ENERGY, SUSTAINABILITY & OVERHEATING STATEMENT

STONEY WOOD QUARTER, THE FAIRWAY, NW7 3HS

ASSESSMENT INFORMATION

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Revision:
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DISCLAIMER

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ENERGY & SUSTAINABILITY STATEMENT

STONEY WOOD QUARTER, THE FAIRWAY, NW7 3HS

CONTENT

The London Plan approach of “Be lean” – “Be clean” – “Be green”- “Be seen” is fully adopted by implementing:

- Passive measures (low U-values, air permeability, avoidance of thermal bridging by accredited details)
- High efficiency services, i.e., high efficiency ventilation with heat recovery, high efficiency lighting
- Renewable sources: Air source heat pumps, Solar PV

Excluded renewable sources are:

- Solar hot water
- Biomass
- Wind turbines

The proposed development including the residential and non-residential components will achieve:

- 74% overall regulated CO2 reduction against 2021 Part L compliant baseline

- 57% overall regulated CO2 reduction by renewable sources

- 17% overall regulated CO2 reduction by efficiency measures (“Be Lean” stage of the energy hierarchy)

ABOUT THE ENERGY STATEMENT

This Energy Strategy has been prepared by Irvineering Ltd on behalf of Stoney Wood Property Developments Ltd in support of an application for full planning permission for:-

The site address is Stoney Wood Quarter, The Fairway, Barnet, London, NW73HS

It should be read alongside the full suite of reports that have been prepared and submitted, particularly the Design and Access Statement, prepared by London Placemaking, and the Planning Statement, prepared by DP9.

This statement covers possible active and passive measures including renewable energy sources to make this development sustainable and environmentally friendly.

Specific requirements of London Plan on Energy Efficiency and Renewable Energy will be met through a combination of passive design features, energy efficient building services and renewable energy sources. This is to comply fully with the London Plan Policies and ensure they are following the "Energy Hierarchy". Specific London Plan policies about CO2 reduction and renewable energy will be met by implementation of passive measures, efficient services and renewable sources. This document has been prepared in line with the GLA London Planning Guidance on Energy Assessments (2022).

Baseline and all estimated energy consumptions have been calculated using a SAP 10.2 of sample residential units and SBEM v6.1 assessment of proposed non-residential spaces (café, coworking, gym, club, concierge).

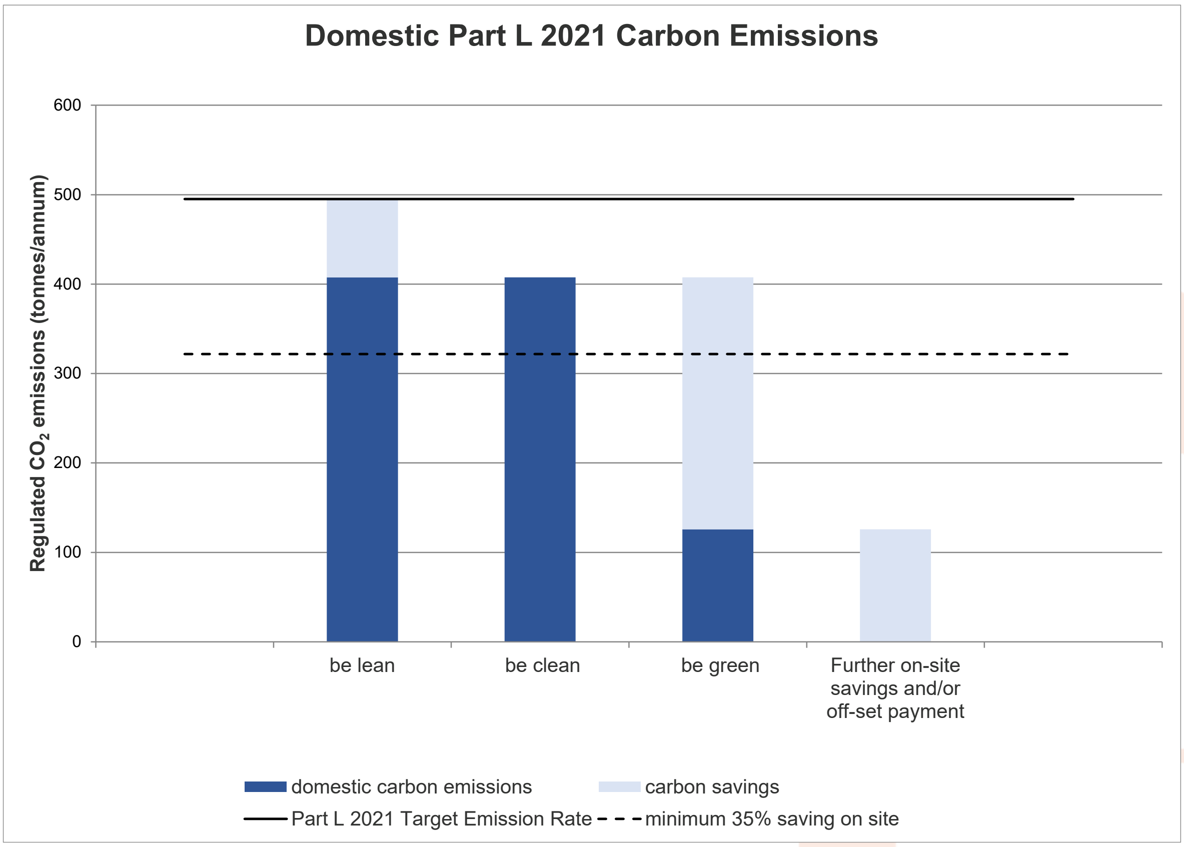
The tables below show a summary of energy requirements for baseline scheme and reduction proposed to be achieved by passive measures, efficient services and on-site renewable energy sources.

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	495.2	154.2
After energy demand reduction (be lean)	410.0	154.2
After heat network connection (be clean)	410.0	154.2
After renewable energy (be green)	126.5	154.2

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	85.1	17%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	283.5	57%
Cumulative on site savings	**368.7**	**74%**
Annual savings from off-set payment	126.5	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**3,796**	-
Cash in-lieu contribution (£)	**360,603**	



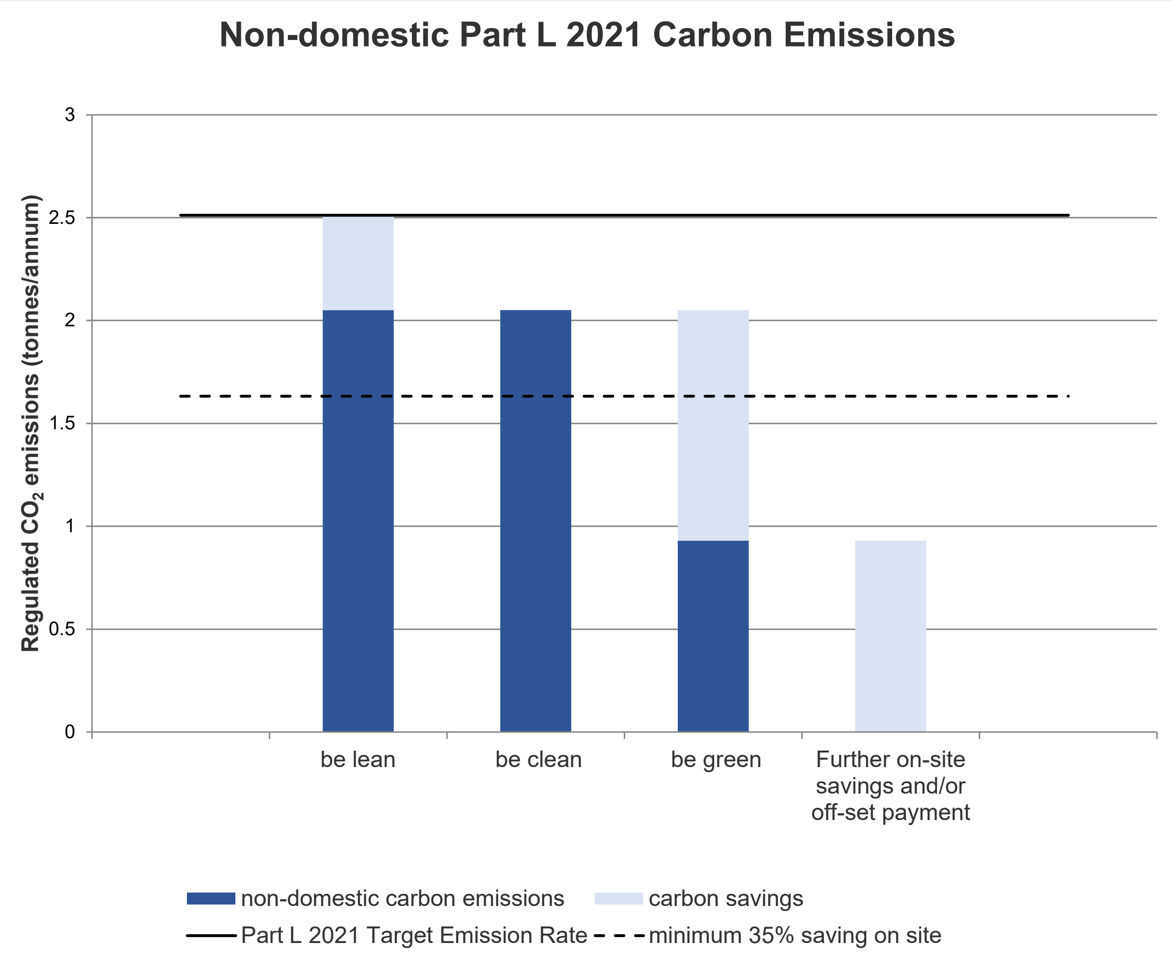
Domestic Part L 2021 Carbon Emissions
Regulated CO_2 emissions (tonnes/annum)
600
500
400
300
200
100
0
be lean
be clean
be green
Further on-site savings and/or off-set payment
domestic carbon emissions
carbon savings
Part L 2021 Target Emission Rate
minimum 35% saving on site

