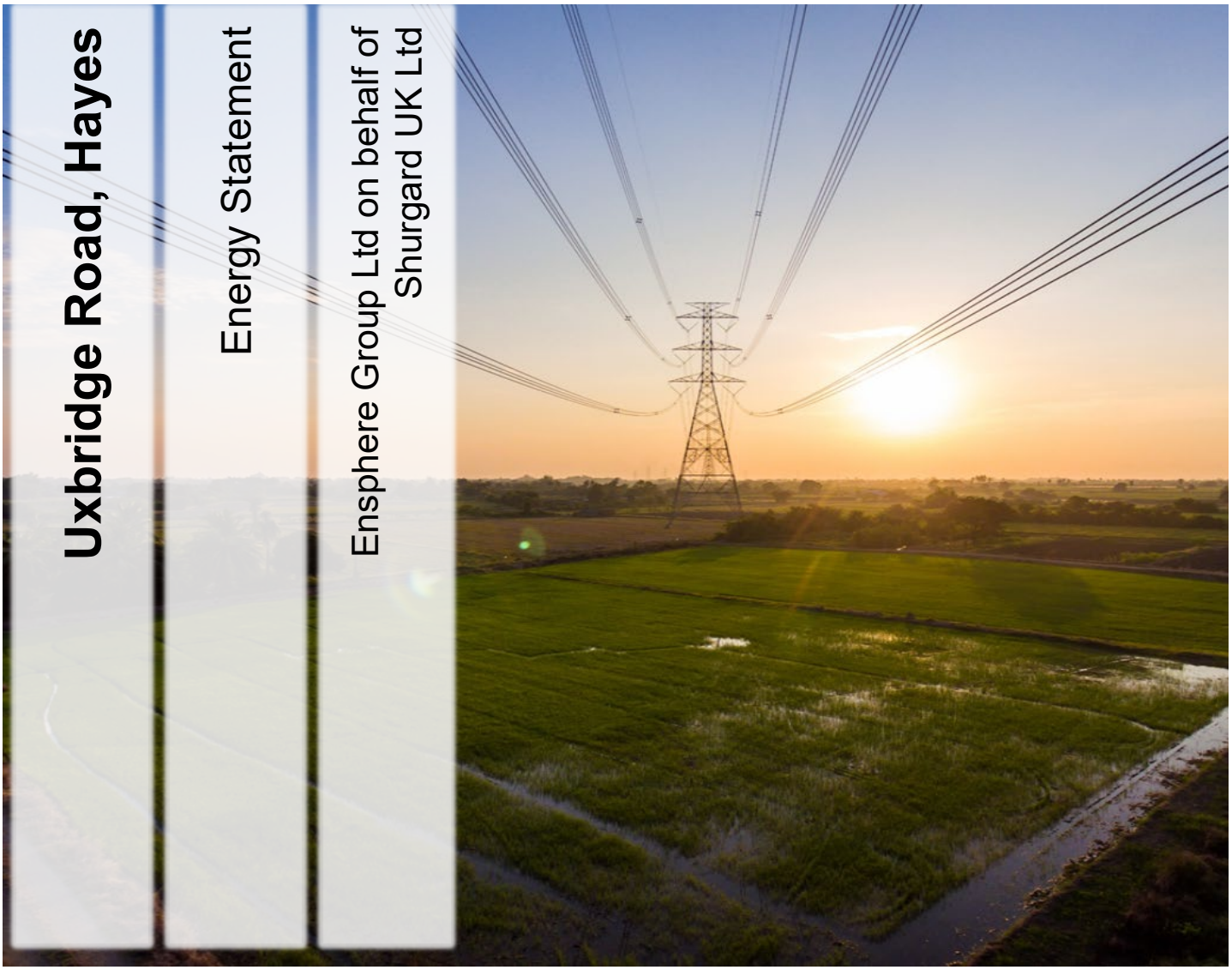
Uxbridge Road, Hayes

Energy Statement

Ensphere Group Ltd on behalf of Shurgard UK Ltd



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Uxbridge Road, Hayes

Energy Statement

Client Name: Shurgard UK Ltd

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Quality Assurance Approval Status

This document has been prepared and checked in accordance with Ensphere Group Ltd's Quality Management System.

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Final	V2	Danielle Cawley	Pete Jeavons	July 2022

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Contents

1. Executive Summary

1.1 This Energy Statement presents the energy strategy for a proposed development at Uxbridge Road, Hayes, UB4 0HD.

1.2 Proposals include the partial demolition and extension to existing building to provide additional self-storage floorspace (Use Class B8) with associated new car and cycle parking, refuse storage, landscaping and other associated works ancillary to the development.

1.3 Consideration has primarily been given to the planning policy context and other requirements prior to establishing a strategy based upon the energy hierarchy; with a priority given to energy reduction and efficiency. Renewable and low carbon technologies have also been considered in the context of their technical feasibility and financial viability.

1.4 The following is therefore proposed:

- High performance building fabric and energy efficient lighting, services and equipment.
- ASHPs for space heating in the office areas.
- Roof mounted PV.

1.5 Living roofs/walls are also proposed in the development. These will provide benefits such as insulation, carbon dioxide absorption as well as improving local air quality by removing particulates.

1.6 The development will satisfy the Council target for an on-site carbon saving of >35% relative to Part L 2021. Residual emissions will be offset with a Carbon Offset payment. Energy efficient measures will target a >15% reduction.

1.7 A copy of the GLA Carbon Emission Reporting Spreadsheet is appended to this report outlining the savings at each stage of the Energy Hierarchy.

1.8 Overall, the proposed energy strategy is considered consistent with the National Planning Policy Framework, London Plan and policies of the Council. When implemented, the scheme will provide an efficient and low carbon development.

2. Introduction

2.1 Ensphere Group Ltd was commissioned by Shurgard UK Ltd to produce an Energy Statement for a proposed development at Uxbridge Road, Hayes, UB4 0HD.

Site and Surroundings

2.2 The application site (the 'Site') is located along Uxbridge Road/The Broadway, adjacent to the Grand Union Canal, and falling under the jurisdiction of London Borough of Hillingdon.

2.3 As existing, Site comprises an existing Shurgard self-storage facility with internal storage units within a 5-storey building and external direct-access storage units within a series of 1-storey structures. The ancillary shop is located at the front of the Site with a "lighthouse" attached.

2.4 Pedestrian and vehicular access is via Uxbridge Road/The Broadway. 15no. car parking spaces are provided beyond the secure gate.

2.5 Bounded by Uxbridge Road/The Broadway to the south, the Grand Union Canal to the east, residential dwellings to the west and Tollgate Drive to the north, the Site lies within an area of mixed townscape character. The immediate area is predominantly residential in character, with a mix of commercial and institutional uses on the opposite side of Uxbridge Road/The Broadway and the Grand Union Canal.

