-	-
06-Stair		61	-	-
06-WC 1		87	-	-
06-WC 2		87	-	-
06-WC 3		87	-	-
06-WC 4		87	-	-
06-WC 5		87	-	-
06-WC 6		87	-	-
06-WC 7		87	-	-
06-WC 8		87	-	-
07-Acc WC 1		80	-	-
07-Circulation		67	-	-
07-Circulation		69	-	-
07-Circulation		61	-	-
07-Circulation		60	-	-
07-Circulation		56	-	-
07-Office Core 2		123	-	-
07-Office Core 3		121	-	-
07-Office Core 5		124	-	-
07-Office Core 6		121	-	-

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
07-Office Core 8		123	-	-
07-Office Core 9		121	-	-
07-Office Core 10		121	-	-
07-Office Core 11		122	-	-
07-Office Core 12		122	-	-
07-Office Perimeter 1		124	-	-
07-Office Perimeter 2		124	-	-
07-Office Perimeter 3		124	-	-
07-Office Perimeter 4		124	-	-
07-Office Perimeter 5		131	-	-
07-Office Perimeter 6		124	-	-
07-Office Perimeter 7		124	-	-
07-Office Perimeter 8		124	-	-
07-Office Perimeter 9		124	-	-
07-Office Perimeter 10		124	-	-
07-Office Perimeter 11		129	-	-
07-Office Perimeter 12		124	-	-
07-Office Perimeter 13		124	-	-
07-Office Perimeter 14		124	-	-
07-Office Perimeter 15		125	-	-
07-Office Perimeter 16		127	-	-
07-Office Perimeter 17		126	-	-
07-Office Perimeter 18		127	-	-
07-Office Perimeter 21		124	-	-
07-Stair		61	-	-
07-Stair		62	-	-
07-WC 1		87	-	-
07-WC 2		87	-	-
07-WC 3		87	-	-
07-WC 4		87	-	-
07-WC 5		87	-	-
07-WC 6		87	-	-
07-WC 7		87	-	-
07-WC 8		87	-	-
08-Acc WC 1		80	-	-
08-Circulation		60	-	-
08-Circulation		69	-	-
08-Circulation		67	-	-
08-Circulation		61	-	-
08-Circulation		56	-	-
08-Office Core 1		121	-	-
08-Office Core 2		123	-	-
08-Office Core 3		121	-	-

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
08-Office Core 5		124	-	-
08-Office Core 6		121	-	-
08-Office Core 8		123	-	-
08-Office Core 9		121	-	-
08-Office Core 10		121	-	-
08-Office Core 11		122	-	-
08-Office Core 12		122	-	-
08-Office Perimeter 1		124	-	-
08-Office Perimeter 2		124	-	-
08-Office Perimeter 3		124	-	-
08-Office Perimeter 4		124	-	-
08-Office Perimeter 5		131	-	-
08-Office Perimeter 6		124	-	-
08-Office Perimeter 7		124	-	-
08-Office Perimeter 8		124	-	-
08-Office Perimeter 9		124	-	-
08-Office Perimeter 10		124	-	-
08-Office Perimeter 11		129	-	-
08-Office Perimeter 12		124	-	-
08-Office Perimeter 13		124	-	-
08-Office Perimeter 14		124	-	-
08-Office Perimeter 15		125	-	-
08-Office Perimeter 16		127	-	-
08-Office Perimeter 17		126	-	-
08-Office Perimeter 18		126	-	-
08-Office Perimeter 19		124	-	-
08-Office Perimeter 20		124	-	-
08-Office Perimeter 21		124	-	-
08-Office Perimeter 22		128	-	-
08-Stair		62	-	-
08-Stair		61	-	-
08-WC 1		87	-	-
08-WC 2		87	-	-
08-WC 3		87	-	-
08-WC 4		87	-	-
08-WC 5		87	-	-
08-WC 6		87	-	-
08-WC 7		87	-	-
08-WC 8		87	-	-
09-Acc WC 1		80	-	-
09-Circulation		60	-	-
09-Circulation		61	-	-
09-Circulation		69	-	-

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
09-Circulation		67	-	-
09-Circulation		56	-	-
09-Office Core 1		121	-	-
09-Office Core 2		123	-	-
09-Office Core 3		121	-	-
09-Office Core 5		124	-	-
09-Office Core 6		121	-	-
09-Office Core 8		123	-	-
09-Office Core 9		121	-	-
09-Office Core 10		121	-	-
09-Office Core 11		122	-	-
09-Office Core 12		122	-	-
09-Office Perimeter 1		124	-	-
09-Office Perimeter 2		124	-	-
09-Office Perimeter 3		124	-	-
09-Office Perimeter 4		124	-	-
09-Office Perimeter 5		131	-	-
09-Office Perimeter 6		124	-	-
09-Office Perimeter 7		124	-	-
09-Office Perimeter 8		124	-	-
09-Office Perimeter 9		124	-	-
09-Office Perimeter 10		124	-	-
09-Office Perimeter 11		129	-	-
09-Office Perimeter 12		124	-	-
09-Office Perimeter 13		124	-	-
09-Office Perimeter 15		125	-	-
09-Office Perimeter 16		127	-	-
09-Office Perimeter 17		126	-	-
09-Office Perimeter 18		125	-	-
09-Office Perimeter 19		124	-	-
09-Office Perimeter 21		124	-	-
09-Stair		62	-	-
09-Stair		61	-	-
09-WC 1		87	-	-
09-WC 2		87	-	-
09-WC 3		87	-	-
09-WC 4		87	-	-
09-WC 5		87	-	-
09-WC 6		87	-	-
09-WC 7		87	-	-
09-WC 8		87	-	-
10-Acc WC 1		80	-	-
10-Circulation		69	-	-

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
10-Circulation		67	-	-
10-Circulation		56	-	-
10-Circulation		60	-	-
10-Circulation		61	-	-
10-Office Core 1		121	-	-
10-Office Core 2		123	-	-
10-Office Core 3		121	-	-
10-Office Core 5		124	-	-
10-Office Core 6		121	-	-
10-Office Core 8		123	-	-
10-Office Core 9		121	-	-
10-Office Core 10		121	-	-
10-Office Core 11		122	-	-
10-Office Core 12		122	-	-
10-Office Perimeter 1		124	-	-
10-Office Perimeter 2		124	-	-
10-Office Perimeter 3		124	-	-
10-Office Perimeter 4		124	-	-
10-Office Perimeter 5		131	-	-
10-Office Perimeter 6		124	-	-
10-Office Perimeter 7		124	-	-
10-Office Perimeter 8		124	-	-
10-Office Perimeter 9		124	-	-
10-Office Perimeter 10		124	-	-
10-Office Perimeter 11		129	-	-
10-Office Perimeter 12		124	-	-
10-Office Perimeter 13		124	-	-
10-Office Perimeter 14		124	-	-
10-Office Perimeter 15		125	-	-
10-Office Perimeter 16		127	-	-
10-Office Perimeter 17		126	-	-
10-Office Perimeter 18		125	-	-
10-Office Perimeter 19		124	-	-
10-Office Perimeter 20		124	-	-
10-Stair		62	-	-
10-Stair		61	-	-
10-WC 1		87	-	-
10-WC 2		87	-	-
10-WC 3		87	-	-
10-WC 4		87	-	-
10-WC 5		87	-	-
10-WC 6		87	-	-
10-WC 7		87	-	-

