

ENERGY STATEMENT

YMCA London City and North, 184 Tottenham
Lane

Produced by XCO2 for YMCA London City and North

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EXECUTIVE SUMMARY

The energy strategy for the 184 Tottenham Lane development has been developed in line with the energy policies of the London Plan and of the London Borough of Haringey policies. The three-step Energy Hierarchy has been implemented and the estimated regulated CO₂ savings on site are 28% for the development, against a Part L 2021 compliant scheme with SAP 10.2 carbon factors.

This report assesses the predicted energy performance and carbon dioxide emissions of the proposed development at 184 Tottenham Lane, located in the London Borough of Haringey.

The Proposed Development consists of:

“Demolition of the existing building and erection of a new, improved hostel facility with ancillary office, training and communal facilities within a part four to part six storey building.”

In line with London Plan policy SI2 and Haringey Local Plan policy SP4, the development would need to achieve ‘zero carbon’ for regulated CO₂ emissions against a Building Regulations (Part L 2021) compliant scheme.

The energy strategy outlined in this report has been completed using the latest Building Regulations Part L 2021 methodology and SAP 10.2 emissions factors as per current GLA Guidance. These carbon emission factors reflect the grid decarbonisation of recent years and ensure that the assessment of new developments better reflect the actual carbon emissions associated with their expected operation.

The methodology used to determine the expected operational CO₂ emissions for the development is in accordance with the London Plan’s three-step Energy Hierarchy (Policy SI2) and the CO₂ savings achieved for each step are outlined below:

BE LEAN – USE LESS ENERGY

The first step addresses reduction in energy demand, through the adoption of passive and active design measures.

The proposed energy efficiency measures include levels of insulation beyond Building Regulation requirements, low air tightness levels, efficient lighting as well as energy saving controls for space conditioning and lighting.

By means of energy efficiency measures alone, regulated CO₂ emissions are shown to reduce by:

Regulated CO ₂ Savings at Be Lean Stage (SAP 10.2)		
	%	t/yr
Site wide	9	2.6

The development does not achieve the 15% carbon reduction target for non-domestic buildings associated with the Be Lean stage. The new Part L 2021 for non-domestic buildings notional specification (against which a building’s performance is compared) includes low carbon technologies, making it very challenging to meet the required reductions of the London Plan. This has been recognised by the GLA on their EAG Cover Note¹ updated in November 2022.

Nonetheless, the proposed design incorporates all practicable energy efficiency measures appropriate to

¹ GLA “Part L 2021 and the Energy Assessment Guidance 2022 - Cover Note”, accessed in July 2023

<https://www.london.gov.uk/programmes-strategies/planning/planning-applications-and-decisions/pre-planning-application-meeting-service/energy-planning-guidance>

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the building's nature and operational requirements at this stage of the energy hierarchy through:

- Significantly improved U-values beyond the Part L 2021 minimum standards;
- Air permeability of 3 m³/h/m², beyond Part L 2021 requirements;
- Optimised glazing g-values to balance overheating, winter gains, and daylight;
- Efficient mechanical ventilation system with heat recovery;
- Low-energy lighting with occupancy and daylight controls where applicable.

The remaining carbon reductions are achieved through subsequent Be Clean and Be Green measures, with the overall energy strategy delivering significant improvements in carbon performance in accordance with the energy hierarchy.

BE CLEAN – SUPPLY ENERGY EFFICIENTLY

A review of the map shows that there are no existing heat networks within proximity to the site, and the nearest proposed HDEN Phase 1 network is over 1.3 km from the site. Correspondence with the Energy Infrastructures lead from Haringey Council confirmed that the development of the proposed heat network is on hold and is not expected to be available within 5 years.

A communal Air Source Heat Pump (ASHP) system is proposed to serve the development. The site-wide heat network will comprise a single energy centre incorporating high-efficiency ASHPs, providing heating and hot water to the entire development. This approach offers an efficient, low-carbon heating solution while future-proofing the development for connection to a district heat network should one become available.

Based on the proposed strategy, no regulated CO₂ emissions reductions are achieved at this stage of the Energy Hierarchy.

BE GREEN – USE RENEWABLE ENERGY

The feasibility study carried out for the development identified Photovoltaics (PV) and ASHPs as suitable renewable technologies for the development. The PVs can provide onsite energy supply, and the ASHPs can provide heating, cooling and hot water.

The incorporation of renewable technologies will reduce CO₂ emissions by a further:

Regulated CO ₂ Savings at Be Green Stage (SAP 10.2)		
	%	t/yr
Site wide	19	5.1

CUMULATIVE ON SITE SAVINGS

The overall regulated CO₂ savings on site against a Part L 2021 compliant scheme are therefore:

Cumulative Regulated CO ₂ Savings (SAP 10.2)		
	%	t/yr
Site wide	28	7.7

CARBON OFF-SETTING

The Proposed Development does not meet the London Plan CO₂ savings target of 35% overall.

The development has maximised the CO₂ savings as far as possible by the buildings design has adopted a range of enhancements:

- Fabric first approach, as highlighted at Be Lean stage to maximise savings through good design principles, efficient building fabric, low air permeability and improved thermal bridging.
- Optimised controls of lighting, and systems through a Building Management System (BMS).
- Highly efficient air source heat pumps to provide heating, cooling and hot water.
- High efficiency mechanical ventilation system with heat recovery.
- Low energy lighting.
- Incorporation of PV panels to contribute to on-site renewable energy generation and carbon reduction. The PV array area has been maximised across the available roof area, with panels omitted from shaded sections which significantly impacts performance and overall system efficiency.

The results show that, although under the new Part L 2021 Regulations the development falls short of the GLA and Haringey Local Plan zero carbon target, CO₂ savings have been maximised as far as practicable

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through the adoption of a range of energy efficiency and low-carbon measures.

With the SAP 10.2 carbon factors, to achieve ‘zero carbon’, 20.0 tonnes per annum of regulated CO₂, equivalent to 598 tonnes over 30 years, should be offset offsite. Any carbon offset contributions will be subject to viability discussions and detailed design stage calculations.

DISCLAIMER

XCO2 does not endorse or recommend specific manufacturers, products or materials.

Any reference to specific materials and components is solely for the purposes of recommendation of their thermal and/or embodied carbon performance.

It will be the responsibility of other design team members to specify exact products suitable for the development to match the set performance recommendations. XCO2 is not responsible for confirming or checking any performance parameters not related to thermal conductivity and/or embodied carbon of a product or component (such as, but not limited to, structural integrity, fire risk rating, hygroscopy/hydrophoby, size or cost differences).

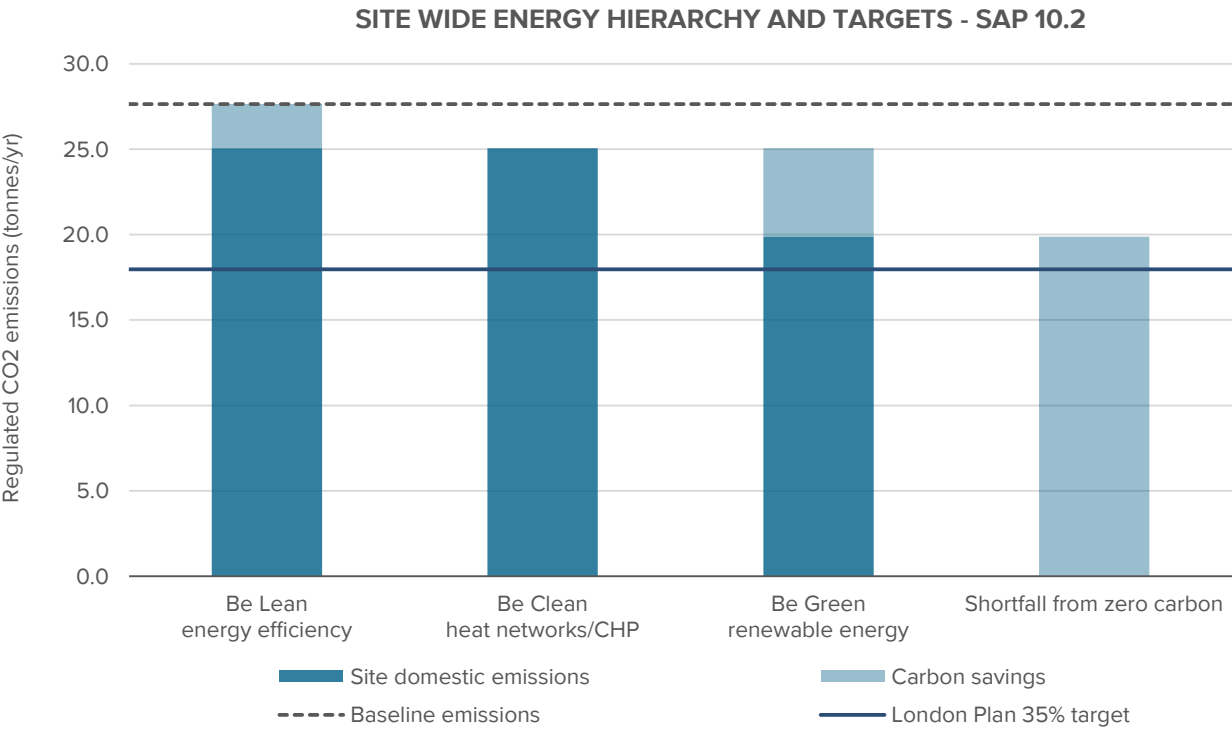


Figure 1: The Energy Hierarchy (Part L 2021: SAP10.2 carbon factors)

INTRODUCTION

This chapter presents the description of the site and of the development proposal, the energy policy framework and the methodology employed for the energy assessment.

SITE & PROPOSAL

The Proposed Development comprises:

“Demolition of the existing building and erection of a new, improved hostel facility with ancillary office, training and communal facilities within a part four to part six storey building”.

The site is located at 184 Tottenham Lane in the London Borough of Haringey. The existing building fronts Tottenham Lane between Rosebery Gardens and Elmfield Avenue. The eastern part is five storeys in height, whilst the western part is four storeys. Both elements have a mansard top floor. The building is a hostel for young people, with ancillary functions.

The approximate location and boundary of the application site is shown in Figure 2.

 Site Location



Figure 2: Location of the application site.

POLICY FRAMEWORK

The proposal will seek to respond to the energy policies of the London Plan and of the policies within the London Borough of Haringey Local Development Framework documents.

The most relevant applicable energy policies in the context of the proposed development are presented below.

THE LONDON PLAN (2021)

The London Plan (2021) published 2nd March 2021 sets out the Mayor's overarching strategic spatial development strategy for greater London and underpins the planning framework from 2019 up to 2041.

The new Plan has a strong sustainability focus with many new policies addressing the concern to deliver a sustainable and zero carbon London, particularly addressed in chapter 9 Sustainable Infrastructure.

The following policies, related to Energy, are of relevance for the proposed development:

POLICY SI2 MINIMISING GREENHOUSE GAS EMISSIONS

This policy sets the requirements for all major developments to follow the energy hierarchy and achieve net-zero-carbon for both residential and non-residential schemes (via on-site carbon reductions and offset payments) and introduces new targets at Lean stage:

“... ”

This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy:

- 1) be lean: use less energy and manage demand during operation*
- 2) be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly*
- 3) be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site*

4) be seen: monitor, verify and report on energy performance.

“... ”

“... ”

A minimum on-site reduction of at least 35 per cent beyond Building Regulations is required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either:

- 1) through a cash in lieu contribution to the borough's carbon offset fund, or*
- 2) off-site provided that an alternative proposal is identified and delivery is certain.*

“... ”

This policy also sets the requirements to consider whole-life carbon emissions, including embodied carbon and unregulated emissions:

“... ”

Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.

Development proposals referable to the Mayor should calculate whole lifecycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

“... ”

The policy supporting text provides additional clarifications on the requirements for major developments:

- Developments including major refurbishments should also aim to meet the net-zero carbon target.
- All developments should maximise opportunities for on-site electricity and heat production from solar technologies (photovoltaic and thermal), use innovative building materials and smart technologies.

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- Recommendation to use SAP10.2 carbon factors as per GLA Energy Guidance.
- Recommended carbon offset price of £95 per tonne CO₂.
- Requirement for major developments to monitor and report operational energy performance to the GLA.

POLICY SI 3 ENERGY INFRASTRUCTURE

This policy requires all major developments within Heat Network Priority Areas will need to utilise a communal low-temperature heating system and follow the energy hierarchy to determine the most suitable system. Where developments are utilising CHP, this policy also requires them to demonstrate that 'the emissions relating to energy generation will be equivalent or lower than those of an ultra-low NO_x gas boiler'. Any combustion on site should meet the requirements of part B of Policy SI1.

POLICY SI 4 MANAGING HEAT RISK

This policy requires:

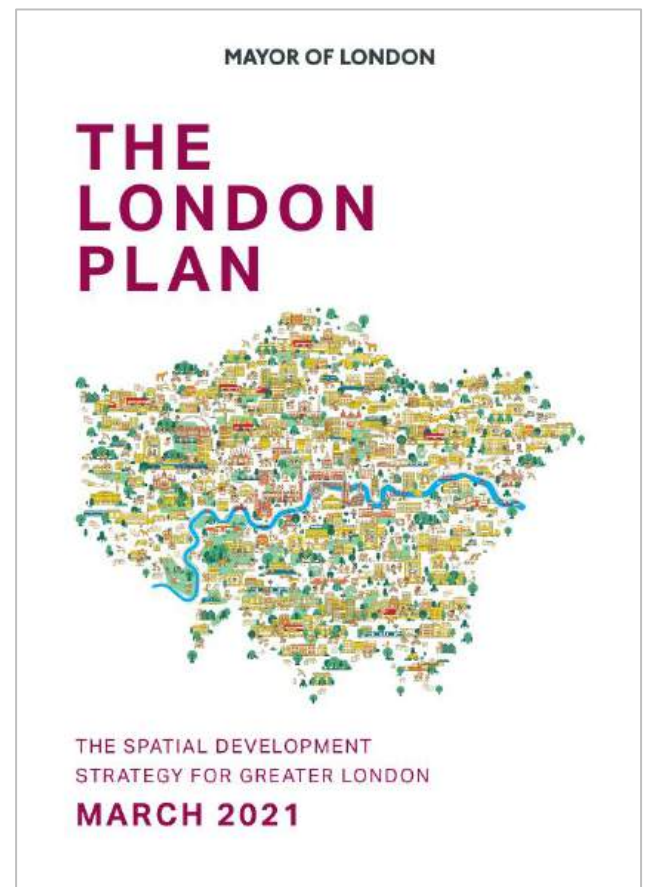
A Development proposals should minimise adverse impacts on the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure.

B Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the following cooling hierarchy:

- 1) reduce the amount of heat entering a building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure*
- 2) minimise internal heat generation through energy efficient design*
- 3) manage the heat within the building through exposed internal thermal mass and high ceilings*
- 4) provide passive ventilation*
- 5) provide mechanical ventilation*
- 6) provide active cooling systems.*

The London Plan also consists of a suite of guidance documents, such as the Energy Assessment Guidance: Greater London Authority guidance on preparing

energy assessments as part of planning applications (April 2020).



GLA GUIDANCE ON PREPARING ENERGY ASSESSMENTS

This document (last updated in June 2022) provides guidance on preparing energy assessments to accompany strategic planning applications; it contains clarifications on Policy SI 2, of the new London Plan, carbon reduction targets in the context of zero carbon policy, as well as detailed guidelines on the content of the Energy Assessments undertaken for planning.

The guidance document specifies the emission reduction targets the GLA will apply to applications as follows:

“Major developments are required to achieve net zero-carbon by following the energy hierarchy (Policy SI 2). This means that regulated carbon emissions should be reduced so they are as close as possible to zero. Once on-site reductions have been maximised, the residual emissions should be offset via a payment into the relevant borough’s carbon offset fund.

Major developments are required to achieve a minimum 35 per cent on-site carbon reduction over Part L 2021. ...”

“... If the net zero-carbon target cannot be met on site and the GLA and the relevant borough is satisfied that on-site savings have been maximised, then the annual remaining carbon emissions figure is multiplied by the assumed lifetime of the development’s services (e.g. 30 years) to give the cumulative shortfall. The cumulative shortfall is multiplied by the carbon dioxide offset price to determine the required cash-in-lieu contribution. ...”

The new guidance also includes changes to technical requirements relating to the use of updated carbon factors, cost estimates, overheating risk analysis, the structure of the heating hierarchy and scrutiny over the performance of heat pumps. The guidance also provides information on how the new stage of the energy hierarchy ‘be seen’ is expected to be carried out in energy assessments, which includes calculating the unregulated carbon emissions.

The structure of this report and the presentation of the carbon emission information for the development follows the guidance in this document.

MAYOR OF LONDON

Energy Assessment Guidance

Greater London Authority guidance on preparing energy assessments as part of planning applications (June 2022)

NEW DRAFT LONDON PLAN (2028)

The new draft London Plan sets out a revised approach to energy and net zero policy for the capital. Notably, the draft moves away from the current percentage-based carbon reduction targets in favour of Energy Use Intensity (EUI) and Space Heating Demand (SHD) performance standards. As the plan is at an early consultation stage, with adoption anticipated in early 2028, it carries limited weight in the planning decision making process. However, this assessment has been prepared with awareness for the new London Plan, and the Proposed Development's energy strategy is not considered to conflict with its emerging aims.

LONDON BOROUGH OF HARINGEY DRAFT NEW LOCAL PLAN (2027)

An update to the current local planning documents is currently under consultation and is due to be implemented in February 2027.

This has been included as part of the Energy Strategy report to show that the proposed scheme has considered the emerging policies of the upcoming update, despite having limited weight in the planning decision making process.

POLICY D1: HARINGEY DESIGN PRINCIPLES

“

- A. *All proposals must achieve good design and contribute to the distinctive character and amenity of the local area. The Council will support proposals developed through a design-led approach which are consistent with the following design principles:*

(1) *Prioritise climate resilience – by beginning the design process with the sensitive placement and orientation of buildings within a high-quality, biodiverse landscape, to ensure well-integrated and resilient public and private amenity spaces.*

...

(7) *Be Zero Carbon – minimising carbon emissions through high-quality, passive design and using resources efficiently, including beyond a building's lifespan following principles outlined in policy CE1.*

(8) *Be designed to last - creating development that can adapt to a changing climate and is robust and easy to maintain.*

- B. *Proposals must be designed in accordance with adopted design guides and/or codes, where these apply.”*

POLICY CR1: CLIMATE RESILIENCE AND ADAPTATION

“

- A. *The Council will act to ensure the borough and its communities are able to adapt to a changing climate and have sufficient resilience to withstand, and recover from, the*

...”

increasing frequency and risk of extreme weather events. To achieve this, the design and location of development will be required to:

- (1) *Support urban cooling and minimise any contribution to the urban heat island effect in accordance with Policy CR2*
- (2) *Minimise overheating risk in buildings in accordance with the Haringey Cooling Hierarchy set out in Policy CR3*
- (3) *Manage and reduce flood risk consistent with Policy CR4*
- (4) *Control surface water-run-off in accordance with Policy CR5*
- (5) *Ensure a high standard of water efficiency in line with Policy CR6*
- (6) *Avoid and/or address subsidence risks in accordance with Policy CR7*
- (7) *Prioritise the improvement of air quality in accordance with Policy CR8.*

- B. *Wherever possible, proposals should utilise nature-based solutions to address climate change risks.*

- C. *Proposals must be informed by an understanding of which areas and populations in the borough are most vulnerable to negative impacts of climate change and will be required to demonstrate how potential impacts on those at higher risk will be avoided and/or satisfactorily addressed.*

- D. *Proposals should complement and integrate with strategic borough-wide measures to address risk from climate change.”*

POLICY CR2: SUPPORTING URBAN COOLING

“

- A. *Proposals must help to deliver urban cooling and avoid worsening the Urban Heat Island effect. To achieve this, proposals should:*
- (1) *be informed by urban heat island mapping of Haringey and demonstrate a positive response to identified risks.*
 - (2) *contribute to passive cooling and shading in proposed external amenity space through urban form, surface treatment and the orientation of buildings and the public realm, supporting heat and sunlight dissipation during heat waves;*
 - (3) *maximise nature-based solutions to improve evaporation cooling and provide shading*

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POLICY CR3: MINIMISING OVERHEATING RISK IN BUILDINGS

“

- A. *Proposals must minimise overheating risk in new and existing buildings in accordance with the Haringey Cooling Hierarchy, which sets a hierarchy of highest priority measures (1) to lowest priority measures (8):*

Haringey Cooling Hierarchy

- (1) Integrate external shading into all building openings except facades that face due north.*
- (2) Minimise the amount of heat entering a building by using passive cooling measures (including building orientation and natural ventilation).*
- (3) Minimise internal heat generation through energy efficient building services design.*
- (4) Prioritise natural ventilation, avoiding single aspect dwellings.*
- (5) Manage heat within the building through exposed internal thermal mass and high ceilings.*
- (6) Provide mechanical ventilation where necessary.*
- (7) Provide active cooling only where robustly justified and it is demonstrated that the above passive measures have been prioritised.*
- (8) Demonstrate a retrofit plan with feasible mitigation measures that will mitigate more extreme heatwaves in the future.*

- B. *Proposals must demonstrate that waste heat from building services is minimised and has been located to mitigate negative heating impacts on future occupants and neighbouring sites.*

- C. *Overheating assessments must be undertaken for all buildings where people spend a significant amount of time.”*

POLICY ZC1: ACHIEVING A ZERO CARBON BALANCE

“

- A. *All development should achieve a Zero Carbon Balance. To deliver this, proposals must:*
- (1) Minimise embodied carbon emissions in accordance with the Embodied Carbon*

Hierarchy set out in Policy CE2, which includes taking a ‘retrofit first approach’.

- (2) Minimise waste by applying the Circular Economy Principles set out in Policy CE3.*
- (3) Achieve Net Zero Operational Carbon by following the Operational Carbon Hierarchy*
 - a. Be Lean - take a ‘passive design’ approach, prioritising building fabric improvements to deliver high levels of energy efficiency as required by Policy CE4*
 - b. Be Clean - use low & zero carbon infrastructure to heat, cool and power buildings as required by Policy CE5*
 - c. Be Green - maximise on-site renewable energy generation as required by Policy CE6*
 - d. Be Seen - measure, monitor and report the energy performance of proposals as they are planned, built-out and in-use as required by Policy CE7”*

POLICY ZC4: ENERGY EFFICIENCY

“

- A. *Proposals which take a passive design approach and deliver high levels of energy efficiency will be supported.*
- B. *New buildings must comply with the energy efficiency targets set out below as appropriate.”*

The Proposed Development would require a Space Heating Demand of < 15 kWh/m²/yr and an Energy Use Intensity of < 35 kWh/m²/yr.

POLICY ZC5: LOW AND ZERO CARBON HEATING INFRASTRUCTURE

“

- A. *Proposals which minimise carbon emissions associated with heating buildings will be supported.*
- B. *Having regard to the proposed solutions available for the site, proposals must prioritise low carbon heating measures in accordance with the Low Carbon Heat Hierarchy, which sets a hierarchy of highest priority measures (1) to lowest priority measures (5).*

Haringey Low Carbon Heat Hierarchy

- (1) High grade waste heat (e.g. from Energy Recovery Facilities (ERF) including Decentralised Energy Networks (DENs) or supplied by energy industry)
- (2) Secondary waste heat (e.g. from underground ventilation shafts, data centres, swimming pools, leisure centres, etc)
- (3) Ambient heat - This should be prioritised in the following order of efficiency: Water Source Heat Pumps (WSHP), Ground Source Heat Pumps (GSHP) and Air Source Heat Pumps (ASHP), solar thermal (with or without heat pump)
- (4) Gas-fired CHP – This will only be supported in strategic energy centres where there is a clear long-term plan for decarbonising the network
- (5) Larger communal boilers – These will only be supported in strategic energy centres or as an interim solution until connection to a Decentralised Energy Network (DEN) becomes available
- C. Individual gas boilers will not be permitted in new development in Haringey.
- D. Ultra-low NOx communal gas boilers will only be permitted as an interim heating solution for developments that are due to connect to a nearby DEN.
- E. Proposals which prioritise and contribute to the provision and use of district heating and cooling networks will be supported.
- F. All major development located within 500 metres of a DEN 'connection zone' should be designed for connection to a DEN.
- G. All minor new-build development located within 25 metres of a DEN 'connection zone' should be designed for connection to a DEN.
- H. Available heat loads on adjacent sites should be used where viable.
- I. Development which includes significant sources of waste heat should investigate opportunities to export the heat to neighbouring sites via a DEN and will be expected to implement viable options. Applicants should engage with the Council and local energy service providers to inform decision making.
- J. Developments with large communal energy centres should review opportunities to expand capacity and supply energy to neighbouring existing and future planned developments beyond the site boundary. Applicants should engage with the Council

and local energy service providers to inform decision making.