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	2.5	4.2
After energy demand reduction (be lean)	2.1	4.2
After heat network connection (be clean)	2.1	4.2
After renewable energy (be green)	0.9	4.2

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	0.5	18%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	1.1	44%
Total Cumulative Savings	**1.6**	**62%**
Annual savings from off-set payment	0.9	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**28**	-
Cash in-lieu contribution (£)	**2,693**	



SITE-WIDE

	Total regulated emissions (Tonnes CO_2 / year)	CO_2 savings (Tonnes CO_2 / year)	Percentage savings (%)
Part L 2021 baseline	497.7		
Be lean	412.1	85.6	17%
Be clean	412.1	0.0	0%
Be green	127.5	284.6	57%
Total Savings	-	370.2	74%
	-	**CO_2 savings off-set (Tonnes CO_2)**	-
Off-set	-	**3,824.2**	-

Table 5: SAP and SBEM calculation specification for each stage of the energy hierarchy

Specification	Notional Baseline	Efficient Baseline (Be Lean)	Proposed Development (Be Green)
Ground floor U-value	0.12	0.10	0.10
External Wall U-value	0.18	0.15	0.15
Wall separating flats or commercial from unheated corridors and stairs U-value	0.18	0.40	0.40
Floor separating flats or commercial from unheated corridors and stairs U-value	0.12	0.10	0.10
Roof U-value	0.13	0.10	0.10
Windows U-value - residential	1.2	0.82 (Velfac In or equivalent)	0.82 (Velfac In or equivalent)
Windows U-value - commercial	1.4	1.3	1.3
External door U-value	1.0	1.0	1.0
Windows g-value - residential	0.63	0.53	0.53
Windows g-value - commercial	0.29	0.20	0.20
Air Permeability	5	3	3
Thermal bridging - residential	Psi-values equivalent to notional dwelling specification Psi-values listed in SAP10.2 table R2;	Psi-values equivalent to notional dwelling specification Psi-values listed in SAP10.2 table R2; **Detailed thermal bridging calculations will be required at detailed design stage**	Psi-values equivalent to notional dwelling specification Psi-values listed in SAP10.2 table R2; **Detailed thermal bridging calculations will be required at detailed design stage**
Space Heating System - residential	Gas boiler, SEDBUK efficiency 89.5%, radiators, time and temperature zone control	Gas boiler, SEDBUK efficiency 89.5%, radiators, time and temperature zone control	Communal heat pump SAV DELTA-HP3 or equivalent with SCoP of 3.3, charging linked to use of communal heating; Heat distribution loss factor 1.5 (heat network designed and commissioned in accordance with the CIBSE/ADE 'Heat Networks: Code of Practice for the UK')
Hot water system - residential	Indirect cylinder with 1.4 kWh/day heat loss; waste water heat recovery system with 36% recovery efficiency; showers flow rate 8 l/min	Indirect cylinder with 1.4 kWh/day heat loss; showers flow rate 8 l/min	Communal heat pump monobloc SAV DELTA-HP3 or equivalent with SCoP of 3.3 , charging linked to use of communal heating; Distribution network compliant with CIBSE code of practice
Space Heating - non-resi	ASHP VRF with heating SCoP of 2.64,	ASHP with heating SCoP of 2.64;	Communal heat pump monobloc SAV DELTA-HP3 or equivalent with SCoP of 3.3
Hot water - non-resi	ASHP VRF with heating SCoP of 2.86,	ASHP VRF with heating SCoP of 2.86,	Communal heat pump monobloc SAV DELTA-HP3 or equivalent with SCoP of 3.3
Ventilation System - flats	Natural ventilation with intermittent mechanical extracts	MVHR Nuaire MRXBOXAB-Eco5 or equivalent MVHR approved by SAP assessor; Supply and extract duct to and from exterior has to be insulated with 25mm insulation if less than 2m long or 50mm thickness for ducts over 2m long	MVHR Nuaire MRXBOXAB-Eco5 or equivalent MVHR approved by SAP assessor; Supply and extract duct to and from exterior has to be insulated with 25mm insulation if less than 2m long or 50mm thickness for ducts over 2m long
Ventilation System - non-resi	MVHR with SFP 1.0 W/l.s and 80% heat recovery efficiency	MVHR with SFP 0.9 W/l.s and 90% heat recovery efficiency; demand control depending on CO2 sensors	MVHR with SFP 0.9 W/l.s and 90% heat recovery efficiency; demand control depending on CO2 sensors
Lighting - flats	Lighting power 2.3 W/m2; Efficacy of all fixed lighting = 80 lm/W	Lighting power 2.3 W/m2; Efficacy of all fixed lighting = 80 lm/W	Lighting power 2.3 W/m2 or less; Efficacy of all fixed lighting = 80 lm/W or higher
Lighting - non-resi	Luminaire efficacy 100 lm/W, occupancy sensors; constant illuminance photoelectric control; metering with 'out of range' alarm	Luminaire efficacy 120 lm/W, constant illuminance, photoelectric control, occupancy sensors; metering with 'out of range' alarm	Luminaire efficacy 120 lm/W, constant illuminance, photoelectric control, occupancy sensors; metering with 'out of range' alarm
Power factor - non-resi	95	95 (power factor correction device is required)	95 (power factor correction device is required)
Solar Photovoltaic - residential	-	-	100.8 kWp, horizontal panels (less than 15° pitch)
Solar Photovoltaic - non-resi	-	-	10 kWp, horizontal panels (less than 15° pitch)
% Improvement in CO2 over Building regulations compliant baseline	**0%**	**17%**	**74%**