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
10-WC 8		87	-	-
11-Acc WC 1		80	-	-
11-Circulation		69	-	-
11-Circulation		61	-	-
11-Circulation		60	-	-
11-Circulation		56	-	-
11-Circulation		67	-	-
11-Office Core 1		121	-	-
11-Office Core 2		123	-	-
11-Office Core 3		121	-	-
11-Office Core 5		124	-	-
11-Office Core 6		121	-	-
11-Office Core 8		123	-	-
11-Office Core 9		121	-	-
11-Office Core 11		121	-	-
11-Office Core 11		122	-	-
11-Office Core 12		122	-	-
11-Office Perimeter 1		124	-	-
11-Office Perimeter 2		124	-	-
11-Office Perimeter 3		124	-	-
11-Office Perimeter 4		124	-	-
11-Office Perimeter 5		131	-	-
11-Office Perimeter 6		124	-	-
11-Office Perimeter 7		124	-	-
11-Office Perimeter 8		124	-	-
11-Office Perimeter 9		124	-	-
11-Office Perimeter 11		124	-	-
11-Office Perimeter 11		129	-	-
11-Office Perimeter 12		124	-	-
11-Office Perimeter 13		124	-	-
11-Office Perimeter 14		124	-	-
11-Office Perimeter 15		125	-	-
11-Office Perimeter 16		128	-	-
11-Office Perimeter 17		127	-	-
11-Office Perimeter 18		125	-	-
11-Office Perimeter 19		124	-	-
11-Office Perimeter 20		124	-	-
11-Office Perimeter 21		124	-	-
11-Office Perimeter 22		128	-	-
11-Stair		62	-	-
11-Stair		61	-	-
11-WC 1		87	-	-
11-WC 2		87	-	-

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
11-WC 3		87	-	-
11-WC 4		87	-	-
11-WC 5		87	-	-
11-WC 6		87	-	-
11-WC 7		87	-	-
11-WC 8		87	-	-
12-Acc WC 1		80	-	-
12-Circulation		67	-	-
12-Circulation		61	-	-
12-Circulation		69	-	-
12-Circulation		56	-	-
12-Circulation		60	-	-
12-Office Core 1		121	-	-
12-Office Core 2		123	-	-
12-Office Core 3		121	-	-
12-Office Core 5		124	-	-
12-Office Core 6		121	-	-
12-Office Core 8		123	-	-
12-Office Core 9		121	-	-
12-Office Core 12		121	-	-
12-Office Core 12		122	-	-
12-Office Core 12		122	-	-
12-Office Perimeter 1		124	-	-
12-Office Perimeter 2		124	-	-
12-Office Perimeter 3		124	-	-
12-Office Perimeter 4		124	-	-
12-Office Perimeter 5		131	-	-
12-Office Perimeter 6		124	-	-
12-Office Perimeter 7		124	-	-
12-Office Perimeter 8		124	-	-
12-Office Perimeter 9		124	-	-
12-Office Perimeter 12		124	-	-
12-Office Perimeter 12		129	-	-
12-Office Perimeter 12		124	-	-
12-Office Perimeter 13		124	-	-
12-Office Perimeter 14		124	-	-
12-Office Perimeter 15		125	-	-
12-Office Perimeter 16		129	-	-
12-Office Perimeter 17		128	-	-
12-Office Perimeter 18		125	-	-
12-Office Perimeter 19		124	-	-
12-Office Perimeter 20		124	-	-
12-Stair		61	-	-

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
12-Stair		62	-	-
12-WC 1		87	-	-
12-WC 2		87	-	-
12-WC 3		87	-	-
12-WC 4		87	-	-
12-WC 5		87	-	-
12-WC 6		87	-	-
12-WC 7		87	-	-
12-WC 8		87	-	-
13-Acc WC 1		80	-	-
13-Circulation		56	-	-
13-Circulation		60	-	-
13-Circulation		67	-	-
13-Circulation		61	-	-
13-Circulation		69	-	-
13-Office Core 1		121	-	-
13-Office Core 2		123	-	-
13-Office Core 3		121	-	-
13-Office Core 5		124	-	-
13-Office Core 6		121	-	-
13-Office Core 8		123	-	-
13-Office Core 9		121	-	-
13-Office Core 13		121	-	-
13-Office Core 13		122	-	-
13-Office Core 13		122	-	-
13-Office Perimeter 1		124	-	-
13-Office Perimeter 2		124	-	-
13-Office Perimeter 3		124	-	-
13-Office Perimeter 4		124	-	-
13-Office Perimeter 5		131	-	-
13-Office Perimeter 6		124	-	-
13-Office Perimeter 7		124	-	-
13-Office Perimeter 8		124	-	-
13-Office Perimeter 9		124	-	-
13-Office Perimeter 13		124	-	-
13-Office Perimeter 13		124	-	-
13-Office Perimeter 13		124	-	-
13-Office Perimeter 13		129	-	-
13-Office Perimeter 14		124	-	-
13-Office Perimeter 15		125	-	-
13-Office Perimeter 16		131	-	-
13-Office Perimeter 17		129	-	-
13-Office Perimeter 18		125	-	-

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
13-Office Perimeter 19		124	-	-
13-Office Perimeter 20		124	-	-
13-Office Perimeter 21		124	-	-
13-Office Perimeter 22		128	-	-
13-Stair		61	-	-
13-Stair		62	-	-
13-WC 1		87	-	-
13-WC 2		87	-	-
13-WC 3		87	-	-
13-WC 4		87	-	-
13-WC 5		87	-	-
13-WC 6		87	-	-
13-WC 7		87	-	-
13-WC 8		87	-	-
14-Acc WC 1		80	-	-
14-Circulation		67	-	-
14-Circulation		56	-	-
14-Circulation		69	-	-
14-Circulation		60	-	-
14-Circulation		61	-	-
14-Office Core 1		121	-	-
14-Office Core 2		123	-	-
14-Office Core 3		121	-	-
14-Office Core 5		124	-	-
14-Office Core 6		121	-	-
14-Office Core 8		123	-	-
14-Office Core 9		121	-	-
14-Office Core 14		122	-	-
14-Office Core 14		122	-	-
14-Office Core 14		121	-	-
14-Office Perimeter 1		124	-	-
14-Office Perimeter 2		124	-	-
14-Office Perimeter 3		124	-	-
14-Office Perimeter 4		124	-	-
14-Office Perimeter 5		131	-	-
14-Office Perimeter 6		124	-	-
14-Office Perimeter 7		124	-	-
14-Office Perimeter 8		124	-	-
14-Office Perimeter 9		124	-	-
14-Office Perimeter 14		124	-	-
14-Office Perimeter 14		124	-	-
14-Office Perimeter 14		124	-	-
14-Office Perimeter 14		129	-	-

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
14-Office Perimeter 14		124	-	-
14-Office Perimeter 15		125	-	-
14-Office Perimeter 16		135	-	-
14-Office Perimeter 17		132	-	-
14-Office Perimeter 18		125	-	-
14-Office Perimeter 19		124	-	-
14-Office Perimeter 20		124	-	-
14-Office Perimeter 21		124	-	-
14-Stair		62	-	-
14-Stair		61	-	-
14-WC 1		87	-	-
14-WC 2		87	-	-
14-WC 3		87	-	-
14-WC 4		87	-	-
14-WC 5		87	-	-
14-WC 6		87	-	-
14-WC 7		87	-	-
14-WC 8		87	-	-
15-Acc WC 1		80	-	-
15-Circulation		69	-	-
15-Circulation		61	-	-
15-Circulation		67	-	-
15-Circulation		56	-	-
15-Circulation		60	-	-
15-Office Core 1		121	-	-
15-Office Core 2		123	-	-
15-Office Core 3		121	-	-
15-Office Core 5		124	-	-
15-Office Core 6		121	-	-
15-Office Core 8		123	-	-
15-Office Core 9		121	-	-
15-Office Core 15		122	-	-
15-Office Core 15		122	-	-
15-Office Core 15		121	-	-
15-Office Perimeter 1		124	-	-
15-Office Perimeter 2		124	-	-
15-Office Perimeter 3		124	-	-
15-Office Perimeter 4		124	-	-
15-Office Perimeter 5		131	-	-
15-Office Perimeter 6		124	-	-
15-Office Perimeter 7		124	-	-
15-Office Perimeter 8		124	-	-
15-Office Perimeter 9		124	-	-