- K. Where site-wide communal and district heating systems are operational, the Council will require heat and energy service providers to enter into customer charters with domestic and micro-business customers, ahead of central government introducing regulation to protect customers on heat networks.
- L. Use of resistive electric heating including storage heaters will not be permitted as the main heat source for dwellings.
- M. New and additional low carbon heating sources will be resisted where there is an existing alternative low carbon heat source which could provide the necessary heat demands to the building occupant. Proposals for Air Source Heat Pumps should be appropriately sized and located, taking into account measures to minimise heating and cooling demand and local environmental impacts."

POLICY ZC6: RENEWABLE ENERGY: ON SITE, OFF - SITE AND OFF SETTING

"

- A. In meeting energy needs for operating buildings, proposals should maximise the use of on-site renewable energy including by producing, storing and using renewable energy on-site.
- B. Proposals which meet and/or exceed the Energy Use Intensity of the development with on-site renewable energy generation to achieve net zero operational carbon will be supported.
- C. For new buildings, the minimum amount of renewable energy generated in a year should be:
 - (1) at least 80 kWh/m²(building footprint) per annum for all building types;
 - (2) at least 120 kWh/m²(building footprint) per annum for industrial buildings;
- D. In exceptional circumstances, where, renewable energy generation has been maximised, and it is clearly demonstrated that the Energy Use Intensity of the development cannot be fully balanced by renewable energy generated on site, proposals should offset the shortfall by:
 - (1) delivering an off -site reduction in emissions within the borough. In this case, a proposal must be identified where

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delivery is certain and subject to agreement with the Council; or (only if this is not feasible or viable)

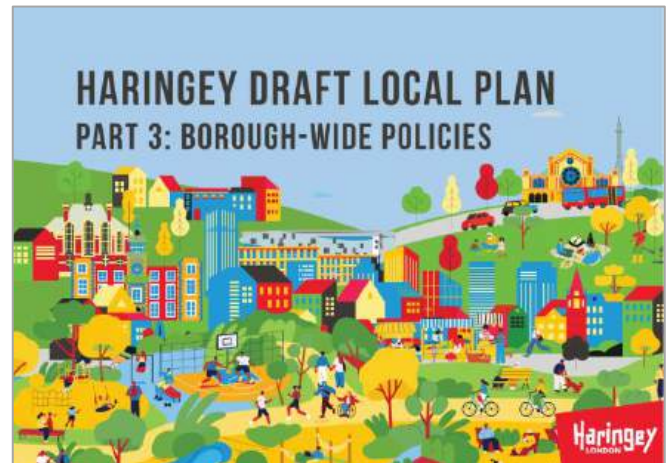
(2) through a cash-in-lieu contribution to Haringey's Energy Off set Fund.

- E. *Proposals that have a significant negative impact on existing renewable energy installations on adjacent sites (e.g. solar, wind) will be resisted.*
- F. *Proposals for community renewable energy projects will be supported.*
- G. *Solar panels will be supported in Conservation Areas except where there is guidance in an adopted Conservation Area Appraisal and Management Plan to indicate that this would be inappropriate or the proposal is otherwise inappropriate having regard to the special character and appearance of the conservation area."*

POLICY ZC7: ASSURING ENERGY PERFORMANCE

"

- A. *Major developments and minor developments creating new residential and/or commercial units should be supported by an Energy Statement detailing how the proposal will deliver a Zero Carbon Balance in accordance with Policy CE1 and should also contain relevant appendices as required for the implementation of Policies CE2 to CE6.*
- B. *For major developments and minor developments creating new residential and/or commercial units the Energy Statement should contain Energy Use Calculations using a Passive House Planning Package model or equivalent as well as a method statement and marked up drawings.*
- C. *For major developments only the following should be appended to the Energy Statement and referred to within the statement as relevant:*
 - (1) Whole Life Carbon Assessment*
 - (2) Circular Economy Statement*
 - (3) Overheating Risk Assessment*
- D. *For major developments and minor developments creating new residential and/or commercial units an assured performance standard such as Passivhaus or BREEAM must be used to demonstrate that operational energy performance targets will be achieved on site. All other types of development are encouraged to use an assured performance standard, as appropriate.*
- E. *All proposals involving retrofit t of existing buildings must submit a Retrofit Method Statement.*
- F. *Major development proposals should disclose to the Council the anticipated energy demand at pre-application and planning application stage and the actual energy demand at pre-occupation stage. "*



STRATEGIC POLICIES DEVELOPMENT PLAN DOCUMENT 2013 - 2026 (2017)

The Haringey Strategic Policies Development Plan Document sets out the council's long-term vision and spatial strategy for the borough's growth and development from 2013 to 2026. It establishes the primary framework for addressing key strategic needs, including the delivery of housing, employment, retail, and necessary infrastructure across the area.

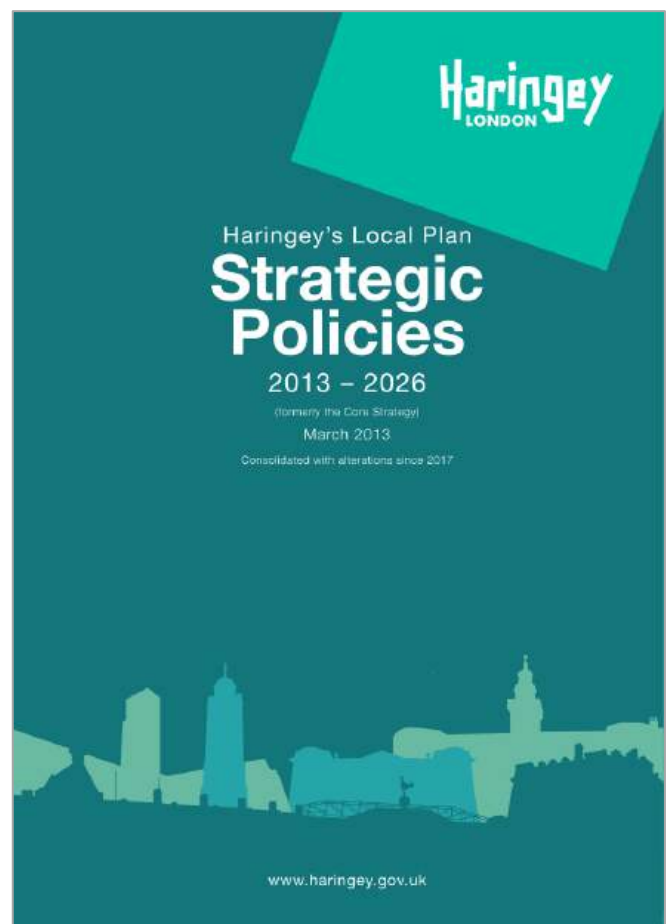
SP4: WORKING TOWARDS A LOW CARBON HARINGEY

"Over the life time of the Local Plan, reducing energy use in buildings and working towards a low carbon borough will be one of the key challenges facing Haringey. The Council will promote the measures outlined below to reduce carbon emissions from new and existing buildings.

1. *In line with London Plan policy, the Council will promote and require all new developments to take measures to reduce energy use and carbon emissions during design, construction and occupation, by incorporating the following measures:*
 - a. *From 2011 onwards, all new residential development will achieve a minimum 25% reduction in total (regulated) CO₂ emissions in line with Code for Sustainable Homes Level 4 energy standards, and should aim to achieve Level 6. All new residential development shall be zero carbon from 2016 onwards; and*
 - b. *From 2011 onwards all new non-residential development shall be built to at least BREEAM "very good" standard and should aim to achieve BREEAM "excellent" or the current nationally agreed standard. All new non-residential development shall be zero carbon from 2019.*
2. *The Council will promote low- and zero-carbon energy generation through the following measures:*
 - a. *Requiring all developments to assess, identify and implement, where viable, site-wide and area-wide decentralised energy facilities including the potential to link into a wider network;*
 - b. *Establishing local networks of decentralised heat and energy facilities by requiring developers to prioritise connection to*

existing or planned networks where feasible;

- c. *Working with neighbouring boroughs and other partners to explore ways of implementing sub-regional decentralised energy networks including the potential in the Upper Lee Valley Opportunity Area; and*
- d. *All new developments are required, where viable, to achieve a reduction in predicted carbon dioxide emissions of 20% from on site renewable energy regeneration, which can include connections to local sources of decentralised renewable energy."*



HARINGEY DEVELOPMENT MANAGEMENT DPD (2017)

The Haringey Development Management DPD provides the criteria-based policies used to assess and determine planning applications throughout the borough. It serves to implement the council's broader spatial strategy by supporting sustainable development while resisting proposals that conflict with the Local Plan.

POLICY DM21: SUSTAINABLE DESIGN, LAYOUT AND CONSTRUCTION

“

- A. All new development, including building and landscape works, will be expected to consider and implement sustainable design, layout and construction techniques. Proposals should:
 - a. Apply the energy hierarchy to minimise energy use in order to meet, and if possible exceed, minimum carbon dioxide reduction requirements;
 - b. Apply the cooling hierarchy to reduce the potential for overheating and limit reliance on mechanical air conditioning systems;
 - c. Maximise opportunities to enhance biodiversity on-site, including through appropriate landscaping, Sustainable Drainage Systems, living roofs and green walls
 - d. Wherever possible, use building materials with high environmental performance ratings; and
 - e. Seek opportunities for locally sourced labor.
- B. The Council will support appropriate measures to sustainably retrofit existing homes and non-residential buildings.
- C. Proposals that fail to demonstrate adequate consideration for sustainable design, layout and construction techniques will be resisted.
- D. Consideration will be given to the use of carbon offset payments, to be secured by planning obligations, where it can be demonstrated that proposals are unable to meet carbon dioxide emission reduction targets on-site.”

POLICY DM22: DECENTRALISED ENERGY

“

- A. Subject to other policy requirements, proposals that contribute to the provision and use of Decentralised Energy network infrastructure will be supported.

Communal energy systems

- B. All development that incorporates site-wide communal energy systems should examine opportunities for extending such systems, irrespective of whether it is connected to a DE network.
- C. All development that incorporates site-wide communal energy systems should optimise opportunities for extending such systems beyond the site boundary to supply energy to neighbouring existing and planned future developments

Existing and planned future DE networks

- D. All development proposals should prioritise connection to existing or planned future DE networks.
- E. All major development located within 500 metres of an existing DE Network, and minor new-build development located within 25 metres, will be expected to secure connection to that network subject to demonstration of technical feasibility and financial viability.
- F. All major development located within 500 metres of a planned future DE Network, which is considered by the Council likely to be operational within 3 years of a grant of planning permission, will be expected to secure connection to that network subject to demonstration of technical feasibility and financial viability.

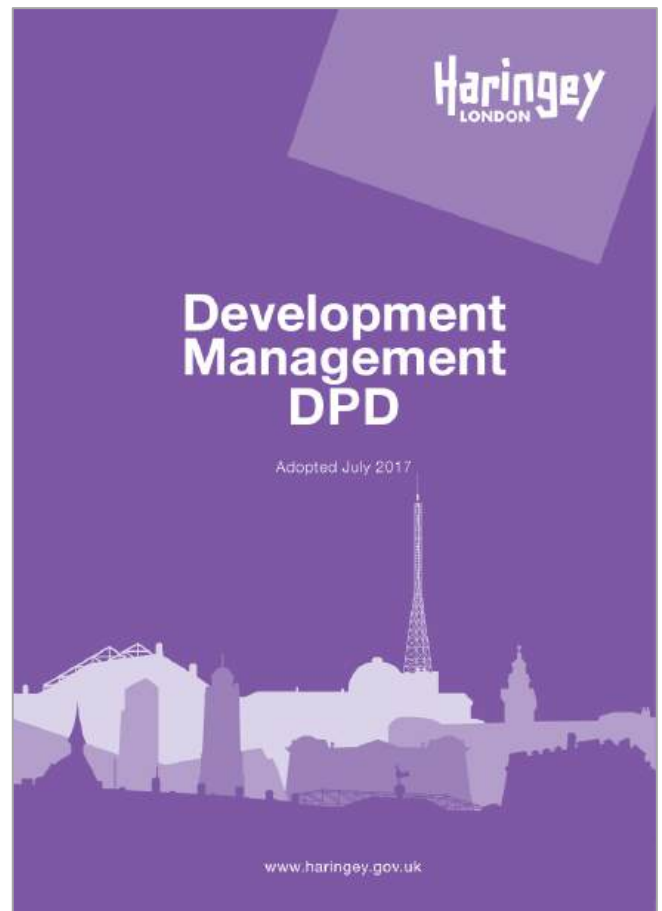
DE network 'connection zones'

- G. All major development located within 500 metres of a DE network 'connection zone' should be designed for connection to a DE network.
- H. All minor new-build development located within 25 metres of a DE network 'connection zone' should be designed for connection to a DE network

ENERGY STATEMENT

Customer charters

Where site-wide communal and district heating systems are operational, the Council will strongly encourage heat and energy service providers to enter into customer charters with domestic and micro-business customers.”



METHODOLOGY

The sections below present the methodology followed in determining the on-site and off-site carbon savings for the proposed scheme.

ON-SITE CARBON SAVINGS – THE ENERGY HIERARCHY

The methodology employed to develop the energy strategy for the scheme and achieve on-site carbon savings is in line with the GLA's *Guidance on preparing energy assessments* and is as follows:

The software used to model and calculate the energy performance and carbon emissions of the scheme is IES Virtual Environment Apache Sim Compliance. The development has been treated similar to a PBSA development, as units are not self-contained, with shared communal kitchen areas.

The **baseline** CO₂ emissions are first established, i.e. the emissions of a scheme that is compliant with Part L 2021 of the Building Regulations.

The Target Emission Rate (TER) for the scheme is multiplied by its floor area to establish the total emissions.

The same approach is followed to determine the energy performance and CO₂ emissions of the proposed scheme for each of the steps of the **Energy Hierarchy**. The CO₂ emissions are estimated based on the SBEM Building Emission Rate (BER) figures. The Energy Hierarchy aims at delivering significant carbon savings on-site.

The consecutive steps of the Energy Hierarchy are:

- **Be Lean** whereby the demand for energy is reduced through a range of passive and active energy efficiency measures; as part of this step the Cooling Hierarchy (see Policy SI4) is implemented, and measures are proposed to reduce the demand for active cooling;
- **Be Clean** whereby as much of the remaining energy demand is supplied as efficiently as possible (e.g. by connecting to a district energy network or developing a site-wide CHP network), and,
- **Be Green** whereby renewable technologies are incorporated to offset part of the carbon emissions of the development. The uptake of

renewable technologies is based on feasibility and viability considerations, including their compatibility with the energy system determined in the previous step.

The implementation of the Energy Hierarchy determines the total regulated carbon savings that can be feasibly and viably achieved on site.

The % improvement against the baseline emissions is compared to the relevant targets for each element and in case of a shortfall, savings through off-site measures should be achieved.

Be Seen Following the implementation of the three previous stages of the hierarchy, a monitoring strategy will be put in place to ensure that the actual energy performance of the development can be monitored and reported post-occupation,

The relevant parties will also be made aware of their responsibilities at subsequent reporting stages.

OFF-SITE CARBON SAVINGS – CARBON OFFSETTING

The GLA and the London Borough of Haringey has an established provision to ensure that the shortfall in carbon savings is met off-site; this comprises a carbon offset payment with a figure of £95/tonne for a period of 30 years.

The cash in lieu contribution for the domestic and non-domestic elements of the proposal is calculated and summed to provide the total carbon offset payment to be made to the Council.

The structure of the main body of the assessment follows the Methodology presented above and comprises the sections:

- Be Lean;
- Be Clean;
- Be Green.

The conclusions section summarises the energy strategy and associated carbon savings for the proposed development.

BE LEAN – USE LESS ENERGY

The proposals incorporate a range of passive and active design measures that will reduce the energy demand for space conditioning, hot water and lighting. Measures will also be put in place to reduce the risk of overheating. The regulated carbon saving achieved in this step of the Energy Hierarchy is 9% over the site wide baseline level with SAP 10.2 emission factors.

In line with GLA guidance (2022), an air-source heat pump with heating efficiency 2.64 and cooling efficiency of 5.0 has been included for supply of space heating. For the provision of hot water, based on the proposed system of the actual development, an air-source heat pump with efficiency of 2.86 has been used.

PASSIVE DESIGN MEASURES

ENHANCED U-VALUES

The heat loss of different building fabric elements is dependent upon their U-value. A building with low U-values provides better levels of insulation and reduced heating demand during the cooler months.

The proposed development will incorporate high levels of insulation and high-performance glazing beyond Part L 2021 targets, in order to reduce the demand for space heating and cooling.

Table 1 demonstrates the improved performance of the proposed building fabric beyond the Building Regulations requirements.

AIR PERMEABILITY IMPROVEMENT

Heat loss may also occur due to air infiltration. Although this cannot be eliminated altogether, good construction detailing and the use of best practice construction techniques can minimise the amount of air infiltration.

The proposed development will aim to improve upon the Part L 2021 minimum standards for air tightness by targeting air permeability rates of 3 m³/m².h at 50Pa for all areas.

Table 1: Thermal Envelope U-values.

Site Wide (U-values in W/m ² .K)			
Element	Building Regulations	Proposed	Improvement
Walls	0.26	0.15	42%
Floor	0.18	0.10	44%
Roof	0.16	0.10	38%
Windows	1.60	1.20	25%

THERMAL BRIDGING

Thermal bridging can cause significant heat loss within buildings, whereby junctions between insulated building fabric elements provide less thermal resistance than the surrounding envelope. While repeating thermal bridges such as timber studs, rafters and wall ties are accounted for within u-value calculations, linear thermal bridges such as floor junctions, corners, roof junctions and window reveals must be included separately within the SBEM calculations.

Heat loss from linear thermal bridges is known as the Psi-value (Ψ). Psi-values can be obtained through the modelling of specific junctions based on the proposed construction details is measured in W/mK. The cumulative impact of the total heat loss expected from all the thermal bridges combined is known as the y-value. The Building Regulations Part L 2021 uses a reference y-value of 0.08 for the notional building.

The Proposed Development will aim to meet the Part L 2021 target of by achieving a typical range of y-value between 0.04-0.08, and this figure has been used within the calculations accordingly. The proposing of materials and elements that can significantly improve

ENERGY STATEMENT

the Ψ value of junctions, such as hi-therm lintels, will be investigated due to the impact they can have on the overall γ -value.

As the technical design of the building fabric is developed, consideration will be given to thermal bridges, and detailed modelling of the junctions will be carried out early on to ensure that these targets can be achieved.

REDUCING THE NEED FOR ARTIFICIAL LIGHTING

The development has been designed to maximise daylight in all habitable spaces as a way of improving the health and wellbeing of its occupants.

Glazing throughout the habitable areas has been optimised to maximise internal daylight levels wherever site constraints allow. This is expected to reduce the need for artificial lighting whilst delivering pleasant, healthy spaces for occupants.

ACTIVE DESIGN MEASURES

HIGH EFFICACY LIGHTING

The development intends to incorporate low energy lighting fittings throughout. All light fittings will be specified as low energy lighting, and will accommodate LED, compact fluorescent (CFLs) or fluorescent luminaires only.

HEAT RECOVERY VENTILATION

Mechanical Ventilation with Heat Recovery (MVHR) is specified throughout the Proposed Development. The mechanical ventilation system will include heat recovery in all occupied spaces (efficiency of 85%) in order to supply fresh air in the most energy-efficient way. Restricted natural ventilation through partially openable windows is also proposed for the residential units.

COMFORT COOLING AND PEAK LOAD LOPPING

The bedrooms and communal KLDs are cooled by using a peak load lopping strategy, delivered by the communal ASHP system. With this strategy, the system activates only during periods of exceptional heat when internal temperatures are predicted to exceed 26°C. By limiting the maximum room temperature, rather than

maintaining a constant lower cooling setpoint in individual rooms, the system maintains comfortable internal temperatures with lower energy consumption than a conventional continuously operated active cooling system.

In the building's common spaces where the cooling load is significantly higher, comfort cooling will be delivered via the same communal ASHP system. This is designed to deliver cooling efficiently, with integrated controls that optimise performance.

CONTROLS

Advanced lighting and space conditioning controls will be incorporated, specifically:

- For amenity areas and non-residential areas of infrequent use, occupant sensors will be fitted for lighting, whereas day lit areas will incorporate daylight sensors where appropriate;
- Heating controls in dwellings will comprise either a programmer or room thermostats; and,
- Space conditioning in the ground floor common spaces will be controlled by time and temperature controls.

MONITORING

In addition to the above design measures, the development will incorporate monitoring equipment and systems to enable occupiers to monitor and reduce their energy use.

Smart meters will be installed to monitor the heat and electricity consumption of each dwelling; the display board will demonstrate real-time and historical energy use data and will be installed at an accessible location within the dwellings.

BUILDING MANAGEMENT SYSTEM

An automatic control and Building Management System (BMS) is proposed for the Proposed Development. This includes controls, metering, and monitoring to optimise and manage building services such as heating, cooling, ventilation, lighting, electrical distribution, water systems, security, and fire safety.

ENERGY STATEMENT

MINIMISING OVERHEATING

The potential risk of overheating will be mitigated by incorporating passive and active design measures, in line with the London Plan Policy SI4 and the Cooling Hierarchy, as follows.

THE COOLING HIERARCHY

MINIMISING INTERNAL HEAT GENERATION THROUGH ENERGY EFFICIENT DESIGN

The distribution of heat infrastructure within the residential parts of the development will be designed to reduce the lateral pipework lengths within the internal spaces to reduce heat loss.

Heat sources and pipework will be sufficiently insulated (following CIBSE CoP1 guidelines).

REDUCING THE AMOUNT OF HEAT ENTERING THE BUILDING IN SUMMER

Various passive design solutions are implemented for the Proposed Development with the aim of reducing solar gain during the summer. These measures include:

- Reduced glazing ratios on the south and west facades as much as feasibly possible;
- Maximised natural ventilation through openable windows where feasible.
- Solar controlled glazing with a transmission of 40%;
- Deep window recesses (225 mm) to provide shading to occupied spaces; and
- Recommendation to include internal blinds for further occupant control.

USE OF HIGH CEILINGS TO MANAGE THE HEAT WITHIN THE BUILDING

The average ceiling height across the residential units is 2.64 metres, which exceeds the London Plan minimum floor-to-ceiling height of 2.5 metres for new housing developments. The increased ceiling height enhances air circulation in habitable spaces, particularly during peak summer periods.

PASSIVE VENTILATION

Due to high external noise levels exceeding Approved Document Part O (AD O) limits, and 100mm restrictors fitted to windows for protection from falling, natural ventilation through openable windows in dwellings is restricted during night-time. Therefore, further ventilation through mechanical systems is required to maintain an adequate flow rate.

Nevertheless, side-hung windows are specified where possible, thereby maximising the natural ventilation flow rate as much as possible. Occupants will have autonomy over choosing to open their windows if they wish.

MECHANICAL VENTILATION

MVHR systems are proposed for both residential and communal spaces to ensure adequate fresh air is supplied to occupied spaces in the most energy efficient way. The MVHR will be capable of operating in summer bypass mode allowing for the dissipation of any heat build-up during peak summer conditions.