Proposed Development

2.6 Partial demolition and extension to existing building to provide additional self-storage floorspace (Use Class B8) with associated new car and cycle parking, refuse storage, landscaping and other associated works ancillary to the development.

Report Objective

2.7 The objective of the Energy Statement is to outline how energy efficiency, low carbon and renewable technologies have been considered as part of the energy strategy.

3. Assessment Methodology

3.1 The assessment methodology follows the Energy Hierarchy, on the basis that it is preferable to firstly minimise carbon dioxide emissions through reduced energy demand; prior to considering low carbon and renewable energy supply options.

3.2 The tiers of the Energy Hierarchy are:

- Be Lean Demand Reduction
- Be Clean Use Energy More Efficiently
- Be Green Use Renewable Energy
- Be Seen Monitor, Verify & Report

3.3 Where opportunities to improve the efficiency of the design have been maximised, consideration is then given to the second principle whereby priority is given to the efficient use of energy. This is on the basis that low carbon technologies can be cost-effective and provide significant carbon savings when compared to conventional technologies.

3.4 The third principle of the hierarchy promotes the use of renewable technologies. Whilst these technologies can be relatively expensive to install, they do offer the potential to significantly reduce carbon emissions.

3.5 Following the application of renewable technologies, the final tier of the Hierarchy requires monitoring, verification and reporting on energy performance.

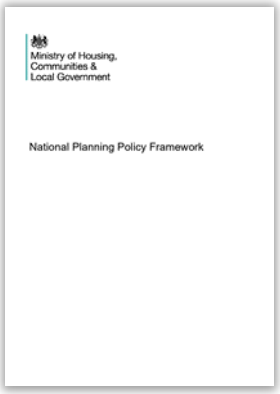
3.6 The following sections of the report review the planning policy requirements prior to establishing a baseline from which the principles of the Energy Hierarchy are applied.

4. Planning Context

4.1 Local planning policy relevant to sustainable development is considered below:

National Context

National Planning Policy Framework (2021)



4.2 The National Planning Policy Framework (NPPF) was updated in July 2021. Paragraph 7 of the revised NPPF includes reference to the following:

7. "The purpose of the planning system is to contribute to the achievement of sustainable development.

4.3 Chapter 14 of the NPPF includes consideration of climate change and the use and supply of renewable and low carbon energy. Paragraph 152 states:

"The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure."

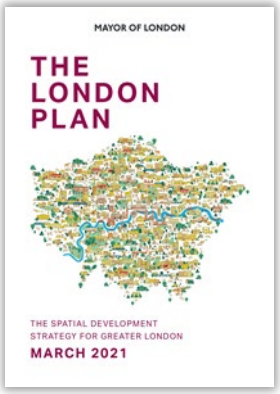
Planning Practice Guidance (2016; updated 2021)

- Climate Change - Advises how planning can identify suitable mitigation and adaption measures in plan-making and the application process to address the potential for climate change.

- Renewable and Low Carbon Energy - The guidance is intended to assist local councils in developing policies for renewable energy in local plans, and identifies the planning considerations for a range of renewable sources.

London Context

London Plan (2021)



4.4 The London Plan is the overall strategic plan for London, it sets out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. The London Plan is part of the Development Plan and covers a range of planning issues. The presented policies provide

a vision for how London should sustainably grow and develop in the future. Policies considered pertinent to this report are presented below:

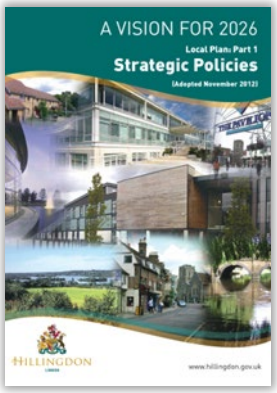
- Policy SI1 (*Improving air quality*) – Development proposals should not lead to further deterioration of existing poor air quality.
- Policy SI 2 (*Minimising greenhouse gas emissions*) - Major development should be net zero-carbon and minimise emissions in accordance with the following energy hierarchy: be lean, be clean, be green, be seen. A minimum on site reduction of 35% beyond Building Regulations will be required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Any short fall with the zero carbon target should be addressed through a carbon offset payment. Development referable to the GLA should also calculate whole life-cycle carbon emissions.
- Policy SI3 (*Energy infrastructure*) - Major development proposals within Heat Network Priority Areas should have a communal low-temperature heating system.
- Policy SI 4 (*Managing heat risk*) - Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems.

Energy Assessment Guidance (2022)

4.5 This guidance document explains how to prepare an energy assessment to accompany strategic planning applications referred to the Mayor. It states that the purpose of an energy assessment is to demonstrate that the proposed climate change mitigation measures comply with London Plan energy policies, including the energy hierarchy. Although primarily aimed at strategic planning applications, London boroughs are encouraged to apply the same structure for energy assessments related to non-referable applications and adapt it for relevant scales of development.

Local Context

London Borough of Hillingdon Local Plan Part 1 - Strategic Policies (2012)



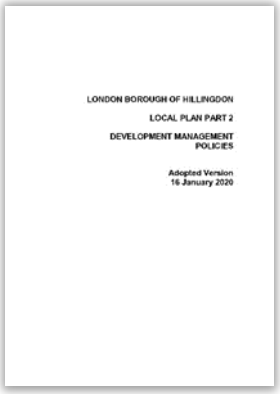
4.6 The Local Plan Part 1 sets out the overall level and broad locations of growth up to 2026. It comprises a spatial vision and strategy, strategic objectives, core policies and a monitoring and implementation framework with clear objectives for achieving delivery

4.7 The following policies are considered pertinent to this report:

- Policy BE1 (*Built Environment*) - The Council will require all new development to improve and maintain the quality of the built environment in order to create successful and sustainable neighbourhoods. Includes reference to aligning with the carbon dioxide targets of the London Plan; and BREEAM.

- Policy EM1 (*Climate Change Adaptation and Mitigation*) - The Council will ensure that climate change mitigation is addressed at every stage of the development process.

London Borough of Hillingdon Local Plan Part 2 - Development Management Policies (2020)



4.8 This Development Management Policies document forms part of Hillingdon's Local Plan Part 2. Its purpose is to provide detailed policies that will form the basis of the Council's decisions on individual planning applications.

4.9 The following policies are highlighted:

- Policy DMEI1 *(Living Walls and Roofs and On-Site Vegetation)* - All major development should incorporate living roofs and/or walls into the development.