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
15-Office Perimeter 15		124	-	-
15-Office Perimeter 15		124	-	-
15-Office Perimeter 15		124	-	-
15-Office Perimeter 15		129	-	-
15-Office Perimeter 15		125	-	-
15-Office Perimeter 15		124	-	-
15-Office Perimeter 16		135	-	-
15-Office Perimeter 17		132	-	-
15-Office Perimeter 18		125	-	-
15-Office Perimeter 19		124	-	-
15-Office Perimeter 20		124	-	-
15-Office Perimeter 21		124	-	-
15-Office Perimeter 22		128	-	-
15-Stair		62	-	-
15-Stair		61	-	-
15-WC 1		87	-	-
15-WC 2		87	-	-
15-WC 3		87	-	-
15-WC 4		87	-	-
15-WC 5		87	-	-
15-WC 6		87	-	-
15-WC 7		87	-	-
15-WC 8		87	-	-
16-Stair		53	-	-
B1-Acc Changing		87	-	-
B1-AHU Plant		81	-	-
B1-Circulation		41	-	-
B1-Circulation		45	-	-
B1-Cold Water Tank Room Plant		82	-	-
B1-Cycle Store		41	-	-
B1-Dry Change		121	-	-
B1-Dry Change		121	-	-
B1-Dry Room		62	-	-
B1-Lift Lobby		42	-	-
B1-Rainwater Plant		76	-	-
B1-Shower		87	-	-
B1-Shower		87	-	-
B1-Shower		87	-	-
B1-Shower		87	-	-
B1-Shower		87	-	-
B1-Shower		87	-	-
B1-Shower		87	-	-

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
07-Office Core 7		123	-	-
06-Lift Lobby		42	-	-
06-Office Core 7		123	-	-
05-Lift Lobby		42	-	-
05-Office Core 7		123	-	-
04-Lift Lobby		42	-	-
04-Office Core 7		123	-	-
03-Lift Lobby		42	-	-
03-Office Core 7		123	-	-
02-Lift Lobby		42	-	-
02-Office Core 7		123	-	-
01-Lift Lobby		42	-	-
01-Office Core 7		124	-	-
10-Office Core 4		124	-	-
09-Office Core 4		124	-	-
08-Office Core 4		124	-	-
06-Office Core 4		124	-	-
05-Office Core 4		124	-	-
04-Office Core 4		124	-	-
03-Office Core 4		124	-	-
02-Office Core 4		124	-	-
01-Office Core 4		124	-	-
00-Transformer Room		78	-	-
00-Acc WC 2		87	-	-
00-Circulation		87	-	-
00-WC 3		87	-	-
00-Management Office/Fire Control		235	-	-
00-Stair		73	-	-
00-WC 1		87	-	-
00-Circulation		87	-	-
00-WC 2		87	-	-
00-Staff Welfare		206	-	-
00-Entrance Lobby/Amenity		29	15	9
00-WC Lobby		87	-	-
00-Acc WC 1		87	-	-
00-Sub Station		82	-	-
00-Main LV Switchroom		52	-	-
00-Contemplation		137	-	-
00-Ablution		137	-	-
00-Contemplation		137	-	-
00-Ablution		137	-	-
00-WC		87	-	-
00-WC circulation		87	-	-

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
00-WC 5		87	-	-
00-Circulation		54	-	-
00-Circulation		53	-	-
00-Indicative Retail/F&B		30	15	9
00-Indicative Retail/F&B		29	15	9
00-Circulation		47	-	-
B1-Stair		61	-	-
B1-Circulation		63	-	-
B1-Changing		54	-	-
B1-Changing		121	-	-
B1-Changing		121	-	-
B1-Circulation		47	-	-
B1-Sprinkler Plant		75	-	-
B1-Wet Riser Plant		75	-	-
B1-Non Binary Changing		83	-	-
B1-Circulation		54	-	-
16-Essential Supplies LV Switchroom		101	-	-
16-Circulation		50	-	-
16-WC		66	-	-
16-Acc WC		36	-	-
16-WC		68	-	-
16-Acc WC		58	-	-
16-Circulation		41	-	-
16-Circulation		51	-	-
16-Stair		53	-	-
16-Circulation		47	-	-
16-Phone Booth		43	-	-
16-Phone Booth		43	-	-
16-Events		30	-	-
16-Storage		112	-	-
04-Office Core 9		121	-	-
05-Office Core 8		123	-	-
06-Office Core 8		123	-	-
06-Office Core 9		121	-	-
03-Office Perimeter 20		124	-	-
03-Office Perimeter 21		124	-	-
03-Office Core 1		121	-	-
04-Office Perimeter 13		124	-	-
05-Office Core 1		121	-	-
05-Office Core 2		123	-	-
06-Office Core 1		121	-	-
07-Office Core 4		124	-	-
09-Office Perimeter 20		124	-	-

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
09-Office Perimeter 14		124	-	-
05-Office Perimeter 22		128	-	-
14-Office Perimeter 22		128	-	-
09-Office Perimeter 22		128	-	-
07-Office Perimeter 22		128	-	-
02-Office Core 10		122	-	-
02-Office Perimeter 19		124	-	-
02-Office Core 9		122	-	-
07-Office Core 1		121	-	-
07-Office Perimeter 20		124	-	-
07-Office Perimeter 19		124	-	-
04-Office Perimeter 21		124	-	-
04-Office Perimeter 22		128	-	-
03-Office Perimeter 18		128	-	-
10-Office Perimeter 22		128	-	-
10-Office Perimeter 21		124	-	-
12-Office Perimeter 21		124	-	-
12-Office Perimeter 22		128	-	-
03-Office Perimeter 19		124	-	-
03-Office Core 11		122	-	-

