JS LEWIS LTD

Sustainable Design and Construction Statement

incorporating Energy

Enderby Place

Revision B

Maritime View Ltd

November 2023

Client:	Maritime View Ltd
Report:	Sustainable Design and Construction Statement – Enderby Place
Date:	November 2023
Revision Details:	Revision B
Previous Revisions:	*Draft for Review*

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EXECUTIVE SUMMARY

The Applicant is seeking planning permission for the Enderby Place site (the "Site") including the erection of part-3, part-23, part-35 storey buildings, providing up to 564 residential apartments (Class C3), light industrial (Class E(g)(iii)) and community / café use (Sui Generis), and associated highways, landscaping and public realm works. The basement provides cycle storage, refuse, plant space and some commercial space. The podium level provides further commercial spaces, whilst the upper floors are residential with the floor plans largely repeating. All apartments have external balconies, and significant overhangs have been designed in to reduce unwanted solar gain.

The scheme has to address national, regional and local planning policy on energy and sustainability. It also has to address the regulatory framework at the post-planning detailed design stage. This document sets out the energy strategy and the sustainability strategy as required by both the local and the regional planning policy. The strategy put in place makes key commitments to the headline standards.

It should be recognised that as schemes are developed post-planning, some of the details may change as the detailed design considerations are resolved in more depth. Accordingly, any related planning conditions should be worded to allow flexibility in how the details are resolved.

The first section of this report sets out the purpose and scope of the Energy and Sustainability Strategy, the context within which it sits, and the description of development. An accommodation schedule is provided to inform the energy/CO2 assessment. The second section sets out the planning policy and regulatory framework against which the development will be assessed. This covers national policy, local policy, emerging local policy, national building regulation and emerging national guidance that relates to property developments and policy-making. It identifies the London Plan CO2 reductions as the key headline policy for the development to address, including the need to use the updated SAP CO2 factors. It also sets out the wider sustainability policy framework.

Section 3 considers the energy hierarchy, the heating hierarchy, the cooling hierarchy, the energy demand assessment and the CO2 strategy. The CO2 emissions estimates are as follows:

Table 2: The London Plan Energy Hierarchy		Regulated CO2 Emissions					
		Residential tCO2	Saving %	Non-Resi tCO2	Saving %	Total tCO2	Saving %
Baseline: Part L Compliant	A	498		6		504	
After energy reduction (be lean)	B	429	14%	5	12%	434	14%
After heat network (be clean)	C	429	0%	5	0%	434	0%
After renewable energy (be green)	D	125	71%	3	31%	129	70%

Table 3: The London Plan Energy Hierarchy SAP 10.0 factors		Regulated CO2 Emissions			
		Residential tCO2	Non-Resi tCO2	Total tCO2	(%)
Be lean: savings from energy demand reduction	A-B	69	1	70	14%
Be clean: savings from heat network	B-C	-	-	-	0%
Be green: savings from renewable energy	C-D	304	2	305	61%
Cumulative on-site savings	A-D =E	373	2	375	74%
Carbon shortfall	A-E = F	125	3	129	
Cumulative savings for offset payment		3,755	102	3,857	
Cash-in-lieu contribution (£95/tCO2)		£ 356,735	£ 9,678	366,413	

Table 4: Fees Table	TFEE	DFEE	%
Development Total	27.14	23.60	13%

Figure 1 - CO2 Emissions Summary

The scheme achieves significantly higher savings (74%) than the required onsite CO2 reduction (35%) through a strategy that incorporates energy efficiency measures, mechanical ventilation with heat recovery, and an ambient loop heating system that uses external communal air source heat pumps to heat a low temperature heating loop to 25 degrees that links all dwellings and non-residential uses. Individual water source heat pumps are then used within each dwelling to raise the temperature to useful heating and hot water temperatures. There is limited potential for solar PV due to the relatively small roof area and competing demands for the space. However, its use has been maximised within these constraints. The exact specification and performance of the energy systems will evolve as the detailed servicing specification is determined at the building control stage. The energy hierarchy has been addressed as follows:

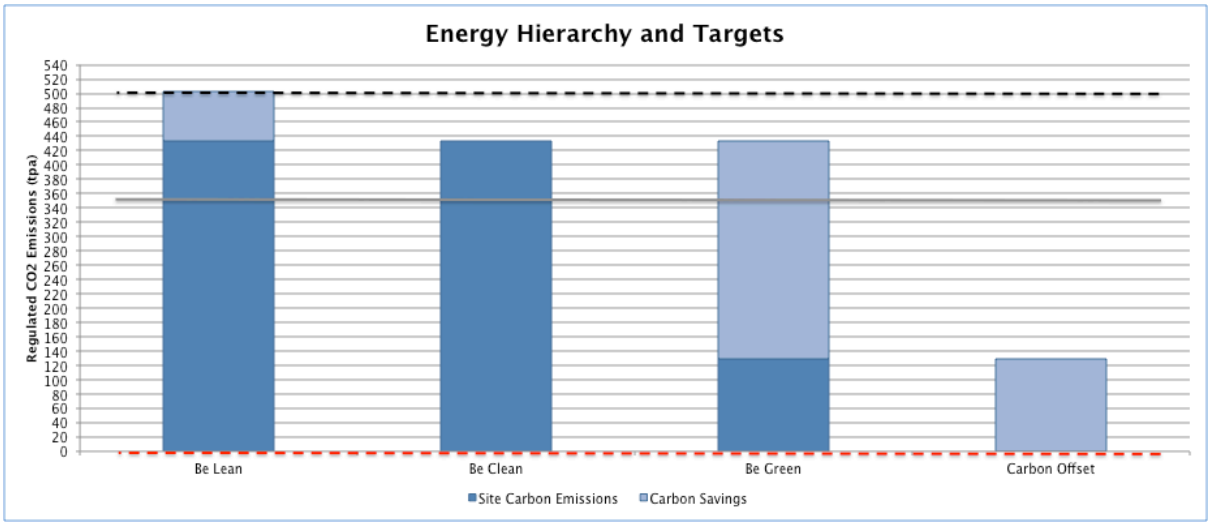

Figure 2 - Energy Hierarchy and Targets

The proposed ambient loop system has many permutations regarding heat sources, circulation temperatures, and heat extraction options. The preferred solution outlined is one permutation. Other permutations that are also policy compliant may be suited to the site. Detailed Stage E engineering will review the options again for suitability. Any selected option will remain policy compliant on CO2 emissions.

The scheme also addresses the emerging 'Be Seen' guidance and matters regarding peak demand and demand-side responses.

The fourth section considers the sustainability strategy for the development. Flood, water conservation, sustainable transport, materials and resource efficiency, waste and ecology are all considered.

The final section sets out the conclusions and recommended standards for the scheme. The client is aiming to deliver a sustainable development that addresses the environmental, social and economic issues in the round. National and local policy have been reviewed and analysed.

Through the provision of this strategy, the proposed development is considered to address the planning policy framework.

1 INTRODUCTION

1.1 Context

The Applicant is seeking planning permission for the Enderby Place site (the "Site"). The scheme's design represents an evolution of a long design process that has involved a series of pre-application meetings with the Council and the Greater London Authority. The proposals are for three buildings rising to 3, 23 and 35 storeys respectively, and extensive landscaping and public open space. This document, a combined energy and sustainability strategy, forms one of a suite of documents that form a planning application to be submitted to the Royal Borough of Greenwich ("the Council").

Other related documents that support the application include:

- Overheating Risk Assessment;
- Circular Economy Statement;
- Whole Lifecycle Carbon Assessment;
- BREEAM Assessment.

The scheme has to address national, regional and the Council's policy on energy and sustainability. It also has to address the regulatory framework at the post-planning detailed design stage. This document sets out the energy strategy and the sustainability strategy as required by both the local and the regional planning policy. The strategy put in place makes key commitments to the headline standards. However, it should be recognised that as schemes are developed post-planning, some of the details may change as the detailed design considerations are resolved in more depth. Accordingly, any related planning conditions should be worded to allow flexibility in how the details are resolved.

1.2 Location and Description of Development

The site sits on the Western part of the Greenwich Peninsula, and the proposed scheme includes the erection of part-3, part-23, part-35 storey buildings, providing up to 564 residential apartments (Class C3), light industrial (Class E(g)(iii)) and community / café use (Sui Generis), and associated highways, landscaping and public realm works. The basement provides cycle storage, refuse, plant space and some commercial space. The podium level provides further commercial spaces, whilst the upper floors are residential with the floor plans largely repeating. All apartments have external balconies, and significant overhangs have been designed in to reduce unwanted solar gain.

The client has appointed a design team to develop the proposals that address local, regional and national policy, and to submit the planning application.

Accommodation Schedule	Units	Area
		sqm
Residential	564	36,429
Commercial	3	1,445

Figure 3 - Accommodation Schedule

2 POLICY AND REGULATORY CONTEXT

2.1 National Policy

National Planning Policy Framework (2023)

The National Planning Policy Framework sets out a framework for positive growth, making progress in environmental, social and economic areas, and enhancing existing areas. It is a material consideration in planning decisions and reinforces the need for decisions to be determined in accordance with the local plan, unless material considerations indicate otherwise.

The policies throughout the NPPF constitute the government's view of what sustainable development is, and requires the planning process to perform a number of roles:

1. An economic role – building a strong economy, supporting growth and innovation;
2. A social role – supporting communities through providing housing supply, a high-quality built environment, and accessible local services;
3. An environmental role – contributing to natural and built environments, improving biodiversity, using resources prudently, minimizing waste and addressing climate change, including moving to a low carbon economy.

The 2023 National Planning Policy Framework retains a presumption in favour of sustainable development. Section 14 concerns itself with climate change:

153. *Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures. Policies should support appropriate measures to ensure the future resilience of communities and infrastructure to climate change impacts, such as providing space for physical protection measures, or making provision for the possible future relocation of vulnerable development and infrastructure.*

154. *New development should be planned for in ways that:*

a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and

b) can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.