Table 6. SAP and SBEM results summary of the proposed development

RESIDENTIAL CO_2 ANALYSIS (PART L1)																
				Baseline		'Be Lean'	'Be Green'	Fabric Energy Efficiency (FEE)		Baseline		'Be Lean'			'Be Green'	
Unit identifier (e.g. plot number, dwelling type etc.)	Model total floor area	Number of units	Total area represented by model	TER	Energy saving/generation technologies (-)	DER	DER	Target Fabric Energy Efficiency	Dwelling Fabric Energy Efficiency	Part L 2021 CO_2 emissions	Energy saving / generation technologies	Part L 2021 CO_2 emissions	Part L 2021 CO_2 emissions with Notional PV savings included	'Be Lean' savings	Part L 2021 CO_2 emissions	'Be Green' savings
	(m²)		(m²)	($kgCO_2$ / m²)	($kgCO_2$ p.a.)	($kgCO_2$ / m²)	($kgCO_2$ / m²)	(kWh/m²)	(kWh/m²)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)
UNIT 01	79	31	2440	14.66	-84.51	12.48	3.51	40.63	34.79	35,765	-2,610	30,447	27,837	7,928	8,563	19,274
UNIT 02	82.4	31	2545	14.31	-52.73	12.12	3.45	37.79	34.22	36,414	-1,628	30,841	29,213	7,201	8,779	20,434
UNIT 03	71.7	31	2214	16.24	-50.27	13.47	3.87	43.40	37.13	35,959	-1,552	29,825	28,273	7,686	8,569	19,704
UNIT 04	90.1	31	2782	13.55	-126.73	12.12	3.49	39.89	35.33	37,702	-3,914	33,723	29,810	7,893	9,711	20,099
UNIT 05	73.5	31	2270	15.33	-78.64	12.92	3.62	41.11	34.97	34,796	-2,429	29,326	26,897	7,899	8,217	18,681
UNIT 06	62.2	31	1921	13.67	-57.08	12.46	3.43	29.17	25.54	26,258	-1,763	23,934	22,171	4,087	6,588	15,582
UNIT 07	71.7	31	2214	16.34	-50.27	13.57	3.90	43.85	37.79	36,180	-1,552	30,047	28,494	7,686	8,635	19,859
UNIT 08	91.3	31	2819	12.72	-117.11	11.73	3.38	35.77	35.28	35,864	-3,617	33,073	29,456	6,408	9,530	19,926
UNIT 09	55	31	1698	13.85	-58.86	13.35	3.68	27.34	27.60	23,524	-1,818	22,675	20,857	2,667	6,250	14,607
UNIT 10	60.6	31	1871	14.39	-77.77	14.06	3.93	33.36	34.72	26,930	-2,402	26,312	23,911	3,019	7,355	16,556
UNIT 11	51.6	31	1593	15.00	-55.22	14.22	3.90	31.29	28.08	23,902	-1,705	22,659	20,954	2,948	6,215	14,740
UNIT 12	53.9	31	1665	16.35	-69.17	15.21	4.31	39.60	35.95	27,215	-2,136	25,317	23,181	4,034	7,174	16,007
UNIT 13	93.2	31	2878	16.23	-119.54	15.04	4.42	52.66	50.10	46,713	-3,692	43,288	39,596	7,117	12,722	26,875
UNIT 14	51.6	31	1593	18.05	-55.22	17.08	4.84	45.41	42.72	28,763	-1,705	27,217	25,512	3,251	7,713	17,799
UNIT 15	72.7	31	2245	17.46	-66.71	16.01	4.68	50.66	49.64	39,199	-2,060	35,944	33,884	5,316	10,507	23,377
Sum	1,061	463	32,750	15.1	-78.3	13.6	3.9	40.1	36.8	495,184	-34,582	444,628	410,046	85,138	126,527	283,519
NON-RESIDENTIAL CO_2 ANALYSIS (PART L2)																
				Baseline		'Be Lean'	'Be Green'			Baseline		'Be Lean'			'Be Green'	
Building Use	Model Area	Number of units	Total area represented by model	BRUKL TER	BRUKL Displaced electricity (-)	BRUKL BER	BRUKL BER			Part L 2021 CO_2 emissions	Energy saving / generation technologies	Part L 2021 CO_2 emissions	Part L 2021 CO_2 emissions with Notional PV savings included	'Be Lean' savings	Part L 2021 CO_2 emissions	'Be Green' savings
	(m²)		(m²)	($kgCO_2$ / m²)	(kWh / m²)	($kgCO_2$ / m²)	($kgCO_2$ / m²)			($kgCO_2$ p.a.)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)
Non-resi	456.2	1	456.2	5.51	0.00	4.50	2.07			2,512	0.00	2,050.99	2,051	461	945	1,106
Sum		1	456	5.5	0.0	4.5	2.1			2,512	0	2,051	2,051	461	945	1,106
SITE-WIDE ENERGY CONSUMPTION AND CO_2 ANALYSIS																
Total Sum			33,206	-	-	-	-			497,696	-34,582	446,679	412,097	85,599	127,472	284,625

Estimated costs to consumers have been considered to ensure protection from high prices. In line with the energy hierarchy, energy demand reduction has been prioritised. Energy efficiency measures have been the primary factor of consideration before proceeding with a selection of the energy system

Appropriate quality assurance mechanisms and commitments that have been considered as part of the energy strategy and which will be considered during operation include:

- Gaining quality assurance accreditation (e.g. Heat Trust)
- Following quality standards (e.g. CIBSE Code of Practice)
- Transparent billing, including separation of the ongoing maintenance and capital replacement aspects of the standing charge
- Aftercare support (e.g. BREEAM Man 05 Aftercare)
- Heat tariffs options given to occupants
- Consumer choice for metering arrangements at no extra cost (e.g. Prepayment Meters (PPM))

Table 7. EPC ratings and Energy Cost for sample flats

Plot Reference	SAP Rating	EPC band	Total Annual Energy Costs
UNIT 01	82	B	£386.12
UNIT 02	82	B	£393.50
UNIT 03	81	B	£384.57
UNIT 04	82	B	£424.17
UNIT 05	82	B	£373.59
UNIT 06	82	B	£324.27
UNIT 07	81	B	£386.90
UNIT 08	83	B	£408.51
UNIT 09	82	B	£310.28
UNIT 10	81	B	£338.00
UNIT 11	82	B	£305.15
UNIT 12	81	B	£329.46
UNIT 13	79	C	£500.97
UNIT 14	79	C	£343.47
UNIT 15	79	C	£428.85

BACKGROUND

This Energy Strategy has been prepared by Irvineering Ltd on behalf of Stoney Wood Property Developments Ltd in support of an application for full planning permission for:-

Stoney Wood Quarter, The Fairway, Barnet, London, NW73HS

It should be read alongside the full suite of reports that have been prepared and submitted, particularly the Design and Access Statement, prepared by London Placemaking, and the Planning Statement, prepared by DP9.

This statement covers possible active and passive measures including renewable energy sources to make this development sustainable and environmentally friendly.

DESCRIPTION OF THE SITE

Full planning permission is sought for *"Redevelopment of the site for residential use (Class C3), in buildings up to ground plus 5 storeys with ancillary flexible commercial spaces (Use Class E) uses at ground floor level. Together with plant, play space, car and cycle parking, hard and soft landscaping and all other works associated with the development."*

NATIONAL POLICY

MHCLG sets out basis for local policies in section 14 of National Planning Policy Framework. It requires new development to be planned in ways that can help to reduce greenhouse gas emissions, such as through its location, orientation and design. In Paragraphs 164-165, to help increase the use and supply of renewable and low carbon energy and heat, plans are encouraged to:
a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);
b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and
c) identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

THE LONDON PLAN

The London Plan is the name given to the Mayor's spatial development strategy. The current version of London Plan was adopted in March 2021. The aim is to develop London as an exemplary sustainable world city, based on three interwoven themes.

- Strong, diverse long term economic growth
- Social inclusivity to give all Londoners the opportunity to share in London's future success
- Fundamental improvements in London's environment and use of resources.

This energy statement is prepared in line with the London Plan and the latest GLA Energy Assessment Guidance 2022

Specific requirements on development sustainability are set out in the following policies:

POLICY SI 2 MINIMISING CO2 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 152 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.

POLICY SI 3 D – ENERGY INFRASTRUCTURE

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.

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.

SUMMARY

An overheating analysis has been performed in order to assess performance of the proposed development against CIBSE TM59 defining criteria of thermal comfort, and CIBSE TM49 urban climate projections

A representative sample of 10 No residential units has been modelled. The predicted internal temperature was simulated considering all aspects of occupancy, solar gain and predicted internal heat gains. Specific weather files have been applied to the model to assess the building performance against urban heat island effects and projected future climate conditions.

The calculation results show that the tested residential units fail on the TM59 thermal comfort overheating criteria using the main TM49 weather file (DSY1) for the 'future near extreme summer', which is due to limited window opening dictated by Noise Assessment. A complete series of tests, including 2 additional projected weather files (DSY2 and DSY3), each representing distinct near-extreme summer conditions, have informed the overheating strategy, which includes passive design considerations. Mechanical cooling using hybrid MVHR add-on units is proposed as the final step of the GLA cooling hierarchy.

RESIDENTIAL CRITERIA
CIBSE TM59

Compliance is based on passing the following criteria:

For naturally ventilated dwellings:

Criterion 1a: Hours of Exceedance (He):
For living rooms, kitchens and bedrooms:
Same as CIBSE TM52 Criterion 1.