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?
00-Lift Lobby	N/A	N/A
00-Main Comms Room	N/A	N/A
01-Office Core 1	NO (-83.2%)	NO
01-Office Core 2	NO (-86.6%)	NO
01-Office Core 3	NO (-86.9%)	NO
01-Office Core 5	NO (-84.1%)	NO
01-Office Core 6	NO (-76.7%)	NO
01-Office Core 8	NO (-81.8%)	NO
01-Office Core 9	NO (-82.9%)	NO
01-Office Perimeter 1	NO (-68.8%)	NO
01-Office Perimeter 2	NO (-74.7%)	NO
01-Office Perimeter 3	NO (-71.7%)	NO
01-Office Perimeter 4	NO (-73.2%)	NO
01-Office Perimeter 5	NO (-73.6%)	NO
01-Office Perimeter 6	NO (-71.6%)	NO
01-Office Perimeter 7	NO (-73.2%)	NO
01-Office Perimeter 8	NO (-72%)	NO
01-Office Perimeter 9	NO (-73%)	NO
01-Office Perimeter 10	NO (-68.2%)	NO
01-Office Perimeter 11	NO (-55.7%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
01-Office Perimeter 12	NO (-42.1%)	NO
01-Office Perimeter 13	NO (-46.1%)	NO
01-Office Perimeter 14	NO (-48.3%)	NO
01-Office Perimeter 15	YES (+27.7%)	NO
01-Office Perimeter 16	NO (-70.8%)	NO
01-Office Perimeter 17	NO (-65.7%)	NO
01-Office Perimeter 18	NO (-63.5%)	NO
01-Office Perimeter 19	NO (-60.2%)	NO
01-Office Perimeter 20	NO (-60.4%)	NO
01-Office Perimeter 21	NO (-68.6%)	NO
02-Office Core 1	NO (-84.5%)	NO
02-Office Core 2	NO (-86.9%)	NO
02-Office Core 3	NO (-87.1%)	NO
02-Office Core 5	NO (-83.6%)	NO
02-Office Core 6	NO (-76.2%)	NO
02-Office Core 8	NO (-70.1%)	NO
02-Office Perimeter 1	NO (-70.4%)	NO
02-Office Perimeter 2	NO (-74.9%)	NO
02-Office Perimeter 3	NO (-71.7%)	NO
02-Office Perimeter 4	NO (-73.1%)	NO
02-Office Perimeter 5	NO (-73.5%)	NO
02-Office Perimeter 6	NO (-71.5%)	NO
02-Office Perimeter 7	NO (-73%)	NO
02-Office Perimeter 8	NO (-71.7%)	NO
02-Office Perimeter 9	NO (-72.3%)	NO
02-Office Perimeter 10	NO (-62%)	NO
02-Office Perimeter 11	NO (-42.7%)	NO
02-Office Perimeter 12	NO (-22.8%)	NO
02-Office Perimeter 13	NO (-23.1%)	NO
02-Office Perimeter 14	NO (-13.4%)	NO
02-Office Perimeter 15	NO (-31.7%)	NO
02-Office Perimeter 16	NO (-28.5%)	NO
02-Office Perimeter 17	NO (-33.2%)	NO
02-Office Perimeter 18	NO (-48.7%)	NO
02-Office Perimeter 20	NO (-52.4%)	NO
02-Office Perimeter 21	NO (-61.2%)	NO
02-Office Perimeter 22	NO (-67.9%)	NO
03-Office Core 2	NO (-86.7%)	NO
03-Office Core 3	NO (-87%)	NO
03-Office Core 5	NO (-83.2%)	NO
03-Office Core 6	NO (-75.5%)	NO
03-Office Core 8	NO (-68.8%)	NO
03-Office Core 9	NO (-65.5%)	NO
03-Office Core 10	NO (-70.7%)	NO
03-Office Core 12	NO (-86.6%)	NO
03-Office Perimeter 1	NO (-70.1%)	NO
03-Office Perimeter 2	NO (-74.8%)	NO
03-Office Perimeter 3	NO (-71.6%)	NO
03-Office Perimeter 4	NO (-73%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
03-Office Perimeter 5	NO (-73.3%)	NO
03-Office Perimeter 6	NO (-71.2%)	NO
03-Office Perimeter 7	NO (-72.7%)	NO
03-Office Perimeter 8	NO (-71.3%)	NO
03-Office Perimeter 9	NO (-71.8%)	NO
03-Office Perimeter 10	NO (-61.1%)	NO
03-Office Perimeter 11	NO (-41%)	NO
03-Office Perimeter 12	NO (-20.8%)	NO
03-Office Perimeter 13	NO (-19.8%)	NO
03-Office Perimeter 14	NO (-12.1%)	NO
03-Office Perimeter 15	NO (-27.3%)	NO
03-Office Perimeter 16	NO (-21.4%)	NO
03-Office Perimeter 17	NO (-24.4%)	NO
03-Office Perimeter 22	NO (-66.6%)	NO
04-Office Core 1	NO (-83.4%)	NO
04-Office Core 2	NO (-86.5%)	NO
04-Office Core 3	NO (-86.9%)	NO
04-Office Core 5	NO (-82.9%)	NO
04-Office Core 6	NO (-74.9%)	NO
04-Office Core 8	NO (-67.8%)	NO
04-Office Core 10	NO (-71%)	NO
04-Office Core 11	NO (-78.4%)	NO
04-Office Core 12	NO (-81.7%)	NO
04-Office Perimeter 1	NO (-69.5%)	NO
04-Office Perimeter 2	NO (-74.6%)	NO
04-Office Perimeter 3	NO (-71.4%)	NO
04-Office Perimeter 4	NO (-72.8%)	NO
04-Office Perimeter 5	NO (-73%)	NO
04-Office Perimeter 6	NO (-70.8%)	NO
04-Office Perimeter 7	NO (-72.3%)	NO
04-Office Perimeter 8	NO (-70.8%)	NO
04-Office Perimeter 9	NO (-71.3%)	NO
04-Office Perimeter 10	NO (-60.1%)	NO
04-Office Perimeter 11	NO (-39.3%)	NO
04-Office Perimeter 12	NO (-19.4%)	NO
04-Office Perimeter 14	NO (-7.1%)	NO
04-Office Perimeter 15	NO (-19.3%)	NO
04-Office Perimeter 16	NO (-22.1%)	NO
04-Office Perimeter 17	NO (-25.2%)	NO
04-Office Perimeter 18	NO (-42.1%)	NO
04-Office Perimeter 19	NO (-45.5%)	NO
04-Office Perimeter 20	NO (-44.9%)	NO
05-Office Core 3	NO (-86.5%)	NO
05-Office Core 5	NO (-82.2%)	NO
05-Office Core 6	NO (-73.6%)	NO
05-Office Core 9	NO (-65.3%)	NO
05-Office Core 10	NO (-69.7%)	NO
05-Office Core 11	NO (-77.3%)	NO
05-Office Core 12	NO (-80.7%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
05-Office Perimeter 1	NO (-68.9%)	NO
05-Office Perimeter 2	NO (-74.3%)	NO
05-Office Perimeter 3	NO (-71%)	NO
05-Office Perimeter 4	NO (-72.4%)	NO
05-Office Perimeter 5	NO (-72.3%)	NO
05-Office Perimeter 6	NO (-70%)	NO
05-Office Perimeter 7	NO (-71.5%)	NO
05-Office Perimeter 8	NO (-69.6%)	NO
05-Office Perimeter 9	NO (-69.7%)	NO
05-Office Perimeter 10	NO (-58.6%)	NO
05-Office Perimeter 11	NO (-36.1%)	NO
05-Office Perimeter 12	NO (-15.7%)	NO
05-Office Perimeter 13	NO (-10.8%)	NO
05-Office Perimeter 14	NO (-2.7%)	NO
05-Office Perimeter 15	NO (-13.6%)	NO
05-Office Perimeter 16	NO (-20.5%)	NO
05-Office Perimeter 17	NO (-20.1%)	NO
05-Office Perimeter 18	NO (-37.4%)	NO
05-Office Perimeter 19	NO (-40.3%)	NO
05-Office Perimeter 20	NO (-39.1%)	NO
05-Office Perimeter 21	NO (-49.3%)	NO
06-Office Core 2	NO (-85.2%)	NO
06-Office Core 3	NO (-85.7%)	NO
06-Office Core 5	NO (-81.2%)	NO
06-Office Core 6	NO (-72.6%)	NO
06-Office Core 10	NO (-67.6%)	NO
06-Office Core 11	NO (-75.3%)	NO
06-Office Core 12	NO (-78.9%)	NO
06-Office Perimeter 1	NO (-67.1%)	NO
06-Office Perimeter 2	NO (-72.6%)	NO
06-Office Perimeter 3	NO (-68.9%)	NO
06-Office Perimeter 4	NO (-70.2%)	NO
06-Office Perimeter 5	NO (-70.4%)	NO
06-Office Perimeter 6	NO (-68.4%)	NO
06-Office Perimeter 7	NO (-69.9%)	NO
06-Office Perimeter 8	NO (-67.6%)	NO
06-Office Perimeter 9	NO (-67.4%)	NO
06-Office Perimeter 10	NO (-55.7%)	NO
06-Office Perimeter 11	NO (-34%)	NO
06-Office Perimeter 12	NO (-12.4%)	NO
06-Office Perimeter 13	NO (-7.9%)	NO
06-Office Perimeter 14	NO (-0.4%)	NO
06-Office Perimeter 16	NO (-17.5%)	NO
06-Office Perimeter 17	NO (-9.4%)	NO
06-Office Perimeter 18	NO (-29.5%)	NO
06-Office Perimeter 19	NO (-32.4%)	NO
06-Office Perimeter 20	NO (-30%)	NO
06-Office Perimeter 21	NO (-41.5%)	NO
06-Office Perimeter 22	NO (-57.3%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
06-Office Perimeter 115	NO (-0.4%)	NO
07-Office Core 2	NO (-82%)	NO
07-Office Core 3	NO (-82.7%)	NO
07-Office Core 5	NO (-79.8%)	NO
07-Office Core 6	NO (-71.1%)	NO
07-Office Core 8	NO (-63.2%)	NO
07-Office Core 9	NO (-61.1%)	NO
07-Office Core 10	NO (-65.4%)	NO
07-Office Core 11	NO (-73%)	NO
07-Office Core 12	NO (-76.2%)	NO
07-Office Perimeter 1	NO (-61.1%)	NO
07-Office Perimeter 2	NO (-66.3%)	NO
07-Office Perimeter 3	NO (-59.6%)	NO
07-Office Perimeter 4	NO (-59.6%)	NO