OVERHEATING RISK ASSESSMENT

An overheating assessment was undertaken for representative 'worst case' dwellings, in line with AD O and the London Borough of Haringey requirements. Dynamic thermal modelling was conducted using three design weather years, also accounting for climate change scenarios.

All habitable residential rooms assessed for the Proposed Development were found to meet CIBSE TM59 and AD O overheating risk criteria for the London Weather Centre DSY1 future weather data set (2020 High 50 Percentile) when incorporating a combination of natural ventilation and solar control strategies such as external shading devices and window reveals. Due to protection from falling and opening restrictions from external noise, further mitigation measures via peak load topping strategy will be required to achieve full AD O compliance for habitable spaces, while active cooling will be required for common spaces.

The Overheating Assessment can be seen in full in Appendix A – Overheating Risk Assessment.

ENERGY STATEMENT

ACTIVE COOLING PROPOSALS

Active cooling will be required for the proposed development. Comfort cooling to the ground floor amenity spaces will be provided via the communal Air Source Heat Pump (ASHP) system. Within the residential dwellings, a peak load lopping strategy will be adopted to minimise cooling demand and reduce reliance on active cooling wherever feasible.

Table 2 presents the cooling demand for the Proposed Development. These figures are derived from BRUKL outputs using the National Calculation Methodology (NCM) and therefore are based on simplified modelling inputs. As such, they do not account for the reduction in cooling demand that is expected to be achieved through the proposed peak load lopping strategy in bedrooms and communal kitchen areas.

Further operational modelling has therefore been undertaken in line with TM54 methodology, with results presented in the TM54 section of this report.

Table 2: Part L Compliance Modelling Cooling Demand

	Area weighted average cooling demand (MJ/m ²)	Total cooling demand (MJ/year)
Actual	101.2	708,329
Notional	95.4	667,733

- Significantly improved U-values beyond the Part L 2021 minimum standards;
- Air permeability of 3 m³/h/m², beyond Part L 2021 requirements;
- Optimised glazing g-values to balance overheating, winter gains, and daylight;
- Efficient mechanical ventilation system with heat recovery;
- Low-energy lighting with occupancy and daylight controls.

BE LEAN CO₂ EMISSIONS

At the 'Be Lean' stage, the Proposed Development does not meet the GLA target of 15% regulated CO₂ emission reductions. As stated previously, this has been recognised by the GLA on their EAG Cover Note (2022)².

Nonetheless, the proposed design incorporates all practicable energy efficiency measures appropriate to the building's nature and operational requirements, through:

² GLA "Part L 2021 and the Energy Assessment Guidance 2022 - Cover Note", accessed in July 2023

<https://www.london.gov.uk/programmes-strategies/planning/planning-applications-and-decisions/pre-planning-application-meeting-service/energy-planning-guidance>

BE CLEAN – SUPPLY ENERGY EFFICIENTLY

A site-wide heat network incorporating low carbon heat generation is proposed; the strategy will future proof the connection of the development to a district heating network when and if one becomes available. Based on the strategy proposed, no savings are achieved at this stage.

ENERGY SYSTEM HIERARCHY

The energy system for the development has been selected in accordance with the London Plan decentralised energy hierarchy. The hierarchy listed in Policy SI3 states that energy systems should consider:

1. Connection to existing heating and cooling networks;
2. Site wide CHP network; and,
3. Communal heating and cooling.

Local heat and power sources minimise distribution losses and achieve greater efficiencies when compared to separate energy systems, thus reducing CO₂ emissions.

In a communal energy system, energy in the form of heat, cooling, and/or electricity is generated from a central source and distributed via a network of insulated pipes to surrounding residences.

CONNECTION TO AN EXISTING OR PROPOSED NETWORK

A review of the London Borough of Haringey Energy Masterplan has been undertaken and confirms that the Hornsey area, where the Proposed Development is located, is not considered a top priority for immediate implementation of a District Heat Network (DHN).

Moreover, the London Heat Map identifies existing and potential opportunities for decentralised energy projects in London. It builds on the 2005 London Community Heating Development Study.

An excerpt from the London Heat Map can be seen in Figure 3. The map highlights any existing and proposed DHN within the vicinity of the development.

A review of the map shows that there are no networks in the area, and the nearest proposed HDEN Phase 1 network is over 1.3 km from the site.

Correspondence with the Energy Infrastructures lead from Haringey Council confirmed that the development of the proposed heat network is on hold and is not expected to be available within 5 years.

COMMUNAL HEATING AND COOLING

A communal Air Source Heat Pump (ASHP) system is proposed to serve the development. The site-wide heat network will comprise a single energy centre incorporating high-efficiency ASHPs, providing heating and hot water to the entire development.

This approach offers an efficient, low-carbon heating solution while future-proofing the development for connection to a district heat network should one become available.

BE CLEAN CO₂ EMISSIONS

Given that it has not been found feasible or viable for the Proposed Development to incorporate the supply of low carbon heating through a DHN, and the savings due to communal ASHPs are reported at the 'Be Green' stage, no carbon savings are achieved for this step of the Energy Hierarchy.

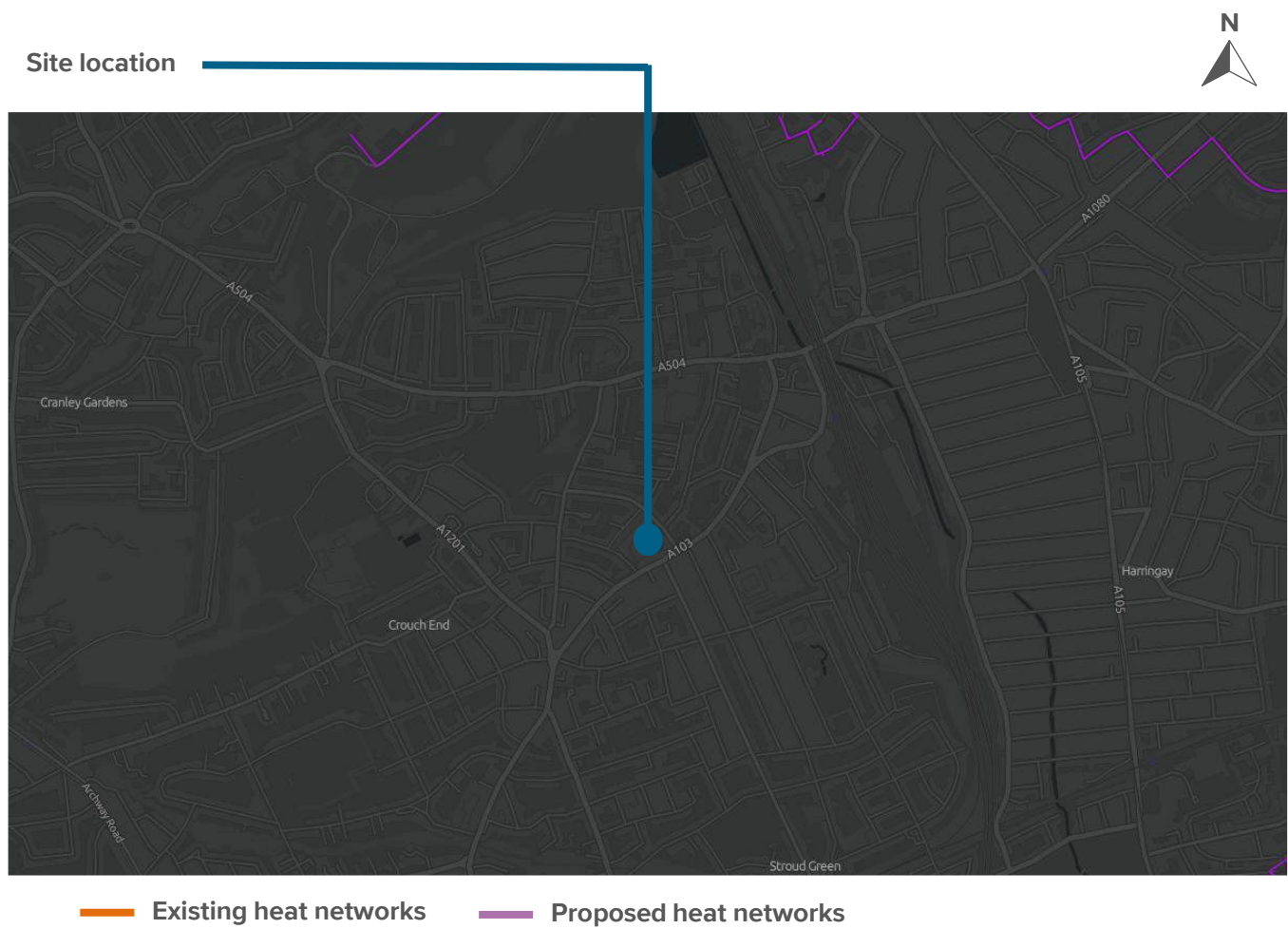


Figure 3: Excerpt from the London Heat Map. Existing district networks are indicated in orange and proposed networks in purple.

BE GREEN – USE RENEWABLE ENERGY

The renewable technologies feasibility study carried out for the development identified PVs and ASHPs as suitable technologies for the development. The regulated carbon savings achieved in this step of the Energy Hierarchy is 19% over the site wide baseline level with SAP 10.2 emission factors.

RENEWABLE TECHNOLOGIES FEASIBILITY STUDY

Methods of generating on-site renewable energy (Green) were assessed, once Lean and Clean measures were considered.

The Proposed Development will benefit from an energy efficient building fabric which will reduce the energy consumption in the first instance. A range of renewable technologies were subsequently considered including:

- Biomass;
- Ground/water source heat pumps;
- Air source heat pump;
- Wind energy;
- PV panels, and,
- Solar thermal panels.

In determining the appropriate renewable technology for the site, the following factors were considered:

- CO₂ savings achieved;
- Site constraints; and
- Any potential visual impacts.

RENEWABLE ENERGY APPRAISAL SUMMARY

Table 3 summarises the factors considered in determining the appropriate renewable technologies for this project. This includes estimated capital cost, lifetime, level of maintenance and level of impact on external appearance. The final column indicates the feasibility of the technology in relation to the site conditions (10 being the most feasible and 0 being infeasible). It is important to note that the information provided is indicative and based upon early project stage estimates.

The feasibility study demonstrates that PV and ASHP would be the most feasible renewable technologies for the Proposed Development. Detailed assessments for the proposed technologies can be found in the following sections.

ENERGY STATEMENT

Table 3. Summary of renewable technologies feasibility study

		Comments	Lifetime	Maintenance	Impact on external appearance	Site feasibility
Biomass		Not adopted – burning of wood pellets releases high NOx emissions and there are limitations for their storage and delivery within an urban location.	20 yrs.	High	High	1
PV		Adopted – there is accessible roof space available for PV installation. The PV array has been optimised to utilise suitable roof areas, with panels located where solar exposure is most effective.	25 yrs.	Low	Med	8
Solar thermal		Not adopted – would compete with PV for roof space. PVs are preferred given that the output (electricity) is more flexible for various uses in the building.	25 yrs.	Low	Med	2
GSHP		Not adopted - the installation of ground loops requires significant space, additional time at the beginning of the construction process and very high capital costs.	20 yrs.	Med	Low	2
ASHP		Adopted – well suited to the scale of the Proposed Development and dwelling typology.	20 yrs.	Med	Med	10
Wind		Not adopted - Wind turbines located at the site will have a significant visual impact on the site and surroundings, and turbulent urban airflow might not generate enough energy.	25 yrs.	Med	High	1

DETAILED ASSESSMENT OF PHOTOVOLTAIC PANELS

Four types of solar cells are available on the market at present and these are mono-crystalline, poly-crystalline, thin film and hybrid panels. Although mono-crystalline and hybrid cells are the most expensive, they are also the most efficient with an efficiency rate of 12-20%. Poly-crystalline cells are cheaper but they are less efficient (9-15%). Thin film cells are only 5-8% efficient but can be produced as thin and flexible sheets.

PVs are considered a suitable technology for this development for the following reasons:

- The development provides an extent of roof space for the installation of PV panels;
- PV arrays are relatively easy to install when compared to other renewable systems; and
- PV panels provide a significant amount of CO₂ savings.

An analysis was undertaken to identify the most suitable areas for PV deployment. The assessment considered roof orientation, available area, and potential shading impacts throughout the year. The analysis identified the primary roof areas with the greatest solar exposure and least shading as the preferred locations for PV arrays.

The north-east facing roof area on the 4th floor was identified to experience significant shading during substantial periods of the year due to the building geometry. As a result, the expected energy generation in this location is reduced, making it less suitable for PV installation. This area has therefore been excluded from the proposed PV array layout to maximise system performance and overall energy yield.

The PV shall comprise 21 kWp (~100 m²) of horizontal roof mounted arrays.

Table 4 summarises the technical data for the proposed PV array and estimated CO₂ savings from the

application of this technology. In total the PV installation would produce regulated CO₂ savings of 3.8% for the development.

An indicative area for the installation of the PV panels on the roof can be found in the following page. Detailed PV layouts will be completed at Stage 4.

Table 4: Summary of technical/operational data and estimated CO₂ savings for PVs

PV	
Array area	100 m ²
Module efficiency (before losses)	20 %
Collector orientation	Horizontal
Carbon intensity of electricity	0.136 kgCO ₂ /kWh
Predicted site solar energy	913.9 kWh/m ² .yr
Losses	20 %
System peak power	21 kWp
Primary electricity offset by PV array	7720 kWh/yr.
Total CO₂ savings	1.05 tCO₂/yr.
Regulated baseline CO₂ emissions	27.65 tCO₂/yr.
% Regulated CO₂ reduction from site-wide baseline	3.8 %



Figure 4: Monocrystalline PV arrays

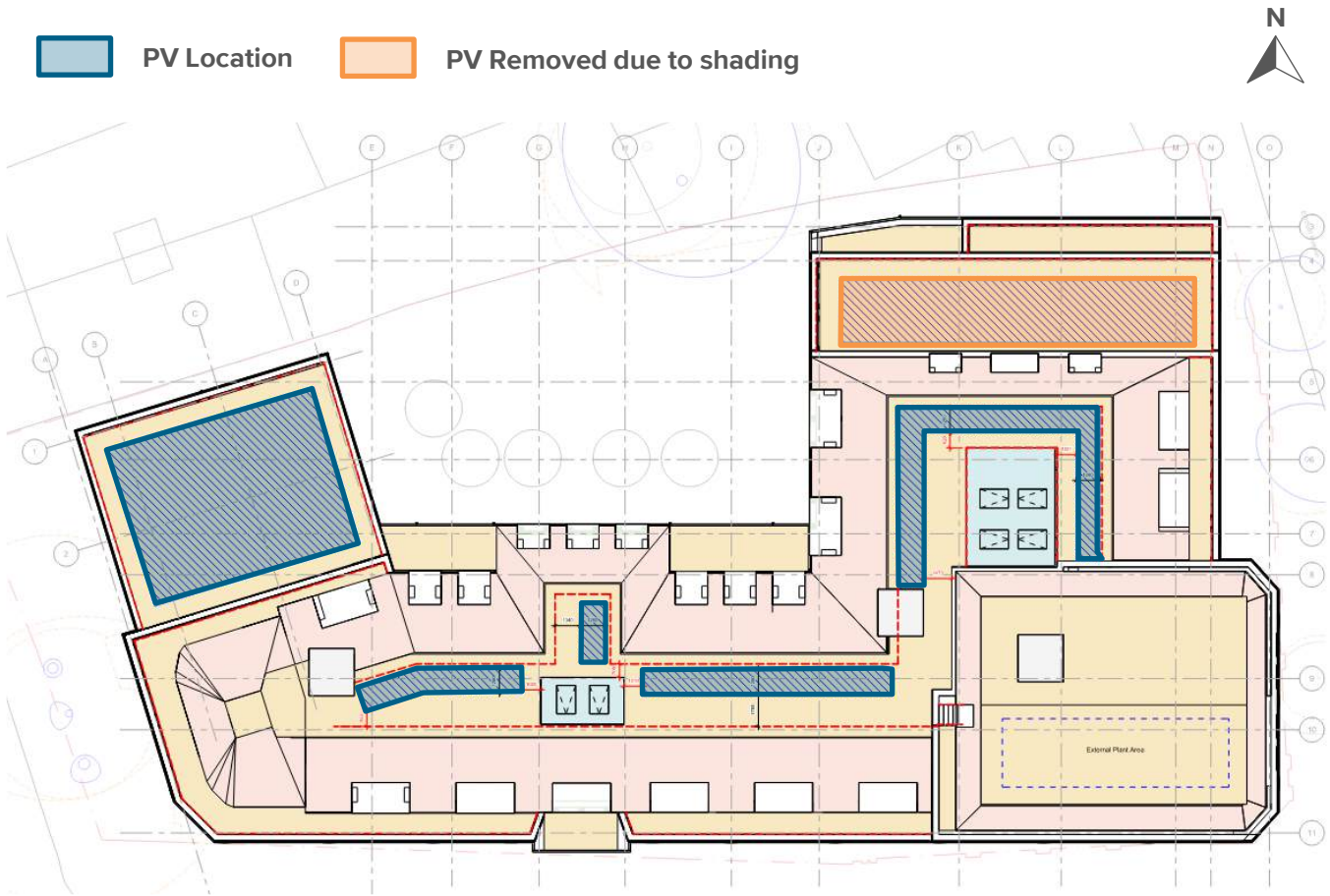


Figure 5: Proposed PV Areas

DETAILED ASSESSMENT OF AIR SOURCE HEAT PUMPS

Air source heat pumps (ASHPs) absorb heat from the outside air into a refrigerant at low temperature. Using electricity, the pump compresses the refrigerant to increase its temperature, which is then sent to the heating circuit to heat the building.

The efficiency of heat pumps is very much dependent on the temperature difference between the heat source and the space required to be heated. As a result, ASHPs tend to have a lower COP than GSHPs. This is due to the varying levels of air temperature throughout the year when compared to the relatively stable ground temperature. The lower the difference between internal and external air temperature, the more efficient the system.

ASHP is considered a suitable technology for the development for the following reasons:

- It is a high efficiency system that can cater for the space heating and cooling of the most energy-intensive areas of the proposed development;
- Requires less capital cost than GSHP and other renewable technologies;
- It can be integrated with the proposed ventilation strategy; and,
- It is simple to install when compared to other renewable technologies and will work well alongside PV.

Table 5 summarises the technical data for the proposed ASHP and estimated CO₂ savings from the application of this technology. In total the ASHP technology would produce regulated CO₂ savings of 14.7% for the development.

Technical datasheets for the ASHP units can be found in Appendix E – Heat Pump Information.

Table 5: Summary of technical/operational data and estimated CO₂ savings for ASHP

ASHP	
COP heating	4.00
COP cooling	4.56
Carbon intensity of electricity	0.136 kgCO ₂ /kWh
Proportion of space heating met by ASHP	100 %
Proportion of DHW met by ASHP	100 %
Proportion of space cooling met by ASHP	100 %
Energy used by ASHP	81,682 kWh/yr.
Total CO ₂ savings	4.06 t/yr.
Regulated baseline CO ₂ emissions	27.65 t/yr.
% Regulated CO ₂ reduction*	14.7 %

* % reduction from site baseline



Figure 6: Outdoor ASHP units.

BE GREEN CO₂ EMISSIONS

Following the measures adopted at the Be Lean stage, further savings have been obtained at Be Green stage, through the specification of highly efficiency ASHP systems and maximising available roof space for PV panels.

TM54 PREDICTED ENERGY FIGURES

This section presents the metrics used to evaluate the predicted energy performance of the development: energy use intensity (EUI) and space heating demand (SHD), which were calculated using the TM54 methodology, alongside the primary energy rate for the dwelling and notional buildings (DPER/TPER).

ENERGY USE INTENSITY (EUI) & SPACE HEATING DEMAND

The GLA Guidance on preparing energy assessments indicates that SHD and EUI should be reported. The target values for these metrics, found in the table below, have been developed by the Low Energy Transition Initiative (LETI), and are supported by other industry bodies (RIBA, UKGBC, CIBSE, CCC).

EUI and Space Heating Demand Targets		
Building type	EUI (kWh/m ² .yr)	SHD (kWh/m ² .yr)
All other non-residential	55	15

Space heating demand measures fabric efficiency, indicating the energy needed to heat a development, regardless of the heating system efficiency.

EUI is a measure of regulated and unregulated energy consumption of the proposed development, which considers the efficiencies of space conditioning technology, but excludes offset from PV. EUI can be defined as follows:

“Energy Use Intensity (EUI) is a measure of the total energy consumed in a building annually. It includes both regulated (fixed systems for lighting, heating, hot water, air conditioning and mechanical ventilation) and unregulated (cooking and all electrical appliances, and other small power) energy. It does not include energy use from electric vehicle charging or any reduction in EUI due to renewable energy generation on-site. EUI should be expressed using gross internal area (GIA).” (Energy Assessment Guidance, 2022, GLA).

TM54 METHODOLOGY

The EUI and SHD figures for this assessment are calculated in accordance with CIBSE TM54 methodology.

CIBSE TM54 is an industry-standard methodology used to evaluate operational energy use and carbon emissions in buildings during the design stage, accounting for in use operation, including occupancy patterns and equipment loads. To ensure these results better reflect operational realities, a collaborative workshop was conducted with the project team to define accurate usage profiles and operational parameters for the assessment.

The modelling assumptions used as part of this assessment are shown in Appendix D – TM54 Assessment Inputs.

RESULTS

The following table summarises the predicted EUI, SHD and space cooling demand for the proposed development using the results from the TM54 analysis.

Predicted EUI and Space Heating and Cooling Demand			
	EUI kWh/m ² .yr	SHD kWh/m ² .yr	Space Cooling kWh/m ² .yr
Proposed Development	70	17.5	6.8

Figure 7 shows a comparison of the results provided from the TM54 assessment, with the Part L.

ENERGY STATEMENT

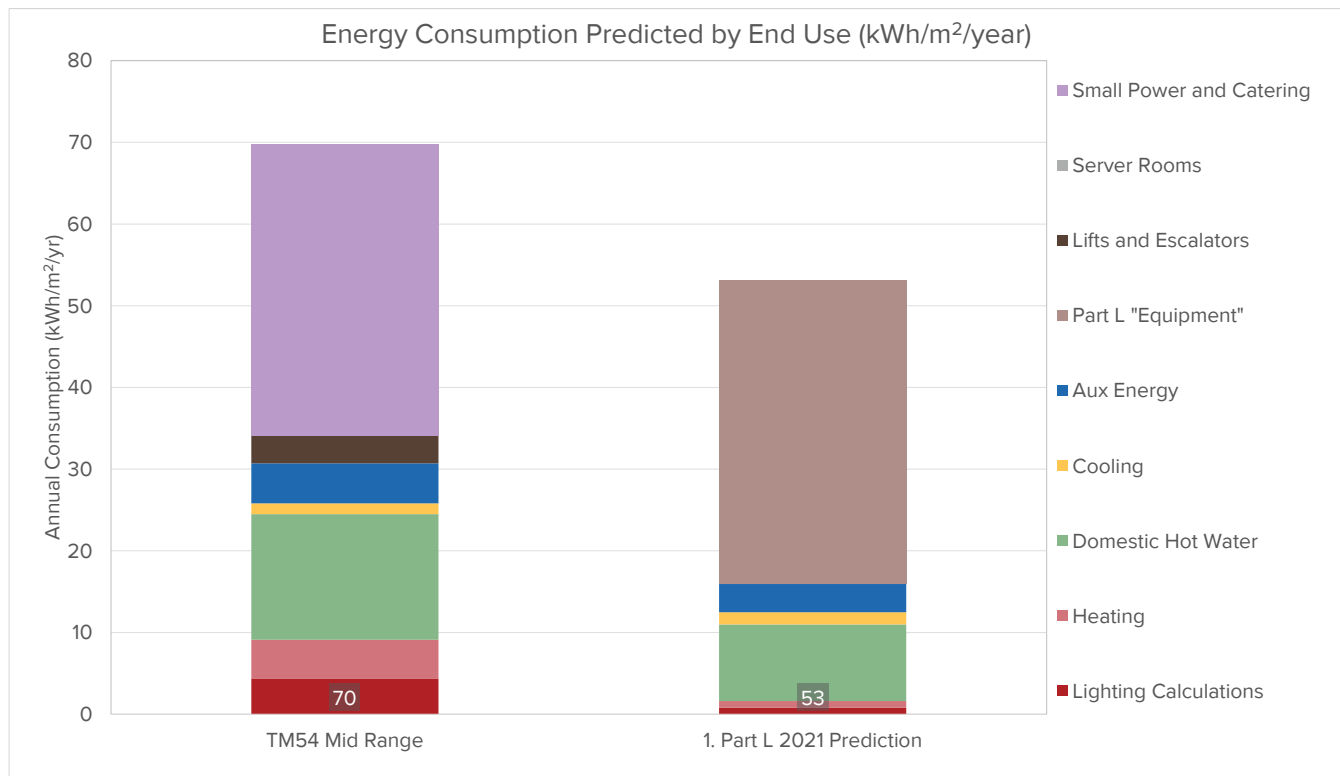


Figure 7: TM54 and Part L Results Comparison

The results illustrate the expected performance gap between compliance modelling and predicted operational energy use. Space heating accounts for a relatively small proportion of the total energy demand, while domestic hot water and unregulated loads (small power, other equipment and catering) are the largest contributors to the overall EUI.