The NPPF sets out the importance of dealing with climate change, and the use renewable energy. Development should be in sustainable locations to reduce CO2 emissions. It notes the need to align local policies with the national timeline for low carbon buildings.

2.2 London Policy

The London Plan (2021)

Policy SI2 reflects the current adopted position on energy and CO2 savings:

A. *Major development should be net zero-carbon. This means reducing carbon dioxide emissions from construction and 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 construction and operation.*

   2. *Be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly. Development in Heat Network Priority Areas should follow the heating hierarchy in Policy SI3 Energy infrastructure.*

   3. *Be green: generate, store and use renewable energy on-site.*

   4. *Be seen: monitor, verify and report on energy performance.*

B. *Major development 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 Regulations152 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 relevant 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 greenhouse gas reductions. The operation of offset funds should be monitored and reported on annually.*

Guidance on Preparation of Energy Strategies (2022)

The 2022 version of this document requires energy strategies to use the updated carbon factors in the new SAP. This means that the electricity aspect of regulated emissions, already small, has become even less substantial. In addition, the guidance clarifies the targets to be sought by all new major developments, summarized below:

- Commit to achieving compliance with Part L through efficiency measures only;
- Demonstrate how residential developments will achieve 35% saving onsite, with 10% from efficiency (noted as not always viable);
- Demonstrate how non-residential developments will achieve 35% saving onsite, with 15% from efficiency (noted as not always viable);

- For free-running buildings, include information regarding how overheating risk has been addressed;
- Demonstrate that connection to existing or planned networks have been prioritized;
- Investigate low carbon and renewable heating plant;
- Investigate low carbon and renewable technology onsite;
- Include information on post-occupancy energy performance monitoring;
- Align documents with the rest of the submission.

Be Seen Energy Monitoring Guidance (September 2021)

This document notes that static energy assessments based upon building regulations alone are not particularly accurate reflections of energy consumption of a building when in use. As a result, it recommends that actual energy use is monitored to help understand and bridge the gap between modelled energy use and actual. Applications are required to provide monitoring data for 'Reportable Units', which include individual buildings, heating and cooling systems and energy centres. At the planning stage, much of the energy demand and carbon emissions information is covered by the information in the GLA reporting spreadsheet. However, non-regulated energy uses should also be estimated applying the principles of CIBSE TM54 where applicable.

2.3 Local Policy - Royal Borough of Greenwich

The 2014 adopted Core Strategy has the following relevant policies:

- Policy H5 Housing Design suggests building to Code 4 and BREEAM;
- Policy DH1 Design suggests maximising energy conservation, mitigate climate change, enhance biodiversity, resource efficiency;
- Policy E1 Carbon Emissions suggests following the GLA targets.

2.4 Analysis and Interpretation

The key policy standards for the development to achieve are driven largely by the London Plan and its supporting guidance documentation:

1. 10% improvement on Part L through efficiency alone (residential);
2. 15% improvement on Part L through efficiency alone (non-residential) where viable;
3. 35% CO2 reduction onsite overall;
4. 20% renewable energy where feasible;
5. Zero carbon development overall;
6. Application of the energy hierarchy;
7. Application of the cooling hierarchy;
8. Application of the heat hierarchy;
9. 105 litres per person per day water consumption.

3 ENERGY ASSESSMENT

3.1 Methodology

This chapter explains the methodology for assessing energy demand and CO2 emissions profile and for undertaking options appraisal for low carbon and renewable energy solutions. It provides details of the process of identifying and assessing the likely significant environmental effects of the proposed development.

The content and conclusions of the strategy are based on an assessment of the proposed development identified in Section 1. The building was evaluated using both a dynamic thermal model and SAP. The results were then plugged into the GLA spreadsheet tool to test how the proposals perform with the new CO2 factors.

3.2 Carbon Factors

The GLA Emissions Reporting Spreadsheet has been used in this document to analyse the emissions arising and to help determine the appropriate strategy.

3.3 Establishing CO2 Emissions (Business as Usual)

The scheme has been assessed using SAP for representative unit types for the residential. The results were then extrapolated across the area schedule for the whole building. A representative non-residential unit was assessed using EDSL TAS dynamic modelling software to provide a BRUKL output that was then extrapolated across the non-domestic uses. The approach used follows the Energy Guidance document and the supporting FAQs. The baseline emissions are estimated to be as follows:

Table 2: The London Plan Energy Hierarchy		Regulated CO2 Emissions					
		Residential tCO2	Saving %	Non-Resi tCO2	Saving %	Total tCO2	Saving %
Baseline: Part L Compliant	A	498		6		504	

Figure 4 - Business as Usual Emissions Table

3.4 Demand Reduction (Be Lean)

3.4.1 Residential

The scheme is inherently energy efficient due to its scale and form, and although this is not recognised in Part L particularly well, but is an important consideration. The proposed energy efficient specification for the apartments is as follows:

- Walls – 0.18W/m2K (Part L minimum of 0.3W/m2K)
- Floors – 0.13W/m2K (Part L minimum of 0.25W/m2K)
- Roofs – 0.10W/m2K (Part L minimum of 0.20W/m2K)
- Doors – 1.0W/m2K (Part L minimum of 2.0W/m2K)
- Glazing – 1.0W/m2K (Part L minimum of 2.0W/m2K)
- Accredited construction details ((Part L minimum of standard details);
- Air permeability – 2.5m3/m2/hr (Part L minimum of 10m3/m2/hr)
- Mechanical ventilation with heat recovery;
- LED lighting.