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

For mechanically ventilated dwellings:
all occupied rooms should not exceed an operative temperature of 26 ˚C for more than 3% of the annual occupied annual hours

CIBSE TM49 REQUIREMENTS

Overheating is assessed using CIBSE TM49 future weather files to provide a risk-based analysis of the summer performance of a building under the impact of both the local microclimatic Urban Heat Island (UHI) effect, and the macroclimatic effect of an uncertain climate future.

The analysis behind the TM49 requirements has identified a substantial increase in the likelihood of warmer summers in the future, with the more extreme historical summers becoming average summers by the middle of the century. This is the period over which most buildings built today will be in operation. Hence it is recommended to evaluate overheating risk using climate change-adjusted weather data. With reference to the latest climate projections for the UK (UKCP09 projections), the future weather files utilise three years of varying severity of hot events:

DSY1 - 1989: a moderately warm summer. This is the current design summer year for London, with which the scheme should comply to demonstrate resilience to overheating.

DSY2 - 2003: a year with a brief yet extreme heat wave. It is not mandatory for the building to comply: as such this data has been used to evaluate risk and inform the design.

DSY3 - 1976: a year with a prolonged period of sustained warmth. It is not mandatory for the building to comply: as such this data has been used to evaluate risk and inform the design.

DYNAMIC SIMULATIONS

The analysis was carried out using DesignBuilder v6 - EnergyPlus v8 engine. The 3D model is based on the architectural drawings and specifications.

The selected sample of 10 units reflects the full range of unit characteristics present across the scheme, including variations in dwelling size, layout, orientation and exposure. Units were chosen to capture different façade conditions (north-, east-, south- and west-facing), varying levels of solar access, and a spread across ground, mid- and top-floor locations. The sample also includes both single-aspect and dual-aspect dwellings. These ten dwellings provide a proportionate and representative coverage of the development’s typologies, ensuring that the dynamic assessment appropriately reflects the thermal performance expected across the wider scheme.

Modelled flats

INTERNAL DESIGN CONDITIONS

Occupancy and equipment loads in flats are modelled as per CIBSE TM59 Table 2:

Unit/ room type	Occupancy	Equipment load
Studio	2 people at all times	Peak load of 450 W from 6 pm to 8 pm*. 200 W from 8 pm to 10 pm 110 W from 9 am to 6 pm and 10 pm to 12 pm Base load of 85 W for the rest of the day
1-bedroom apartment: living room/kitchen	1 person from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 450 W from 6 pm to 8 pm 200 W from 8 pm to 10 pm 110 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 85 W for the rest of the day
1-bedroom apartment: living room	1 person at 75% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 150 W from 6 pm to 10 pm 60 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 35 W for the rest of the day
1-bedroom apartment: kitchen	1 person at 25% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 300 W from 6 pm to 8 pm Base load of 50 W for the rest of the day
2-bedroom apartment: living room/kitchen	2 people from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 450 W from 6 pm to 8 pm 200 W from 8 pm to 10 pm 110 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 85 W for the rest of the day
2-bedroom apartment: living room	2 people at 75% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 150 W from 6 pm to 10 pm 60 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 35 W for the rest of the day
2-bedroom apartment: kitchen	2 people at 25% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 300 W from 6 pm to 8 pm Base load of 50 W for the rest of the day
3-bedroom apartment: living room/kitchen	3 people from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 450 W from 6 pm to 8 pm 200W from 8 pm to 10 pm 110 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 85 W for the rest of the day
3-bedroom apartment: living room	3 people at 5% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 150 W from 6 pm to 10 pm 60 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 35 W for the rest of the day
3-bedroom apartment: kitchen	3 people at 25% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 300 W from 6 pm to 8 pm base load of 50 W for the rest of the day
Double bedroom	2 people at 70% gains from 11 pm to 8 am 2 people at full gains from 8 am to 9 am and from 10 pm to 11 pm 1 person at full gain in the bedroom from 9 am to 10 pm	Peak load of 80 W from 8 am to 11 pm Base load of 10 W during the sleeping hours
Single bedroom (too small to accommodate double bed)	1 person at 70% gains from 11 pm to 8 am 1 person at full gains from 8 am to 11 pm	Peak load of 80 W from 8 am to 11 pm Base load of 10 W during sleeping hours
Communal corridors	Assumed to be zero	Pipework heat loss only; see section 3.1 above

* All times in GMT

Lighting is modelled as 2 W/m2 from 6pm to 11pm.

GLAZING AND SOLAR SHADING

All windows in houses are modelled without internal blinds, in line with Part O guidance.
g-value of 0.53 is used for all residential glazing

Proposed amount of glazing has been chosen to represent the optimal balance between positive impact of solar gains in winter, natural ventilation through window opening, daylight requirement and overheating prevention.

While reducing the glazed areas would somewhat reduce the solar gains, it would also mean reduced natural ventilation and daylighting and therefore the overheating results would be very similar.
Reduction in glazed areas would therefore not lead to more units complying with TM59 criteria.

Solar shading from external obstacles (balconies / overhangs) is included in the model. Other external shading (external blinds / louvres / fins) are not proposed due to:

- Architectural (visual) reasons
- Installation cost
- Maintenance requirements

VENTILATION

Ventilation strategy for the flats has been chosen in line with London Plan Cooling hierarchy and with energy efficiency impacts in mind. It is proposed to install continuous heat recovery ventilation with summer bypass in all units. The proposed strategy will ensure optimal balance in capital cost, occupant comfort in terms of fresh air and thermal comfort while reducing the cooling requirements.

Limited natural ventilation through openable windows is included in the model. Windows are modelled in line with Noise Impact Assessment as 1-3% openable area as percentage of floor area.

Mechanical ventilation is also modelled in all flats, providing 0.5 air change per hour.

Simulation for a theoretical scenario with fully openable windows has also been modelled, showing compliance with Part O criteria under DSY1 weather data. This proves, that the overheating risks have been effectively mitigated through passive design measures, including effective window sizing solar shading features such as overhangs, appropriate glazing specifications and mechanical ventilation with summer bypass. The only constraint preventing this scenario to be implemented is the external noise.

Performance against Mechanical ventilation criteria of TM59 (operative temperature of 26 ˚C for more than 3% of the annual occupied annual hours) has been tested using increased mechanical ventilation rate of 20 l/s.person. This is considered to be the maximum ventilation rate that can be provided by domestic MVHR units. With this ventilation rate, most habitable rooms in the tested apartments still fail under DSY1 weather data, which is a common and expected result observed commonly in other similar schemes in London area.

MECHANICAL COOLING

After applying all of the above measures, it is concluded, that it is not possible to ensure sufficient thermal comfort in majority (68%) of habitable rooms due to limited window opening dictated by noise risk assessment. As the last step in cooling hierarchy it is therefore proposed to install low-energy hybrid cooling systems, which will be add-on units on the MVHR units and will provide cooling through MVHR supply air without needing external condensers. This system will consume significantly less energy than traditional air conditioning systems.

Cooling demand is expected to align closely with periods of peak solar generation—typically during warm, sunny days—when the grid also experiences surplus electricity production. By operating primarily during these peak PV periods, the cooling system will:

- Utilise on-site renewable energy, reducing reliance on grid electricity;
- Coincide with times of national grid overgeneration, helping to absorb excess renewable energy;
- Contribute to grid stability by increasing local daytime demand during solar surpluses.

This integrated approach supports the transition to a low-carbon energy system by aligning building energy consumption patterns with renewable generation profiles, in line with national decarbonisation goals.

Spaces where cooling is required for compliance are highlighted in light blue on page 22.

It should be noted that the cooling module does not provide sufficient cooling to constitute comfort cooling and is aimed at peak looping. Control is on/off determined by room temperature sensor. Output temperature controlled by units internal temperatures and air flows. Performance cannot be modulated, set points are determined at design stage and are not user adjustable. The sole purpose of the system is to mitigate overheating, therefore typically cooling is only intended to be active for the percentage of the year when the internal temperature is predicted to exceed 26ºC.