The space cooling demand shown is significantly lower than the notional value calculated in Part L, this is due to the higher set points, and centralised control of the system, not intended for full active cooling in the bedrooms and kitchens, which is not accounted for in a Part L compliance model.

BENCHMARKS

The following benchmarks have been identified as appropriate for the development:

- GLA Operational Energy Benchmark: 55 kWh/m²·yr
- UK Net Zero Carbon Buildings Standard (UKNZCBS) Operational Energy Target for Student Accommodation (2026): 74 kWh/m²·y

The predicted EUI of 70 kWh/m²·yr for the YMCA development sits between the GLA benchmark of 55 kWh/m²·yr and the UKNZCBS student residential target of 74 kWh/m²·yr. This shows that the development is performing at a high level.

The SHD of the development is 17.5kWh/m² which is just higher than the best practice target of 15 kWh/m²·yr. This low SHD demonstrates that the building's thermal envelope has been successfully optimised through a robust "fabric-first" approach, ensuring minimal energy is wasted on heating regardless of system efficiencies.

The marginal variance in the overall EUI target reflects the high-amenity, 24/7 communal energy demands and intensive domestic hot water usage inherent to community-led social developments that standard models do not fully capture. This demonstrates a strong level of operational energy performance that aligns closely with current best practice, while keeping a clear pathway for targeted demand-reduction measures during detailed design to achieve absolute net-zero alignment.

ENERGY STATEMENT

PRIMARY ENERGY RATE (DPER/TPER)

The Primary Energy Rating, equally to the EUI, encapsulates all of the estimated energy consumption for the development, but adds a factor to account for the primary source of that energy (e.g. power plant), and transmission from there to the building.

The DPER following all Be Lean and Be Green measures, complies with the target primary energy rate (TPER), with an improvement of 28%

Primary Energy Rate		
TPER (kWh _{PE} /m ² .yr)	DPER (kWh _{PE} /m ² .yr)	Improvement
3.95	2.85	28%

ESTIMATION OF OPERATIONAL FUEL COSTS

This section provides an early-stage estimation of the operation costs of the development from an energy perspective.

OPERATIONAL COSTS

The annual estimated operational fuel cost predictions associated with the development as a whole using SBEM methodologies are outlined in the Table 6 below.

The operational fuel costs presented in this report are solely based on Building Regulations Part L compliance calculations carried out at early design stage. These estimations do not necessarily reflect the actual operational costs, and do not take into consideration occupant behaviour and account for costs associated with un-regulated energy use.

Table 6: Estimated operational fuel cost for 184 Tottenham Lane.

		Unit
Space heating energy demand	5,669	kWh/year
Hot water energy demand	65,583	kWh/year
Other electricity demand	340,796	kWh/year
Per unit cost - electricity	0.27	£/kWh
Total annual operational energy fuel cost	111,253	£/year

CONCLUSIONS

Following the implementation of the three-step Energy Hierarchy, the cumulative regulated CO₂ savings on site are estimated at 28%, against a Part L 2021 compliant scheme, using SAP 10.2 carbon factors.

ON SITE CO₂ SAVINGS

By implementing the three step Energy Hierarchy as detailed in the previous sections, the Regulated CO₂ emissions for the development have been reduced against a Part L 2021 compliant scheme through on site measures alone by:

Cumulative Regulated CO ₂ Savings (SAP 10.2)		
	%	t/yr
Site wide	28	7.70

BE SEEN

Following the implementation of the three previous stages of the hierarchy, a monitoring strategy will be put in place to ensure that the actual energy performance of the development can be monitored and reported post-occupancy. The relevant parties will also be made aware of their responsibilities at subsequent reporting stage.

OFF SITE CO₂ SAVINGS: CARBON OFFSET PAYMENT

The Proposed Development does not meet the London Plan CO₂ savings target of 35% overall.

With the SAP 10.2 carbon factors, to achieve ‘zero carbon’, 20.0 tonnes per annum of regulated CO₂, equivalent to 598 tonnes over 30 years, should be offset offsite.

Any carbon offset contributions will be subject to viability discussions and detailed design stage calculations when the SAP 10.2 methodology and emission factors are finalised.

The tables in the following pages summarise the implementation of the Energy Hierarchy for the proposed scheme and detail the CO₂ emissions and savings against the baseline scheme for each step of the hierarchy; as well as the savings achieved through carbon offset.

Overall, the proposed development has been designed to meet energy policies set out by the GLA and the London Borough of Haringey, which demonstrates the client and the design team’s commitment to enhancing sustainability of the scheme.

ENERGY STATEMENT

SITE WIDE CUMULATIVE SAVINGS

Table 7: CO₂ emissions after each step of the Energy Hierarchy for the non-domestic part of the development

	Carbon dioxide emissions for non-domestic buildings (tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline	27.7	35.4
After energy demand reduction	25.1	35.4
After heat network/CHP	25.1	35.4
After renewable energy	20.0	35.4

Table 8: Regulated CO₂ savings from each stage of the Energy Hierarchy for the non-domestic part of the development

	Regulated non-domestic carbon dioxide savings	
	Tonnes CO ₂ per annum	% over baseline
Savings from energy demand reduction	2.6	9
Savings from heat network/CHP	0.0	0
Savings from renewable energy	5.1	19
Cumulative on site savings	7.7	28
Shortfall from zero carbon	598 tonnes over 30 years	

SITE-WIDE CUMULATIVE SAVINGS

Table 9: Site wide regulated CO₂ emissions and savings

	Total regulated emissions (tonnes CO ₂ /year)	Regulated CO ₂ savings (tonnes CO ₂ /year)	Percentage saving (%)
Baseline	27.7		
Be Lean	25.1	2.6	9
Be Clean	25.1	0.0	0
Be Green	20.0	5.1	19
Total		7.7	28
Offset to zero carbon	598.4 tonnes over 30 years		

APPENDIX A – OVERHEATING RISK ASSESSMENT

OVERHEATING RISK DESIGN NOTE

10.183 – YMCA LONDON & CITY NORTH, 184 TOTTENHAM LANE

30/07/2026 by DD, reviewed by OB

All habitable residential rooms assessed at the proposed development were found to meet CIBSE TM59 and the Approved Document Part O (AD O) overheating risk criteria for the London Weather Centre (LWC) DSY1 (2020 High 50 Percentile) when incorporating a combination of natural ventilation and solar control strategies such as optimised glazing ratios in south and west facades, deep window reveals, use of low solar control glazing, maximising window openable area, and natural ventilation in daytime and night-time. Due to window opening restrictions from the external noise levels above AD O limits and additional security measures, further active mitigation measures via peak load lopping strategy will be required to achieve full AD O compliance for habitable spaces. While active cooling has been provided in the common spaces, passive design measures have been implemented to reduce the cooling demand as far as feasible.

EXECUTIVE SUMMARY

An overheating analysis has been conducted for the proposed residential development at YMCA London & City North, 184 Tottenham Lane, located in the London Borough of Haringey (LBH). The purpose of this analysis is to test the design of the proposed scheme and ensure the mitigation of any overheating risk within the occupied zones across the development. This will ensure the comfort of occupants as well as future-proof the scheme by accounting for projected increased ambient air temperatures from climate change.

In order to assess the thermal performance of the development, models were constructed within thermal simulation software. The internal temperature, lighting and ventilation conditions were estimated for all habitable internal spaces.

With the aim of giving the most robust consideration, the performance of the various occupied rooms was compared with CIBSE Technical Memorandum 59¹ performance recommendations. These are rigorous targets that determine the acceptability of overheating based on the temperature differential between the internal and the external environment (ΔT), considering the frequency of high temperature difference beyond which the level of overheating is considered unacceptable. Specifically, for bedrooms, the methodology aims to evaluate comfort during the sleeping hours by setting a maximum number of hours for which the operative temperature can exceed 26°C.

The restrictions outlined in Approved Document O² (2021) were also applied within this assessment. This document was developed to provide guidance on compliance with Requirement O1 (2) (a) of Schedule 1 to the Building Regulations 2010 which notes that:

¹ CIBSE TM59:2017 – Design Methodology for the assessment of overheating risk in homes

² Approved Document O – Requirement O1: Overheating Mitigation, Regulations: 40B

“ ...

(1) Reasonable provision must be made in respect of a dwelling, institution or any other building containing one or more rooms for residential purposes, other than a room in a hotel (“residences”) to –

- a. limit unwanted solar gains in summer;
- b. provide an adequate means to remove heat from the indoor environment.

(2) In meeting the obligations in paragraph (1) –

- a. account must be taken of the safety of any occupant, and their reasonable enjoyment of the residence; and
- b. mechanical cooling may only be used where insufficient heat is capable of being removed from the indoor environment without it.

...”

The AD O covers the overheating mitigation requirements of the Building Regulations 2021 and is currently the most appropriate assessment methodology for assessing overheating risk in residential properties in the UK.

Compliance with the AD O has been demonstrated through dynamic thermal modelling. The ‘Haringey Dynamic Thermal Modelling Assessment Requirements’ were also followed.

The findings of the assessment have been outlined below.

Habitable spaces

- The proposed development is predicted to satisfy the overheating risk criteria using the DSY1 (2020s, high emissions, 50 percentile) weather data for LWC through passive strategies, including:
 - Optimising glazing ratio in south and west facades;
 - Inclusion of extended lintels above windows and deep reveals.
 - Use of low solar control glass with a g-value of 0.40.
 - Natural ventilation through fully openable panes. This includes maximising openable area of windows;
 - Nighttime ventilation for kitchens on the upper floors.
- Findings from the Noise Impact Assessment show that the external noise levels are above AD O guidance onsite hence bedroom window opening is expected to be restricted at night. Moreover, window restrictors will be implemented on windows for protection from falling, which limits the free area available for natural ventilation in daytime. When applying these restrictions to ventilation, further active mitigation measures are required.
- To maintain comfortable internal temperatures under current and future weather scenarios, the bedrooms and communal kitchens are cooled by using a peak load topping strategy operated from a centralised energy strategy delivered by the same ASHP system that provides heating and cooling system to the building’s common spaces. With this strategy, the system activates only during periods of exceptional heat in the year when internal temperatures are predicted to exceed 26°C.
- The passive design measures enumerated above have reduced the cooling demand for the proposed development.

Common Spaces

- Additional passive design measures for the common spaces includes:
 - Use of low-energy lighting
 - Continuous background ventilation
- Active cooling is required to achieve full AD O compliance and ensure thermal comfort in common spaces under current and future climate conditions.
- The passive design measures enumerated above have reduced the cooling demand for the proposed development.

Communal Corridor

- The ground floor corridor is flagged as presenting a overheating risk and should be reviewed to prevent internal heat build-up. Findings from this assessment should be reviewed alongside the MEP strategy for these spaces at the next design stage.

Based on the method of assessment adopted, XCO2 recommend the design team to consider incorporating the features that allow compliance with CIBSE TM59 and Approved Document O under the DSY1/DSY2/DSY3 2020 50percentile weather scenario.

A future retrofit plan has been outlined in this report, and it is recommended that the future building management of YMCA London & City North is made aware of the proposals that should be reviewed to assess if local environmental conditions have changed and new design/technological innovations are available.

It should be noted that the findings of this assessment are related to planning stage design only and are based on a sample of units. Any changes to the ventilation strategy, façade opening areas, window operation and shading elements would impact the performance of the building and may void the results of the current assessment. If so, it is recommended that additional modelling is undertaken to ensure compliance with the LBH and London Plan Policy requirements and building regulations.

METHODOLOGY

Compliance with the AD O Requirement O1 (2) can be demonstrated using one of two methods:

- a. The simplified method.
- b. The dynamic thermal modelling method.

The dynamic thermal modelling method was used to conduct the assessment presented in this note.

The AD O outlines additional requirements to be applied to CIBSE's TM59 methodology in order to restrict the choices made by the modeller. To demonstrate compliance using the dynamic thermal modelling method, the following guidance was followed:

- CIBSE's TM59 methodology for predicting overheating risk.
- The limits on the use of CIBSE's TM59 methodology, as outlined in the AD O.
- The acceptable strategies for reducing overheating risk set out in the AD O.

The building has been modelled using IESVE dynamic thermal simulation software. The software can compute operative temperatures using weather data sets, building fabric specification, window areas and opening, all aspects of solar and internal gains as well as natural ventilation flows within buildings. Compliance of the design with the criteria outlined in TM59 (with restrictions outlined in the AD O) has been sought and recommendations formulated.

The 3D thermal models of each flat have been developed based on the planning architectural drawings. All the flats in the proposed development have been modelled with a total of 174 flats, which complies with the sampling stated in the Haringey Dynamic Thermal Modelling Assessment Requirements and will provide an understanding of the worst performing dwellings in line with LBH's requirements.

Overall, a total of 174 bedrooms and 34 communal kitchens were analysed to provide a holistic overview of the space and dwelling typologies within the development. Non-habitable spaces such as the ensembles and lightwells have also been included in the assessment; and their internal gains have been accounted for in the model.

Other shared communal rooms and common spaces of buildings containing more than one residential unit fall within the scope of the AD O. There are 14 common spaces that were analysed as part of this assessment.

Additionally, two corridors were modelled to assess their overheating risk, one on the ground floor and another on the top floor. The current building design incorporates multiple vertical risers adjacent to the bedrooms, minimising the need for horizontal pipework throughout the building. Consequently, horizontal pipework is limited to the ground floor enclosed corridors and one top floor corridor.

Axonometric views of the model are presented in Figure 1 and Figure 2 overleaf.

The overheating risks of the spaces were assessed using the CIBSE Design Summer Year 1 (DSY1) weather file which represents a moderately warm summer. The 2020s, high emissions, 50% percentile scenario was selected in line with methodology requirements. The 2020 period is of particular interest as this relates to the period 2011-2040, which is the period we have now entered; the 50% percentile scenario may be viewed as the 'best guess' level of change.

In line with Haringey Dynamic Thermal Modelling Assessment Requirements, further testing with DSY2 and DSY3 (2020s, high emissions, 50% percentile scenario) and DSY 1 2050 and DSY 1 2080 was undertaken to test the development robustness against more severe weather patterns. Although compliance with these files is not a requirement, this report outlines mitigation measures to comply as far as feasible with DSY 2 and 3, 2020 weather files and future retrofit plan measures that can be implemented to comply with the 2050 and 2080 future weather patterns.



Figure 1: An axonometric view of southwest



Figure 2: An axonometric view of northwest

ASSESSMENT CRITERIA

CIBSE TM59 overheating methodology for predominantly naturally ventilated rooms assesses against two criteria:

1) For living rooms, kitchens, communal rooms and bedrooms:

The number of hours during which ΔT (the difference between operative and threshold comfort temperatures) is greater than or equal to one degree (K), during the period of May to September inclusive, shall not be more than 3 per cent of occupied hours. (CIBSE TM52 Criterion 1: Hours of exceedance).

2) For bedrooms only:

To evaluate comfort during sleeping hours, the operative temperature in the bedroom from 10 pm to 7 am shall not exceed 26°C for more than 1% of annual hours. (Note: 1% of the annual hours between 22:00 and 07:00 for bedrooms is 32 hours, so 33 or more hours above 26°C will be recorded as a fail).

The first criterion is evaluated in terms of the ΔT , which is the difference between the operative temperature T_{op} and the limiting maximum temperature T_{max} , $\Delta T = T_{op} - T_{max}$ ⁴. In order to estimate T_{op} , dynamic thermal modelling is carried out to compute the predicted temperature distribution in the different thermal zones of the building. The maximum acceptable temperature is a function of the outdoor temperature and the design limits, which are shown in Table 1. The table details the suggested acceptability in terms of the temperature range of naturally ventilated buildings. For the purpose of the assessment, we have used Category II limits, as recommended within CIBSE TM52.

Table 1: CIBSE TM52 – Suggested applicability of the category and the associated acceptable temperature range for a free running building

Category	Explanation	Acceptable Range (°C)
II	Normal expectation (for new buildings and renovations)	±3

MODELLING ASSUMPTIONS

FABRIC PERFORMANCE

The specification of the fabric is aligned with the proposals at planning stage, as outlined in the Energy Statement for the scheme and summarised in Table 2.

Table 2: Building fabric assumptions

Element	Specification	
	U-value [W/m ² .K]	
External Walls	0.15	
Ground Floor	0.10	
Roof	0.10	
	U-value [W/m ² .K]	g-value
Window	1.20	0.4 for all floors/facades
	Air permeability (@50Pa)	
	3 m ³ /m ² .h	

³ Operative temperature models the combined effect of convective and radiant heat transfer. It accounts for the combined effect of the temperature of the air, the temperature of the surfaces and air speed.

⁴ T_{max} is the maximum acceptable temperature and is dependent on the outdoor running mean temperature and the building category with each associated acceptability range.

OCCUPANCY

The TM59 methodology specifies the hours during which spaces are anticipated to be occupied and these have been used within the overheating assessment calculations. The same occupancy assumptions apply in the dynamic thermal analysis method of Part O. Table 3 sets out the predicted occupancy patterns for the assessed rooms in line with the TM59 requirements; these are programmed into the dynamic software model to calculate the relative occupancy gains for the designated spaces.

For the common spaces included within this assessment, CIBSE does not specify the exact hours that the spaces are occupied, and as a result the BRE estimates that are inherited for the National Calculation Methodology (NCM) are often used as a basis for the prediction of the occupied hours of different areas of occupation in overheating assessment calculations. Table 3 outlines the NCM profiles assumed for these spaces and the predicted occupation pattern associated with each profile.

Table 3: Occupancy assumptions for the room types assessed

Area	Predicted Occupation Pattern
Single Bedroom	00:00 – 24:00, 7 days/week
Double Bedroom	00:00 – 24:00, 7 days/week
3–Bed Kitchen Living Dining	09:00 – 22:00, 7 days/week, 3 people, 100% gains
Reception (<i>NCM Hotel: Reception</i>)	07:00 – 23:00, 7 days/week, 100% gains 23:00 – 24:00, 7 days/week, 30% gains
Resident Lounge (<i>NCM Hotel: Reception</i>)	00:00 – 14:00, 7 days/week, 12 people, 100% gains 14:00 – 23:00, 7 days/week, 21 people, 100% gains 23:00 – 24:00, 7 days/week, 12 people, 100% gains
Open Office (<i>NCM Hotel: Office (Open)</i>) Break-Out Room (<i>NCM Hotel: Office (Common)</i>) Meeting Room/Board Room (<i>NCM Hotel: Office (Meeting)</i>) Reflection Room (<i>NCM Hotel: Office (Common)</i>)	07:00 – 08:00, 7 days/week, 25% gains 08:00 – 09:00, 7 days/week, 50% gains 09:00 – 12:00, 7 days/week, 100% gains 12:00 – 14:00, 7 days/week, 75% gains 14:00 – 17:00, 7 days/week, 100% gains 17:00 – 18:00, 7 days/week, 50% gains 18:00 – 19:00, 7 days/week, 25% gains
Laundry Room (<i>NCM Hotel: Laundry</i>)	08:00 – 18:00, 7 days/week, 100% gains

INTERNAL GAINS

For all residential units modelled, the predicted occupancy hours and internal gains (lighting, equipment, people) for occupied areas are incorporated within the model in line with the guidance set out in TM59.

Similar to occupancy hours, the BRE estimates that are inherited for the National Calculation Methodology (NCM) are often used as a basis for the prediction of internal gains (lighting, equipment, people); when information is available that is specific to the project with regards to internal gains, this is incorporated into the model to give a more accurate representation of the conditions expected in the assessed rooms. For the common spaces assessed in the proposed development, people and equipment gains were assumed as per the NCM predictions and lighting gains were assumed based on current assumptions for the lighting specification for the development.

Table 4 sets out the various internal gains for the assessed rooms. Non-occupied spaces such as circulation, bathrooms and storage were modelled based on the typical internal gains specified within the TM59 methodology.

Table 4: Internal gains modelled for each room type assessed

Area	Predicted Internal Gains		
	Lighting [W/m ²]	People	Equipment
Double Bedroom	2.0	150 W sensible, 110 W latent	80 W
Single Bedroom	2.0	75 W sensible, 55 W latent	80 W
3-Bed Kitchen Living Dining	2.0	225 W sensible 155 W latent	450 W
Reception (<i>NCM Hotel: Reception</i>)	15.6 (general) 9.0 (display)	85.4 W/person sensible 54.6 W/person latent	4.72 W/m ²
Resident Lounge (<i>NCM Hotel: Reception</i>)	15.6 (general) 9.0 (display)	85.4 W/person sensible 54.6 W/person latent	4.72 W/m ²
Open Office (<i>NCM Hotel: Office (Open)</i>) Break-Out Room (<i>NCM Hotel: Office (Common)</i>) Meeting Room/Board Room (<i>NCM Hotel: Office (Meeting)</i>) Reflection Room (<i>NCM Hotel: Office (Common)</i>)	11.25	73 W/person sensible 50 W/person latent	12.6 W/m ²
Laundry Room (<i>NCM Hotel: Laundry</i>)	15.6	90 W/person	52 W/m ²

Under Part O, the inclusion of communal corridors in overheating analysis is required. As outlined in the Energy Statement, space heating and hot water to the domestic parts of the development will be provided by a communal Air Source Heat Pump (ASHP) system.

Distribution pipework along communal corridors is not typical in the building as the pipework is routed through vertical risers adjacent to individual flats. However, two fully enclosed sample corridors with communal pipework were identified and assessed. In order to estimate the internal gains associated with the communal pipework, the estimated outside diameter of the flow and return pipes respectively was converted to a maximum heat loss per metre run of pipe (W/m) using a conversion table contained within the CIBSE TM59 guidance document. These figures were converted to a corridor pipework heat gain in watts using the estimated length of the flow and return pipes within each corridor. The internal gains for the internal corridors modelled are displayed in Table 5. **Error! Reference source not found..**

Table 5: Internal gains modelled for corridor areas

Area	Predicted Internal Gains		
	Lighting [W/m ²]	People [peak W]	Pipework [peak W]
Corridor 1 (top floor) @22mm, 18m F+R	2.0 W/m ²	-	164 W
Corridor 2 (ground floor) @35mm, 26m F+R	2.0 W/m ²	-	288 W

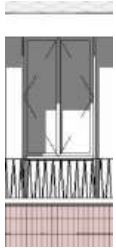
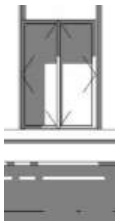
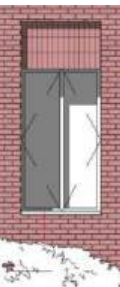
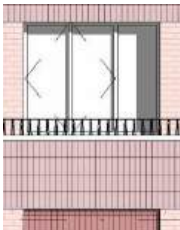
VENTILATION

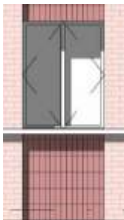
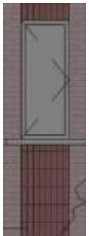
All habitable rooms will have openable windows to provide passive natural ventilation for overheating mitigation. Additionally, the proposed ventilation strategy for the development entails the use of Mechanical Ventilation with Heat Recovery (MVHR) which provides continuous background ventilation throughout the year. Therefore, the estimated ventilation flow rates have been included in the model in line with Part F requirements for ventilation as part of the active design iterations.