07-Office Perimeter 5	NO (-61.4%)	NO
07-Office Perimeter 6	NO (-62.8%)	NO
07-Office Perimeter 7	NO (-65.9%)	NO
07-Office Perimeter 8	NO (-64.2%)	NO
07-Office Perimeter 9	NO (-64.6%)	NO
07-Office Perimeter 10	NO (-51.7%)	NO
07-Office Perimeter 11	NO (-30.5%)	NO
07-Office Perimeter 12	NO (-8.2%)	NO
07-Office Perimeter 13	NO (-4.4%)	NO
07-Office Perimeter 14	YES (+3.5%)	NO
07-Office Perimeter 15	YES (+5.4%)	NO
07-Office Perimeter 16	NO (-7%)	NO
07-Office Perimeter 17	NO (-2.5%)	NO
07-Office Perimeter 18	NO (-19.1%)	NO
07-Office Perimeter 21	NO (-28%)	NO
08-Office Core 1	NO (-69.8%)	NO
08-Office Core 2	NO (-68%)	NO
08-Office Core 3	NO (-71.6%)	NO
08-Office Core 5	NO (-77.1%)	NO
08-Office Core 6	NO (-69.2%)	NO
08-Office Core 8	NO (-60.9%)	NO
08-Office Core 9	NO (-58.3%)	NO
08-Office Core 10	NO (-60.4%)	NO
08-Office Core 11	NO (-68.2%)	NO
08-Office Core 12	NO (-70.4%)	NO
08-Office Perimeter 1	NO (-31.2%)	NO
08-Office Perimeter 2	NO (-32.7%)	NO
08-Office Perimeter 3	NO (-23.5%)	NO
08-Office Perimeter 4	NO (-28.9%)	NO
08-Office Perimeter 5	NO (-40.8%)	NO
08-Office Perimeter 6	NO (-51.1%)	NO
08-Office Perimeter 7	NO (-59.4%)	NO
08-Office Perimeter 8	NO (-58.8%)	NO
08-Office Perimeter 9	NO (-59.9%)	NO
08-Office Perimeter 10	NO (-44.9%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
08-Office Perimeter 11	NO (-26.7%)	NO
08-Office Perimeter 12	NO (-3.5%)	NO
08-Office Perimeter 13	NO (-0.7%)	NO
08-Office Perimeter 14	YES (+7.9%)	NO
08-Office Perimeter 15	YES (+7.8%)	NO
08-Office Perimeter 16	NO (-0.3%)	NO
08-Office Perimeter 17	YES (+14.2%)	NO
08-Office Perimeter 18	NO (-4.1%)	NO
08-Office Perimeter 19	NO (-6.1%)	NO
08-Office Perimeter 20	YES (+2%)	NO
08-Office Perimeter 21	NO (-10.6%)	NO
08-Office Perimeter 22	NO (-32.9%)	NO
09-Office Core 1	NO (-60%)	NO
09-Office Core 2	NO (-62.5%)	NO
09-Office Core 3	NO (-67.5%)	NO
09-Office Core 5	NO (-72.9%)	NO
09-Office Core 6	NO (-65.6%)	NO
09-Office Core 8	NO (-59.3%)	NO
09-Office Core 9	NO (-54.9%)	NO
09-Office Core 10	NO (-53.8%)	NO
09-Office Core 11	NO (-61.9%)	NO
09-Office Core 12	NO (-63.2%)	NO
09-Office Perimeter 1	NO (-14.1%)	NO
09-Office Perimeter 2	NO (-24.3%)	NO
09-Office Perimeter 3	NO (-16.1%)	NO
09-Office Perimeter 4	NO (-22.9%)	NO
09-Office Perimeter 5	NO (-32.8%)	NO
09-Office Perimeter 6	NO (-38.5%)	NO
09-Office Perimeter 7	NO (-47.1%)	NO
09-Office Perimeter 8	NO (-46.5%)	NO
09-Office Perimeter 9	NO (-48.8%)	NO
09-Office Perimeter 10	NO (-32.7%)	NO
09-Office Perimeter 11	NO (-18%)	NO
09-Office Perimeter 12	YES (+2.1%)	NO
09-Office Perimeter 13	YES (+4.2%)	NO
09-Office Perimeter 15	YES (+9.9%)	NO
09-Office Perimeter 16	YES (+8.7%)	NO
09-Office Perimeter 17	YES (+26%)	NO
09-Office Perimeter 18	YES (+8.9%)	NO
09-Office Perimeter 19	YES (+7.6%)	NO
09-Office Perimeter 21	YES (+7.8%)	NO
10-Office Core 1	NO (-55%)	NO
10-Office Core 2	NO (-58.6%)	NO
10-Office Core 3	NO (-60.6%)	NO
10-Office Core 5	NO (-61.9%)	NO
10-Office Core 6	NO (-59.3%)	NO
10-Office Core 8	NO (-56.6%)	NO
10-Office Core 9	NO (-49.6%)	NO
10-Office Core 10	NO (-48.3%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
10-Office Core 11	NO (-56.5%)	NO
10-Office Core 12	NO (-57.7%)	NO
10-Office Perimeter 1	NO (-8.2%)	NO
10-Office Perimeter 2	NO (-20.1%)	NO
10-Office Perimeter 3	NO (-10.9%)	NO
10-Office Perimeter 4	NO (-15.9%)	NO
10-Office Perimeter 5	NO (-19.1%)	NO
10-Office Perimeter 6	NO (-17%)	NO
10-Office Perimeter 7	NO (-25.4%)	NO
10-Office Perimeter 8	NO (-24%)	NO
10-Office Perimeter 9	NO (-28.6%)	NO
10-Office Perimeter 10	NO (-13.7%)	NO
10-Office Perimeter 11	NO (-6.2%)	NO
10-Office Perimeter 12	YES (+10.8%)	NO
10-Office Perimeter 13	YES (+10.9%)	NO
10-Office Perimeter 14	YES (+15.7%)	NO
10-Office Perimeter 15	YES (+14.4%)	NO
10-Office Perimeter 16	YES (+22.9%)	NO
10-Office Perimeter 17	YES (+42.1%)	NO
10-Office Perimeter 18	YES (+19.3%)	NO
10-Office Perimeter 19	YES (+18.4%)	NO
10-Office Perimeter 20	YES (+31.9%)	NO
11-Office Core 1	NO (-53.1%)	NO
11-Office Core 2	NO (-55.7%)	NO
11-Office Core 3	NO (-54.7%)	NO
11-Office Core 5	NO (-50.9%)	NO
11-Office Core 6	NO (-53.1%)	NO
11-Office Core 8	NO (-55.6%)	NO
11-Office Core 9	NO (-50%)	NO
11-Office Core 11	NO (-47.8%)	NO
11-Office Core 11	NO (-55.2%)	NO
11-Office Core 12	NO (-56%)	NO
11-Office Perimeter 1	NO (-4.7%)	NO
11-Office Perimeter 2	NO (-16.5%)	NO
11-Office Perimeter 3	NO (-6%)	NO
11-Office Perimeter 4	NO (-8.8%)	NO
11-Office Perimeter 5	NO (-6.7%)	NO
11-Office Perimeter 6	YES (+1.5%)	NO
11-Office Perimeter 7	NO (-7%)	NO
11-Office Perimeter 8	NO (-4.5%)	NO
11-Office Perimeter 9	NO (-11.1%)	NO
11-Office Perimeter 11	YES (+5.1%)	NO
11-Office Perimeter 11	YES (+4%)	NO
11-Office Perimeter 12	YES (+17%)	NO
11-Office Perimeter 13	YES (+15.1%)	NO
11-Office Perimeter 14	YES (+18.8%)	NO
11-Office Perimeter 15	YES (+16%)	NO
11-Office Perimeter 16	YES (+10.9%)	NO
11-Office Perimeter 17	YES (+32.3%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
11-Office Perimeter 18	YES (+21.4%)	NO
11-Office Perimeter 19	YES (+21.6%)	NO
11-Office Perimeter 20	YES (+36.1%)	NO
11-Office Perimeter 21	YES (+24.2%)	NO
11-Office Perimeter 22	YES (+1.4%)	NO
12-Office Core 1	NO (-52.6%)	NO
12-Office Core 2	NO (-54.9%)	NO
12-Office Core 3	NO (-53.9%)	NO
12-Office Core 5	NO (-49.6%)	NO
12-Office Core 6	NO (-51.8%)	NO
12-Office Core 8	NO (-54%)	NO
12-Office Core 9	NO (-47.8%)	NO
12-Office Core 12	NO (-46.1%)	NO
12-Office Core 12	NO (-54.4%)	NO
12-Office Core 12	NO (-55.5%)	NO
12-Office Perimeter 1	NO (-3%)	NO
12-Office Perimeter 2	NO (-14.9%)	NO
12-Office Perimeter 3	NO (-4.1%)	NO
12-Office Perimeter 4	NO (-6.7%)	NO
12-Office Perimeter 5	NO (-5.5%)	NO
12-Office Perimeter 6	YES (+2.3%)	NO
12-Office Perimeter 7	NO (-6%)	NO
12-Office Perimeter 8	NO (-3.1%)	NO
12-Office Perimeter 9	NO (-9.2%)	NO
12-Office Perimeter 12	YES (+7.7%)	NO
12-Office Perimeter 12	YES (+6.1%)	NO
12-Office Perimeter 12	YES (+19.6%)	NO
12-Office Perimeter 13	YES (+18.7%)	NO
12-Office Perimeter 14	YES (+21%)	NO
12-Office Perimeter 15	YES (+18.5%)	NO
12-Office Perimeter 16	YES (+25.3%)	NO
12-Office Perimeter 17	YES (+44.7%)	NO
12-Office Perimeter 18	YES (+23.1%)	NO
12-Office Perimeter 19	YES (+22.2%)	NO
12-Office Perimeter 20	YES (+36.7%)	NO
13-Office Core 1	NO (-51.7%)	NO
13-Office Core 2	NO (-53.6%)	NO
13-Office Core 3	NO (-52.6%)	NO
13-Office Core 5	NO (-49.1%)	NO
13-Office Core 6	NO (-50.9%)	NO
13-Office Core 8	NO (-53.7%)	NO
13-Office Core 9	NO (-47%)	NO
13-Office Core 13	NO (-46.5%)	NO
13-Office Core 13	NO (-55.5%)	NO
13-Office Core 13	NO (-54.5%)	NO
13-Office Perimeter 1	NO (-0.1%)	NO
13-Office Perimeter 2	NO (-11.5%)	NO
13-Office Perimeter 3	YES (+0.1%)	NO
13-Office Perimeter 4	NO (-3.1%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
13-Office Perimeter 5	NO (-2.7%)	NO