OVERHEATING SIMULATION RESULTS – DSY1 – THEORETICAL SCENARIO WITH FULLY OPENABLE WINDOWS

Criteria for predominantly naturally ventilated homes				
Block	Zone	Criterion A (%)	Criterion B (hr)	Pass/Fail
A-00LG	03bed1	0	19.5	Pass
A-00LG	03bed2s	0	15	Pass
A-00LG	03hall	0	N/A	Pass
A-0GF	03kit-din3	0	N/A	Pass
A-1st	03bed3s	0	14.5	Pass
D-1st	05LDK3	0	N/A	Pass
D-1st	05bed1	0	8.5	Pass
D-1st	05bed2s	0	9	Pass
D-1st	05bed3s	0	15	Pass
D-2nd	10LDK2	0	N/A	Pass
D-2nd	10bed1	0	9	Pass
D-2nd	10bed2s	0.45	9	Pass
D-4th	12bed1	1.71	18	Pass
D-4th	12bed2s	1.33	17.5	Pass
D-4th	12kit-din2	2.3	N/A	Pass
D-4th	12liv2	0.58	N/A	Pass
E-1st	08LDK3	0	N/A	Pass
E-2nd	08bed1	0	10	Pass
E-3rd	08bed2s	0.04	12.5	Pass
E-3rd	08bed3s	0.1	11.5	Pass
F-4th	13bed1	0.18	15	Pass
F-4th	13bed2s	0	12.5	Pass
F-4th	13bed3s	0.29	13.5	Pass
F-4th	13bed4s	0	13	Pass
F-4th	13kit-din4	0.2	N/A	Pass
F-4th	13liv4	0	N/A	Pass
G-00LG	02bed1	0.05	20	Pass
G-00LG	02bed2s	0	21.5	Pass
G-00LG	02bed3s	0	17	Pass
G-00LG	02hall	0	N/A	Pass
G-1st	09bed1	0	7.5	Pass
G-1st	09kit-din1	0	N/A	Pass
G-1st	09liv1	0	N/A	Pass
G-3rd	11bed1	0	13	Pass
G-3rd	11bed2s	0	8.5	Pass
G-3rd	11kit-din2	0	N/A	Pass
G-3rd	11liv2	0	N/A	Pass
I00LG	01bed1	0	20.5	Pass
I00LG	01bed2s	0.04	19	Pass
I00LG	01hall	0	N/A	Pass

OVERHEATING SIMULATION RESULTS – DSY1 WITH LIMITED WINDOW OPENING

Criteria for predominantly naturally ventilated homes				
Block	Zone	Criterion A (%)	Criterion B (hr)	Pass/Cooling Required
A-00LG	03bed1	0	75	Cooling Required
A-00LG	03bed2s	0	54.5	Cooling Required
A-00LG	03hall	0	N/A	Pass
A-0GF	03kitXdin3	0.03	N/A	Pass
A-1st	03bed3s	0.44	180.5	Cooling Required
D-1st	05LDK3	0.03	N/A	Pass
D-1st	05bed1	0.25	248	Cooling Required
D-1st	05bed2s	0.19	142	Cooling Required
D-1st	05bed3s	0	225	Cooling Required
D-2nd	10LDK2	20.24	N/A	Cooling Required
D-2nd	10bed1	14.36	514.5	Cooling Required
D-2nd	10bed2s	23.81	417	Cooling Required
D-4th	12bed1	45.45	868.5	Cooling Required
D-4th	12bed2s	43.04	807.5	Cooling Required
D-4th	12kitXdin2	59.21	N/A	Cooling Required
D-4th	12liv2	45.17	N/A	Cooling Required
E-1st	08LDK3	0.46	N/A	Pass
E-2nd	08bed1	0.93	128.5	Cooling Required
E-3rd	08bed2s	1.49	162	Cooling Required
E-3rd	08bed3s	2.07	159	Cooling Required
F-4th	13bed1	15.43	438	Cooling Required
F-4th	13bed2s	6.58	405.5	Cooling Required
F-4th	13bed3s	7.88	245.5	Cooling Required
F-4th	13bed4s	4.4	339.5	Cooling Required
F-4th	13kitXdin4	18.93	N/A	Cooling Required
F-4th	13liv4	9.11	N/A	Cooling Required
G-00LG	02bed1	0.08	29.5	Pass
G-00LG	02bed2s	0	30	Pass
G-00LG	02bed3s	0	27	Pass
G-00LG	02hall	0	N/A	Pass
G-1st	09bed1	0.29	220.5	Cooling Required
G-1st	09kitXdin1	0.3	N/A	Pass
G-1st	09liv1	0.4	N/A	Pass
G-3rd	11bed1	91.24	1341	Cooling Required
G-3rd	11bed2s	78.3	1323.5	Cooling Required
G-3rd	11kitXdin2	94.18	N/A	Cooling Required
G-3rd	11liv2	89.73	N/A	Cooling Required
I00LG	01bed1	0	30	Pass
I00LG	01bed2s	0.14	28.5	Pass
I00LG	01hall	0	N/A	Pass

OVERHEATING SIMULATION RESULTS – DSY1 – THEORETICAL SCENARIO WITH INCREASED MECHANICAL VENTILATION 20 L/S.PERSON

Zone	% hours exceeded	Pass / Fail
A-00LG 03BED1	1.77%	Pass
A-00LG 03BED2S	3.48%	Fail
A-0GF 03KIT-DIN3	2.68%	Pass
A-0GF 03LIV3	2.36%	Pass
A-1ST 03BED3S	11.48%	Fail
D-1ST 05BED1	4.11%	Fail
D-1ST 05BED2S	5.57%	Fail
D-1ST 05BED3S	1.87%	Pass
D-1ST 05LDK3	1.73%	Pass
D-2ND 10BED1	4.49%	Fail
D-2ND 10BED2S	28.54%	Fail
D-2ND 10LDK2	12.10%	Fail
D-4TH 12BED1	18.88%	Fail
D-4TH 12BED2S	22.08%	Fail
D-4TH 12KIT-DIN2	18.19%	Fail
D-4TH 12LIV2	9.21%	Fail
E-1ST 08LDK3	13.19%	Fail
E-2ND 08BED1	8.81%	Fail
E-3RD 08BED2S	12.47%	Fail
E-3RD 08BED3S	18.34%	Fail
F-4TH 13BED1	14.49%	Fail
F-4TH 13BED2S	7.92%	Fail
F-4TH 13BED3S	18.68%	Fail
F-4TH 13BED4S	8.41%	Fail
F-4TH 13KIT-DIN4	13.89%	Fail
F-4TH 13LIV4	7.65%	Fail
G-00LG 02BED1	1.74%	Pass
G-00LG 02BED2S	4.27%	Fail
G-00LG 02BED3S	2.39%	Pass
G-0GF 02LDK3	6.30%	Fail
G-1ST 09BED1	2.93%	Pass
G-1ST 09KIT-DIN1	2.89%	Pass
G-1ST 09LIV1	5.77%	Fail
G-3RD 11BED1	5.01%	Fail
G-3RD 11BED2S	4.27%	Fail
G-3RD 11KIT-DIN2	11.15%	Fail
G-3RD 11LIV2	4.97%	Fail
I00LG 01BED1	1.63%	Pass
I00LG 01BED2S	8.09%	Fail
I-0GF 01LDK2	11.00%	Fail

