Energy & Sustainability Statement

157-159 Hornsey Park Road, LONDON N8

Irvineering Ltd

Assessment information

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Disclaimer

The findings, conclusions and recommendations of this report are based on the information supplied. Irvineering Ltd disclaims responsibility in respect of incorrect information imparted to them or for the actual performance of any of the building services installations.
This report is prepared for the use of 157-159 Hornsey Park Road, a duty of care is not owed to other parties.

CONTENT

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:

- 88% overall regulated CO2 reduction against 2021 Part L compliant baseline

- 79% overall regulated CO2 reduction by renewable sources

- 10% overall regulated CO2 reduction by efficiency measures ("Be Lean" stage of the energy hierarchy)

ABOUT THE ENERGY STATEMENT

Irvineering Ltd have been appointed to provide an Energy Statement for the proposed development at 157-159 Hornsey Park Road.

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 Energy Team Guidance on Planning Energy Assessments.

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 commercial space in accordance with Part L procedures.

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	28.7	9.8
After energy demand reduction (be lean)	25.9	9.8
After heat network connection (be clean)	25.9	9.8
After renewable energy (be green)	2.8	9.8

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	2.8	10%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	23.0	80%
Cumulative on site savings	**25.8**	**90%**
Annual savings from off-set payment	2.8	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**85**	-
Cash in-lieu contribution (£)	**8,109**	