The methodology outlined in Appendix D of the AD O was used to calculate the equivalent area of each of the window types included within the architectural drawings received from Levitt Bernstein on June 19, 2026. The level of exposure and associated coefficients of discharge are set up in accordance with the relative position of each window in relation to building massing.

The equivalent areas of the different window types (with openable panes) modelled are outlined in Table 6.

Table 6: Equivalent areas for window types with openable panes in habitable spaces.

Window Reference	Window Image	Window Operation	Equivalent Area at $\alpha = 90^\circ$
W1		Side hung	88.6%
W2		Side hung (Some variations with fixed bottom panels which were modelled separately)	87.6%
W3		Side hung (Some variations with fixed bottom panels which were modelled separately)	86.7%
W4		Side hung	89.5%
W5		Side hung with fixed side panel	62.2%
W6		Side hung with fixed side panel	61.6%

W7		Side hung	88.0%
W8		Side hung	80.3%
D1		Side hung	89.3%

The aforementioned window types were modelled with the following opening assumptions:

- Inward opening windows capable of opening to 90 degrees

In line with the limits on CIBSE's TM59 methodology outlined in the AD O, the assumed opening profiles differ for openings to rooms at ground floor level compared to those above ground floor level that are not deemed to be easily accessible.

Openings to rooms above ground floor level:

- Start to open when the internal temperature exceeds 22 °C
- Be fully open when the internal temperature exceeds 26 °C
- Start to close when the internal temperature falls below 26 °C
- Be fully closed when the internal temperature falls below 22 °C
- Be modelled as fully open if the internal temperature exceeds 23 °C at 11 pm

Openings to rooms at ground floor level, unoccupied at night

- Start to open when the internal temperature exceeds 22 °C
- Be fully open when the internal temperature exceeds 26 °C
- Start to close when the internal temperature falls below 26 °C
- Be fully closed when the internal temperature falls below 22 °C
- Be closed at night if the room is unoccupied and be modelled as fully open if the internal temperature exceeds 23 °C at 11 pm if the room is occupied.

In order to ensure the overheating mitigation strategy is usable, the AD O details further restrictions related to noise, pollution and protection from entrapment. A summary of the requirements and, where applicable, how compliance can be demonstrated for the proposed development at this stage, has been provided below.

Noise

The Noise Impact Assessment (NIA) developed by KP Acoustics and submitted in support of this planning application, indicates that there will be restrictions in opening windows for natural ventilation during sleeping hours across all facades. The assessment showed that only the north façade has some allowance for night-time ventilation through window opening as a % of floor area.

Configuration	Sound Reduction Required to Achieve ADO Target Internal L _{Aeq} Noise Levels	Sound Reduction Required to Achieve ADO Target Internal L _{Amax} Noise Levels	Maximum Open Area of the Window as a Percentage of the Floor Area to Achieve ADO Target Internal Noise Levels
Configuration 1 	18 dB	19 dB	0 %
Configuration 2 	16 dB	19 dB	0 %
Configuration 3 	3 dB	5 dB	12 %

Figure 3. Excerpt of night-time opening restriction due to external noise from KP Acoustics Noise Impact Assessment report (31178.NIA.01 07/01/2026) Table 6.4



Figure 4: Excerpt of GA Plan from KP Acoustics Noise Impact Assessment report (31178.NIA.01 07/01/2026) highlighting the configurations of night-time opening restrictions due to external noise.

Pollution

An Air Quality Assessment has been undertaken by XCO2 for the proposed development at planning stage which indicates that the site was not found to have any existing emission sources and pollutant concentrations that may significantly affect air quality or amenity at the proposed development. See Air Quality Assessment submitted with this planning application for more details.

Security

The AD O outlines requirements related to security. During sleeping hours, the AD O notes that only the proportion of windows that can be opened securely should be considered to provide useful ventilation. As outlined above, for rooms unoccupied during sleeping hours (e.g., KLDs) that are at ground floor or are easily accessible, windows should be modelled as closed at night. Normally, for rooms occupied during sleeping hours (e.g., bedrooms), ground-floor windows and easily accessible windows should only be used for ventilation during sleeping hours where they have been made secure, specifically via the use of fixed or lockable louvred shutters or fixed or lockable window grilles or railings.

Protection from Falling

The AD O outlines specific requirements to minimise the risk of falling associated with the use of a natural ventilation strategy. Requirements are based on the degree of opening possible and guarding heights. The openable windows above ground floor level of the proposed development have sill heights of 1.1 metres and will have a 100mm window restrictor. The restrictors are considered in the overheating risk assessment thereby limiting the window free area.

Protection from Entrapment

Where louvred shutters, window rails and ventilation grilles are specified in line with security requirements, these must comply with criteria to protect from entrapment related to the size of openings and the presence of child safety devices. These requirements will be considered by the design team at the next design stage, to ensure any security measures required as part of the overheating mitigation strategy comply with these requirements.

RESULTS

This section presents the results summary for each of the tests carried out for the proposed development.

HABITABLE SPACES - PASSIVE DESIGN SOLUTION

Preliminary overheating guidance has informed the design from early stages of the project. The key overheating considerations and associated design measures that have influenced the development of the current scheme are:

- Optimised glazing ratios on exposed south and west facades to reduce excess solar gains.
- Reduction of floor-to-ceiling high glazing
- Maximise natural ventilation by having larger window openable area which can be achieved by installing side hung windows and reducing fixed panes.
- Provision of shade through deep window reveals of 225mm.
- Have solar control glazing with g-value of 40%

These measures were identified by doing a preliminary overheating risk analysis on three worst case bedrooms as shown Figure 5.

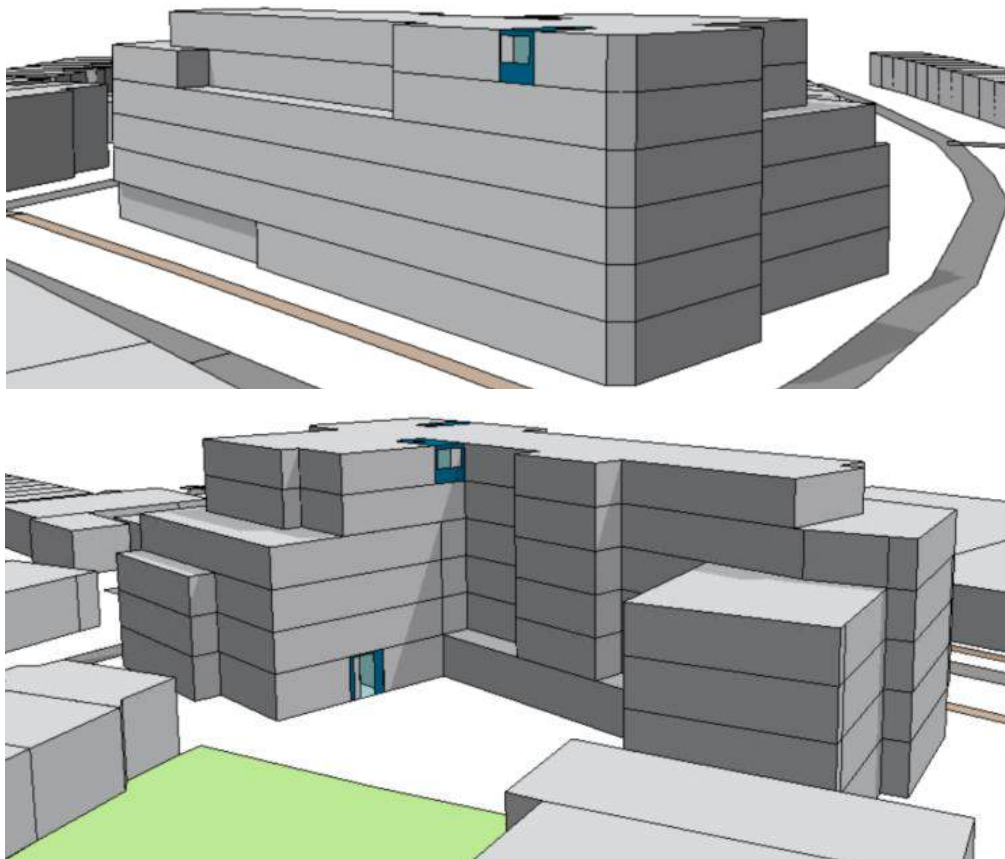


Figure 5. Axonometric views of the model showing the three worst case bedrooms.

The ongoing detailed analysis of worse-case bedrooms informed the design from an early stage. The mitigation measures identified significantly reduced the risk of overheating for the development and were incorporated throughout the scheme reflected in the model shown in Figure 1 and Figure 2. The scheme shows compliance with AD O, DSY 1 weather file scenario as shown in the results in the following section.

DSY1 2020 SCENARIO

Table 7 shows the result of the baseline design conducted using London Weather Centre DSY1 2020 weather data. In total, 174 bedrooms and 34 communal kitchens were included in the assessment.

Table 7: Overheating assessment results for London Weather Centre DSY1 2020 (High Emissions, 50% Percentile)

Iteration No.	Design Change	No. Bedrooms not meeting night-time hours >26°C Criterion 2 TM59	No. Bedrooms not meeting Criterion 1 TM59	No. Communal KLDs not meeting Criterion 1 TM59	Overall Result (P/F)
Baseline	Weather file: LWC DSY1 2020 High50 g-value: 0.40 External Shading: 225mm window reveal Window Openings: Communal Kitchens are fully open in daytime; Bedrooms are fully open in daytime and night-time Window EA: As per design	0/174	0/174	2/34	F
Iteration 1	Weather file: LWC DSY1 2020 High50 g-value: 0.40 External Shading: 225mm window reveal Window Openings: Communal Kitchens are fully open in daytime and night-time; Bedrooms are fully open in daytime and night-time Window EA: As per design	0/174	0/174	0/34	P

The following observations can be made from the results:

- Under the assumptions outlined above on the Baseline 1 design, all habitable spaces assessed pass TM59 Criterion 1 and 2 using the London Weather Centre DSY1 weather file.
- Moreover, maximising night-time ventilation in the kitchens on the fourth and fifth floors (Iteration 1) is an effective passive design strategy that results in all habitable spaces achieving full compliance with the ADO criteria.

HABITABLE SPACES - ACTIVE DESIGN SOLUTION

The preliminary overheating guidance also involved reviewing features relevant to the findings of the NIA and considerations for protection from falling. The noise levels onsite limit window opening during sleeping hours across all facades, while window restrictors are also installed to prevent risks from falling thereby limiting window free area in daytime. These conditions make it challenging to reduce overheating risks by natural ventilation.

Passive solutions were tested as part of the overheating strategy, taking the restrictions into account. The measures are enumerated below and shown in Figure 6:

- External shading sensitivity test: 600mm overhang above windows
- Acoustic and ventilation panels

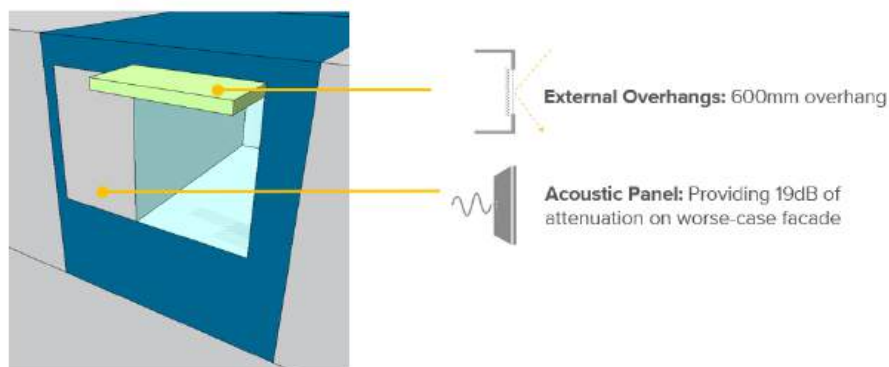


Figure 6: Close up image of modelled passive measures.

The preliminary results showed the acoustic ventilation panels would require a large free area to achieve acceptable internal temperatures while also offsetting the high external noise levels, making them impractical in this context. Similarly, a deep external overhang did not provide a meaningful reduction in overheating risk as overheating was primarily driven by inadequate night-time cooling resulting from restricted window opening, rather than excessive daytime solar gains. Hence, these measures were not carried out in the current design scheme.

Consequently, passive measures alone were insufficient to address the identified overheating risk, and mechanical cooling have been incorporated to achieve acceptable thermal comfort conditions. A more efficient solution was identified that utilises the same heat pump system for both heating and cooling within the building, operating under a controlled strategy without the need for a separate active cooling system in the habitable spaces:

- **Peak Load Lopping.** The bedrooms and communal kitchens are cooled by using a peak load lopping strategy delivered by the same ASHP system that provides heating and cooling system to the building's common spaces. With this strategy, the system activates only during periods of exceptional heat when internal temperatures are predicted to exceed 26°C. By limiting the maximum room temperature to approximately 26°C via the central controls or the building management system (BMS), rather than maintaining a constant lower cooling setpoint in individual rooms, the system maintains comfortable internal temperatures with lower energy consumption than a conventional continuously operated active cooling system.

DSY1 2020 SCENARIO

The results for further active iterations are shown in Table 7.

Table 8: Overheating assessment results for London Weather Centre DSY1 2020 (High Emissions, 50% Percentile)

Iteration No.	Design Change	No. Bedrooms not meeting night-time hours >26°C Criterion 2 TM59	No. Bedrooms not meeting Criterion 1 TM59	No. Communal KLDs not meeting Criterion 1 TM59	Overall Result (P/F)
Iteration 2	Weather file: LWC DSY1 2020 High50 g-value: 0.40 External Shading: 225mm window reveal Window Openings: 100mm restricted opening in daytime and restricted opening at night-time in line with NIA findings Window EA: As per design MVHR: Background	174/174	68/174	33/34	F
Iteration 3	Weather file: LWC DSY1 2020 High50 g-value: 0.40 External Shading: 225mm window reveal Window Openings: 100mm restricted opening in daytime and restricted opening at night-time in line with NIA findings Window EA: As per design MVHR: Background Cooling strategy: Peak load lopping operated from a centralised energy strategy	0/174	0/174	0/34	P

The following observations can be made from the results:

- Based on the Noise Impact Assessment, bedroom windows are restricted for night-time ventilation while maintaining compliance with the internal noise level criteria set out in Approved Document O. Moreover, 100mm restrictors will be required to prevent instances of accidental falls. As a result of these ventilation restrictions (Iteration 2), about 40% of the bedrooms fail to comply with Criterion 1, and all bedrooms fail to comply with Criterion 2. Almost all of the kitchens also fail to comply with Criterion 2.
- Due to the limitations to maximise natural ventilation, additional mitigation measures are required to achieve AD O compliance. This is achieved by utilising the existing ASHP system in a peak load lopping strategy, avoiding the need for a separate active cooling system.

It is also important to note that the findings of this assessment are related to planning stage design only and any changes to the ventilation strategy, façade opening areas and window operation and shading elements would impact the performance of the building and void the results of the current assessment.

DSY2 AND DSY3 2020 SCENARIO

Although compliance with DSY2 and DSY3 weather files is not a requirement of Approved Document O, it is recommended that these additional weather files are assessed alongside DSY1 to evaluate the development's resilience to future climate conditions. This approach aligns with Haringey's Key Overheating Planning Application Requirements and can help identify opportunities to incorporate appropriate mitigation measures in the current design.

Table 9 show the iterations undertaken to gain an understanding of the mitigation measures to prevent overheating against the 2020 London Weather Centre DSY2 weather which has a short, intense warm spell and DSY3 weather which has a long, less intense warm spell:

Table 9: Overheating assessment results for the London Weather Centre, DSY2 and DSY 3 2020 (High Emissions, 50% Percentile)

Iteration No.	Design Change	No. Bedrooms not meeting night-time hours >26°C Criterion 2 TM59	No. Bedrooms not meeting Criterion 1 TM59	No. Communal KLDs not meeting Criterion 1 TM59	Overall Result (P/F)
Iteration 4	Weather file: LWC DSY2 2020 High50 g-value: 0.40 External Shading: 225mm window reveal Window Openings: 100mm restricted opening in daytime and restricted opening at night-time in line with NIA findings Window EA: As per design MVHR: Background Cooling strategy: Peak load lopping operated from a centralised energy strategy	0/174	0/174	0/34	P
Iteration 5	Weather file: LWC DSY3 2020 High50 g-value: 0.40 External Shading: 225mm window reveal Window Openings: 100mm restricted opening in daytime and restricted opening at night-time in line with NIA findings Window EA: As per design MVHR: Background Cooling strategy: Peak load lopping operated from a centralised energy strategy	0/174	0/174	0/34	P

The following observations can be made from the results:

- The ASHP system operating with a peak load lopping strategy maintains indoor temperatures at or below 26°C during periods of peak overheating as set in the BMS. By providing cooling only when required, the system maintains thermal comfort while consuming less energy than a conventional continuously operated active cooling system, even under the warmer weather conditions of DSY2 and DSY3 2020.

While passive mitigation measures have been identified as far as feasible within the project constraints in line with Haringey's Key Overheating Planning Application Requirements, meeting the TM59 criterion under these weather scenarios can be challenging. The DSY2 and DSY3 weather files represent increasingly severe warm-weather conditions and are therefore useful for assessing a development's resilience to future climate change and extreme heat events. Under these scenarios, achieving full compliance with the TM59 overheating criteria can become significantly more challenging, even where appropriate passive design measures have been incorporated. In essence, they are representative of a period where overheating is an intrinsic risk within the environment itself, rather than a risk imposed by inappropriate design. Where passive mitigation measures alone are insufficient, it is likely that active cooling will be necessary to fully meet the criteria.

FUTURE WEATHER SCENARIO AND RETROFIT PLAN

Table 10 shows the iterations undertaken to gain an understanding of the mitigation measures as part of the retrofit plan to prevent overheating against the 2050 and 2080 London Weather Centre DSY1 weather:

Table 10: Overheating assessment results for the London Weather Centre, DSY1 2050 and 2080 (High Emissions, 50% Percentile)

Iteration No.	Design Change	No. Bedrooms not meeting night-time hours >26°C Criterion 2 TM59	No. Bedrooms not meeting Criterion 1 TM59	No. Communal KLDs not meeting Criterion 1 TM59	Overall Result (P/F)
Iteration 6	Weather file: LWC DSY1 2050 High50 g-value: 0.40 External Shading: 225mm window reveal Window Openings: 100mm restricted opening in daytime and restricted opening at night-time in line with NIA findings Window EA: As per design MVHR: Background Cooling strategy: Peak load lopping operated from a centralised energy strategy	0/174	0/174	0/34	P
Iteration 7	Weather file: LWC DSY1 2080 High50 g-value: 0.40 External Shading: 225mm window reveal Window Openings: 100mm restricted opening in daytime and restricted opening at night-time in line with NIA findings Window EA: As per design MVHR: Background Cooling strategy: Peak load lopping operated from a centralised energy strategy	0/174	0/174	0/34	P

It was considered appropriate to incorporate this cooling strategy to effectively mitigate overheating risks under the DSY1 2050 and DSY1 2080 weather scenarios. The peak load lopping strategy operated from a centralised energy strategy is expected to provide a more energy-efficient solution than a dedicated continuously operated cooling system or an MVHR cooling module, as cooling is provided only during periods of peak overheating in a year while maintaining acceptable internal temperatures.

The following considerations have been incorporated to support the long-term performance of this strategy:

- The current system incorporates one of the three ASHPs to provide both heating and cooling. Should future cooling demand increase, the remaining heating-only ASHP/s can be replaced with simultaneous heat pump units to provide additional cooling capacity with minimal modification to the overall system.
- The chilled water pipework has been sized to accommodate higher flow rates, thereby providing sufficient capacity for system expansion. This future-proofs the installation by avoiding the need for extensive pipework modifications, thereby minimising disruption and reducing the cost of future upgrades.

As part of the retrofit plan, responsibility for the future management and operation of the building will be under YMCA London City and North. This includes reviewing available technologies that can be undertaken at the time of implementation to ensure the selected solution reflects current best practice and technological advancements.

COMMON SPACES

DSY1 2020 SCENARIO

Table 11 shows the iterations conducted using London Weather Centre DSY1 2020 weather data. In total, 14 commons spaces were included in the assessment.

Table 11: Overheating assessment results for London Weather Centre DSY1 2020 (High Emissions, 50% Percentile)

Iteration No.	Design Change	Common Spaces not meeting Criteria 1 TM52	Overall Result (P/F)
Baseline	Weather File: LHR DSY1 2020 High50 g-value: 0.40 External Shading: 225mm window reveal Window Openings: fully open in daytime Window EA: As per design MVHR: Background	12/14	F
Iteration 2	Weather File: LHR DSY1 2020 High50 g-value: 0.40 External Shading: 225mm window reveal Window Openings: 100mm restricted opening in daytime Window EA: As per design MVHR: Background	14/14	F
Iteration 8	Weather File: LHR DSY1 2020 High50 g-value: 0.40 External Shading: 225mm window reveal Window Openings: 100mm restricted opening in daytime Window EA: As per design MVHR: Background Other: improved lighting efficiency to 2W/m²	14/14	F
Iteration 9	Weather File: LHR DSY1 2020 High50 g-value: 0.40 External Shading: 225mm window reveal Window Openings: 100mm restricted opening in daytime Window EA: As per design MVHR: Background; continuously on 24 hours Other: improved lighting efficiency to 2W/m ²	14/14	F
Iteration 10	Weather File: LHR DSY1 2020 High50 g-value: 0.40 External Shading: 225mm window reveal Window Openings: 100mm restricted opening in daytime Window EA: As per design MVHR: Background; continuously on 24 hours Other: improved lighting efficiency to 2W/m ² Cooling System: Active cooling	0/14	P

The following observations can be made from the results:

- The implementation of passive mitigation measures alone is insufficient to achieve compliance with Criterion 1 for the communal spaces. Furthermore, the effectiveness of such measures is inherently limited, as there are spaces that are not adjacent to external façades and cannot benefit from natural ventilation strategies.
- Reducing internal heat gains from lighting did result in a significant improvement in reducing overheating hours, however it was still not enough for the communal spaces to comply with Criterion 1.
- While continuous operation of the MVHR provide a modest increase in background ventilation and assisted in removing some internal heat thereby substantially reducing overheating hours, it was still not enough for the communal spaces to comply with Criterion 1.
- Utilisation of active cooling is necessary to achieve AD O compliance.

It is also important to note that the findings of this assessment are related to planning stage design only and any changes to the ventilation strategy, façade opening areas and window operation and shading elements would impact the performance of the building and void the results of the current assessment.

DSY2 AND DSY3 2020 SCENARIO

Although compliance with DSY2 and DSY3 weather files is not a requirement of Approved Document O, it is recommended that these additional weather files are assessed alongside DSY1 to evaluate the development's resilience to future climate conditions. This approach aligns with Haringey's Key Overheating Planning Application Requirements and can help identify opportunities to incorporate appropriate mitigation measures within the current design.

Table 12 shows the iterations undertaken to gain an understanding of the mitigation measures to prevent overheating against the 2020 London Weather Centre DSY2 weather which has a short, intense warm spell and DSY3 weather which has a long, less intense warm spell:

Table 12: Overheating assessment results for the London Weather Centre, DSY2 & DSY3 2020 (High Emissions, 50% Percentile)

Iteration No.	Design Change	Common Spaces not meeting Criteria 1 TM52	Overall Result (P/F)
Iteration 11	Weather File: LHR DSY2 2020 High50 g-value: 0.40 External Shading: 225mm window reveal Window Openings: 100mm restricted opening in daytime Window EA: As per design MVHR: Background Other: improved lighting efficiency to 2W/m ² Cooling System: Active cooling	0/14	P
Iteration 12	Weather File: LHR DSY3 2020 High50 g-value: 0.40 External Shading: 225mm window reveal Window Openings: 100mm restricted opening in daytime Window EA: As per design MVHR: Background Other: improved lighting efficiency to 2W/m ² Cooling System: Active cooling	0/14	P

The following observations can be made from the results:

- With the active cooling system, thermal comfort is maintained even under the warmer conditions of DSY2 and DSY3 2020 weather scenarios.