OVERHEATING SIMULATION RESULTS – DSY2 WITH LIMITED WINDOW OPENING

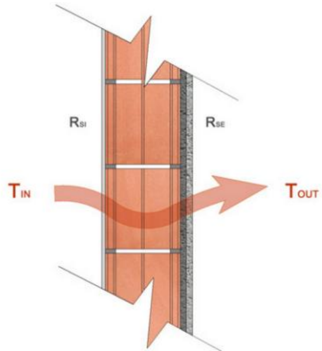
Criteria for predominantly naturally ventilated homes				
Block	Zone	Criterion A (%)	Criterion B (hr)	Pass/Fail
A-00LG	03bed1	0.19	107.5	Fail
A-00LG	03bed2s	0.14	88.5	Fail
A-00LG	03hall	0.28	N/A	Pass
A-0GF	03kitXdin3	0.43	N/A	Pass
A-1st	03bed3s	1.63	176	Fail
D-1st	05LDK3	0.25	N/A	Pass
D-1st	05bed1	0.42	151.5	Fail
D-1st	05bed2s	0.51	131.5	Fail
D-1st	05bed3s	0.11	200	Fail
D-2nd	10LDK2	8.73	N/A	Fail
D-2nd	10bed1	4.58	351	Fail
D-2nd	10bed2s	14.43	274	Fail
D-4th	12bed1	17.8	326.5	Fail
D-4th	12bed2s	18.59	321	Fail
D-4th	12kitXdin2	25.05	N/A	Fail
D-4th	12liv2	17.03	N/A	Fail
E-1st	08LDK3	2.1	N/A	Pass
E-2nd	08bed1	1.77	129.5	Fail
E-3rd	08bed2s	2.63	159.5	Fail
E-3rd	08bed3s	3.5	145.5	Fail
F-4th	13bed1	7.22	215	Fail
F-4th	13bed2s	2.45	240.5	Fail
F-4th	13bed3s	5.15	192	Fail
F-4th	13bed4s	2.23	217.5	Fail
F-4th	13kitXdin4	7.79	N/A	Fail
F-4th	13liv4	4.18	N/A	Fail
G-00LG	02bed1	0.04	44.5	Fail
G-00LG	02bed2s	0.16	46	Fail
G-00LG	02bed3s	0.42	58	Fail
G-00LG	02hall	0.23	N/A	Pass
G-1st	09bed1	0.71	168	Fail
G-1st	09kitXdin1	0.94	N/A	Pass
G-1st	09liv1	1.42	N/A	Pass
G-3rd	11bed1	68.34	1115	Fail
G-3rd	11bed2s	58.13	1093	Fail
G-3rd	11kitXdin2	71.43	N/A	Fail
G-3rd	11liv2	67.03	N/A	Fail
I00LG	01bed1	0.12	44	Fail
I00LG	01bed2s	1.01	62.5	Fail
I00LG	01hall	1.01	N/A	Pass

OVERHEATING SIMULATION RESULTS – DSY3 WITH LIMITED WINDOW OPENING

Criteria for predominantly naturally ventilated homes				
Block	Zone	Criterion A (%)	Criterion B (hr)	Pass/Fail
A-00LG	03bed1	0.32	154.5	Fail
A-00LG	03bed2s	0.37	131.5	Fail
A-00LG	03hall	0.28	N/A	Pass
A-0GF	03kitXdin3	1.9	N/A	Pass
A-1st	03bed3s	3.71	244.5	Fail
D-1st	05LDK3	0.76	N/A	Pass
D-1st	05bed1	1.3	240	Fail
D-1st	05bed2s	1.66	213.5	Fail
D-1st	05bed3s	0.59	264	Fail
D-2nd	10LDK2	15.44	N/A	Fail
D-2nd	10bed1	9.11	415	Fail
D-2nd	10bed2s	18.28	373	Fail
D-4th	12bed1	22.16	534	Fail
D-4th	12bed2s	22.6	526.5	Fail
D-4th	12kitXdin2	33.86	N/A	Fail
D-4th	12liv2	23.96	N/A	Fail
E-1st	08LDK3	4.98	N/A	Fail
E-2nd	08bed1	3.85	195	Fail
E-3rd	08bed2s	4.85	223.5	Fail
E-3rd	08bed3s	5.43	212	Fail
F-4th	13bed1	11.79	361.5	Fail
F-4th	13bed2s	6.77	347	Fail
F-4th	13bed3s	9.69	264.5	Fail
F-4th	13bed4s	6.02	306	Fail
F-4th	13kitXdin4	14.98	N/A	Fail
F-4th	13liv4	9.39	N/A	Fail
G-00LG	02bed1	0.14	61	Fail
G-00LG	02bed2s	0.18	88.5	Fail
G-00LG	02bed3s	0.23	93.5	Fail
G-00LG	02hall	0.13	N/A	Pass
G-1st	09bed1	2.88	250	Fail
G-1st	09kitXdin1	3.92	N/A	Fail
G-1st	09liv1	4.96	N/A	Fail
G-3rd	11bed1	78.85	1187	Fail
G-3rd	11bed2s	65.52	1130.5	Fail
G-3rd	11kitXdin2	83.43	N/A	Fail
G-3rd	11liv2	76.7	N/A	Fail
I00LG	01bed1	0.11	95.5	Fail
I00LG	01bed2s	1.49	87	Fail
I00LG	01hall	0.91	N/A	Pass

Several passive design measures and measures improving energy efficiency of building services have been included in the design to underline the "Passive first" approach in the scheme design. Implemented measures are summarised in Table 3 of this report and include:

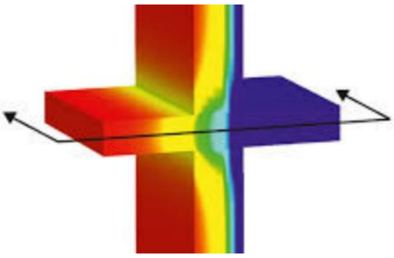
LOW U-VALUES OF BUILDING FABRIC



Thermal performance of fabric is the most important aspect of passive measures mosaic. Low U-values ensure, that the amount of heat transmitted through building external elements is minimised. This is achieved by using highly insulated building materials with low thermal conductivity.

Notional dwelling U-values as set out in 2021 Part L1 are generally followed with significant improvements in some elements, e.g. triple glazed windows.

AVOIDANCE OF THERMAL BRIDGING



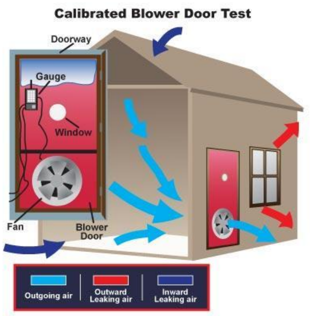
Thermal bridges occur at all junctions between building thermal elements, typically at junctions between wall/floor, wall/roof etc. Recent changes in the building regulations have emphasized the significance of thermal bridging in building design.

Continuity of insulation has to be maximised in order to minimise thermal bridging. Calculations presented in this energy statement and current proposal are based on thermal bridging Psi-values equivalent to notional dwelling specification Psi-values listed in SAP10.2 table R2. This is a conservative estimate of Psi-values, equivalent to 2021 Part L1 notional building performance, which has been consistently achieved in similar projects with the same construction type (hybrid steel frame walls, insulated balcony connectors). Psi-values of all applicable junctions will be assessed by a suitably qualified assessor at the detailed design stage by either:

- Custom Psi-value calculation by 2D thermal modelling
- Psi value from database of approved details

BE LEAN: PASSIVE DESIGN MEASURES AND EFFICIENT SERVICES

AIR TIGHTNESS



Air tight buildings minimise their heat loss through infiltration of cold air through gaps and cracks in building envelope. Air tightness of buildings is expressed as air permeability rate. Air permeability rate of 3.0 m3/h.m2 is set out as a reference value for the current building regulations notional dwelling. This value has to be confirmed by post-construction air tightness testing.

HIGH EFFICIENCY LIGHTING

While previous versions of Part L1 recognised low energy lighting to certain degree, the impact of low energy lighting is more accurate and more significant in 2021 Part L. All installed light fittings need to be included in detail in the assessment. To meet the efficiency level of notional reference dwelling, the installed power density shouldn't exceed 2.3 W/m2 and all light fittings should achieve a luminaire efficacy of at least 80 lm/W

WATER EFFICIENCY

Reducing general water consumption in dwellings also reduces amount of energy needed to provide hot water. Part L1 notional building therefore allows for overall water consumption of 125 l/person.day and more specifically, showers with flow rate of 8 l/min.