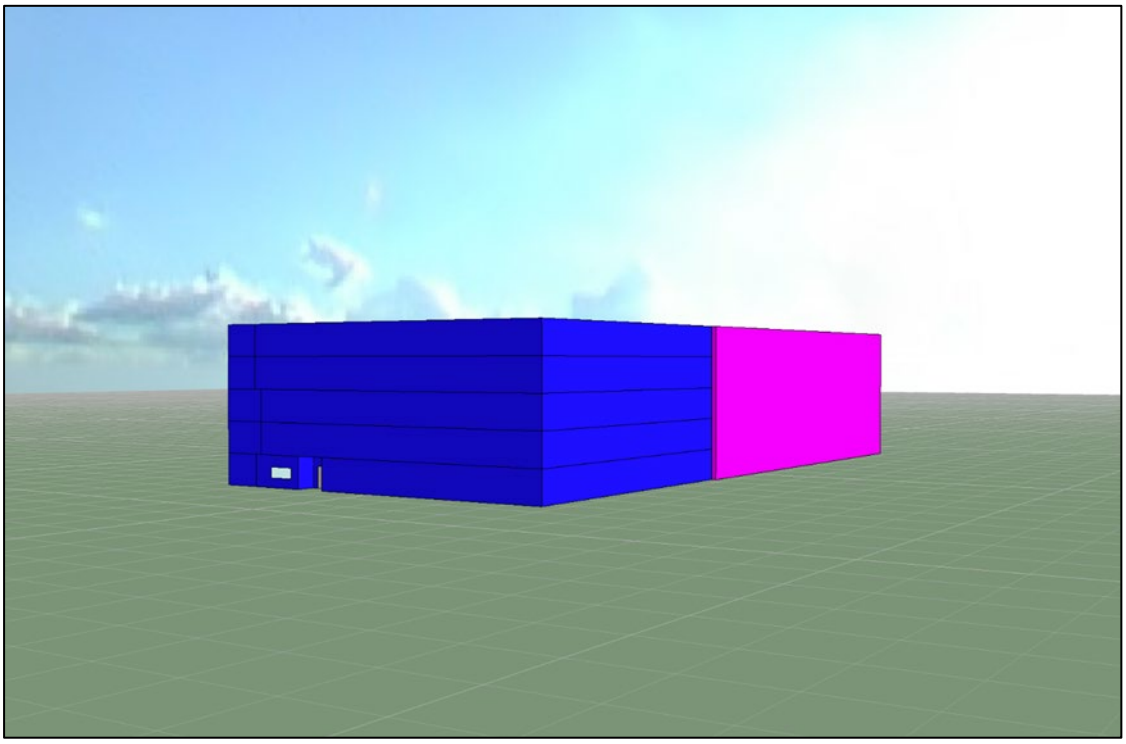
- Policy DMEI2 (*Reducing Carbon Emissions*) - All developments are required to make the fullest contribution to minimising carbon dioxide emissions in accordance with London Plan targets.

- Policy DMEI3 (*Decentralised Energy*) - All major developments are required to be designed to be able to connect to a Decentralised Energy Network (DEN).

5. Baseline Emissions

5.1 This section establishes the baseline position from which carbon savings are to be achieved. For the purposes of this assessment, and in line with GLA and local authority policies and guidance, the baseline position equates to regulated carbon dioxide emissions, assuming compliance with Part L 2021 of the Building Regulations, as calculated using approved compliance software.

Figure 5.1 Energy Model



5.2 When determining this baseline, it has been assumed that heating would be provided by gas boilers (irrespective of the design proposals) and that any active cooling system would be provided by electrically powered equipment. This is to ensure consistency with the requirements of the GLA guidance.

5.3 Regulated emissions are emissions which are covered by the Building Regulations and include the energy consumed in the operation of the space heating / cooling and hot-water systems, ventilation and internal lighting.

5.4 Unregulated emissions (i.e. those associated with cooking and all electrical appliances and other small power) have been separately calculated.

5.5 All emissions have been assessed using the SAP10.2 carbon factors. Non-domestic unregulated emissions have been taken from the unregulated emissions values generated by the SBEM model.

6. Demand Reduction (Be Lean)

6.1 This section considers features of the proposed design (including indicative performance levels) relevant to passive design and energy efficiencies.

Passive Design

6.2 Passive design seeks to maximise the use of natural sources of heating, cooling and ventilation to maintain thermal comfort levels within the building.

Building Massing & Orientation

6.3 The site size and proximity of neighbouring properties limits the orientation options, and the building is positioned to maximise the efficient use of the site. Nevertheless, the multi-storey design will help reduce the ratio of external surfaces to mass, meaning that heat will be better retained.

Fabric Efficiency

6.4 Fabric efficiency concerns the thermal properties associated with the building fabric and construction.

Insulation

6.5 Heat Transfer Coefficients, otherwise referred to as U-Values, are a measure of the rate of heat transfer through a building element over a given area, under standardised conditions (i.e. the rate at which heat is lost or gained through a fabric).

6.6 It is intended that the performance of the building fabric will incorporate relatively low U-Values to reduce the rate at which the buildings lose heat, preserving the heat within the space and reducing the requirement for mechanical heating.

Table 6.1 Proposed Building Fabric U-Values (Non-Domestic)

Fabric Element	Part L2 (W/m^{2}K)	Proposed (W/m^{2}K)
External Wall	0.26	~0.20
Roof	0.18	~0.12
Ground Floor	0.18	~0.12
Windows	1.6	~1.4

Air Tightness

6.7 A high level of air tightness is proposed and a level in the order $3m^3/h/m^2$ is targeted, meaning that air infiltration between the internal and the external environment will be largely controlled, and space heating demand further reduced.

Thermal Bridging

6.8 Thermal bridging is the penetration of the insulation layer by a highly conductive non-insulating material allowing rapid heat transfer from an interior to exterior environment (and vice versa). In well insulated buildings, as much as 30% of heat loss can occur through thermal bridges.

6.9 The building fabric shall be constructed so that there are no reasonably avoidable thermal bridges in the insulation layers caused by gaps within the various elements. It is expected that Accredited Construction Details (ACDs) will be applied.

System Efficiencies

Heating Systems

6.10 The Amendment Regulations and accompanying Approved Documents L: Volumes 1 and 2 have recently been published by the Ministry of Housing, Communities & Local Government. These contain revised carbon conversion factors to address the carbon intensity projections from the National Grid, with consideration given to the rapidly reducing emission rates associated with electricity in the context of the energy strategy. The newly adopted factors (SAP10.2) are presented below in relation to the previous SAP2012 and SAP10 factors, demonstrating the continued trend of electricity decarbonisation.