Other energy saving measures are likely to include:

- Heating controls;
- Energy usage displays;
- Internal clothes drying lines;
- Controlled flow showers and hot taps to reduce hot water consumption.

3.4.2 Non-Residential

The non-residential element consists of flexible class E space and play space for residents. A model of unit B.04 was developed to assess the energy demands and carbon emissions arising. The efficiency measures were as follows:

- Walls – 0.18W/m2K (Part L minimum of 0.3W/m2K)
- Floors – 0.13W/m2K (Part L minimum of 0.25W/m2K)
- Roofs – 0.10W/m2K (Part L minimum of 0.20W/m2K)
- Doors – 1.0W/m2K (Part L minimum of 2.0W/m2K)
- Glazing – 1.0W/m2K (Part L minimum of 2.0W/m2K)
- Solar control glass;
- Accredited construction details ((Part L minimum of standard details);
- Air permeability – 3m3/m2/hr (Part L minimum of 10m3/m2/hr)
- LED lighting for both space and display purposes.

3.4.3 Be Lean Emissions Summary

The emissions savings from energy efficiency are 14%:

Table 2: The London Plan Energy Hierarchy		Regulated CO2 Emissions					
		Residential tCO2	Saving %	Non-Resi tCO2	Saving %	Total tCO2	Saving %
Baseline: Part L Compliant	A	498		6		504	
After energy reduction (be lean)	B	429	14%	5	12%	434	14%

Figure 5 - Be Lean Emissions Table

Table 4: Fees Table	TFEE	DFEE	%
Development Total	27.14	23.60	13%

Figure 6 - Fabric Energy Efficiency Table

3.5 Cooling and Overheating

The cooling hierarchy is set out below together with the scheme responses to it:

1. Reduce the amount of heat entering the building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure:
    a. The facade articulation provides a means of self-shading unwanted solar gain;

   b. Most rooms are well shaded though balcony provision above;
   c. Low g glazing will be used to facades with E, SE, S, SW or W orientations.
2. Minimise internal heat generation through efficient design;
   a. Use of ambient loop technology should result in negligible heat gains from heat distribution network cutting out the main internal gain;
   b. Stack ventilation can potentially be used to cool cores naturally.
3. Reduce amount of heat entering building during summer:
   a. Windows will be openable, side-hung with the exception of sliding doors;
   b. Glazing will be low g-values to areas at risk (g<0.4).
4. Use of thermal mass and high ceilings
   a. There is likely to be some exposed thermal mass although the assessment takes account of the lighter-weight partition and party walls;
   b. Ceiling heights are generous too, reducing overheating risks.
5. Passive ventilation:
   a. There will be mechanical ventilation with heat recovery. However, this will include summer bypass mechanisms to allow for free cooling.
6. Mechanical ventilation:
   a. MVHR has been proposed - a by-pass on the heat recovery system should allow for summer operation as noted above.

Unit	Floor Area	Opaque Facade Area	Glazed Area	Total Façade Area	Glazing to Façade	Glazing to Floor Area
1A	52.00	23.50	15.50	39.00	40%	30%
1B	51.00	4.70	11.80	16.50	72%	23%
1C	56.00	4.20	11.80	16.00	74%	21%
2b3P	58.00	26.20	19.80	46.00	43%	34%
3B5P	87.00	28.00	21.00	49.00	43%	24%
Total	304.00	86.60	79.90	166.50	48%	26%

Figure 7 - Glazing Ratios Table

3.6 Heating Infrastructure (Be Clean)

The heating hierarchy is as follows:

1. Connection to an existing or planned heating network;
2. Communal heating system:
   a. Site-wide heat network;
   b. Building level heating system;
3. Individual heating system.

The London Heat Map has been used to identify potential opportunities for connections to existing and proposed heat networks.