COMMUNAL CORRIDORS

The current building design incorporates multiple vertical risers adjacent to the bedrooms, minimising the need for horizontal pipework throughout the building. Consequently, horizontal pipework is limited to the ground floor enclosed corridors and two top floor corridors. One of the top floor corridors and a selected ground floor corridor were modelled to assess their overheating risk and the results are shown in Table 13. Communal heating pipework distribution gains were estimated based on an assumed pipework layout in the Internal Gains section Table 5.

Table 13: Communal corridor overheating assessment results for specify whether London Weather Centre DSY1 2020 Weather File

Iteration	Internal Gains	Auxiliary Ventilation	Weather File	% Annual Hours T _{op} > 28 °C	Criteria met
Corridor 1 (Top floor)	Pipework = 164.2 W Lighting = 2.0 W/m ²	N	DSY1 2020	0.3%	Y
Corridor 2 (Ground floor)	Pipework = 288.1 W Lighting = 2.0 W/m ²	N	DSY1 2020	6.1%	N

The following observations can be made from the results shown above:

- Corridor 2 on the ground floor exceeds 28°C for more than 3% of the total annual hours and is therefore flagged as presenting a significant overheating risk within this report.
- Heat transfer of this corridor to the adjacent bedrooms is not deemed significant, as thermal modelling confirms that all the bedrooms meet the ADO compliance criteria, as shown in Table 7.

It should be noted that the overheating risk within communal corridors will depend on the final heat distribution method as well as the pipework specification and insulation levels, and ventilation systems in place. It is therefore recommended that a full assessment is conducted once the relevant specifications are confirmed. The details and specification of environmental fans should be considered alongside the fire and ventilation strategy⁵ at the next stage of the design development.

⁵ Fire and ventilation guidance should be sought from the relevant specialist.

CONCLUSIONS AND RECOMMENDATIONS

The results show that all sample flats achieve compliance with CIBSE TM59 and Part O for London Weather Centre DSY1 2020 weather data, provided that adequate design considerations are taken into account.

The results detailed on the previous pages demonstrate that a combination of passive and active strategies is essential for compliance with the overheating risk criteria. Passive strategies include optimised glazing ratios in south and west facades, deep window reveals, use of low solar control glazing, maximising window openable area, and natural ventilation in daytime and night-time especially in communal kitchens. Generally, a g-value of 0.4 should be the preferred specification in mitigating unnecessary solar gains while avoiding compromising the energy performance and compliance with CO₂ emissions targets.

The active strategy involves a BMS-controlled peak load lopping strategy using the same ASHP system that provides heating and cooling to the building's common spaces to also provide cooling to the bedrooms and communal kitchens. This strategy limits the maximum room temperatures to 26°C only during periods of hot weather in a year rather than maintaining a constant lower cooling setpoint in each space. Moreover, the passive design measures enumerated above have reduced the cooling demand for the proposed development.

Creating comfortable indoor temperatures in future weather scenarios will utilise the same cooling strategy within the habitable spaces. This can be accommodated by designing the existing system to meet the calculated cooling load through the provision of appropriately sized chilled water pipework and the ability to replace heating-only heat pumps with simultaneous heat pump units, should additional cooling capacity be required. These recommendations should be considered alongside the energy efficiency performance guidance. It is recommended that the analysis is revisited at the time of implementation to assess if local environmental conditions have changed and new design/technological innovations are available.

Table 14 summarises the design recommendations that can be implemented in the current design to contribute to reducing overheating risk in line with the GLA and LB Haringey's guidance.

Table 14: Summary of recommendations for the proposed development.

Measure	Implementation
Minimise internal heat generation through energy efficient design	
High efficiency lighting installations (LED)	Lower lighting gains reduces internal heat load in all spaces.
LTHW pipework design and installations (location, configuration and insulation) to minimise heat losses.	- Providing multiple vertical risers reduces the length of horizontal ductwork in communal corridors, improving system efficiency and simplifying installation. - Corridor pipework should be fully insulated to minimise internal heat gains contributing to elevated temperatures. - Consideration of environmental fans along corridors, where necessary.
Reduce the amount of heat entering the building	
External shading devices	Deep window reveals of 225mm across the site
Solar control glazing	- Optimise glazing ratio in south and west facades - Use of solar control glazing to achieve a lower g-value of 0.4.
Passive ventilation	
Natural ventilation opening	- Maximise free area for natural ventilation through inward opening windows with panes openable to at least and reducing fixed panels - Utilisation of night-time ventilation for kitchens on the upper floors. - Apply AD O approved security measures for ground floor and easily accessible openings for optimised natural ventilation.

Measure	Implementation
Mechanical ventilation	
Continuous background ventilation	- Continuous MVHR system operation for background ventilation throughout the year assists in removing some accumulated internal heat. - Specifically on the ground floor corridor with pipework, the feasibility of providing dedicated supply and extract ventilation should be considered at the next stage of design development to mitigate overheating risk,
Peak load lopping strategy	A BMS-controlled strategy that works within the same ASHP system for the common spaces and limits the maximum room temperature to 26°C during hot days, rather than maintaining a constant lower cooling setpoint in individual rooms, thereby providing thermal comfort with significantly lower energy consumption than a conventional full-time and dedicated active cooling system or an MVHR cooling module.
Active cooling	While active cooling has been provided in the common spaces, passive design measures have been implemented to reduce the cooling demand as far as feasible.

Table 15 summarises the design recommendations that can be implemented as part of the retrofit plan to contribute to reducing overheating risk and cooling loads in line with the LBH requirement. As part of the retrofit plan, responsibility for the future management and operation of the building will be under YMCA London City and North.

Table 15. Future retrofit plan.

Measure	Implementation
Mechanical ventilation	
Peak load lopping strategy	- Allowances on capacities are incorporated in the current design through the chilled water pipework sizes avoiding the need for extensive pipework modifications, thereby minimising disruption and reducing the cost of future upgrades. - Ability to replace heating-only heat pumps with reversible units should additional cooling capacity is needed with minimal modification to the overall system. - Current innovations at the time of implementation should be reviewed.

APPENDIX B – SBEM ASSUMPTIONS

23/07/2026

The figures listed below are assumptions only, based on a combination of best judgement at design stage and information from the design team where appropriate. Throughout the design stage the systems and size of renewable systems are likely to change whilst the building designs are being finalised. All information detailed in this design note is a basic recommendation at the BREEAM and Planning Stage Part L pre-assessment. It should be noted that this document is not exhaustive and the contractor should allow for flexibility on site where necessary.

Opaque Elements		
Floors		
Ground, basement and exposed floors (to outside)	0.10 W/m ² .K	Based on best judgement on Planning Stage
Exposed floors to unheated space	0.15 W/m ² .K	Based on best judgement on Planning Stage
Walls		
External walls	0.15 W/m ² .K	Based on best judgement on Planning Stage
Walls to cycle stores/ plant rooms etc.	0.20 W/m ² .K	Based on best judgement on Planning Stage
Walls to corridors and stairs	0.20 W/m ² .K	Based on best judgement on Planning Stage
Roofs		
Flat roofs	0.10 W/m ² .K	Based on best judgement on Planning Stage
Roof terrace/ other roof areas with shallower depths	0.15 W/m ² .K	Based on best judgement on Planning Stage
Openings		
Doors		
U-Value	1.2 W/m ² .K	Based on best judgement on Planning Stage
Windows		
Glazing Type	Double-glazing	
U-Value	1.2 W/m ² .K	Based on best judgement on Planning Stage
Transmittance Factor (g-value)	40 %	Based on best judgement on Planning Stage
Frame Factor	0.8	Based on best judgement on Planning Stage
Ventilation		
Supply and extract		
MVHR assumed	Yes	Based on provisional M&E Information
Specific Fan Power	0.9 (2.1 in kitchens) W/l/s	Based on provisional M&E Information
Heat Recovery		
Heat Recovery assumed	Yes	Based on provisional M&E Information
Type	Plate heat exchanger	Based on provisional M&E Information
Efficiency	85 %	Based on provisional M&E Information
Air permeability		
Design air permeability rate	3 m ³ /hm ²	Based on best judgement on Planning Stage
Heating / Cooling / DHW		
Heating and Cooling		
HVAC system type	Communal ASHP	Based on provisional M&E Information
Specification	Daikin EWYE070CZN-A2	Based on provisional M&E Information
Seasonal COP	4.00	Based on provisional M&E Information
Seasonal EER	4.56	Based on provisional M&E Information
System Controls		
Central time control	no	Based on best judgement on Planning Stage
Optimum start/stop control	no	Based on best judgement on Planning Stage
Local time control (i.e. room by room)	yes	Based on best judgement on Planning Stage
Local temperature control (i.e. room by room)	yes	Based on best judgement on Planning Stage
Weather compensation control	no	Based on best judgement on Planning Stage
Hot Water		
Electric		
DHW Generator type	From ASHP	Based on provisional M&E Information
Generator efficiency	Same as heating	Based on provisional M&E Information
Fuel type	Electricity	Based on provisional M&E Information
Renewable Technologies		
Total PV output	21.2 kWp	To be maximised as per available useful roof space
PV efficiency	20 %	Based on best judgement on Planning Stage
PV array area	~100 m ²	To be maximised as per available useful roof space
Tilt of collector / orientation	0 degrees	Based on best judgement on Planning Stage
Overshading	None or very little	Based on best judgement on Planning Stage
Orientation	South	Based on best judgement on Planning Stage
Ductwork and Metering		
Ductwork and AHU leakage		
Ductwork leakage tested?	Yes	Based on best judgement on Planning Stage
CEN classification	Class D	Based on best judgement on Planning Stage
AHU meets CEN leakage standards?	Yes	Based on best judgement on Planning Stage
CEN classification	Class L1	Based on best judgement on Planning Stage
Metering provision		
The system has provision for metering	Yes	Based on best judgement on Planning Stage
The metering warns "out of range" values	Yes	Based on best judgement on Planning Stage
Lighting and Lighting Controls		
Proposed		
Lamp efficacy	120-160 (depending on room) lm/cW	Based on provisional M&E Information
Light Output Ratio Other Lighting	1.00	Based on best judgement on Planning Stage
Photoelectric Lighting Control	Yes, where feasible	Based on best judgement on Planning Stage
Occupancy Sensing	Yes, where feasible	Based on best judgement on Planning Stage

APPENDIX C – SBEM RESULTS

Project name

YLCAN Crouch End - Be Green

As built

Date: Fri Jul 24 09:32:52 2026

Administrative information

Building Details

Address: YLCAN London City North, London, N8 8SG

Certifier details

Name: XCO2

Telephone number: 020 7700 1000

Address: The Gymnasium, 56 Kingsway Place, Sans Walk,
London, EC1R 0LU

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.31

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.31

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

Foundation area [m²]: 647.56The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	3.95
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	2.85
Target primary energy rate (TPER), kWh _{PE} /m ² .annum	42.89
Building primary energy rate (BPER), kWh _{PE} /m ² .annum	30.99
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	0.28	4F000034:Surf[5]
Floors	0.18	0.1	0.1	SP000004:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.1	0.1	SP000008:Surf[1]
Windows** and roof windows	1.6	1.2	1.2	SP000002:Surf[1]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	-	-	No personnel doors in building
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	3

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- Be Green Heating & Cooling (Standard)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	4.56	0	-	0.85
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

2- Be Green Heating & Cooling (Commercial)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	4.56	0	1.8	0.85
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.					

1- Be Green HW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	4	0.002
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

Zone-level mechanical ventilation, exhaust, and terminal units

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

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		Zone	Standard
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1			
GF_Ensuites	-	0.9	-	-	-	-	-	-	-	-	-	N/A
GF_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	-	N/A
GF_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	-	N/A
GF_Ensuites	-	0.9	-	-	-	-	-	-	-	-	-	N/A
GF_Kitchens	-	2.1	-	-	-	-	-	-	-	-	-	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	
GF_Ensuites	-	0.9	-	-	-	-	-	-	-	-	N/A	
GF_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
GF_Ensuites	-	0.9	-	-	-	-	-	-	-	-	N/A	
GF_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
GF_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
GF_Ensuites	-	0.9	-	-	-	-	-	-	-	-	N/A	
GF_Offices	-	-	-	-	-	-	-	0.3	-	-	N/A	
GF_Kitchenette	-	-	-	-	-	-	-	0.3	-	-	N/A	
GF_Offices	-	-	-	-	-	-	-	0.3	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Kitchens	-	2.1	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Kitchens	-	2.1	-	-	-	-	-	-	-	-	N/A	
1F_Kitchens	-	2.1	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms												

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
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
1F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
1F_Ensuites		-	0.9	-	-	-	-	-	-	-	-	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	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuites	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Kitchens	-	2.1	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Kitchens	-	2.1	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	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
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
2F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	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
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
4F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
4F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
4F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	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
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
4F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
GF_Reflection Room		-	-	-	-	-	-	-	0.3	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
4F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
4F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
1F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
3F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
3F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
2F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
2F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
5F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
4F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
GF_Meeting Rooms		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
4F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
5F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
5F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
5F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
GF_Meeting		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_Presentation Space		-	-	-	-	-	-	-	0.3	-	-	N/A
5F_Meeting Room		-	-	-	-	-	-	-	0.3	-	-	N/A
4F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
3F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
2F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
1F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
GF_Entrance/Reception		-	-	-	-	-	-	-	0.3	-	-	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
4F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
GF_Lounge		-	-	-	-	-	-	-	0.3	-	-	N/A
5F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
Basement_Laundry		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_WC		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_WC		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_Store		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_Store		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_Large Parcel Store		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_CCTV Comms		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_Store		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_WC		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_Bathroom		-	-	-	-	-	-	-	0.3	-	-	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
GF_Ensuites		120	-	-
GF_Bedrooms		120	-	-
GF_Bedrooms		120	-	-
GF_Ensuites		120	-	-
GF_Kitchens		120	-	-
GF_Ensuites		120	-	-
GF_Bedrooms		120	-	-
GF_Ensuites		120	-	-
GF_Bedrooms		120	-	-
GF_Bedrooms		120	-	-
GF_Ensuites		120	-	-
GF_Offices		142	-	-
GF_Kitchenette		120	-	-
GF_Offices		142	-	-
1F_Ensuite		120	-	-
1F_Ensuite		120	-	-
1F_Ensuite		120	-	-
1F_Bedrooms		120	-	-
1F_Bedrooms		120	-	-
1F_Bedrooms		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuite		120	-	-
1F_Kitchens		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuite		120	-	-
1F_Kitchens		120	-	-

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
1F_Ensuite		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuite		120	-	-
1F_Ensuite		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuite		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuite		120	-	-
1F_Ensuite		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuite		120	-	-
1F_Ensuite		120	-	-
1F_Bedrooms		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuite		120	-	-
1F_Ensuite		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuite		120	-	-
1F_Kitchens		120	-	-
1F_Kitchens		120	-	-
1F_Ensuites		120	-	-
1F_Bedrooms		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuites		120	-	-
1F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Kitchens		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Kitchens		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-

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
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Kitchens		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-

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
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Kitchens		120	-	-
2F_Kitchens		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
3F_Kitchens		120	-	-
2F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Kitchens		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-

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
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-

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
4F_Ensuite		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Kitchens		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-

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
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
3F_Kitchens		120	-	-
4F_Kitchens		120	-	-
GF_Reflection Room		142	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
4F_Kitchens		120	-	-
4F_Kitchens		120	-	-
1F_Kitchens		120	-	-
3F_Kitchens		120	-	-

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
3F_Kitchens		120	-	-
2F_Kitchens		120	-	-
2F_Kitchens		120	-	-
5F_Bedrooms		120	-	-
4F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
1F_Bedrooms		120	-	-
GF_Meeting Rooms		142	-	-
GF_Circulation		134	-	-
GF_Kitchens		120	-	-
4F_Kitchens		120	-	-
5F_Kitchens		120	-	-
5F_Kitchens		120	-	-
5F_Kitchens		120	-	-
GF_Meeting		142	-	-
GF_Presentation Space		142	-	-
GF_Laundry		120	-	-
5F_Meeting Room		142	-	-
4F_Kitchens		120	-	-
3F_Kitchens		120	-	-
2F_Kitchens		120	-	-
1F_Kitchens		120	-	-
GF_Entrance/Reception		134	-	-
4F_Kitchens		120	-	-
GF_Lounge		142	-	-
5F_Kitchens		120	-	-
Basement_Energy Centre		160	-	-
Basement_Tank Room		160	-	-
Basement_Laundry		120	-	-
Basement_Circulation		134	-	-
Basement_Comms		160	-	-
GF_Circulation		134	-	-
GF_Circulation		134	-	-
GF_Circulation		134	-	-
GF_Circulation		134	-	-
GF_WC		120	-	-
GF_WC		120	-	-
GF_Store		54	-	-
GF_Store		35	-	-
GF_Large Parcel Store		57	-	-
GF_Circulation		134	-	-
GF_Circulation		134	-	-

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
GF_CCTV Comms		86	-	-
GF_Bin Store		160	-	-
GF_Switchroom		160	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
4F_Circulation		134	-	-
4F_Circulation		134	-	-
4F_Circulation		134	-	-
4F_Circulation		134	-	-
4F_Circulation		134	-	-
4F_Circulation		134	-	-

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
4F_Circulation		134	-	-
4F_Circulation		134	-	-
4F_Circulation		134	-	-
5F_Circulation		134	-	-
5F_Circulation		134	-	-
5F_Circulation		134	-	-
5F_Circulation		134	-	-
5F_Circulation		134	-	-
5F_Circulation		134	-	-
5F_Circulation		134	-	-
5F_AWC		120	-	-
Roof_Circulation		134	-	-
Roof_Plant		160	-	-
GF_Store		36	-	-
GF_Circulation		134	-	-
GF_Circulation		134	-	-
GF_WC		120	-	-
GF_Bathroom		120	-	-
GF_Maintenace		160	-	-
GF_Circulation		134	-	-

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?
GF_Ensuites	N/A	N/A
GF_Bedrooms	NO (-49.3%)	NO
GF_Bedrooms	NO (-49.1%)	NO
GF_Ensuites	N/A	N/A
GF_Kitchens	NO (-90.1%)	NO
GF_Ensuites	N/A	N/A
GF_Bedrooms	NO (-68.7%)	NO
GF_Ensuites	N/A	N/A
GF_Bedrooms	NO (-71%)	NO
GF_Bedrooms	NO (-72.9%)	NO
GF_Ensuites	N/A	N/A
GF_Offices	NO (-18.4%)	NO
GF_Kitchenette	NO (-1.6%)	NO
GF_Offices	YES (+0.5%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-62.9%)	NO
1F_Bedrooms	NO (-61.3%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
1F_Bedrooms	NO (-61.3%)	NO
1F_Bedrooms	NO (-90.9%)	NO
1F_Ensuite	N/A	N/A
1F_Kitchens	NO (-87%)	NO
1F_Bedrooms	NO (-58.6%)	NO
1F_Ensuite	N/A	N/A
1F_Kitchens	NO (-64.2%)	NO
1F_Kitchens	NO (-69.6%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-62.3%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-62.2%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-59.9%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-63%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-60.9%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-63.2%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-60.4%)	NO
1F_Bedrooms	NO (-63.4%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-63.3%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-60.7%)	NO
1F_Bedrooms	NO (-62.6%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-63%)	NO
1F_Bedrooms	NO (-63.1%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-70.8%)	NO
1F_Bedrooms	NO (-60.4%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-61.9%)	NO
1F_Bedrooms	NO (-62.3%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-81.6%)	NO
1F_Kitchens	NO (-80.9%)	NO
1F_Bedrooms	NO (-71.8%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-85.2%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
1F_Bedrooms	NO (-86.3%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-79.6%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-74.9%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-75.8%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-86%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-69%)	NO
1F_Bedrooms	NO (-65%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-62.5%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-60.1%)	NO
1F_Kitchens	NO (-84.8%)	NO
1F_Kitchens	N/A	N/A
1F_Ensuites	N/A	N/A
1F_Bedrooms	NO (-91.1%)	NO
1F_Bedrooms	NO (-80.5%)	NO
1F_Ensuites	N/A	N/A
1F_Bedrooms	NO (-78.3%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-62.9%)	NO
2F_Bedrooms	NO (-61.1%)	NO
2F_Bedrooms	NO (-61.3%)	NO
2F_Bedrooms	NO (-90.8%)	NO
2F_Ensuite	N/A	N/A
2F_Kitchens	NO (-87%)	NO
2F_Bedrooms	NO (-58.4%)	NO
2F_Ensuite	N/A	N/A
2F_Kitchens	NO (-63.5%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-61.7%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-61.6%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-59.2%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-62.4%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-60.1%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-62.4%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-59.6%)	NO
2F_Bedrooms	NO (-62.6%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-62.5%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-60.1%)	NO
2F_Bedrooms	NO (-62.1%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-62.4%)	NO
2F_Bedrooms	NO (-63.1%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-70.7%)	NO
2F_Bedrooms	NO (-60.4%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-61.8%)	NO
2F_Bedrooms	NO (-62.3%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-81.6%)	NO
2F_Kitchens	NO (-79.2%)	NO
2F_Bedrooms	NO (-71%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-84.9%)	NO
2F_Bedrooms	NO (-85%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-74.8%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-73.4%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-75%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-85.8%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-67.6%)	NO
2F_Bedrooms	NO (-62.5%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-60.2%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-59.4%)	NO
2F_Kitchens	NO (-83.7%)	NO
2F_Kitchens	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-89.3%)	NO
2F_Bedrooms	NO (-77.1%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-77.3%)	NO
2F_Bedrooms	NO (-61.4%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-61.2%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-62.6%)	NO
3F_Bedrooms	NO (-61%)	NO
3F_Kitchens	NO (-87%)	NO
2F_Bedrooms	NO (-58.1%)	NO
3F_Ensuite	N/A	N/A
3F_Kitchens	NO (-63.3%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-61.6%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-61.5%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-59.1%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-62.4%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-60.1%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-62.4%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-59.6%)	NO
3F_Bedrooms	NO (-62.5%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-62.5%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-60.1%)	NO
3F_Bedrooms	NO (-62%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-62.4%)	NO
3F_Bedrooms	NO (-63.1%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-70.7%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
3F_Bedrooms	NO (-60.4%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-61.8%)	NO
3F_Bedrooms	NO (-62.3%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-81.6%)	NO
3F_Kitchens	NO (-77.6%)	NO
3F_Bedrooms	NO (-70.6%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-84.9%)	NO
3F_Bedrooms	NO (-84.7%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-70.9%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-72.3%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-74.6%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-85.8%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-64.7%)	NO
3F_Bedrooms	NO (-60.9%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-59.5%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-59.4%)	NO
3F_Kitchens	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-88.9%)	NO
3F_Bedrooms	NO (-76.6%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-76.9%)	NO
3F_Bedrooms	NO (-61.3%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-61.1%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-72.5%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-62.6%)	NO
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
4F_Bedrooms	NO (-61.6%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-61.5%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-59.1%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-62.4%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-60.1%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-62.4%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-59.6%)	NO
4F_Bedrooms	NO (-62.5%)	NO
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-62.5%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-60.1%)	NO
4F_Bedrooms	NO (-62%)	NO
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-62.4%)	NO
4F_Bedrooms	NO (-63.1%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-70.6%)	NO
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-84.9%)	NO
4F_Bedrooms	NO (-84.7%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-70.5%)	NO
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-71.5%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-73.8%)	NO
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-61.9%)	NO
4F_Bedrooms	NO (-60.7%)	NO
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-81.2%)	NO
4F_Bedrooms	NO (-75.7%)	NO
4F_Bedrooms	NO (-61.3%)	NO
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
4F_Bedrooms	NO (-61.1%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-83.8%)	NO
4F_Bedrooms	NO (-79%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-58.1%)	NO
4F_Kitchens	NO (-86.9%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-74.4%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-62.3%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-59.5%)	NO
5F_Bedrooms	NO (-62.5%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-62.4%)	NO
5F_Bedrooms	NO (-73.7%)	NO
5F_Ensuite	N/A	N/A
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-86.5%)	NO
5F_Bedrooms	NO (-86.3%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-73.6%)	NO
5F_Ensuite	N/A	N/A
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-74.3%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-74.8%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-65%)	NO
5F_Bedrooms	NO (-64.8%)	NO
5F_Bedrooms	NO (-83.2%)	NO
5F_Bedrooms	NO (-76.6%)	NO
5F_Bedrooms	NO (-58%)	NO
5F_Bedrooms	NO (-79.4%)	NO
5F_Bedrooms	NO (-65.2%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-65.3%)	NO
5F_Bedrooms	NO (-65.7%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-65%)	NO
5F_Ensuite	N/A	N/A
3F_Kitchens	NO (-69.9%)	NO
4F_Kitchens	NO (-63.2%)	NO
GF_Reflection Room	NO (-46.1%)	NO
5F_Ensuite	N/A	N/A
5F_Ensuite	N/A	N/A
5F_Ensuite	N/A	N/A
5F_Ensuite	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
5F_Ensuite	N/A	N/A
5F_Ensuite	N/A	N/A
5F_Ensuite	N/A	N/A
5F_Ensuite	N/A	N/A
4F_Kitchens	NO (-61.8%)	NO
4F_Kitchens	NO (-60.8%)	NO
1F_Kitchens	NO (-70.3%)	NO
3F_Kitchens	NO (-61.8%)	NO
3F_Kitchens	NO (-60.9%)	NO
2F_Kitchens	NO (-62.6%)	NO
2F_Kitchens	NO (-61.7%)	NO
5F_Bedrooms	NO (-64.2%)	NO
4F_Bedrooms	NO (-64.3%)	NO
3F_Bedrooms	NO (-67.1%)	NO
2F_Bedrooms	NO (-69.8%)	NO
1F_Bedrooms	NO (-71.1%)	NO
GF_Meeting Rooms	NO (-8.9%)	NO
GF_Kitchens	NO (-42.5%)	NO
4F_Kitchens	NO (-87.5%)	NO
5F_Kitchens	NO (-69.8%)	NO
5F_Kitchens	NO (-37.4%)	NO
5F_Kitchens	NO (-63.2%)	NO
GF_Meeting	NO (-14.6%)	NO
GF_Presentation Space	NO (-42.6%)	NO
5F_Meeting Room	YES (+3.7%)	NO
4F_Kitchens	NO (-64.3%)	NO
3F_Kitchens	NO (-64.3%)	NO
2F_Kitchens	NO (-64.4%)	NO
1F_Kitchens	NO (-64.5%)	NO
GF_Entrance/Reception	NO (-26.7%)	NO
4F_Kitchens	NO (-78.9%)	NO
GF_Lounge	NO (-51.2%)	NO
5F_Kitchens	NO (-75.4%)	NO
Basement_Laundry	N/A	N/A
Basement_Comms	N/A	N/A
GF_WC	N/A	N/A
GF_WC	N/A	N/A
GF_Store	N/A	N/A
GF_Store	N/A	N/A
GF_Large Parcel Store	N/A	N/A
GF_CCTV Comms	N/A	N/A
GF_Store	N/A	N/A
GF_WC	N/A	N/A
GF_Bathroom	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	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]	6999.3	6999.3
External area [m ²]	6807.8	7589.5
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	1672.76	3146.95
Average U-value [W/m ² K]	0.25	0.41
Alpha value* [%]	24.99	10