Table 5.1 Carbon Factors SAP2012, SAP10 and SAP10.2

	SAP2012	SAP10	SAP10.2
Gas	0.216kgCO_2/kWh	0.210kgCO_2/kWh	0.210 kgCO2/kWh
Electricity	0.519kgCO_2/kWh	0.233kgCO_2/kWh	0.136kgCO2/kWh

6.11 The choice of heating systems is therefore mindful of the need for flexibility in consideration of the decarbonisation of the national grid.

Ventilation / Cooling Systems

6.12 It is anticipated that the majority of the building will have the potential to be ventilated naturally via openable windows and / or trickle vents. This has the advantage of lower energy consumption; decreased costs associated with capital expenditure, operation and maintenance; and reduced noise impacts associated with mechanical plant. Mechanical ventilation heat recovery will also be included where necessary (likely in the office areas) to ensure that energy is used efficiently in cooler months, and when it is less desirable to open windows.

Extract Fans

6.13 It is anticipated that extract fans will be employed in WC and kitchen areas. The specific fan power (SFP) for these systems will be efficient and target a power consumption rate of 0.3W/l/s.

Controls

6.14 Time and temperature controls by suitable arrangement will be installed, in order to maximise the efficiency of the heating system.

Lighting Efficiency

6.15 Lighting design is intended to be highly efficient and in excess of Building Standards requirements. In the storage areas it is intended that lighting efficacy shall be in excess of 115 lumens/circuit Watt.

6.16 External lighting shall be highly efficient and employ controls to avoid energy wastage from unnecessary operation during daytime.

Appliances

6.17 Appliances, such as fridges, may be included in the kitchen areas. It is proposed that the EU energy label of these appliances shall be A+ or greater.

7. Heating Infrastructure (Be Clean)

District Energy Networks (DEN)

7.1 The term “district energy” applies to the energy distribution network, rather than the origins of the energy and the extent of any carbon savings will be largely determined by the energy source and heat losses on the network.

7.2 The London Heat Map is a tool provided by the Mayor of London to identify opportunities for decentralised energy projects in London and it builds on the 2005 London Community Heating Development Study.

Figure 7.1 Extract from the London Heat Map

7.3 The above extract from The London Heat Map shows the site located in an area of modest heat density. There are no existing District Energy Networks (DEN) in close proximity; potential district energy network (orange line) are located approximately ~2km to the east and west of the site. The Site is not located within a zone defined as an Opportunity Area and a Heat Priority Area.

District Energy Appraisal

7.4 In the absence of a DEN in close proximity to the Site and that the source of the heat is likely higher carbon than alternatives, it is not proposed to accommodate DEN as part of the energy strategy.

Combined Heat & Power (CHP)

7.5 Combined Heat & Power (CHP) systems generate electrical energy and provide the waste heat from the process to be used on site. They are typically gas-fired but can be run off alternative fuel sources. CHP is a highly efficient means to supply heat in developments, providing

significant carbon savings and wider environmental benefits (the power generation is much less resource intensive and carbon emitting compared to grid electricity from the average UK power station).

CHP Appraisal

7.6 The Site has a very small heating demand (as most of the space is unheated). At this scale, it is generally not economic to install CHP as smaller CHPs tend to have lower electrical efficiencies and therefore higher carbon emissions. CHP also tends to emit higher levels of NO_x than other heating systems; potentially adversely impacting local air quality.

7.7 A centralised CHP plant would create complex managerial arrangements and the administrative burden of managing CHP electricity sales to grid when the power is not required on site; combined with the relatively low unit price for small volumes of exported CHP electricity can create incentives for the CHP to be installed but not operated. CHP is therefore not proposed.

7.8 This conclusion is consistent with the GLA's latest Energy Assessment Guidance.

8. Renewable Technology Review (Be Green)

8.1 This section considers the potential application of low carbon and renewable technology options.

Biomass Systems

8.2 Biomass systems are heating systems that use agricultural, forest, urban and industrial residues and waste to produce heat and (depending on the system) electricity. At the building scale, biomass boilers using wood pellets or woodchips are the norm. Biomass should be sourced locally to limit "embodied carbon" associated with transport and ideally be derived from waste wood products to limit the take-up of agricultural land for fuel crops.

Biomass Appraisal

8.3 Whilst technically feasible, heat demands are low and the absence of a readily available and diverse local fuel source creates risk associated with security of fuel supply. This has implications for operational viability.

8.4 Carbon emissions associated with cultivation, processing and transport of biomass are not normally considered in the context of planning or Building Regulations meaning that total carbon emissions are likely to be significantly higher than estimated. Biomass is also likely to cause other air quality impacts (e.g. particulates), which have implications for local air quality. Biomass is therefore not proposed.

Heat Pumps

8.5 Heat pumps draw thermal energy from the air, water or ground ("source") and upgrade it to be used as useful heat at another location ("sink"). Heat pumps require electricity to operate (or gas in the case of Gas Absorption Heat Pumps) as mechanical input is required to convert harvested energy to useful heat and complete its transport to the "sink".

8.6 Heat pumps are generally considered as renewable (despite an electrical or gas requirement) because the source of the heat is the ambient temperature in the exterior environment, which is ultimately heated via the sun.

8.7 Reversible systems can provide air conditioning comfort cooling; however, when in cooling mode, the system is not considered renewable as it is not taking advantage of a renewable source of energy.

Heat Pump Appraisal

8.8 It is noted that ASHPs will perform very well under the forthcoming Building Regulations, in consideration of the new carbon factors, meaning that it will likely have much lower emissions

and environmental impact than alternatives. ASHPs are therefore proposed for the heated areas of the development.

Micro Hydro Power

8.9 Micro hydro power systems harness energy from flowing water by using height differences (called “head”); the minimum allowable head is 1.5m and ideally not lower than 10m.

Micro Hydro Appraisal

8.10 There are no surface water courses immediately accessible to the site. Micro hydro is therefore not considered an option for the site, for technical feasibility reasons.

Micro Wind Power

8.11 Wind turbines are used to generate electricity; with power production determined by the rotation of the blades and being proportionate to the speed of their rotation. The technology is most efficient for constant, low turbulence wind profiles.

Micro Wind Appraisal

8.12 Whilst wind turbines are considered technically feasible in a limited capacity, wind speeds are relatively low and subject to turbulence. The technology is therefore likely to underperform.

8.13 Given the uncertainty over performance, the fact that any contribution will likely be quite minor, micro wind turbines are not proposed for the development.

Solar Systems

8.14 Both solar thermal and photovoltaic (PV) systems convert energy from the sun into a form which can be applied within the building. Solar thermal generates energy for heating (usually for hot water) and PV generates electricity. Hybrid photovoltaic / solar thermal collectors are also available and co-generate heat and power.