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

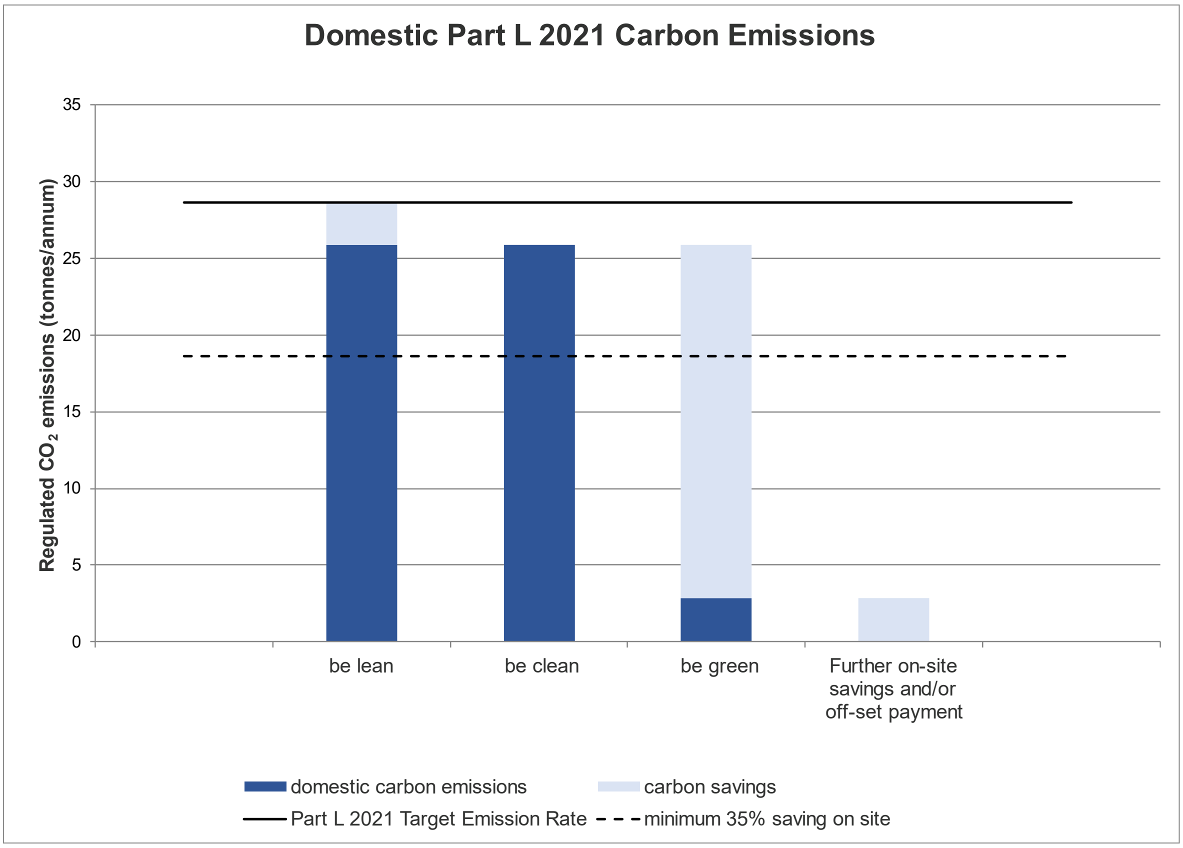

Domestic Part L 2021 Carbon Emissions
Regulated CO_2 emissions (tonnes/annum)
35
30
25
20
15
10
5
0
be lean
be clean
be green
Further on-site savings and/or off-set payment
domestic carbon emissions
carbon savings
Part L 2021 Target Emission Rate
minimum 35% saving on site

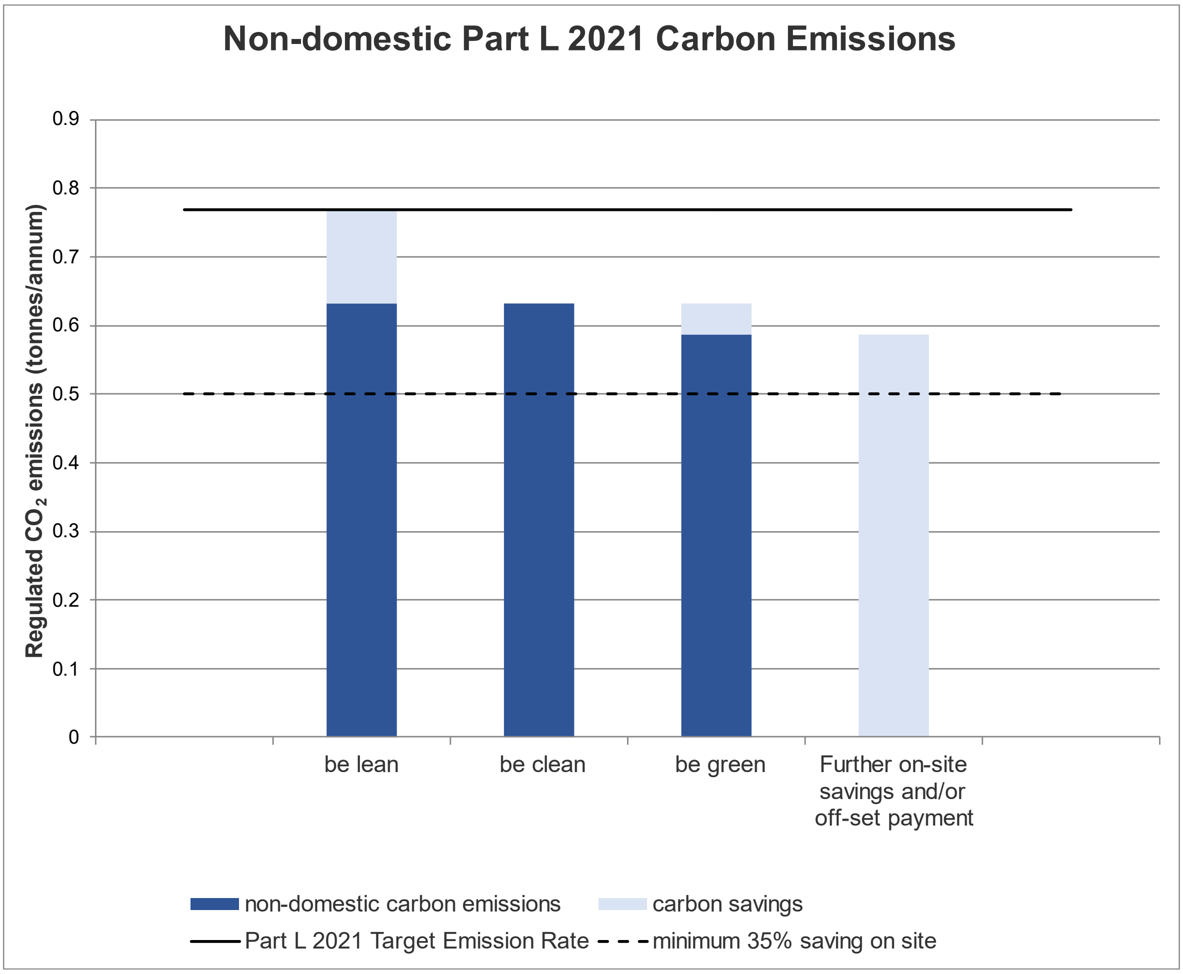
Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-residential buildings