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
22	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
78	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	0.81	2.98
Cooling	1.49	2.11
Auxiliary	3.45	2.42
Lighting	6.57	8.27
Hot water	9.37	13.24
Equipment*	37.18	37.18
TOTAL **	21.69	29.02

* 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	1.23	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>1.23</i>	<i>0</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	30.03	51.4
Primary energy [kWh _{PE} /m ²]	30.99	42.89
Total emissions [kg/m ²]	2.85	3.95

HVAC Systems Performance

System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Fan coil systems, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	49	101.2	3.6	7.8	26.8	3.75	3.6	4	4.56
Notional	59.3	95.4	5.9	9.3	19	2.78	2.84	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	11.3	15.7	0.8	1.3	1.2	3.92	3.41	4	4.56
Notional	43.6	21.8	4.4	2.1	0.3	2.78	2.84	----	----
[ST] No Heating or Cooling									
Actual	0	0	0	0	0	0	0	0	0
Notional	0	0	0	0	0	0	0	----	----

Key to terms

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

Project name

YLCAN Crouch End - Be Lean

As built

Date: Fri Jul 24 09:06:33 2026

Administrative information

Building Details

Address: YLCAN London City North, London, N8 8SG

Certifier details

Name: XCO2

Telephone number: 020 7700 1000

Address: The Gymnasium, 56 Kingsway Place, Sans Walk,
London, EC1R 0LU

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.31

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.31

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

Foundation area [m²]: 647.56The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	3.95
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	3.58
Target primary energy rate (TPER), kWh _{PE} /m ² .annum	42.89
Building primary energy rate (BPER), kWh _{PE} /m ² .annum	39.08
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	0.28	4F000034:Surf[5]
Floors	0.18	0.1	0.1	SP000004:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.1	0.1	SP000008:Surf[1]
Windows** and roof windows	1.6	1.2	1.2	SP000002:Surf[1]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors [^]	1.6	-	-	No personnel doors in building
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	3

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- Be Lean Heating & Cooling (Standard)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.64	4.56	0	-	0.85
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

2- Be Lean Heating & Cooling (Commercial)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.64	4.56	0	1.8	0.85
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.					

1- Be Lean HW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	2.86	0.002
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

Zone-level mechanical ventilation, exhaust, and terminal units

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

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		Zone	Standard
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1			
GF_Ensuites	-	0.9	-	-	-	-	-	-	-	-	-	N/A
GF_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	-	N/A
GF_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	-	N/A
GF_Ensuites	-	0.9	-	-	-	-	-	-	-	-	-	N/A
GF_Kitchens	-	2.1	-	-	-	-	-	-	-	-	-	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	
GF_Ensuites	-	0.9	-	-	-	-	-	-	-	-	N/A	
GF_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
GF_Ensuites	-	0.9	-	-	-	-	-	-	-	-	N/A	
GF_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
GF_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
GF_Ensuites	-	0.9	-	-	-	-	-	-	-	-	N/A	
GF_Offices	-	-	-	-	-	-	-	0.3	-	-	N/A	
GF_Kitchenette	-	-	-	-	-	-	-	0.3	-	-	N/A	
GF_Offices	-	-	-	-	-	-	-	0.3	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Kitchens	-	2.1	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Kitchens	-	2.1	-	-	-	-	-	-	-	-	N/A	
1F_Kitchens	-	2.1	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
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1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
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1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
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1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
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1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms												

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
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
1F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
1F_Ensuites		-	0.9	-	-	-	-	-	-	-	-	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	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Ensuites	-	0.9	-	-	-	-	-	-	-	-	N/A	
1F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Kitchens	-	2.1	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Kitchens	-	2.1	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Bedrooms	-	0.9	-	-	-	-	-	-	-	-	N/A	
2F_Ensuite	-	0.9	-	-	-	-	-	-	-	-	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
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
4F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
GF_Reflection Room		-	-	-	-	-	-	-	0.3	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
5F_Ensuite		-	0.9	-	-	-	-	-	-	-	-	N/A
4F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
4F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
1F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
3F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
3F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
2F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
2F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
5F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
4F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
3F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
2F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
1F_Bedrooms		-	0.9	-	-	-	-	-	-	-	-	N/A
GF_Meeting Rooms		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
4F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
5F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
5F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
5F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
GF_Meeting		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_Presentation Space		-	-	-	-	-	-	-	0.3	-	-	N/A
5F_Meeting Room		-	-	-	-	-	-	-	0.3	-	-	N/A
4F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
3F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
2F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
1F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
GF_Entrance/Reception		-	-	-	-	-	-	-	0.3	-	-	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
4F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
GF_Lounge		-	-	-	-	-	-	-	0.3	-	-	N/A
5F_Kitchens		-	2.1	-	-	-	-	-	-	-	-	N/A
Basement_Laundry		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_WC		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_WC		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_Store		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_Store		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_Large Parcel Store		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_CCTV Comms		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_Store		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_WC		-	-	-	-	-	-	-	0.3	-	-	N/A
GF_Bathroom		-	-	-	-	-	-	-	0.3	-	-	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
GF_Ensuites		120	-	-
GF_Bedrooms		120	-	-
GF_Bedrooms		120	-	-
GF_Ensuites		120	-	-
GF_Kitchens		120	-	-
GF_Ensuites		120	-	-
GF_Bedrooms		120	-	-
GF_Ensuites		120	-	-
GF_Bedrooms		120	-	-
GF_Bedrooms		120	-	-
GF_Ensuites		120	-	-
GF_Offices		142	-	-
GF_Kitchenette		120	-	-
GF_Offices		142	-	-
1F_Ensuite		120	-	-
1F_Ensuite		120	-	-
1F_Ensuite		120	-	-
1F_Bedrooms		120	-	-
1F_Bedrooms		120	-	-
1F_Bedrooms		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuite		120	-	-
1F_Kitchens		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuite		120	-	-
1F_Kitchens		120	-	-

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
1F_Ensuite		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuite		120	-	-
1F_Ensuite		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuite		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuite		120	-	-
1F_Ensuite		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuite		120	-	-
1F_Ensuite		120	-	-
1F_Bedrooms		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuite		120	-	-
1F_Ensuite		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuite		120	-	-
1F_Kitchens		120	-	-
1F_Kitchens		120	-	-
1F_Ensuites		120	-	-
1F_Bedrooms		120	-	-
1F_Bedrooms		120	-	-
1F_Ensuites		120	-	-
1F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Kitchens		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Kitchens		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-

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
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Kitchens		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-

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
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Kitchens		120	-	-
2F_Kitchens		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
2F_Ensuite		120	-	-
2F_Ensuite		120	-	-
2F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
3F_Kitchens		120	-	-
2F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Kitchens		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-

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
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-
3F_Ensuite		120	-	-
3F_Bedrooms		120	-	-
3F_Ensuite		120	-	-

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
4F_Ensuite		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Ensuite		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Bedrooms		120	-	-
4F_Ensuite		120	-	-
4F_Bedrooms		120	-	-
4F_Kitchens		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-

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
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Bedrooms		120	-	-
5F_Bedrooms		120	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
3F_Kitchens		120	-	-
4F_Kitchens		120	-	-
GF_Reflection Room		142	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
5F_Ensuite		120	-	-
4F_Kitchens		120	-	-
4F_Kitchens		120	-	-
1F_Kitchens		120	-	-
3F_Kitchens		120	-	-

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
3F_Kitchens		120	-	-
2F_Kitchens		120	-	-
2F_Kitchens		120	-	-
5F_Bedrooms		120	-	-
4F_Bedrooms		120	-	-
3F_Bedrooms		120	-	-
2F_Bedrooms		120	-	-
1F_Bedrooms		120	-	-
GF_Meeting Rooms		142	-	-
GF_Circulation		134	-	-
GF_Kitchens		120	-	-
4F_Kitchens		120	-	-
5F_Kitchens		120	-	-
5F_Kitchens		120	-	-
5F_Kitchens		120	-	-
GF_Meeting		142	-	-
GF_Presentation Space		142	-	-
GF_Laundry		120	-	-
5F_Meeting Room		142	-	-
4F_Kitchens		120	-	-
3F_Kitchens		120	-	-
2F_Kitchens		120	-	-
1F_Kitchens		120	-	-
GF_Entrance/Reception		134	-	-
4F_Kitchens		120	-	-
GF_Lounge		142	-	-
5F_Kitchens		120	-	-
Basement_Energy Centre		160	-	-
Basement_Tank Room		160	-	-
Basement_Laundry		120	-	-
Basement_Circulation		134	-	-
Basement_Comms		160	-	-
GF_Circulation		134	-	-
GF_Circulation		134	-	-
GF_Circulation		134	-	-
GF_Circulation		134	-	-
GF_WC		120	-	-
GF_WC		120	-	-
GF_Store		54	-	-
GF_Store		35	-	-
GF_Large Parcel Store		57	-	-
GF_Circulation		134	-	-
GF_Circulation		134	-	-

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
GF_CCTV Comms		86	-	-
GF_Bin Store		160	-	-
GF_Switchroom		160	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
1F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
2F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
3F_Circulation		134	-	-
4F_Circulation		134	-	-
4F_Circulation		134	-	-
4F_Circulation		134	-	-
4F_Circulation		134	-	-
4F_Circulation		134	-	-
4F_Circulation		134	-	-

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
4F_Circulation		134	-	-
4F_Circulation		134	-	-
4F_Circulation		134	-	-
5F_Circulation		134	-	-
5F_Circulation		134	-	-
5F_Circulation		134	-	-
5F_Circulation		134	-	-
5F_Circulation		134	-	-
5F_Circulation		134	-	-
5F_Circulation		134	-	-
5F_AWC		120	-	-
Roof_Circulation		134	-	-
Roof_Plant		160	-	-
GF_Store		36	-	-
GF_Circulation		134	-	-
GF_Circulation		134	-	-
GF_WC		120	-	-
GF_Bathroom		120	-	-
GF_Maintenace		160	-	-
GF_Circulation		134	-	-

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?
GF_Ensuites	N/A	N/A
GF_Bedrooms	NO (-49.3%)	NO
GF_Bedrooms	NO (-49.1%)	NO
GF_Ensuites	N/A	N/A
GF_Kitchens	NO (-90.1%)	NO
GF_Ensuites	N/A	N/A
GF_Bedrooms	NO (-68.7%)	NO
GF_Ensuites	N/A	N/A
GF_Bedrooms	NO (-71%)	NO
GF_Bedrooms	NO (-72.9%)	NO
GF_Ensuites	N/A	N/A
GF_Offices	NO (-18.4%)	NO
GF_Kitchenette	NO (-1.6%)	NO
GF_Offices	YES (+0.5%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-62.9%)	NO
1F_Bedrooms	NO (-61.3%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
1F_Bedrooms	NO (-61.3%)	NO
1F_Bedrooms	NO (-90.9%)	NO
1F_Ensuite	N/A	N/A
1F_Kitchens	NO (-87%)	NO
1F_Bedrooms	NO (-58.6%)	NO
1F_Ensuite	N/A	N/A
1F_Kitchens	NO (-64.2%)	NO
1F_Kitchens	NO (-69.6%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-62.3%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-62.2%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-59.9%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-63%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-60.9%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-63.2%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-60.4%)	NO
1F_Bedrooms	NO (-63.4%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-63.3%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-60.7%)	NO
1F_Bedrooms	NO (-62.6%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-63%)	NO
1F_Bedrooms	NO (-63.1%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-70.8%)	NO
1F_Bedrooms	NO (-60.4%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-61.9%)	NO
1F_Bedrooms	NO (-62.3%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-81.6%)	NO
1F_Kitchens	NO (-80.9%)	NO
1F_Bedrooms	NO (-71.8%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-85.2%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
1F_Bedrooms	NO (-86.3%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-79.6%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-74.9%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-75.8%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-86%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-69%)	NO
1F_Bedrooms	NO (-65%)	NO
1F_Ensuite	N/A	N/A
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-62.5%)	NO
1F_Ensuite	N/A	N/A
1F_Bedrooms	NO (-60.1%)	NO
1F_Kitchens	NO (-84.8%)	NO
1F_Kitchens	N/A	N/A
1F_Ensuites	N/A	N/A
1F_Bedrooms	NO (-91.1%)	NO
1F_Bedrooms	NO (-80.5%)	NO
1F_Ensuites	N/A	N/A
1F_Bedrooms	NO (-78.3%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-62.9%)	NO
2F_Bedrooms	NO (-61.1%)	NO
2F_Bedrooms	NO (-61.3%)	NO
2F_Bedrooms	NO (-90.8%)	NO
2F_Ensuite	N/A	N/A
2F_Kitchens	NO (-87%)	NO
2F_Bedrooms	NO (-58.4%)	NO
2F_Ensuite	N/A	N/A
2F_Kitchens	NO (-63.5%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-61.7%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-61.6%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-59.2%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-62.4%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-60.1%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-62.4%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-59.6%)	NO
2F_Bedrooms	NO (-62.6%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-62.5%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-60.1%)	NO
2F_Bedrooms	NO (-62.1%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-62.4%)	NO
2F_Bedrooms	NO (-63.1%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-70.7%)	NO
2F_Bedrooms	NO (-60.4%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-61.8%)	NO
2F_Bedrooms	NO (-62.3%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-81.6%)	NO
2F_Kitchens	NO (-79.2%)	NO
2F_Bedrooms	NO (-71%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-84.9%)	NO
2F_Bedrooms	NO (-85%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-74.8%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-73.4%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-75%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-85.8%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-67.6%)	NO
2F_Bedrooms	NO (-62.5%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-60.2%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-59.4%)	NO
2F_Kitchens	NO (-83.7%)	NO
2F_Kitchens	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-89.3%)	NO
2F_Bedrooms	NO (-77.1%)	NO
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-77.3%)	NO
2F_Bedrooms	NO (-61.4%)	NO
2F_Ensuite	N/A	N/A
2F_Ensuite	N/A	N/A
2F_Bedrooms	NO (-61.2%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-62.6%)	NO
3F_Bedrooms	NO (-61%)	NO
3F_Kitchens	NO (-87%)	NO
2F_Bedrooms	NO (-58.1%)	NO
3F_Ensuite	N/A	N/A
3F_Kitchens	NO (-63.3%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-61.6%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-61.5%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-59.1%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-62.4%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-60.1%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-62.4%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-59.6%)	NO
3F_Bedrooms	NO (-62.5%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-62.5%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-60.1%)	NO
3F_Bedrooms	NO (-62%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-62.4%)	NO
3F_Bedrooms	NO (-63.1%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-70.7%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
3F_Bedrooms	NO (-60.4%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-61.8%)	NO
3F_Bedrooms	NO (-62.3%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-81.6%)	NO
3F_Kitchens	NO (-77.6%)	NO
3F_Bedrooms	NO (-70.6%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-84.9%)	NO
3F_Bedrooms	NO (-84.7%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-70.9%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-72.3%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-74.6%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-85.8%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-64.7%)	NO
3F_Bedrooms	NO (-60.9%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-59.5%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-59.4%)	NO
3F_Kitchens	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-88.9%)	NO
3F_Bedrooms	NO (-76.6%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-76.9%)	NO
3F_Bedrooms	NO (-61.3%)	NO
3F_Ensuite	N/A	N/A
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-61.1%)	NO
3F_Ensuite	N/A	N/A
3F_Bedrooms	NO (-72.5%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-62.6%)	NO
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
4F_Bedrooms	NO (-61.6%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-61.5%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-59.1%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-62.4%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-60.1%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-62.4%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-59.6%)	NO
4F_Bedrooms	NO (-62.5%)	NO
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-62.5%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-60.1%)	NO
4F_Bedrooms	NO (-62%)	NO
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-62.4%)	NO
4F_Bedrooms	NO (-63.1%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-70.6%)	NO
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-84.9%)	NO
4F_Bedrooms	NO (-84.7%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-70.5%)	NO
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-71.5%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-73.8%)	NO
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-61.9%)	NO
4F_Bedrooms	NO (-60.7%)	NO
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-81.2%)	NO
4F_Bedrooms	NO (-75.7%)	NO
4F_Bedrooms	NO (-61.3%)	NO
4F_Ensuite	N/A	N/A
4F_Ensuite	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
4F_Bedrooms	NO (-61.1%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-83.8%)	NO
4F_Bedrooms	NO (-79%)	NO
4F_Ensuite	N/A	N/A
4F_Bedrooms	NO (-58.1%)	NO
4F_Kitchens	NO (-86.9%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-74.4%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-62.3%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-59.5%)	NO
5F_Bedrooms	NO (-62.5%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-62.4%)	NO
5F_Bedrooms	NO (-73.7%)	NO
5F_Ensuite	N/A	N/A
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-86.5%)	NO
5F_Bedrooms	NO (-86.3%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-73.6%)	NO
5F_Ensuite	N/A	N/A
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-74.3%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-74.8%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-65%)	NO
5F_Bedrooms	NO (-64.8%)	NO
5F_Bedrooms	NO (-83.2%)	NO
5F_Bedrooms	NO (-76.6%)	NO
5F_Bedrooms	NO (-58%)	NO
5F_Bedrooms	NO (-79.4%)	NO
5F_Bedrooms	NO (-65.2%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-65.3%)	NO
5F_Bedrooms	NO (-65.7%)	NO
5F_Ensuite	N/A	N/A
5F_Bedrooms	NO (-65%)	NO
5F_Ensuite	N/A	N/A
3F_Kitchens	NO (-69.9%)	NO
4F_Kitchens	NO (-63.2%)	NO
GF_Reflection Room	NO (-46.1%)	NO
5F_Ensuite	N/A	N/A
5F_Ensuite	N/A	N/A
5F_Ensuite	N/A	N/A
5F_Ensuite	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
5F_Ensuite	N/A	N/A
5F_Ensuite	N/A	N/A
5F_Ensuite	N/A	N/A
5F_Ensuite	N/A	N/A
4F_Kitchens	NO (-61.8%)	NO
4F_Kitchens	NO (-60.8%)	NO
1F_Kitchens	NO (-70.3%)	NO
3F_Kitchens	NO (-61.8%)	NO
3F_Kitchens	NO (-60.9%)	NO
2F_Kitchens	NO (-62.6%)	NO
2F_Kitchens	NO (-61.7%)	NO
5F_Bedrooms	NO (-64.2%)	NO
4F_Bedrooms	NO (-64.3%)	NO
3F_Bedrooms	NO (-67.1%)	NO
2F_Bedrooms	NO (-69.8%)	NO
1F_Bedrooms	NO (-71.1%)	NO
GF_Meeting Rooms	NO (-8.9%)	NO
GF_Kitchens	NO (-42.5%)	NO
4F_Kitchens	NO (-87.5%)	NO
5F_Kitchens	NO (-69.8%)	NO
5F_Kitchens	NO (-37.4%)	NO
5F_Kitchens	NO (-63.2%)	NO
GF_Meeting	NO (-14.6%)	NO
GF_Presentation Space	NO (-42.6%)	NO
5F_Meeting Room	YES (+3.7%)	NO
4F_Kitchens	NO (-64.3%)	NO
3F_Kitchens	NO (-64.3%)	NO
2F_Kitchens	NO (-64.4%)	NO
1F_Kitchens	NO (-64.5%)	NO
GF_Entrance/Reception	NO (-26.7%)	NO
4F_Kitchens	NO (-78.9%)	NO
GF_Lounge	NO (-51.2%)	NO
5F_Kitchens	NO (-75.4%)	NO
Basement_Laundry	N/A	N/A
Basement_Comms	N/A	N/A
GF_WC	N/A	N/A
GF_WC	N/A	N/A
GF_Store	N/A	N/A
GF_Store	N/A	N/A
GF_Large Parcel Store	N/A	N/A
GF_CCTV Comms	N/A	N/A
GF_Store	N/A	N/A
GF_WC	N/A	N/A
GF_Bathroom	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	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]	6999.3	6999.3
External area [m ²]	6807.8	7589.5
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	1672.76	3146.95
Average U-value [W/m ² K]	0.25	0.41
Alpha value* [%]	24.99	10

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
22	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
78	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	1.18	2.98
Cooling	1.49	2.11
Auxiliary	3.45	2.42
Lighting	6.57	8.27
Hot water	13.14	13.24
Equipment*	37.18	37.18
TOTAL **	25.84	29.02

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	30.03	51.4
Primary energy [kWh _{PE} /m ²]	39.08	42.89
Total emissions [kg/m ²]	3.58	3.95

HVAC Systems Performance

System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Fan coil systems, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	49	101.2	5.2	7.8	26.8	2.64	3.6	2.64	4.56
Notional	59.3	95.4	5.9	9.3	19	2.78	2.84	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	11.3	15.7	1.2	1.3	1.2	2.64	3.41	2.64	4.56
Notional	43.6	21.8	4.4	2.1	0.3	2.78	2.84	----	----
[ST] No Heating or Cooling									
Actual	0	0	0	0	0	0	0	0	0
Notional	0	0	0	0	0	0	0	----	----

Key to terms

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

APPENDIX D – TM54 ASSESSMENT INPUTS

Table A1: Modelling inputs as collated from the wider design team, relevant benchmarks, and guided estimates.