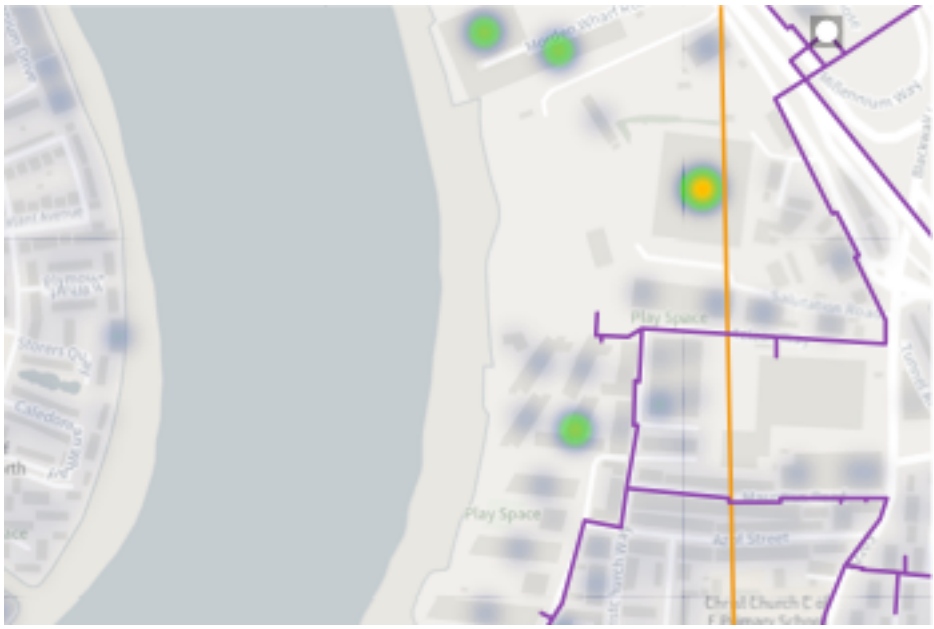

Figure 8 - London Heat Map Findings[1]

The only extant network that is represented on the London Heat Map is the Loka network the far side of the Peninsula. This is too far away for a practical or commercial connection, and relies on gas. The site to the South, Enderby Wharf, has a gas CHP-driven heat network. Gas CHP is not a desirable solution under the current regulatory regime and would be punitive in terms of the carbon emissions equation for the site. Nevertheless, contact was made with the system operator, EOn, and the possibility of a connection has not been entirely discounted at this stage. For it to become viable, the network would have to decarbonise substantially, and commercially acceptable terms would have to be agreed.

Other connection opportunities that have been investigated include Morden Wharf to the North and Lovells Wharf scheme further to the South. Contact has been made with Lovells Wharf - the site is understood to have an energy centre designed specifically for the site itself. Added to the impracticality of not be adjacent renders this as an unlikely opportunity. To date, no response has been received from the Morden Wharf scheme, but it too is likely to have been designed as a discreet site-wide system. It is understood to be based on an ambient loop strategy, fed by a combination of air source heat pumps and some gas boilers for peak-lopping.

With the uncertainties provided by the very limited opportunities for wider connections, it is pragmatic to proceed with a site-focussed solution that can be delivered from day 1, and that can form part of a wider extended network if at some point in the future such a network is created and if this became available on a commercially acceptable basis.

Plant areas have been designed in at basement and roof levels to allow for external air source heat pump technology that will feed the ambient loop. A full engineering design would be undertaken post-planning for the heat network. The use of an ambient loop with flow and return temperatures in the order of 25-10 degrees Celcius minimises heat losses. Further measures to reduce heat losses will be used where appropriate including:

[1] London Heat Map context layers on: extant and proposed heat networks, transmission routes, accessed 20/11/23

1. Minimising horizontal runs through use of more vertical risers (building form lends itself to efficient distribution);
2. Specifying good insulation levels and continuity of insulation over junctions, valves, flanges and fittings (CIBSE CP1 – 50-60mm) for higher temperature elements;
3. System design for low temperature flow and returns;
4. Avoidance of runs adjacent to cold water pipe work;
5. Pipes sized according to flow rates based on realistic diversified demands.

It goes without saying that the system must be designed to be effective and to meet occupants' needs. These are detailed design matters and will be addressed in full at RIBA Stage E. The calculations have been done on the basis of 100% air source heat pump provision.

3.7 Renewable Energy (Be Green) and Carbon Offsetting

The proposed scheme incorporates an ambient loop system that is 'fed' by communal external air source heat pumps. These external communal sources heat the ambient loop, maintaining a flow temperature of circa 25 degrees C and a return temperature of around 10 degrees. Individual flats then extract the heat from the ambient loop via individual water source heat pumps, circulating water at 35 degrees C for underfloor heating, and raising water to 55 degrees C for domestic hot water storage.

System COP Calculator

DHW	kWh			
DHW Demand	1,262			
ASHP Loop	1,262			
WSHP Loop	1,262			
	COP	Energy	Elec	COP
Stage 1 - ASHP taking loop from 10 to 25 degrees	5.30	1,262	238	5.3
Stage 2 - WSHP taking loop from 25 to 65 degrees	4.11	1,262	307	4.1
		1,262	545	2.3
SH	kWh			
SH Demand	279			
ASHP Loop	279			
WSHP Loop	279			
	COP	Energy	Elec	COP
Stage 1 - ASHP taking loop from 10 to 25 degrees	5.30	279	53	
Stage 2 - WSHP taking loop from 25 to 35 degrees	12.00	279	23	
		279	76	3.7
Combined SH and DHW				
		Energy	Elec	COP
DHW		1,262	545	2.3
SH		279	76	3.7
Total		1,541	621	2.5