13-Office Perimeter 6	YES (+4.3%)	NO
13-Office Perimeter 7	NO (-4.7%)	NO
13-Office Perimeter 8	NO (-2.2%)	NO
13-Office Perimeter 9	NO (-8.6%)	NO
13-Office Perimeter 13	YES (+19.5%)	NO
13-Office Perimeter 13	YES (+21.7%)	NO
13-Office Perimeter 13	YES (+9%)	NO
13-Office Perimeter 13	YES (+8.4%)	NO
13-Office Perimeter 14	YES (+21.9%)	NO
13-Office Perimeter 15	YES (+20.4%)	NO
13-Office Perimeter 16	YES (+20.1%)	NO
13-Office Perimeter 17	YES (+27%)	NO
13-Office Perimeter 18	YES (+22.3%)	NO
13-Office Perimeter 19	YES (+21.8%)	NO
13-Office Perimeter 20	YES (+36.4%)	NO
13-Office Perimeter 21	YES (+25%)	NO
13-Office Perimeter 22	YES (+4.1%)	NO
14-Office Core 1	NO (-51.6%)	NO
14-Office Core 2	NO (-53.3%)	NO
14-Office Core 3	NO (-52.4%)	NO
14-Office Core 5	NO (-48.8%)	NO
14-Office Core 6	NO (-50.6%)	NO
14-Office Core 8	NO (-53.8%)	NO
14-Office Core 9	NO (-47.4%)	NO
14-Office Core 14	NO (-54.9%)	NO
14-Office Core 14	NO (-55.4%)	NO
14-Office Core 14	NO (-46.9%)	NO
14-Office Perimeter 1	YES (+0.3%)	NO
14-Office Perimeter 2	NO (-11.2%)	NO
14-Office Perimeter 3	YES (+0.4%)	NO
14-Office Perimeter 4	NO (-2.4%)	NO
14-Office Perimeter 5	NO (-2.1%)	NO
14-Office Perimeter 6	YES (+4.9%)	NO
14-Office Perimeter 7	NO (-4.2%)	NO
14-Office Perimeter 8	NO (-1.8%)	NO
14-Office Perimeter 9	NO (-8.3%)	NO
14-Office Perimeter 14	YES (+9.2%)	NO
14-Office Perimeter 14	YES (+22.1%)	NO
14-Office Perimeter 14	YES (+19.8%)	NO
14-Office Perimeter 14	YES (+9.6%)	NO
14-Office Perimeter 14	YES (+23%)	NO
14-Office Perimeter 15	YES (+19.7%)	NO
14-Office Perimeter 16	NO (-11.8%)	NO
14-Office Perimeter 17	YES (+6.2%)	NO
14-Office Perimeter 18	YES (+21.6%)	NO
14-Office Perimeter 19	YES (+21.8%)	NO
14-Office Perimeter 20	YES (+36.8%)	NO
14-Office Perimeter 21	YES (+25.2%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
15-Office Core 1	NO (-51.8%)	NO
15-Office Core 2	NO (-53.5%)	NO
15-Office Core 3	NO (-52.3%)	NO
15-Office Core 5	NO (-48.8%)	NO
15-Office Core 6	NO (-50.3%)	NO
15-Office Core 8	NO (-55.2%)	NO
15-Office Core 9	NO (-51%)	NO
15-Office Core 15	NO (-56%)	NO
15-Office Core 15	NO (-55.8%)	NO
15-Office Core 15	NO (-49.9%)	NO
15-Office Perimeter 1	YES (+0.2%)	NO
15-Office Perimeter 2	NO (-11.3%)	NO
15-Office Perimeter 3	YES (+0.3%)	NO
15-Office Perimeter 4	NO (-2.3%)	NO
15-Office Perimeter 5	NO (-2.4%)	NO
15-Office Perimeter 6	YES (+4.5%)	NO
15-Office Perimeter 7	NO (-4.7%)	NO
15-Office Perimeter 8	NO (-2.1%)	NO
15-Office Perimeter 9	NO (-8.2%)	NO
15-Office Perimeter 15	YES (+9.5%)	NO
15-Office Perimeter 15	YES (+22%)	NO
15-Office Perimeter 15	YES (+20.3%)	NO
15-Office Perimeter 15	YES (+10.1%)	NO
15-Office Perimeter 15	YES (+13.5%)	NO
15-Office Perimeter 15	YES (+22.9%)	NO
15-Office Perimeter 16	NO (-21%)	NO
15-Office Perimeter 17	NO (-11.7%)	NO
15-Office Perimeter 18	YES (+18.8%)	NO
15-Office Perimeter 19	YES (+21.2%)	NO
15-Office Perimeter 20	YES (+35.9%)	NO
15-Office Perimeter 21	YES (+24.4%)	NO
15-Office Perimeter 22	YES (+4.2%)	NO
B1-Acc Changing	N/A	N/A
B1-Dry Change	NO (-100%)	NO
B1-Dry Change	NO (-100%)	NO
B1-Dry Room	N/A	N/A
15-Office Core 4	NO (-51.7%)	NO
15-Lift Lobby	N/A	N/A
15-Office Core 7	NO (-61.6%)	NO
14-Office Core 4	NO (-51.6%)	NO
14-Lift Lobby	N/A	N/A
14-Office Core 7	NO (-61.4%)	NO
13-Lift Lobby	N/A	N/A
13-Office Core 7	NO (-61.6%)	NO
13-Office Core 4	NO (-52%)	NO
12-Office Core 4	NO (-52.8%)	NO
12-Lift Lobby	N/A	N/A
12-Office Core 7	NO (-61.9%)	NO
16-Lift Lobby	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
11-Office Core 4	NO (-53.7%)	NO
11-Lift Lobby	N/A	N/A
11-Office Core 7	NO (-63%)	NO
10-Lift Lobby	N/A	N/A
10-Office Core 7	NO (-65.7%)	NO
09-Lift Lobby	N/A	N/A
09-Office Core 7	NO (-68.2%)	NO
08-Lift Lobby	N/A	N/A
08-Office Core 7	NO (-69.7%)	NO
07-Lift Lobby	N/A	N/A
07-Office Core 7	NO (-70.6%)	NO
06-Lift Lobby	N/A	N/A
06-Office Core 7	NO (-72.1%)	NO
05-Lift Lobby	N/A	N/A
05-Office Core 7	NO (-72.9%)	NO
04-Lift Lobby	N/A	N/A
04-Office Core 7	NO (-74.5%)	NO
03-Lift Lobby	N/A	N/A
03-Office Core 7	NO (-75.8%)	NO
02-Lift Lobby	N/A	N/A
02-Office Core 7	NO (-76.5%)	NO
01-Lift Lobby	N/A	N/A
01-Office Core 7	NO (-79.1%)	NO
10-Office Core 4	NO (-62.8%)	NO
09-Office Core 4	NO (-72.8%)	NO
08-Office Core 4	NO (-77.1%)	NO
06-Office Core 4	NO (-85.1%)	NO
05-Office Core 4	NO (-85.9%)	NO
04-Office Core 4	NO (-86.3%)	NO
03-Office Core 4	NO (-86.5%)	NO
02-Office Core 4	NO (-86.7%)	NO
01-Office Core 4	NO (-86.9%)	NO
00-Management Office/Fire Control	N/A	N/A
00-Staff Welfare	N/A	N/A
00-Entrance Lobby/Amenity	YES (+33.2%)	NO
00-Contemplation	N/A	N/A
00-Ablution	N/A	N/A
00-Contemplation	N/A	N/A
00-Ablution	N/A	N/A
00-Indicative Retail/F&B	NO (-48.6%)	NO
00-Indicative Retail/F&B	YES (+9.7%)	NO
B1-Changing	NO (-99.8%)	NO
B1-Changing	N/A	N/A
B1-Changing	N/A	N/A
B1-Non Binary Changing	N/A	N/A
16-Circulation	N/A	N/A
16-Circulation	N/A	N/A
16-Circulation	N/A	N/A
16-Circulation	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
16-Phone Booth	N/A	N/A
16-Phone Booth	N/A	N/A
16-Events	YES (+62%)	NO
04-Office Core 9	NO (-66.5%)	NO
05-Office Core 8	NO (-65.6%)	NO
06-Office Core 8	NO (-65.2%)	NO
06-Office Core 9	NO (-63.9%)	NO
03-Office Perimeter 20	NO (-48.9%)	NO
03-Office Perimeter 21	NO (-57.9%)	NO
03-Office Core 1	NO (-84.2%)	NO
04-Office Perimeter 13	NO (-17.2%)	NO
05-Office Core 1	NO (-82.7%)	NO
05-Office Core 2	NO (-86.1%)	NO
06-Office Core 1	NO (-81.2%)	NO
07-Office Core 4	NO (-83.1%)	NO
09-Office Perimeter 20	YES (+18.8%)	NO
09-Office Perimeter 14	YES (+10.3%)	NO
05-Office Perimeter 22	NO (-61.7%)	NO
14-Office Perimeter 22	YES (+3.7%)	NO
09-Office Perimeter 22	NO (-12%)	NO
07-Office Perimeter 22	NO (-49.4%)	NO
02-Office Core 10	NO (-82.2%)	NO
02-Office Perimeter 19	NO (-51.5%)	NO
02-Office Core 9	NO (-77%)	NO
07-Office Core 1	NO (-78%)	NO
07-Office Perimeter 20	NO (-15.1%)	NO
07-Office Perimeter 19	NO (-20.3%)	NO
04-Office Perimeter 21	NO (-53.8%)	NO
04-Office Perimeter 22	NO (-64.7%)	NO
03-Office Perimeter 18	NO (-46.4%)	NO
10-Office Perimeter 22	NO (-2.3%)	NO
10-Office Perimeter 21	YES (+20.3%)	NO
12-Office Perimeter 21	YES (+25%)	NO
12-Office Perimeter 22	YES (+1.8%)	NO
03-Office Perimeter 19	NO (-49.2%)	NO
03-Office Core 11	NO (-79.4%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
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]	24215.1	24215.1
External area [m ²]	14126	14126
Weather	MAN	MAN
Infiltration [m ³ /hm ² @ 50Pa]	2	3
Average conductance [W/K]	7532.35	6961.49
Average U-value [W/m ² K]	0.53	0.49
Alpha value* [%]	25.4	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
100	Offices and Workshop Businesses
	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	1.15	0.85
Cooling	3.66	4.46
Auxiliary	2.43	6.46
Lighting	14.29	17.26
Hot water	5.99	5.48
Equipment*	42.67	42.67
TOTAL **	27.52	34.51