Hours of Operation				
Space		Daily Use Hours	Days per Week	Annual Hours
Basement Laundry Room		12	7	4182
Meeting/Workshop		8	7	3009
Stock Room		12	7	3009
Residents Lounge		18	7	6426
Open Plan Office		8	7	1275
Kitchen		24	7	1275
Bedrooms		24	7	1785
Communal Kitchens		24	7	1785
Board Room		24	7	8568
Lighting				
Space		Lux	Efficacy	Power (W)
Basement Laundry Room		300	120	2.5
Meeting/Workshop		300	142	2.1
Stock Room		100	160	0.6
Residents Lounge		300	142	2.1
Open Plan Office		300	142	2.1
Kitchen		150	120	1.3
Bedrooms		100	120	0.8
Communal Kitchens		150	120	1.3
Board Room		300	125	2.4
Bathroom		150	142	1.1
Circulation		100	125	0.8
Lifts				
Lift Type		No. of Type	Hours of Daily Use	Motor Efficiency
Lifts (50+ Units)		2	3.0	95.0
Small Power				
Room Type	Equipment	Quantity	Power on Operation (W)	Power on Standby (W)
Studio Bedroom	Laptop	1	75	5
	Television	1	100	1.3
	Display Screen	1	65	0.3
	Phone Chargers	1	5	0.2
	Bedside Lamp	1	5	0
Studio Bathroom	bathroom appliances (straighteners, shavers)	1	60	0
	Heated Towel Rack	1	100	0
Offices	Laptops/Desktops	11	75	5
	Speakers	2	45	10
	Televisions	2	100	1.3
Lounge	Laptops / Desktops	5	150	5
	speakers	2	45	10
	Televisions	1	100	1.3
Communal Kitchen	Refrigerators/Freezers	1	12	10
	Microwaves	1	1000	800
	Dishwashers	1	1800	674
	Kettles + tea points	1	3000	2200
	Toasters - kitchen	1	1500	860
	Hob - 4 burner - kitchen	2	4000	3000
Other Equipment	CCTV cameras	20	7	0
	CCTV NVRs	2	40	0
	CCTV monitors at reception	2	30	0.5

	Access control maglocks/readers	60	6	0
	Video intercom	4	10	0
	Wi-Fi access points (PoE)	110	10	0
	Intruder alarm control panel	1	6	0
	Fire alarm system (main panel + repeaters/boosters)	6	12	0

APPENDIX E – HEAT PUMP INFORMATION

Technical Data Sheet

Project: YLCAN Crouch End

Unit: Heat Pump

EWYE070CZN-A2

- > Air to water reversible heat pump
- > Daikin DC-Inverter Scroll Compressor with Vapour Injection
- > High Efficiency
- > R-454C refrigerant



EWYE070CZN-A2

Unit description

Daikin air to water reversible heat pump with inverter driven scroll compressors and R454C refrigerant. Unit colour: Daikin White

Compressor

Inverter driven hermetic orbiting scroll are combined on each unit. Inverter compressors continuously adjust compressor speed to actual demand. Fewer power-consuming starts and stops result in decreased energy consumption and more stable temperatures. Compressors are equipped with oil heaters that keeps the oil from being diluted by the refrigerant when the chiller is not running. The compressor is combined with the vapour injection technology to increase the unit envelope and the capacity control steps

Water Side Heat Exchanger

The unit is equipped with a direct expansion plate to plate type water heat exchanger. It is made of stainless steel brazed plates and covered with nitrile rubber based elastomeric foam. Unit is equipped with the necessary devices for plant integration, such as: flow switch, treated water connections, air purge and drain valves, safety valve, shut off valve.

Air Side Heat Exchanger

Fins and tubes air cooled coil. Fins are designed with non-symmetric waffle louvres to enhance the heat exchange and improve the efficiency and compactness of the unit. The presence of hydrophylic and anti-corrosion treatment on the coil fins enhances the resistance to the aggressive environments.

Air Side Heat Exchanger fans

Air Side Heat Exchanger fans are propeller type with high efficiency design blades to maximize performances. The blades are made of glass-reinforced resin and a guard protects each fan. Units are standardly equipped with inverter driven fans.

Refrigerant circuit

Each refrigerant circuit includes: Compressors, Refrigerant, Air Cooled Condenser, Electronic expansion valve, Oil separator, High pressure switch, refrigerant stop valves (liquid and gas).



Unit Overview

Model Name	Boost	Pump	Power supply
EWYE070CZN-A2	Yes	None	400 V/ 50 Hz / 3N~

Performances calculated according to EN14511-3

Cooling mode performances

Cooling capacity	67.29 kW	IPLV.IP	5.413 kW / kW
Power input	26.60 kW	SEER	4.560 kW / kW
Cooling Efficiency EER	2.530 kW / kW	$\eta_{s,c}$	179.4 %
Lw / Lp @ 1m	86.0 dB(A) / 68.5 dB(A)	SEPR	5.820 kW / kW
Ambient temperature	35.0 °C		
Evaporator			
Fluid IN/OUT	12.00 °C / 7.00 °C	Fluid Flow	3.150 l/s
Pressure Drops	12.1 kPa		
Fluid	Water	Fouling Factor	0.00e+0°C m²/W

IPLV.IP is calculated according to AHRI 550/590. SEER declared according to EN14825, fan coil application 12/7°C (inlet/outlet) water temperatures. SEPR declared according to EN14825, high temperature process cooling application (not Eurovent certified). Sound power in heating mode, measured according to the EN12102 and under test method following the ISO9614. IPLV.IP and seasonal efficiency data generally refer to standard unit without option.

Heating mode performances

Heating capacity	66.50 kW	SCOP LT	4.00kW/kW
Power input	33.33 kW	$\eta_{s,h^{LT}}$	157.0 %
COP Heating Efficiency	1.995 kW / kW	SCOP MT	3.01 kW/kW
Ambient temp dry/wet bulb	-3.0°C/-4.0°C	$\eta_{s,h^{MT}}$	117.4 %
Lw / Lp @ 1m(1)	78.0 dB(A) / 60.5 dB(A)	Lw / Lp @ 1m(2)	86.0 dB(A) / 68.5 dB(A)
Condenser			
Fluid IN/OUT	45.00 °C / 60.00 °C	Fluid Flow	1.075 l/s
Pressure Drops	1.73 kPa	Fluid	Water
Fouling Factor	0.00e+0°C m²/W		

SCOPLT declared according to EN14825, average climate, low temperature application; seasonal efficiency data refers to standard unit.

SCOPMT declared according to EN14825, average climate, medium temperature application



Report YLCAN Crouch End - Heat Pump - EWYE070CZN-A2

Specifications are subject to change without any prior notice. The certified standard performances and the certified selection software version can be verified in www.eurovent-certification.com. This unit is certified in the LCPHP Programme of Eurovent Certita Certification, with its allowed component options as per the TCR document in force at all the conditions with a fouling factor of 0 m2K/kW (except ISEER) and with no antifreeze solution (except MT and LT Process Chiller applications when certified). The certified standard performances and the certified selection software version can be verified in www.eurovent-certification.com.

Istantaneous heating performance not taking in consideration the defrost effect.

(1)Sound power in heating mode, measured according to the EN12102 and under test method following the ISO9614. (2)Sound power level according to ISO9614-1.

Unit information

Capacity control	InverterControlled	Refrigerant type	R454C
Compressor type	Scroll	Refrigerant charge	21.2 kg
Circuit N°	2	Condenser type	CuAl
Compressor N°	2	Evaporator type	BrazedPlate
Condenser fans control	Variable Frequency Drive	Condenser fans N°	4
Nominal air flow	10680 l/s	Altitude	0 m
ESP	0 Pa		

Refrigerant charge data is intended as guideline only, refer to unit nameplate for specific value.

Refrigerant information

Refrigerant type	R454C	Refrigerant charge	21.2 kg
GWP100 (F-GAS)	145.5	ASHRAE Safety Classification	A2L
CO2 equivalent	3.085t		

Electrical information

Power supply	400 V/ 50 Hz / 3N~	Compressor starting method	Variable Frequency Drive
Running current	40.8 A	Max. current wires sizing	68.4 A
Max. Running current	61.5 A	Max. inrush current	0.00 A

Voltage tolerance $\pm 10\%$. Phase Voltage unbalance $\pm 3\%$. Electrical data are referred to base unit without additional options, refer to unit nameplate for specific value.

Physical information

Connections size	50.8 mm	Length	814 mm
		Width	3506 mm
Weight shipping/operating	722 kg / 730 kg	Height	1878 mm

Information referred to standard unit configuration without options, refer to certified unit drawing.



Report YLCAN Crouch End - Heat Pump - EWYE070CZN-A2

Specifications are subject to change without any prior notice. The certified standard performances and the certified selection software version can be verified in www.eurovent-certification.com. This unit is certified in the LCPHP Programme of Eurovent Certita Certification, with its allowed component options as per the TCR document in force at all the conditions with a fouling factor of 0 m2K/kW (except ISEER) and with no antifreeze solution (except MT and LT Process Chiller applications when certified). The certified standard performances and the certified selection software version can be verified in www.eurovent-certification.com.

Acoustic information

Sound pressure level at 1 m from the unit (rif. 2 x 10 ⁻⁵ Pa)								
63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	db(A)
71.1	72.1	67.5	65.1	62.7	60.8	57.7	53.5	68.5

Values referred to Evap. IN/OUT 12/7°C and 35°C Amb, full load operation, to base unit without additional options. Sound pressure level calculated from sound power level. Sound pressure in octave band is for intended as guideline only and not considered binding.

Sound power level (rif. 1 x 10 ⁻¹² W)								
63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	db(A)
88.6	89.6	85.0	82.6	80.2	78.3	75.2	71.0	86.0

Values referred to Evap. IN/OUT 12/7°C and 35°C Amb, full load operation, to base unit without additional options. Sound power in octave band is for intended as guideline only and not considered binding.

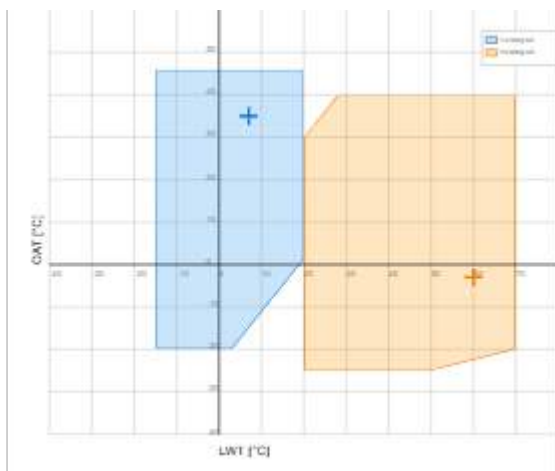
Sound pressure level at 1 m from the unit (rif. 2 x 10 ⁻⁵ Pa)								
63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	db(A)
65.1	61.7	60.0	57.0	53.9	50.8	52.1	50.5	60.5

Values referred to heating mode, measured according to the EN12102, to base unit without additional options. Sound pressure level calculated from sound power level. Sound pressure in octave band is for intended as guideline only and not considered binding.

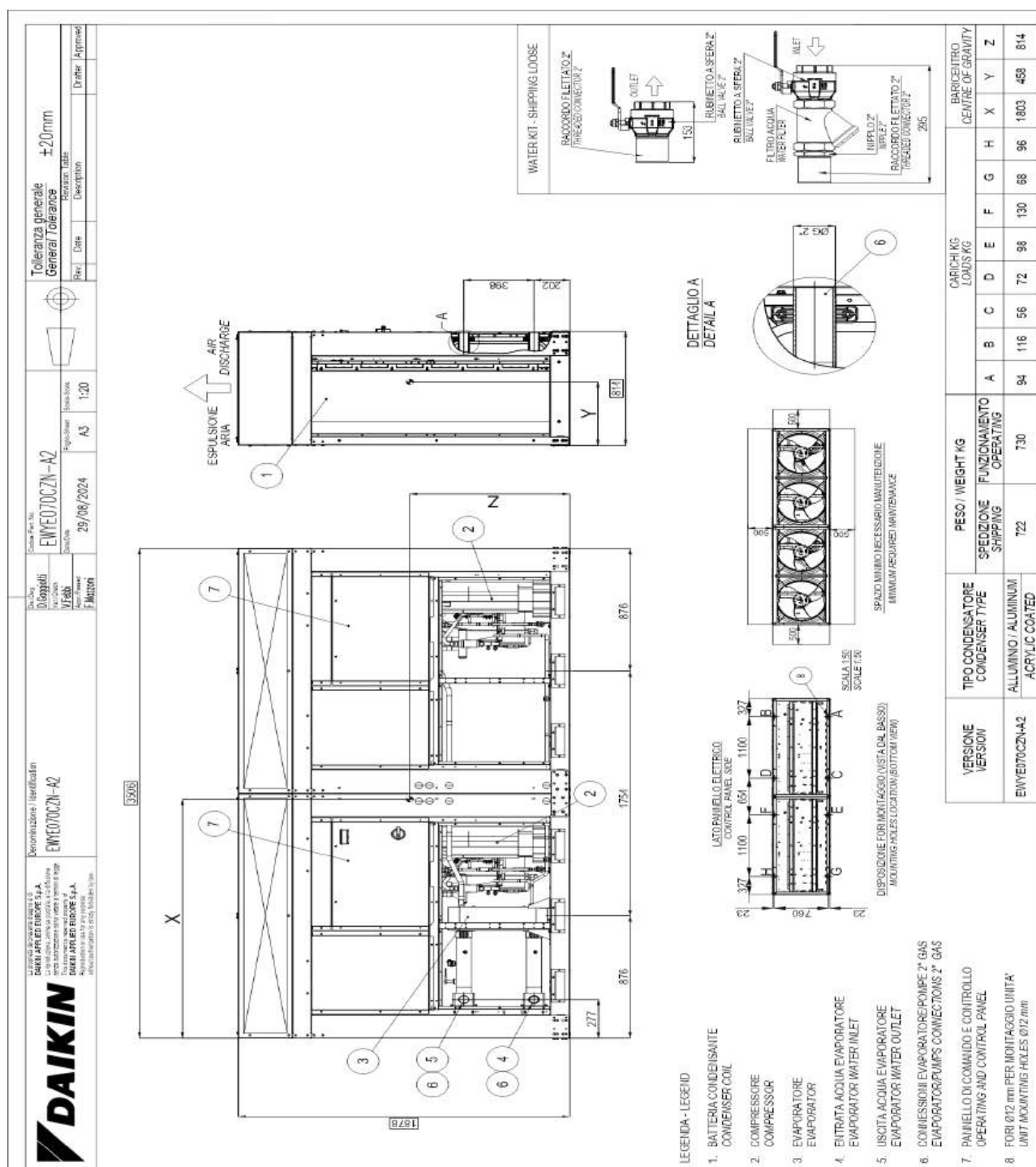
Sound pressure level at 1 m from the unit (rif. 2 x 10 ⁻⁵ Pa)								
63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	db(A)
71.1	72.1	67.5	65.1	62.7	60.8	57.7	53.5	68.5

Values referred to Evap. IN/OUT 40/45°C and 7°C Amb, full load operation, to base unit without additional options. Sound pressure level calculated from sound power level. Sound pressure in octave band is for intended as guideline only and not considered binding.

Envelope



Draws



Certification notes

Within the scope of AHRI Air-Cooled Water-Chilling Packages Certification Program. AHRI Certified performance may be obtained from the manufacturer's representative.

Certified in accordance with Eurovent Certification Program: Liquid Chilling Packages and Heat Pumps (LCP-HP). Standard ratings are specified in the section "Rating requirements" of the Rating Standards. All standard ratings are verified by tests conducted in accordance with the following standards: EN 14511-3 (performance testing) and ISO 9614 (acoustic testing).



General notes

For more information about the above selected product, please go to <http://www.daikineurope.com/industrial/>. Unit performances are reproducible in laboratory test environment only in accordance to recognized industry standards. This technical data sheet is generated by Daikin Applied Tool software designed and distributed by Daikin Applied Europe S.p.A. The present software does not constitute an offer binding upon Daikin Applied Europe S.p.A who compiled the content of this software to the best of its knowledge. No express or implied warranty is given for the completeness, accuracy, reliability or fitness for particular purpose of its content and the products and services presented therein. Specifications are subject to change without prior notice. Product images are indicative only and are intended for illustrative purposes only; pictures may be differed from the ordered product and are subject to change without prior notice. Daikin Applied Europe S.p.A. explicitly rejects any liability for any direct or indirect damage, in the broadest sense, arising from or related to the use and/or interpretation of this document. All content is copyrighted by Daikin Applied Europe S.p.A.



**APPENDIX F – CORRESPONDENCE WITH HEAT NETWORK
OPERATOR**

Oliver Brench

From: Tim Starley-Grainger <Tim.Starley-Grainger@haringey.gov.uk>
Sent: 17 July 2025 13:24
To: Chris Papantoniou
Cc: Sara Godinho; Megan Van Dessel
Subject: Re: Haringey Heat Network query - 184 Tottenham Lane

Categories: Red category

Hi Chris

All I can tell you is the development of the WG network is on hold.
I would not expect it to be available within 5yrs.
I would suggest you develop a 4G site-wide network with your own heat source (ASHP?) and futureproof a route to connect to a network in the future

Best wishes
Tim

Tim Starley-Grainger – Energy Infrastructure Lead

T: 020 8489 1180
M: 07905 733531
E: tim.starley-grainger@haringey.gov.uk
Working Pattern: Full Time

Haringey Council
Alexandra House, Station Road, Wood Green N22 7TY
www.haringey.gov.uk

From: Chris Papantoniou <ChrisP@xco2.com>
Sent: 17 July 2025 13:12
To: Tim Starley-Grainger <Tim.Starley-Grainger@haringey.gov.uk>
Cc: Sara Godinho <sarag@xco2.com>; Megan Van Dessel <MeganVD@xco2.com>
Subject: Haringey Heat Network query - 184 Tottenham Lane

Dear Tim,

I hope this email find you well.

We are working on the development of the energy strategy for the proposal of the scheme on Crouch End, at 184 Tottenham Lane, N8. The proposed scheme will provide over 150 bed spaces, configured into 6-bedroom cluster flats and 1 & 2 bedroom “move-on” flats, as well as communal spaces, support facilities and ground floor spaces for commercial or community use to generate income.

Based on our research we have found that there are no existing DHN's close to the site, the closest being over 5 km away (E.ON Blackhorse Lane). However, the site is less than 1 km from a Proposed Heat Network (Haringey Decentralised Energy Network Phase 1) and is located within a Strategic Heat Network Area for North London Waste Authority (NLWA), with potential to utilise waste heat from sources including the Edmonton Energy from Waste facility and Deephams Sewage Treatment Works.

Could you please advise whether there are any potential developments/plans coming in the next 5 years to help us explore whether connection to the network might be feasible for the development?

Thank you in advance.

Kind Regards,

Chris Papantoniou

Principal Sustainability Consultant

MEng | MSc | CEng | MCIBSE | NDEA (L3,4,5)



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APPENDIX G – GLA SPREADSHEET RESULTS

Part L 2021 Performance

Residential

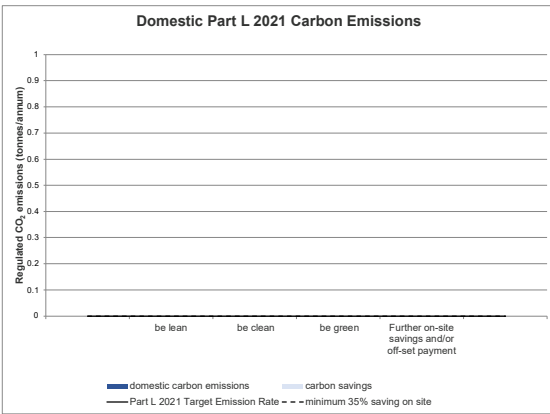
Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for residential buildings

	Carbon Dioxide Emissions for residential buildings (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	0.0	
After energy demand reduction (be lean)	0.0	
After heat network connection (be clean)	0.0	
After renewable energy (be green)	0.0	

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for residential buildings

	Regulated residential carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	0.0	0%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	0.0	0%
Cumulative on site savings	0.0	0%
Annual savings from off-set payment	0.0	-
(Tonnes CO ₂)		
Cumulative savings for off-set payment	0	-
Cash in-lieu contribution (£)	0	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab



Non-residential

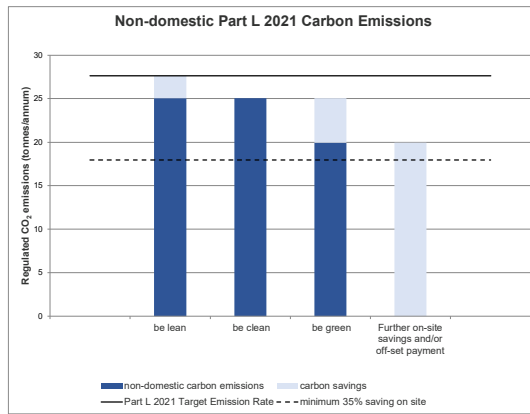
Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-residential buildings

	Carbon Dioxide Emissions for non-residential buildings (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	27.6	35.4
After energy demand reduction (be lean)	25.1	35.4
After heat network connection (be clean)	25.1	35.4
After renewable energy (be green)	19.9	35.4

Table 4: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-residential buildings

	Regulated non-residential carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	2.6	9%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	5.1	18%
Total Cumulative Savings	7.7	28%
Annual savings from off-set payment	19.9	-
(Tonnes CO ₂)		
Cumulative savings for off-set payment	598	-
Cash in-lieu contribution (£)	56,852	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab



SITE-WIDE

	Total regulated emissions (Tonnes CO ₂ / year)	CO ₂ savings (Tonnes CO ₂ / year)	Percentage savings (%)
Part L 2021 baseline	27.6		
Be lean	25.1	2.6	9%
Be clean	25.1	0.0	0%
Be green	19.9	5.1	18%
Total Savings	-	7.7	28%
	-	CO ₂ savings off-set (Tonnes CO ₂)	-
Off-set	-	598.4	-

	Target Fabric Energy Efficiency (kWh/m ²)	Dwelling Fabric Energy Efficiency (kWh/m ²)	Improvement (%)
Development total	0.00	0.00	

	Area weighted non-residential cooling demand (MJ/m ²)	Total non-residential cooling demand (MJ/year)
Actual	101.2	708,329
Notional	95.4	667,733

EUI & space heating demand (predicted energy use)

Residential

Building type	EUI (kWh/m ² /year) (excluding renewable energy)	Space heating demand (kWh/m ² /year) (excluding renewable energy)	EUI value from Table 4 of the guidance (kWh/m ² /year) (excluding renewable energy)	Space heating demand from Table 4 of the guidance(kWh/m ² /year) (excluding renewable energy)	Methodology used (e.g. 'be seen' methodology or an alternative predictive energy modelling methodology)	Explanatory notes (if expected performance differs from the Table 4 values in the guidance)

Non-residential

Building type	EUI (kWh/m ² /year) (excluding renewable energy)	Space heating demand (kWh/m ² /year) (excluding renewable energy)	EUI value from Table 4 of the guidance (kWh/m ² /year) (excluding renewable energy)	Space heating demand from Table 4 of the guidance(kWh/m ² /year) (excluding renewable energy)	Methodology used (e.g. 'be seen' methodology or an alternative predictive energy modelling methodology)	Explanatory notes (if expected performance differs from the Table 4 values in the guidance)

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