Be clean: District Heating and CHP

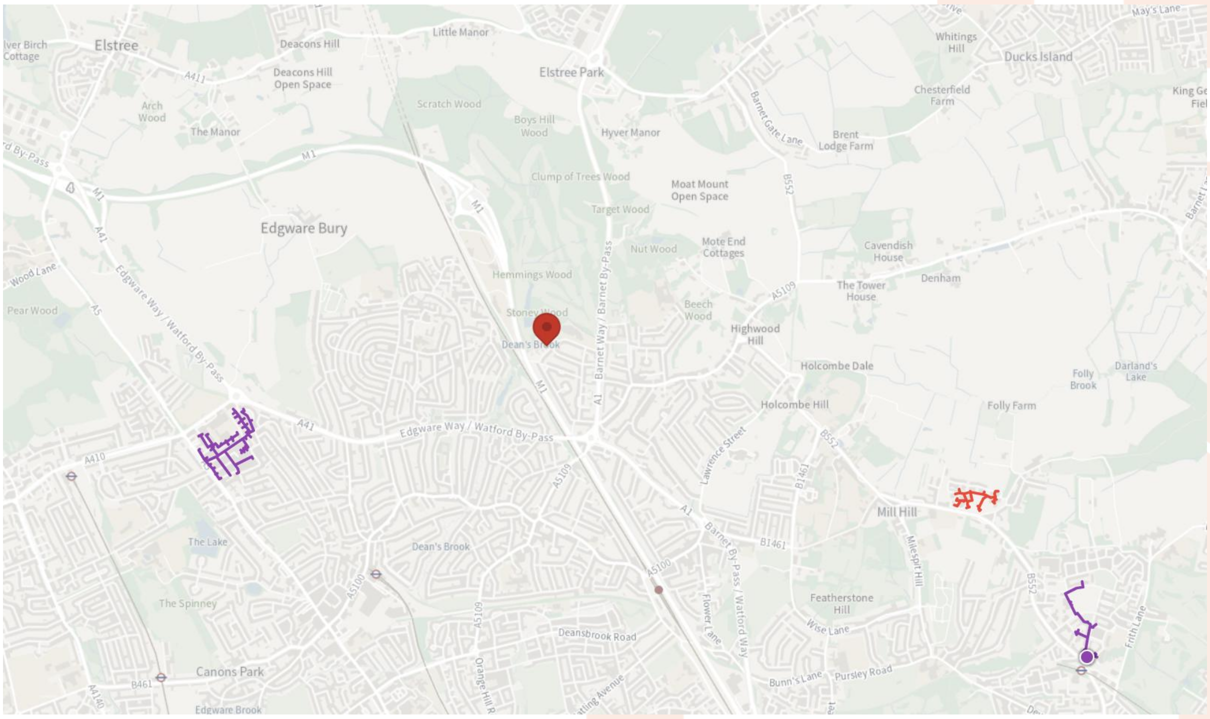
Stoney Wood Quarter, The Fairway, NW7 3HS

Combined Heat and Power

Although gas CHP's used to help to reduce CO2 emissions by delivering heat and electricity locally and reducing the losses that normally occur by conventional power plants. This is no longer true, after significant grid electricity de-carbonisation in recent years. Any local electricity generation using fossil fuels (e.g. mains gas) will deliver electricity with higher carbon footprint than grid electricity. Combined heat and power is therefore no longer considered a low carbon technology.

District Heating Connection

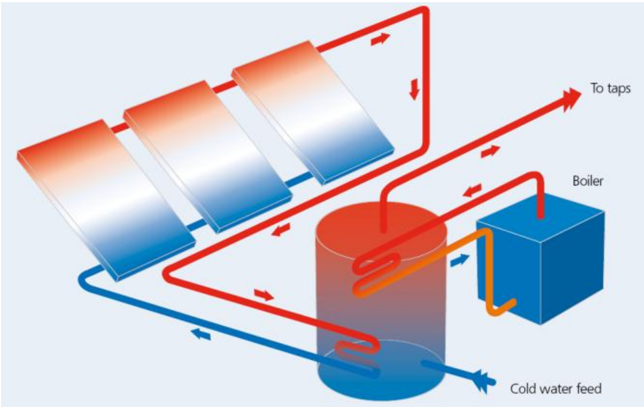
There is no existing or planned heating network in the proximity of site, according to current London Heat Map



Be Green: On-site renewable energy sources – Solar Hot Water

General information

Solar hot water systems for dwellings use collector which provides a separate heating circuit for hot water cylinder. This is usually backed up by electric immersion heater or other source of heat.
Two types of collectors are available:
- Flat Plate – less expensive, less efficient
- Evacuated Tube – more expensive and more efficient



Recommendations specific to this development

Solar hot water system has been ruled out due to high installation cost maintenance requirements space requirement. Other renewable technology (ASHP) is preferred for hot water heating.

BE GREEN: ON-SITE RENEWABLE ENERGY SOURCE - AIR SOURCE HEAT PUMPS

GENERAL INFORMATION

An air source heat pump extracts heat from the outside air in the same way that a fridge extracts heat from its inside. It can extract heat from the air even when the outside temperature is as low as minus 15° C.

On 17 December 2008, the European Parliament adopted the EU Directive on promoting the use of energy from renewable sources. For the first time however, in addition to geothermal energy, aerothermal and hydrothermal energy are also recognised as renewable energy sources.

There are two main types of ASHP:

AIR-TO-WATER SYSTEM

Air-to-water system uses the heat to warm water. Heat pumps heat water to a lower temperature than a standard boiler system would, so they are more suitable for underfloor heating systems than radiator systems. Although some ASHP systems are capable of heating the water to the higher temperature, the efficiency is higher when using low temperature underfloor heating or low temperature fan convectors.

AIR-TO-AIR SYSTEM

Air-to-air system uses the heat to warm the indoor air. The air is heated through individual fan-coils or centrally and then distributed to rooms via ductwork.

RECOMMENDATIONS SPECIFIC TO THIS DEVELOPMENT

It is proposed to install a communal air source heat pump systems comprising 3 heat pump systems, each consisting of modular SAV/Thermonova DELTA-HP modular heat pumps. This system will provide all space heating and hot water to all flats through heat interface units (estimated total heat demand 2,100 MWh). Space heating will be provided by underfloor heating or low temperature radiators / convectors. The proposed system has a calculated SCoP of 3.30 (attached datasheets). This SCoP is used in the SAP and SBEM calculation for Be Green scenario.

Distribution loss factor of 1.5 is used for the calculation, as a SAP default value for heat network designed and commissioned in accordance with the CIBSE/ADE 'Heat Networks: Code of Practice for the UK'

BE GREEN: ON-SITE RENEWABLE ENERGY SOURCE - SOLAR PHOTOVOLTAICS

GENERAL INFORMATION

This system uses semi-conductor cells to convert solar energy into electricity. Two main types of PV panels are available:
- Monocrystalline – More expensive and more efficient
- Polycrystalline – Less expensive and less efficient

Depending on type, the output of 1 kWp (kilowatt peak) can be achieved by panels with area between 6 and 20 m2.

The use of PV panels generally requires relatively large unshaded roof area where they can be mounted facing south, ideally having between 30° and 40° inclination.

RECOMMENDATIONS SPECIFIC TO THIS DEVELOPMENT

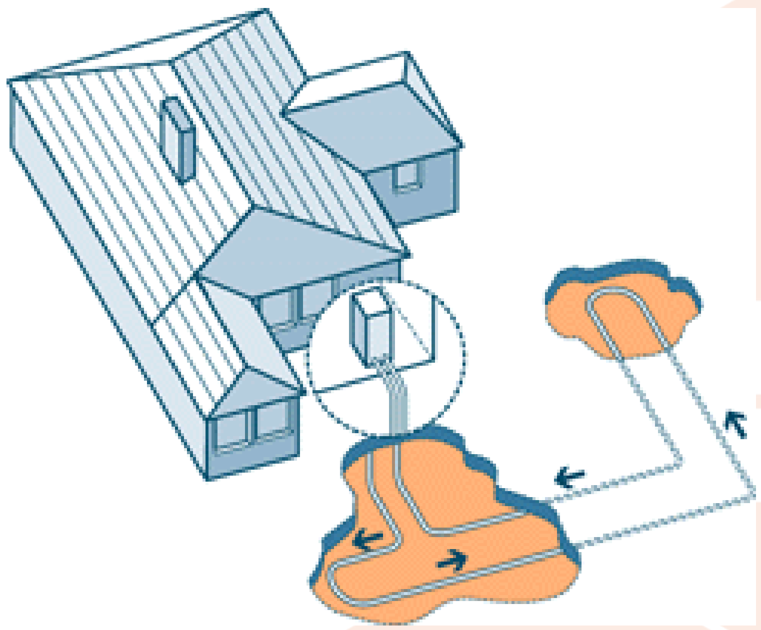
It is proposed to install a solar PV system with total peak output of 100.8 kWp on the flat roofs, allocated to residential units (communal system without individual flat connections). Additional 10 kWp will be allocated to non-residential spaces.
This is currently estimated as the maximum solar PV that can be fitted on the roofs after allowing for areas taken up by amenity and plant equipment.
The PV panels will be installed horizontally (less than 15° pitch to maximise the installed capacity)
The proposed PV system will produce 79,023 kWh electricity per year (calculated using SAP10.2). In addition the non residential PV will produce 7,778kWh electricity per year.