Solar System Appraisal

8.15 An extent of PV is proposed for the roof area. This area will be maximised in the context of the available roof space and other demands on the roof area (e.g., green roof).

9. Monitor, Verify & Report (Be Seen)

9.1 The Applicant is committed to protecting the building users from high prices and is therefore committed to post construction monitoring.

9.2 The extensive metering and integration with the Building Management System (BMS) will facilitate the collation of data.

9.3 The Applicant will undertake a programme of aftercare support as part of its handover process, which will also align with the BREEAM Man05 credit requirements.

10. Summary

10.1 This Energy Statement provides an overview of the energy strategy in consideration of the site context, anticipated energy requirements and local priorities and initiatives.

10.2 A review of Hillingdon's planning policies has identified a number of requirements relating to energy including Local Plan Part 1 policies BE1 (*Built Environment*) and EM1 (*Climate Change Adaptation and Mitigation*); and Local Plan Part 2 policies DMEI1 *(Living Walls and Roofs and On-Site Vegetation)* and DMEI2 (*Reducing Carbon Emissions*). Consideration has also been given to the National and London planning policy framework.

Energy Strategy

Demand Reduction (Be Lean)

10.3 The approach seeks to accommodate the approach of efficient design first on the basis that it is preferable to reduce carbon emissions by reducing energy demand.

10.4 It is proposed to achieve a reduction in emissions through efficiency measures in excess of the 15% target presented in London Plan Policy SI.2 and supported by Policy SC2 of the Local Plan. This is principally achieved through the selection of highly efficient lighting and control systems.

Use Energy More Efficiently (Be Clean)

10.5 So called "Clean" technologies are not proposed on site. CHP no longer provides a low carbon option when considered in the context of a decarbonising electricity grid. Furthermore, heat demands are very low and there is no existing DEN in the immediate vicinity of the site.

Use Renewable Energy (Be Green)

10.6 It is proposed to apply ASHPs to the space heating for the office areas only. Other spaces will not be comfort heated. Hot water will be provided by instantaneous electric heaters on the basis that demand is very low and this type of system avoids storage losses (and is therefore lower carbon than an alternative ASHP option). An extent of PV is proposed at roof level.

Monitor, Verify & Report (Be Seen)

10.7 The Applicant will undertake a programme of aftercare support as part of its handover process, which will also align with the BREEAM Man05 credit requirements

Carbon Savings

10.8 The following table summarise the carbon reductions at each stage of the Energy Hierarchy:

Figure 10.1 CO_2 Emissions after Each Stage of the Energy Hierarchy (SAP10.2)

Step	Carbon Dioxide Emissions (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2021	4.4	1.3
After energy demand reduction	3.6	1.3
After heat network connection	3.6	1.3
After renewable energy	0.0	1.3

Figure 10.2 Regulated CO_2 Savings from Each Stage of the Energy Hierarchy

	Regulated Carbon Dioxide Savings	
	(Tonnes CO_2 per annum)	%
Savings from energy demand reduction	0.7	17%
Savings from heat network	0.0	0%
Savings from renewable energy	3.6	82%
Total Cumulative Savings	4.3	99%

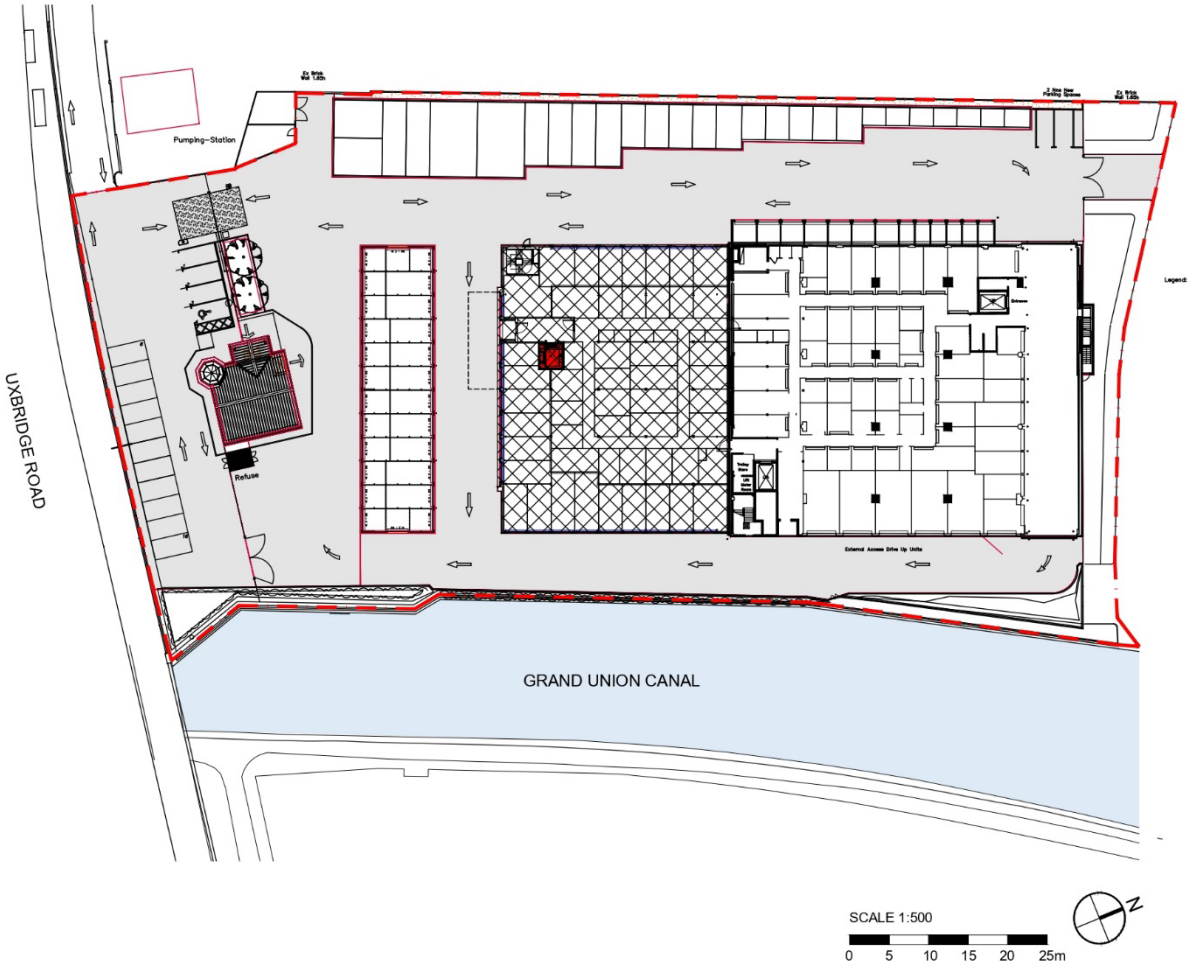
10.9 The development will satisfy the Council target for an on-site carbon saving of >35% relative to Part L 2021. Residual emissions will be offset through a Carbon Offset payment.