* 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	0.89	0.03
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0.89</i>	<i>0.03</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	99.46	82.35
Primary energy [kWh/m ²]	39.18	50.7
Total emissions [kg/m ²]	3.58	4.62

HVAC Systems Performance										
System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
Actual	0	2916.2	0	101.3	11.5	3.5	8	3.5	8	
Notional	0	2538.2	0	152.2	7.2	2.78	4.63	----	----	
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
Actual	16.4	100.4	1.2	4.1	2.3	3.92	6.73	3.92	6.73	
Notional	8.1	90.8	0.8	5.4	7.9	2.78	4.63	----	----	
[ST] Other local room heater - unfanned, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
Actual	9.1	0	2.5	0	5.9	1	0	1	0	
Notional	5.1	0	0.5	0	1.4	2.78	0	----	----	
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
Actual	9.8	187.4	0.7	14.4	2.1	4.03	3.61	3.92	6.73	
Notional	1	77.2	0.1	4.6	6.2	2.78	4.63	----	----	
[ST] Other local room heater - unfanned, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
Actual	0.1	0	0	0	7.1	1	0	1	0	
Notional	0.1	0	0	0	1.3	2.78	0	----	----	
[ST] Other local room heater - unfanned, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
Actual	2.8	0	0.8	0	7.1	1	0	1	0	
Notional	1.2	0	0.1	0	1.3	2.78	0	----	----	
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
Actual	7	0	1.9	0	0	1	0	1	0	
Notional	12	0	2.4	0	0	1.41	0	----	----	
[ST] Other local room heater - unfanned, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
Actual	2.5	0	0.7	0	5.4	1	0	1	0	
Notional	1.4	0	0.1	0	1.3	2.78	0	----	----	
[ST] Other local room heater - unfanned, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
Actual	0.4	0	0.1	0	6.5	1	0	1	0	
Notional	2.4	0	0.2	0	1.6	2.78	0	----	----	
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
Actual	0.9	85.2	0.1	6.5	2.4	4.03	3.61	3.92	6.73	
Notional	1.1	66.8	0.1	4	4	2.78	4.63	----	----	
[ST] Other local room heater - unfanned, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
Actual	0	0	0	0	0.8	1	0	1	0	
Notional	0	0	0	0	1	2.78	0	----	----	
[ST] Other local room heater - unfanned, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
Actual	1.5	0	0.4	0	6.1	1	0	1	0	
Notional	1.9	0	0.2	0	1.4	2.78	0	----	----	
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
Actual	19.7	86.5	1.4	3.4	2.3	3.92	6.98	3.92	6.98	
Notional	10.2	82.2	1	4.9	7.3	2.78	4.63	----	----	
[ST] Other local room heater - unfanned, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
Actual	0	0	0	0	1	1	0	1	0	
Notional	0	0	0	0	0.6	2.78	0	----	----	
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
Actual	39.1	130.7	2.2	4.9	2.2	4.95	7.47	4.95	7.47	
Notional	23.1	59.9	2.3	3.6	7.3	2.78	4.63	----	----	
[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/m ²]	= Heating energy demand
Cool dem [MJ/m ²]	= Cooling energy demand
Heat con [kWh/m ²]	= Heating energy consumption
Cool con [kWh/m ²]	= Cooling energy consumption
Aux con [kWh/m ²]	= 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