	Carbon Dioxide Emissions for non-residential buildings (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	0.8	0.5
After energy demand reduction (be lean)	0.6	0.5
After heat network connection (be clean)	0.6	0.5
After renewable energy (be green)	0.6	0.5

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	0.1	17%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	0.1	7%
Total Cumulative Savings	**0.2**	**24%**
Annual savings from off-set payment	0.6	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**17**	-
Cash in-lieu contribution (£)	**1,659**	

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



SITE-WIDE

	Total regulated emissions (Tonnes CO_2 / year)	CO_2 savings (Tonnes CO_2 / year)	Percentage savings (%)
Part L 2021 baseline	29.4		
Be lean	26.5	2.9	10%
Be clean	26.5	0.0	0%
Be green	3.4	23.1	79%
Total Savings	-	26.0	88%
	-	**CO_2 savings off-set (Tonnes CO_2)**	-
Off-set	-	**102.8**	-

Table 5: SAP 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	0.15	0.15
Roof U-value	0.13	0.10	0.10
Windows U-value	1.2	1.2 (double glazed)	1.2 (double glazed)
External door U-value	1.0	1.0	1.0
Windows g-value - residential	0.63	0.45	0.45
Windows g-value - commercial	0.20	0.20	0.20
Air Permeability	5	3	3
Thermal bridging - residential	y-value 0.05; **Detailed thermal bridging calculations will be required at detailed design stage**	y-value 0.05; **Detailed thermal bridging calculations will be required at detailed design stage**	y-value 0.05; **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 cascade air source heat pump system with primary water loop (Daikin EWYT-CZN or similar), secondary water/water indoor unit in apartments (Daikin EWSAH-UD9W or similar); heat pump convectors (Daikin Altherma HPC or similar) or underfloor heating; heating SCoP 4.0
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 cascade air source heat pump system with primary water loop (Daikin EWYT-CZN or similar), secondary water/water indoor unit in apartments (Daikin EWSAH-UD9W or similar);
Space Heating and cooling - commercial	ASHP VRF with heating SCoP of 2.64, Cooling SEER 3.0	ASHP with heating SCoP of 2.64; cooling SEER 7.0	ASHP with heating SCoP of 4.0; cooling SEER 7.0
Hot water - commercial	Instantenous electric water heaters	Instantenous electric water heaters	Instantenous electric water heaters
Ventilation System - flats	Natural ventilation with intermittent mechanical extracts	MVHR Nuaire MRXBOXAB-Eco3 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-Eco3 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 - commercial	MVHR with SFP 1.0 W/l.s and 80% heat recovery efficiency	MVHR with SFP 1.0 W/l.s and 80% heat recovery efficiency; demand control depending on CO2 sensors	MVHR with SFP 1.0 W/l.s and 80% 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 - commercial	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 - commercial	95	95 (power factor correction device is required)	95 (power factor correction device is required)
Solar Photovoltaic - residential	kWp = 40% of dwelling floor area / (6.5 x number of storeys in block) System facing SE/SW, 45° pitch	kWp = 40% of dwelling floor area / (6.5 x number of storeys in block) System facing SE/SW, 45° pitch	PV system with a total peak output of 25 kWp, panels installed horizontally (less than 15° pitch)
% Improvement in CO2 over Building regulations compliant baseline	**0%**	**10%**	**88%**