10.10 A copy of the GLA Carbon Emission Reporting Spreadsheet is appended to this report outlining the savings at each stage of the Energy Hierarchy.

10.11 Overall, the proposed energy strategy is considered consistent with the National Planning Policy Framework, London Plan and policies of the Council. When implemented, the scheme will provide an efficient and low carbon development.

Appendices

A. Site Plans



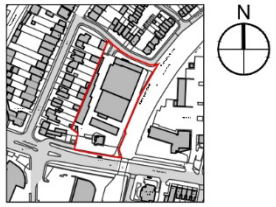
NOTES ORIGINAL A3

All levels and dimensions to be checked on site prior to construction / fabrication; report discrepancies immediately. Do not scale dimensions from this drawings. This drawing is copyright protected.

REVISION

Area of Works = 1053 sqm

Site Boundary
Area = 8196 sqm



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PROJECT

SHURGARD SELF STORAGE
UK04 - HAYES
LONDON UB4 0HD

DRAWING

Site Plan As Proposed

Threesixty Architecture
10 MONTROSE STREET
GLASGOW
G1 1RE
t 0141 229 7575
www.360architecture.com

DRAWING No.

20165GA-SK-001

B. Key Local Planning Policy Requirements

London Planning Policy Framework

London Plan (2021)

Policy SI1 Improving air quality [extract]

[…]

B) To tackle poor air quality, protect health and meet legal obligations the following criteria should be addressed:

1) Development proposals should not:

a) lead to further deterioration of existing poor air quality […]

Policy SI 2 Minimising greenhouse gas emissions

A) Major development should be net zero-carbon. 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.

B) Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.

C) 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.

D) Boroughs must establish and administer a carbon offset fund. Offset fund payments must be ring-fenced to implement projects that deliver carbon reductions. The operation of offset funds should be monitored and reported on annually.

E) 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.

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

Policy SI3 Energy infrastructure

A) Boroughs and developers should engage at an early stage with relevant energy companies and bodies to establish the future energy and infrastructure requirements arising from large-scale development proposals such as Opportunity Areas, Town Centres, other growth areas or clusters of significant new development.

B) Energy masterplans should be developed for large-scale development locations (such as those outlined in Part A and other opportunities) which establish the most effective energy supply options. Energy masterplans should identify:

1) major heat loads (including anchor heat loads, with particular reference to sites such as universities, hospitals and social housing)

2) heat loads from existing buildings that can be connected to future phases of a heat network

3) major heat supply plant including opportunities to utilise heat from energy from waste plants

4) secondary heat sources, including both environmental and waste heat

5) opportunities for low and ambient temperature heat networks

6) possible land for energy centres and/or energy storage

7) possible heating and cooling network routes

8) opportunities for futureproofing utility infrastructure networks to minimise the impact from road works

9) infrastructure and land requirements for electricity and gas supplies

10) implementation options for delivering feasible projects, considering issues of procurement, funding and risk, and the role of the public sector

11) opportunities to maximise renewable electricity generation and incorporate demand-side response measures.

C) Development Plans should:

1) identify the need for, and suitable sites for, any necessary energy infrastructure requirements including energy centres, energy storage and upgrades to existing infrastructure

2) identify existing heating and cooling networks, identify proposed locations for future heating and cooling networks and identify opportunities for expanding and inter-connecting existing networks as well as establishing new networks.

D) Major development proposals within Heat Network Priority Areas should have a communal low-temperature heating system:

1) the heat source for the communal heating system should be selected in accordance with the following heating hierarchy:

a) connect to local existing or planned heat networks

b) use zero-emission or local secondary heat sources (in conjunction with heat pump, if required)

c) use low-emission combined heat and power (CHP) (only where there is a case for CHP to enable the delivery of an area-wide heat network, meet the development's electricity demand and provide demand response to the local electricity network)

d) use ultra-low NOx gas boilers

2) CHP and ultra-low NOx gas boiler communal or district heating systems should be designed to ensure that they meet the requirements in Part B of Policy SI 1 Improving air quality

3) where a heat network is planned but not yet in existence the development should be designed to allow for the cost-effective connection at a later date.

E) Heat networks should achieve good practice design and specification standards for primary, secondary and tertiary systems comparable to those set out in the CIBSE/ADE Code of Practice CP1 or equivalent.

Policy SI 4 Managing heat risk

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.

Local Planning Policy Framework

Local Plan Part 1 - Strategic Policies (2012)

Policy BE1: Built Environment

The Council will require all new development to improve and maintain the quality of the built environment in order to create successful and sustainable neighbourhoods, where people enjoy living and working and that serve the long-term needs of all residents. All new developments should:

1. Achieve a high quality of design in all new buildings, alterations, extensions and the public realm which enhances the local distinctiveness of the area, contributes to community cohesion and a sense of place;

2. Be designed to be appropriate to the identity and context of Hillingdon's buildings, townscapes, landscapes and views, and make a positive contribution to the local area in terms of layout, form, scale and materials and seek to protect the amenity of surrounding land and buildings, particularly residential properties;

3. Be designed to include “Lifetime Homes” principles so that they can be readily adapted to meet the needs of those with disabilities and the elderly, 10% of these should be wheelchair accessible or easily adaptable to wheelchair accessibility encouraging places of work and leisure, streets, neighbourhoods, parks and open spaces to be designed to meet the needs of the community at all stages of people’s lives;

4. In the case of 10 dwellings or over, achieve a satisfactory assessment rating in terms of the latest Building for Life standards (as amended or replaced from time to time);

5. Improve areas of poorer environmental quality, including within the areas of relative disadvantage of Hayes, Yiewsley and West Drayton. All regeneration schemes should ensure that they are appropriate to their historic context, make use of heritage assets and reinforce their significance;

6. Incorporate a clear network of routes that are easy to understand, inclusive, safe, secure and connect positively with interchanges, public transport, community facilities and services;

7. Improve the quality of the public realm and provide for public and private spaces that are attractive, safe, functional, diverse, sustainable, accessible to all, respect the local character and landscape, integrate with the development, enhance and protect biodiversity through the inclusion of living walls, roofs and areas for wildlife, encourage physical activity and where appropriate introduce public art;

8. Create safe and secure environments that reduce crime and fear of crime, anti-social behaviour and risks from fire and arson having regard to Secure by Design standards and address resilience to terrorism in major development proposals;