Appendix E: BREEAM Compliance

The project is targeting a BREEAM 'Excellent' rating with an aspiration to achieve 'Outstanding'. In both cases, a minimum number of credits are required under Ene 01 Reduction of energy use and carbon emissions. Credits are awarded based on modelled performance of the following three metrics:

- 1. Heating and cooling energy demand
- 2. Primary energy consumption
- 3. Carbon dioxide emissions

BREEAM weights these evenly into a single metric, EPR_{NC} , to determine the number of credit awarded.

These metrics are calculated using Part L compliance modelling. The project is being assessed against Part L 2021 which aligns with the latest BREEAM manual – version 6. However, it is possible to revert to the previous BREEAM manual (2018) if the Part L model is re-run under the previous Part L 2013, purely for the purposes of securing more credits under ENE 01 for BREEAM.

The BREEAM Knowledge Base Compliance Note ([KBCN 1535](#)) explains that,

"assessments already registered to BREEAM UK NC 2018 that must comply with the Part L 2021 of the Building Regulations may follow either of the options below:

- 1. *Transfer to the UK NC V6 scheme*
- 2. *Assess under UK NC 2018 and do two Part L models:*
 - a. *Part L 2021 for statutory compliance*
 - b. *Part L 2013 for BREEAM purposes"*

The performance of each Part L model against the BREEAM requirements is tabulated below. A minimum of 4 credits are required to achieve BREEAM Outstanding.

BREEAM Rating	EPR_{NC} Performance	Credits
ADL 2013 / BREEAM UK NC 2018	0.449	4
ADL 2021 / BREEAM UK NC V6	0.220	2

Table 12 Performance against BREEAM requirements

Appendix F: EPC rating

Energy Performance Certificate

Non-Domestic Building



Address 1

Address 2

Address 3

Address 4

City

Postcode

Certificate Reference Number:

6107-0664-9615-7853-8218

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government's website at www.gov.uk/government/collections/energy-performance-certificates.

Energy Performance Asset Rating

More energy efficient

A+

Net zero CO₂ emissions

A 0-25

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

Less energy efficient

17

This is how energy efficient the building is.

Technical information

Main heating fuel:

Grid Supplied Electricity

Building environment:

Air Conditioning

Total useful floor area (m²):

24215.100

Building complexity:

Level 5

Building emission rate (kgCO₂/m² per year):

3.58

Primary energy use (kWh/m² per year):

39.18

Benchmarks

Buildings similar to this one could have ratings as follows:

21

If newly built

85

If typical of the existing stock

Administrative information

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

Assessment Software:	Virtual Environment v7.0.18 using calculation engine ApacheSim v7.0.18
Property Reference:	UPRN-000000000000
Assessor Name:	Name
Assessor Number:	LCEA168935
Accreditation Scheme:	CIBSE Certification Limited
Assessor Qualifications:	NOS5
Employer/Trading Name:	Trading Name
Employer/Trading Address:	Trading Address
Issue Date:	26 Sep 2023
Valid Until:	25 Sep 2033 (unless superseded by a later certificate)
Related Party Disclosure:	Not related to the owner

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report: 9085-3573-3347-3163-7748

About this document and the data in it

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

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

This certificate and other data about the building may be shared with other bodies (including government departments and enforcement agencies) for research, statistical and enforcement purposes. For further information about how data about the property are used, please visit www.ndepcregister.com. To opt out of having information about your building made publicly available, please visit www.ndepcregister.com/optout.

There is more information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government website at: www.gov.uk/government/collections/energy-performance-certificates. It explains the content and use of this document and advises on how to identify the authenticity of a certificate and how to make a complaint.

Opportunity to benefit from a Green Deal on this property

The Green Deal can help you cut your energy bills by making energy efficiency improvements at no upfront costs. Use the Green Deal to find trusted advisors who will come to your property, recommend measures that are right for you and help you access a range of accredited installers. Responsibility for repayments stays with the property - whoever pays the energy bills benefits so they are responsible for the payments.

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



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