BE GREEN: ON-SITE RENEWABLE ENERGY SOURCE - GROUND SOURCE HEAT PUMP

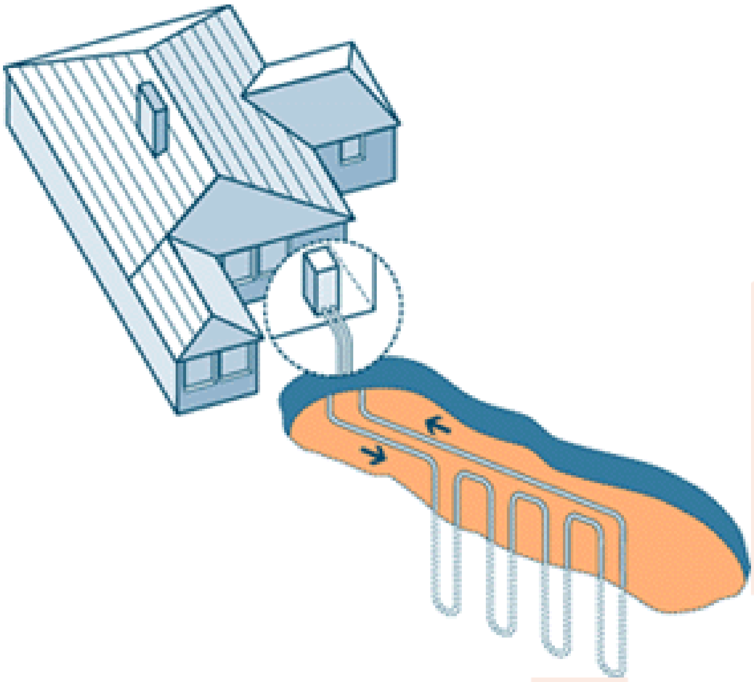
GENERAL INFORMATION

Ground source heat pumps use a buried ground loop which transfers heat from the ground into the building through heating distribution system. GSHP technology can be used both for heating and cooling. Two main types of GSHP are available:

- Horizontal loop is suitable for applications where sufficient area is available to accommodate horizontally buried pipes



- Vertical loop system can be used where ground space is limited, but will require boreholes typically 15-150m deep, and is consequently more expensive to install than horizontal systems.



RECOMMENDATIONS SPECIFIC TO THIS DEVELOPMENT

Ground source heat pumps have been ruled out due to higher installation cost and relatively small CO_2 savings compared to ASHP.

BE GREEN: ON-SITE RENEWABLE ENERGY SOURCE - BIOMASS / BIOFUELS

GENERAL INFORMATION

Producing energy from biomass has both environmental and economic advantages. It is a carbon neutral process as the CO2 released when energy is generated from biomass is balanced by that absorbed during the fuel's production.
There are two main ways of using biomass to heat a domestic property:

- Standalone stoves providing space heating for a room. These can be fuelled by logs or pellets but only pellets are suitable for automatic feed. Generally they are 6-12 kW in output, and some models can be fitted with a back boiler to provide water heating.

- Boilers connected to central heating and hot water systems. These are suitable for pellets, logs or chips, and are generally larger than 15 kW.

RECOMMENDATIONS SPECIFIC TO THIS DEVELOPMENT

Biofuels are ruled out due to negative impact on air quality and environmental issues surrounding liquid biofuels as currently there are no established standards relating to the sustainability of biofuels.

BE GREEN: ON-SITE RENEWABLE ENERGY SOURCE - WIND ENERGY

GENERAL INFORMATION

Wind power is a clean, renewable source of energy which produces no carbon dioxide emissions or waste products. The turbines can have horizontal or vertical axis (Darrieus type). Wind turbines use the wind's lift forces to rotate aerodynamic blades that turn a rotor which creates electricity. Most small wind turbines generate direct current (DC) electricity and are not connected to the national grid. A special inverter and controller is required to convert DC electricity to AC at a quality and standard acceptable to the grid if the turbine is to be connected to national grid.

RECOMMENDATIONS SPECIFIC TO THIS DEVELOPMENT

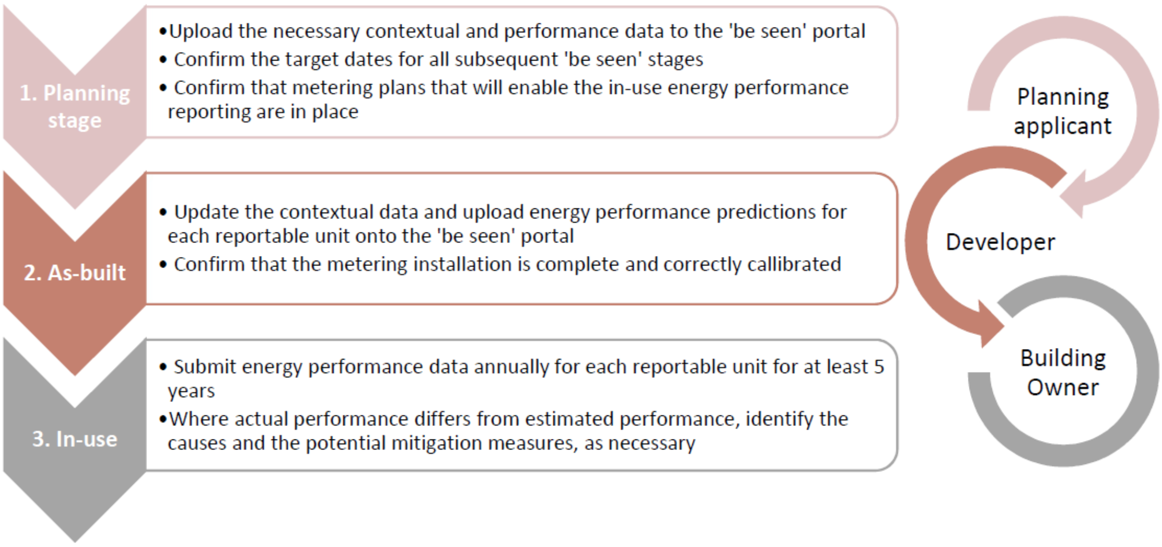
Wind energy systems will not be considered due to negative visual effects, interference, flicker and noise risk. Exposure to wind would be limited by surrounding buildings.

BE SEEN – ENERGY MONITORING

STONEY WOOD QUARTER, THE FAIRWAY, NW7 3HS

London Plan Policy SI 2 sets out the ‘be seen’ requirement for all major development proposals to monitor and report on their actual operational energy performance. The ‘be seen’ policy will help to understand the performance gap and identify ways of closing it while ensuring compliance with London’s net zero-carbon target.

To fully address the “be seen” requirements, the development will be designed to enable post construction monitoring and the information set out in the ‘be seen’ guidance will be submitted to the GLA’s portal at the appropriate reporting stages and be secured by planning conditions.



Internal Water consumption will be reduced by specification of water efficient fittings. The water consumption in the proposed flats will be reduced to 105 litres per person per day or less by specifying water fittings with the following parameters:

WC's: All dual flush capacity 3/6 Litres or less
Kitchen taps flow rate: 8 l/min or less
Bathroom taps flow rate: 6 l/min or less
Bath capacity to overflow: 140 l or less
Showers flow rate: 8 l/min or less
Dishwasher consumption: 0.5 Litres per place setting or less
Washing machine consumption: 6 litres per kg dry load or less

The London Plan approach of “Be lean” – “Be clean” – “Be green” is fully adopted by implementing:

- Passive measures (low U-values, air permeability, avoidance of thermal bridging by accredited details)
- High efficiency services, i.e., high efficiency ventilation with heat recovery, high efficiency lighting
- Renewable sources: Air source heat pumps, Solar PV

Excluded renewable sources are:

- Solar hot water
- Biomass
- Wind turbines

The proposed development will achieve:

- 74% overall regulated CO_2 reduction against 2021 Part L compliant baseline

- 57% overall regulated CO_2 reduction by renewable sources

- 17% overall regulated CO_2 reduction by efficiency measures (“Be Lean” stage of the energy hierarchy)

- The remaining shortfall will be met by a carbon offsetting contribution and “Be seen” energy monitoring will be secured by planning conditions.

Overheating simulations show that the tested residential units fail on the TM59 thermal comfort criteria using the main TM49 weather file (DSY1), which is due to limited window opening dictated by Noise Assessment. Mechanical cooling using hybrid MVHR add-on units is therefore proposed as the final step of the GLA cooling hierarchy.