9. Not result in the inappropriate development of gardens and green spaces that erode the character and biodiversity of suburban areas and increase the risk of flooding through the loss of permeable areas;

10. Maximise the opportunities for all new homes to contribute to tackling and adapting to climate change and reducing emissions of local air quality pollutants. The Council will require all new development to achieve reductions in carbon dioxide emission in line with the London Plan targets through energy efficient design and effective use of low and zero carbon technologies. Where the required reduction from on-site renewable energy is not feasible within major developments, contributions off-site will be sought. The Council will seek to merge a suite of sustainable design goals, such as the use of SUDS, water efficiency, lifetime homes, and energy efficiency into a requirement measured against the Code for Sustainable Homes and BREEAM. These will be set out within the Hillingdon Local Plan: Part 2- Development Management Policies Local Development Document (LDD). All developments should be designed to make the most efficient use of natural resources whilst safeguarding historic assets, their settings and local amenity and include sustainable design and construction techniques to increase the re-use and recycling of construction, demolition and excavation waste and reduce the amount disposed to landfill;

11. In the case of tall buildings, not adversely affect their surroundings including the local character, cause harm to the significance of heritage assets or impact on important views. Appropriate locations for tall buildings will be defined on a Character Study and may include parts of Uxbridge and Hayes subject to considering the Obstacle Limitation Surfaces for Heathrow Airport. Outside of Uxbridge and Hayes town centres, tall buildings will not be supported. The height of all buildings should be based upon an understanding of the local character and be appropriate to the positive qualities of the surrounding townscape.

Support will be given for proposals that are consistent with local strategies, guidelines, supplementary planning documents and Hillingdon Local Plan: Part 2- Development Management Policies.

Policy EM1: Climate Change Adaptation and Mitigation

The Council will ensure that climate change mitigation is addressed at every stage of the development process by:

1. Prioritising higher density development in urban and town centres that are well served by sustainable forms of transport.
2. Promoting a modal shift away from private car use and requiring new development to include innovative initiatives to reduce car dependency.
3. Ensuring development meets the highest possible design standards whilst still retaining competitiveness within the market.
4. Working with developers of major schemes to identify the opportunities to help provide efficiency initiatives that can benefit the existing building stock.
5. Promoting the use of decentralised energy within large scale development whilst improving local air quality levels.
6. Targeting areas with high carbon emissions for additional reductions through low carbon strategies. These strategies will also have an objective to minimise other pollutants that impact on local air quality. Targeting areas of poor air quality for additional emissions reductions.
7. Encouraging sustainable techniques to land remediation to reduce the need to transport waste to landfill. In particular developers should consider bioremediation as part of their proposals.
8. Encouraging the installation of renewable energy for all new development in meeting the carbon reduction targets savings set out in the London Plan. Identify opportunities for new sources of electricity generation including anaerobic digestion, hydroelectricty and a greater use of waste as a resource.
9. Promoting new development to contribute to the upgrading of existing housing stock where appropriate.

The Borough will ensure that climate change adaptation is addressed at every stage of the development process by:

10. Locating and designing development to minimise the probability and impacts of flooding.
11. Requiring major development proposals to consider the whole water cycle impact which includes flood risk management, foul and surface water drainage and water consumption.
12. Giving preference to development of previously developed land to avoid the loss of further green areas.
13. Promoting the use of living walls and roofs, alongside sustainable forms of drainage to manage surface water run-off and increase the amount of carbon sinks.
14. Promoting the inclusion of passive design measures to reduce the impacts of urban heat effects.

Local Plan Part 2 Development Management Policies – (2020)

DMEI 1: Living Walls and Roofs and on-site Vegetation

All development proposals are required to comply with the following:

i. All major development should incorporate living roofs and/or walls into the development. Suitable justification should be provided where living walls and roofs cannot be provided; and

ii. Major development in Air Quality Management Areas must provide onsite provision of living roofs and/or walls. A suitable offsite contribution may be required where onsite provision is not appropriate.

Policy DMEI 2: Reducing Carbon Emissions

A. All developments are required to make the fullest contribution to minimising carbon dioxide emissions in accordance with London Plan targets.

B. All major development proposals must be accompanied by an energy assessment showing how these reductions will be achieved.

C. Proposals that fail to take reasonable steps to achieve the required savings will be resisted. However, where it is clearly demonstrated that the targets for carbon emissions cannot be met onsite, the Council may approve the application and seek an off-site contribution to make up for the shortfall.

Policy DMEI 3: Decentralised Energy

A. All major developments are required to be designed to be able to connect to a Decentralised Energy Network (DEN).

B. Major developments located within 500 metres of an existing DEN, and minor new-build developments located within 100 metres, will be required to connect to that network, including provision of the means to connect to that network and a reasonable financial contribution to the connection charge, unless a feasibility assessment demonstrates that connection is not reasonably possible.

C. Major developments located within 500 metres of a planned future DEN, which is considered by the Council likely to be operational within 3 years of a grant of planning permission, will be required to provide a means to connect to that network and developers shall provide a reasonable financial contribution for the future cost of connection and a commitment to connect via a legal agreement or contract, unless a feasibility assessment demonstrates that connection is not reasonably possible.

D. The Council will support the development of DENs and energy centres in principle, subject to meeting the wider policy requirements of this plan and in particular on design and air quality.

C. GLA Spreadsheet

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

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	4.4	1.3
After energy demand reduction (be lean)	3.6	1.3
After heat network connection (be clean)	3.6	1.3
After renewable energy (be green)	0.0	1.3

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	0.7	17%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	3.6	82%
Total Cumulative Savings	**4.3**	**99%**
Annual savings from off-set payment	0.0	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**1**	-
Cash in-lieu contribution (£)	**100**	

*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

D. Indicative Energy Model Outputs (Be Lean)

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Uxbridge Road - Be Lean

As designed

Date: Tue Jul 12 15:55:23 2022

Administrative information

Building Details

Address: Uxbridge Road, London, UB4 0HD

Certifier details

Name: Ensphere Group Ltd

Telephone number:

Address: 52 Grosvenor Gardens, London, SW1W 0AU

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.b.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.15

BRUKL compliance check version: v6.1.b.0

Foundation area [m²]: 28.05

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), kgCO_2/m².annum	0.84	
Building CO_2 emission rate (BER), kgCO_2/m².annum	0.77	
Target primary energy rate (TPER), kWh/m².annum	9.17	
Building primary energy rate (BPER), kWh/m².annum	8.37	
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	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.2	0.2	GF000008_W1
Floors	0.18	0.12	0.12	GF000008_F
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.12	0.12	GF000008_C_A0
Windows** and roof windows	1.6	1.4	1.4	GF000008_W1_O0
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	-	-	No external personnel doors
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

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

$U_{a\text{-}Calc}$ = 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

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

Air permeability	Limiting standard	This building
m³/(h.m²) at 50 Pa	8	3

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- ASHP Space Heating

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.64	5	-	-	-
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.