Figure 9 - System COP Calculation

The non-residential units will also be serviced by water source heat pumps that draw heat and 'coolth' from the ambient loop. The GLA table demonstrated the final carbon savings to be as follows:

Table 2: The London Plan Energy Hierarchy		Regulated CO2 Emissions					
		Residential tCO2	Saving %	Non-Resi tCO2	Saving %	Total tCO2	Saving %
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After heat network (be clean)	C	429	0%	5	0%	434	0%
After renewable energy (be green)	D	125	71%	3	31%	129	70%

Figure 10 - Be Green Emissions Table

Table 3: The London Plan Energy Hierarchy SAP 10.0 factors		Regulated CO2 Emissions			
		Residential tCO2	Non-Resi tCO2	Total tCO2	(%)
Be lean: savings from energy demand reduction	A-B	69	1	70	14%
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Be green: savings from renewable energy	C-D	304	2	305	61%
Cumulative on-site savings	A-D =E	373	2	375	74%
Carbon shortfall	A-E = F	125	3	129	
Cumulative savings for offset payment		3,755	102	3,857	
Cash-in-lieu contribution (£95/tCO2)		£ 356,735	£ 9,678	366,413	

Figure 11 - Emissions Summary and Carbon Offset Calculation

3.8 Other Renewable Energy Technologies

The London Plan sets a target of 20% renewable energy where feasible. This policy was originally the key energy policy in the London Plan in 2008, but has been increasingly ignored in favour of the overall CO2 targets set.

3.8.1 Biomass

Biomass and biomass CHP bring significant logistical issues in terms of fuel supply that are not compatible with the Site. There is a range of technical hurdles that the site would struggle to overcome. Neither are considered viable.

3.8.2 Solar Thermal

The scheme has extremely limited roof space and PV is more effective in terms of CO2 per sqm saved. Solar thermal is not applicable.

3.8.3 Wind Power

Wind power is generally not suitable for the urban environment.

3.9 Energy Monitoring (Be Seen)

The non-residential estimates were based upon a dynamic thermal model as per TM54. The final occupancy is not clear, so the non-regulatory energy demands are not easy to substantiate at this stage. All reportable units (energy centre, residential, non-residential) are within the body of this report ready for submission.

3.10 Peak Energy and Demand-Side Responses

Dialogue with the DNO will commence at Stage E when detailed design of the services systems commences. The opportunities for peak load management and flexibility available to these proposals are as follows:

1. Heat networks are not an obvious option with regard to the wider neighbourhood. However, there may be some areas for synergy with the adjacent Britannia House site, owned and managed by the applicant;
2. Hot water storage through hot water cylinder capacity to each dwelling, allowing hot water demands to be managed;
3. Heating from heat pumps which allows for switching down for short periods of time at peak demand;
4. The case for incorporating an onsite battery to provide grid services has been considered. At this stage, the density of development and competing demands for space render this as unlikely.
5. As a follow-up point to this, a micro-grid is less viable when not providing grid services. More realistic options for demand side response involve the promotion of smart utility offerings such as Octopus Energy's 'Agile' tariff.
6. The use of smart charging facilities for electric vehicles, allowing for flow and return of electricity, will be of little benefit on the scheme due to the very low parking provision.

3.11 Energy Costs

The energy costs to residents are estimated to be as follows based on quarterly energy prices:

Energy Costs per Flat	Gas Demand kWh	Gas Unit Cost £/kWh	Elec Demand kWh	Elec Unit Cost £/kWh	Total Cost £
Heating	-	0.080	365.00	0.30	109.50
Hot water	-	0.080	766.00	0.30	229.80
Fans and Pumps			95.00	0.30	28.50
Lighting			119.00	0.30	35.70
PV			-	0.30	-
Metering and billing					100.00
Plant replacement					381.67
Management charge					100.00
Total annual cost					985.17

Figure 12 - Estimated Annual Energy Cost

Customers are largely protected from the typical monopoly that arises with more standard medium and high temperature heat networks as they use electricity as the prime driver for their heat, and will be free to secure their supply from the competitive market. There is an element of management and communal energy that needs to be accounted for. In the estimate above, the energy demand from these communal sources are included in the energy demands costed. However, there will be a charge associated with managing the communal equipment and with billing - a process that should be simpler than heat metering as an electricity sub-meter on the heat pump use should correlate with the individual demand a flat is putting on the communal equipment.

3.12 Energy Strategy Summary

The proposed energy strategy comprises the following:

1. Energy efficiency measures for both fabric and fittings;
2. Mechanical ventilation with heat recovery;
3. Solar control through layout/orientation;
4. Ambient loop servicing residential and non-residential;
5. Communal air source heat pumps as lead heat feed into ambient loop;
6. Individual water source heat pumps to extract heat from ambient loop in each apartment and each non-residential unit;
7. Underfloor heating to apartments to allow for high COPs;
8. Immersion top-up for hot water cylinders within apartments;
9. Future connections facilitated by plant space under each building to allow for heat exchangers that would take high-grade heat from the district network and exchange it with the ambient loop network;
10. Solar PV has been incorporated to all roofs bare the ones set aside for heat pumps.

The scheme achieves the policy requirements as follows:

Policy Compliance Checklist	Compliance	Notes
Use of Latest Emissions Reporting Sheet	✓	Done
10% over Part L through efficiency;	✓	14%
35% CO2 reduction onsite overall;	✓	74%
20% renewable energy where feasible;	✓	61%
Zero carbon development overall;	✓	Done

Figure 13 - Energy Compliance Checklist

4 ENVIRONMENTAL SUSTAINABILITY

4.1 Water

Water efficient specifications are now required by Building Regulations. All apartments will incorporate measures such as efficient taps with hydro-brakes, and shower flow rates of 8-9litres per minute. Rainwater is also to be harvested for external irrigation. An exact specification will be required at the building control stage that meets 105lpppd.

4.2 Sustainable Transport

Home office provision will allow occupants to make sustainable lifestyle choices regarding working from home. Extensive cycle storage has been provided, and EV charging has been incorporated. Refer to the transport assessment for further details.

4.3 Materials and Resource Efficiency

Materials resource efficiency will be achieved through the scale of development, which by its very nature should achieve high materials efficiencies and low waste volumes. Certified timber such as FSC and PEFC is widely available and commonly used throughout major development schemes. There will be a preference for using materials that score good ratings in the Green Guide to Specification. A Circular Economy Statement and Whole Lifecycle Carbon Assessment support the application.

4.4 Waste Strategy

A waste management plan will be put in place to reduce site waste generation typically using some or all of the following:

1. Identification of pre-requisites for waste contractors and sub-contractors;
2. Identification of key parties and individuals responsible for waste monitoring and management (main contractor, waste sub-contractors);
3. Identification of appropriate benchmarks for waste generation/recycling including the use of appropriate tools for generating suitable benchmarks for the development such as;
    a. WRAP Net Waste Tool;
    b. BRE SMART Waste;
4. Identification of processes for dealing with different waste streams;
5. Processes for monitoring total waste arisings, proportion reused onsite, proportion recycled offsite, proportion sent to landfill;
6. Reporting mechanisms to capture the waste management data.

During occupation, all units will be required to provide waste segregation and recycling both internally and externally to the local authority standards. This will incorporate:

- Internal waste segregation into the waste streams collected locally;
- External segregation providing bin stores for the streams as above.

Occupants will be provided with information on the local recycling collections.

4.5 Ecology and Biodiversity

The Site is in an urban brownfield development, currently undeveloped and of limited ecological value. The proposals have incorporated areas of landscaping with planting and areas of habitat for biodiversity value. These will increase the Site's value while meeting the GLA policy in green infrastructure.

4.6 Pollution

Boilers are not currently proposed. Light pollution will be designed out as far as possible to reduce impacts on commuting bats. Noise and air quality are addressed in separate reports in support of the application. Neither discipline is understood to impinge on the development's ability to rely on natural ventilation for managing overheating risks.

4.7 BREEAM

BREEAM is targeted and is assessed in a separate report.

5 CONCLUSION

5.1 Sustainable Development

The Applicant is seeking planning permission for the Enderby Place site (the "Site") including the erection of part-3, part-23, part-35 storey buildings, providing up to 564 residential apartments (Class C3), light industrial (Class E(g)(iii)) and community / café use (Sui Generis), and associated highways, landscaping and public realm works. The basement provides cycle storage, refuse, plant space and some commercial space. The podium level provides further commercial spaces, whilst the upper floors are residential with the floor plans largely repeating. All apartments have external balconies, and significant overhangs have been designed in to reduce unwanted solar gain.

The NPPF sets out clearly the three key elements to a sustainable development:

1. An economic role – building a strong economy, supporting growth and innovation;
2. A social role – supporting communities through providing housing supply, a high quality built environment, and accessible local services;
3. An environmental role – contributing to natural and built environments, improving biodiversity, using resources prudently, minimizing waste and addressing climate change, including moving to a low carbon economy.

5.2 Social and Economic Sustainability

1. Creation of 564 new build to rent dwelling houses;
2. Creation of mixed-uses with flexible use class E space at -1, ground and first floor;
3. Provision of construction jobs;
4. Provision of maintenance roles during operational phase;
5. Job creation for ongoing maintenance and management considerations.

5.3 Environmental Sustainability

The Site will achieve the following:

- Energy and CO2
    - Energy efficiency savings for residential and non-residential (25% and 46%);
    - Mechanical ventilation with heat recovery;
    - Solar control through layout/orientation;
    - Ambient loop servicing residential and non-residential;
    - Communal air source heat pumps as lead heat feed into ambient loop;
    - Individual water source heat pumps to extract heat from ambient loop in each apartment and each non-residential unit;
    - Underfloor heating to apartments to allow for high COPs;
    - Immersion top-up for hot water cylinders within apartments;
    - Future connections facilitated by plant space under each building to allow for heat exchangers that would take high-grade heat from the district network and exchange it with the ambient loop network;
    - 59% savings onsite;
    - 43% renewable energy;
    - Zero carbon development through carbon offsetting.