1- SYST0002-DHW

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

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
2F toilet	0.3	-	-	-	-	-	-	-	-	-	N/A
2F toilet	0.3	-	-	-	-	-	-	-	-	-	N/A
GF Office	0.3	-	-	-	0.3	-	-	-	-	0.85	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 floor	115	-	-
GF stairs	115	-	-
GF corridor	115	-	-
GF floor	115	-	-
GF corridor	115	-	-
GF floor	115	-	-
GF lift	115	-	-

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	115	-	-
1F	115	-	-
1F	115	-	-
1F corridor	115	-	-
1F	115	-	-
1F stairs	115	-	-
1F lift	115	-	-
1F	115	-	-
2F stairs	115	-	-
2F	115	-	-
2F	115	-	-
2F	115	-	-
2F lift	115	-	-
2F	115	-	-
2F	115	-	-
2F toilet	115	-	-
2F corridor	115	-	-
2F stairs	115	-	-
2F	115	-	-
2F	115	-	-
2F	115	-	-
2F lift	115	-	-
2F	115	-	-
2F	115	-	-
2F toilet	115	-	-
2F corridor	115	-	-
1F	115	-	-
1F	115	-	-
1F	115	-	-
1F corridor	115	-	-
1F	115	-	-
1F stairs	115	-	-
1F lift	115	-	-
1F	115	-	-
GF floor	115	-	-
GF Office	115	-	-

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 Office	NO (-71.3%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	5165.2	5165.2
External area [m²]	19998.4	19998.4
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	5
Average conductance [W/K]	3190.41	3401.71
Average U-value [W/m²K]	0.16	0.17
Alpha value* [%]	4.77	12.65

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	0.04	0.13
Cooling	0.05	0.04
Auxiliary	0.01	0.03
Lighting	5.55	6.17
Hot water	0.03	0.03
Equipment*	1.91	1.91
TOTAL**	**5.68**	**6.39**

* 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	0.18
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*0.18*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	138.46	146.56
Primary energy [kWh/m²]	8.37	9.17
Total emissions [kg/m²]	0.77	0.84

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] No Heating or Cooling										
	Actual	124.6	13.6	0	0	0	0	0	0	0
	Notional	130.8	14.7	0	0	0	0	0	----	---
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	61.4	122.6	6.6	9.1	2.3	2.59	3.74	2.64	5
	Notional	229.8	109.3	24.2	6.9	5.2	2.64	4.4	----	---

Key to terms

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

E. Indicative Energy Model Outputs (Be Green)

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Uxbridge Road - Be Green

As designed

Date: Tue Jul 12 16:18:18 2022

Administrative information

Building Details

Address: Uxbridge Road, London, UB4 0HD

Certifier details

Name: Ensphere Group Ltd

Telephone number:

Address: 52 Grosvenor Gardens, London, SW1W 0AU

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.b.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.15

BRUKL compliance check version: v6.1.b.0

Foundation area [m²]: 28.05

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), kgCO_2/m².annum	0.84	
Building CO_2 emission rate (BER), kgCO_2/m².annum	0.04	
Target primary energy rate (TPER), kWh/m².annum	9.17	
Building primary energy rate (BPER), kWh/m².annum	0.09	
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	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.2	0.2	GF000008_W1
Floors	0.18	0.12	0.12	GF000008_F
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.12	0.12	GF000008_C_A0
Windows** and roof windows	1.6	1.4	1.4	GF000008_W1_O0
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	-	-	No external personnel doors
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

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

$U_{a\text{-}Calc}$ = 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

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

Air permeability	Limiting standard	This building
m³/(h.m²) at 50 Pa	8	3

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- ASHP Space Heating

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	5	-	-	-
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.

1- SYST0002-DHW

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

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
2F toilet	0.3	-	-	-	-	-	-	-	-	-	N/A
2F toilet	0.3	-	-	-	-	-	-	-	-	-	N/A
GF Office	0.3	-	-	-	0.3	-	-	-	-	0.85	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 floor	115	-	-
GF stairs	115	-	-
GF corridor	115	-	-
GF floor	115	-	-
GF corridor	115	-	-
GF floor	115	-	-
GF lift	115	-	-

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	115	-	-
1F	115	-	-
1F	115	-	-
1F corridor	115	-	-
1F	115	-	-
1F stairs	115	-	-
1F lift	115	-	-
1F	115	-	-
2F stairs	115	-	-
2F	115	-	-
2F	115	-	-
2F	115	-	-
2F lift	115	-	-
2F	115	-	-
2F	115	-	-
2F toilet	115	-	-
2F corridor	115	-	-
2F stairs	115	-	-
2F	115	-	-
2F	115	-	-
2F	115	-	-
2F lift	115	-	-
2F	115	-	-
2F	115	-	-
2F toilet	115	-	-
2F corridor	115	-	-
1F	115	-	-
1F	115	-	-
1F	115	-	-
1F corridor	115	-	-
1F	115	-	-
1F stairs	115	-	-
1F lift	115	-	-
1F	115	-	-
GF floor	115	-	-
GF Office	115	-	-

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 Office	NO (-71.3%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	5165.2	5165.2
External area [m²]	19998.4	19998.4
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	5
Average conductance [W/K]	3190.41	3401.71
Average U-value [W/m²K]	0.16	0.17
Alpha value* [%]	4.77	12.65

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	0.02	0.13
Cooling	0.05	0.04
Auxiliary	0.01	0.03
Lighting	5.55	6.17
Hot water	0.03	0.03
Equipment*	1.91	1.91
TOTAL**	**5.66**	**6.39**

* 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	5.61	0.18
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*5.61*	*0.18*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	138.46	146.56
Primary energy [kWh/m²]	0.09	9.17
Total emissions [kg/m²]	0.04	0.84

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] No Heating or Cooling										
	Actual	124.6	13.6	0	0	0	0	0	0	0
	Notional	130.8	14.7	0	0	0	0	0	----	---
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	61.4	122.6	4.3	9.1	2.3	3.92	3.74	4	5
	Notional	229.8	109.3	24.2	6.9	5.2	2.64	4.4	----	---

Key to terms

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

F. General Notes

The report is based on information available at the time of the writing and discussions with the client during any project meetings. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by Ensphere Group Ltd for inaccuracies in the data supplied by any other party.

The review of planning policy and other requirements does not constitute a detailed review. Its purpose is as a guide to provide the context for the development and to determine the likely requirements of the Local Authority.

No site visits have been carried out, unless otherwise specified.

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