- Transport;
  - Location with good PTAL rating;
  - Extensive cycle storage to basement;
- Water
  - Rainwater harvesting for irrigation;
  - Efficient water fittings to reduce demand for water.
- Waste and materials
  - Waste and recycling management procedures during construction;
  - Waste and recycling provision in line with local standards for operation;
  - Resource efficiency for the new building.
- Biodiversity
  - Living roofs incorporated.

All proposals are developed to the planning application stage and will be subject to further design revisions as the scheme progresses. All planning conditions should make due allowances for this.

A summary of the energy and CO2 position is as follows:

Table 3: The London Plan Energy Hierarchy SAP 10.0 factors		Regulated CO2 Emissions			
		Residential tCO2	Non-Resi tCO2	Total tCO2	(%)
Be lean: savings from energy demand reduction	A-B	69	1	70	14%
Be clean: savings from heat network	B-C	-	-	-	0%
Be green: savings from renewable energy	C-D	304	2	305	61%
Cumulative on-site savings	A-D =E	373	2	375	74%
Carbon shortfall	A-E = F	125	3	129	
Cumulative savings for offset payment		3,755	102	3,857	
Cash-in-lieu contribution (£95/tCO2)		£ 356,735	£ 9,678	366,413	

Figure 14 - Summary of CO2 Performance

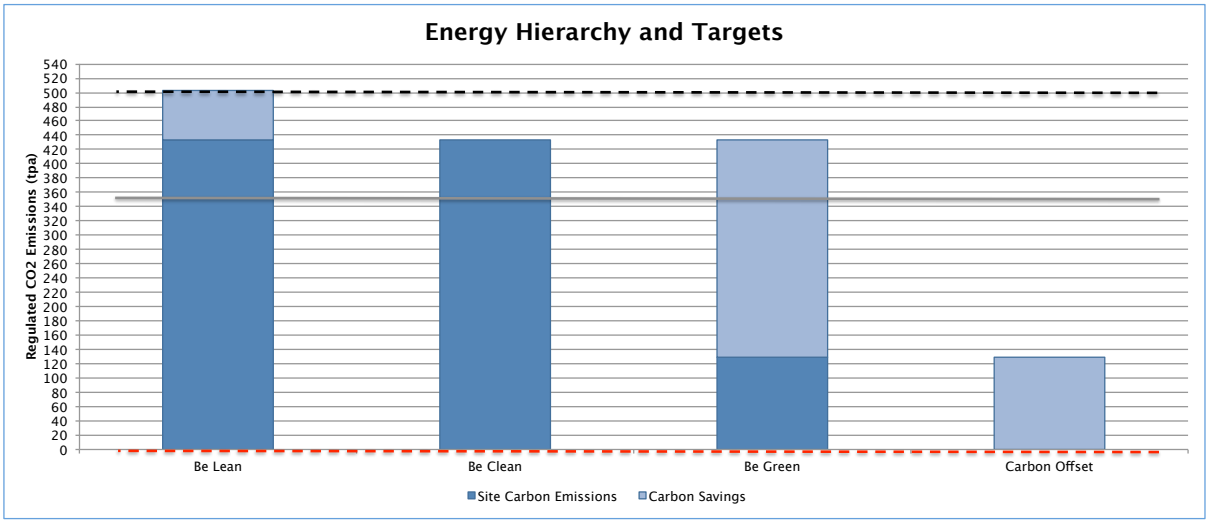

Figure 15 - Energy Hierarchy and Targets

5.4 Statement of Policy Compliance

In the development of the proposals, the design team has reviewed, interpreted and addressed the relevant planning policy on energy and CO2 emissions and sustainable development. The proposals have reviewed early-stage opportunities for efficiency and clean and renewable energy technology.

Policy Compliance Checklist	Compliance	Notes
Use of Latest Emissions Reporting Sheet	✓	Done
10% over Part L through efficiency;	✓	14%
35% CO2 reduction onsite overall;	✓	74%
20% renewable energy where feasible;	✓	61%
Zero carbon development overall;	✓	Done

Figure 16 - Energy and CO2 Policy Compliance Checklist

It is compliant with the following documents:

The National Planning Policy Framework (2023)

The London Plan (2021)

The Mayor's Guidance on Preparing Energy Strategies (2022)

The Mayor's Guidance on 'Be Seen' (2020)

RB Greenwich's Adopted Core Strategy (2014)

5.5 Supporting Documentation

The following documents are provided separately in support of this document:

- SAP TER and DER sheets for Be Lean stage;
- SAP TER and DER sheets for Be Green stage;
- BRUKL for Be Lean and Be Green stages;
- DH connection communications;
- Example datasheets for communal air source heat pump;
- Example datasheets for individual water source heat pump;
- GLA reporting spreadsheet completed.

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