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	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)	($kgCO_2$ / m^2)	($kgCO_2$ p.a.)	($kgCO_2$ / m^2)	($kgCO_2$ / m^2)	(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.)
A01	92.2	12.82	-98.61	11.77	1.07	36.50	34.60	1,182	-99	1,085	987	195	99	888
A02	73.4	14.39	-78.53	13.78	1.40	39.00	36.20	1,056	-79	1,011	933	123	103	830
A03	58.8	16.66	-62.92	16.53	1.83	43.90	42.80	980	-63	972	909	71	108	801
A14	50.9	14.22	-54.48	13.81	1.31	28.20	26.00	724	-54	703	648	75	67	582
A15	41.6	16.12	-44.53	16.66	1.74	30.90	33.40	671	-45	693	649	22	72	576
A16	73.4	14.70	-78.53	14.25	1.47	40.60	39.80	1,079	-79	1,046	967	112	108	860
A17	58.8	14.96	-62.92	14.29	1.44	35.70	33.20	880	-63	840	777	102	85	693
A28	50.9	14.22	-78.53	13.81	1.31	28.20	26.00	724	-79	703	624	99	67	558
A29	41.6	16.12	-62.92	16.66	1.74	30.90	33.40	671	-63	693	630	40	72	558
A210	73.4	14.70	-54.48	14.25	1.47	40.60	39.80	1,079	-54	1,046	991	88	108	884
A211	58.8	14.96	-44.53	14.29	1.44	35.70	33.20	880	-45	840	796	84	85	711
A312	50.9	14.22	-54.48	13.81	1.31	28.20	26.00	724	-54	703	648	75	67	582
A313	41.6	16.12	-44.53	16.66	1.74	30.90	33.40	671	-45	693	649	22	72	576
A314	73.4	14.70	-78.53	14.25	1.47	40.60	39.80	1,079	-79	1,046	967	112	108	860
A315	58.8	14.96	-62.92	14.29	1.44	35.70	33.20	880	-63	840	777	102	85	693
A416	56.2	14.22	-60.14	14.43	1.44	31.50	33.00	799	-60	811	751	48	81	670
A417	73.4	12.93	-78.53	12.86	1.23	32.40	32.80	949	-79	944	865	84	90	775
A418	58.8	14.96	-62.92	14.29	1.44	35.70	33.20	880	-63	840	777	102	85	693
A519	56.2	15.92	-60.14	16.09	1.74	39.20	40.20	895	-60	904	844	51	98	746
A520	73.4	14.47	-78.53	14.47	1.52	39.60	39.60	1,062	-79	1,062	984	79	112	872
A521	58.8	16.48	-62.92	15.96	1.73	42.80	40.00	969	-63	938	876	93	102	774
B11	71.3	13.24	-114.26	13.54	1.34	35.50	34.40	944	-114	965	851	93	96	756
B12	50.9	15.38	-81.60	15.96	1.68	36.80	36.50	783	-82	812	731	52	86	645
B13	86.6	13.28	-138.75	13.15	1.31	40.10	37.30	1,150	-139	1,139	1,000	150	113	887
B24	71.3	11.44	-114.26	11.96	1.05	27.10	27.20	816	-114	853	738	77	75	664
B25	50.9	13.52	-81.60	14.38	1.39	28.30	29.30	688	-82	732	650	38	71	580
B26	86.6	11.63	-138.75	11.52	1.02	32.30	30.60	1,007	-139	998	859	148	88	771
B37	71.3	11.44	-114.26	11.96	1.05	27.10	27.20	816	-114	853	738	77	75	664
B38	50.9	13.52	-81.60	14.38	1.39	28.30	29.30	688	-82	732	650	38	71	580
B39	86.6	11.63	-138.75	11.52	1.02	32.30	30.60	1,007	-139	998	859	148	88	771
B410	73.9	13.48	-118.43	13.98	1.43	37.60	37.20	996	-118	1,033	915	81	106	809
B411	52.7	17.62	-84.48	17.78	2.02	48.20	45.90	929	-84	937	853	76	106	746
Sum	955	14.1	-84.7	14.0	1.4	35.3	34.4	*28,654*	*-2,571*	*28,466*	*25,895*	*2,759*	*2,845*	*23,050*

NON-RESIDENTIAL CO_2 ANALYSIS (PART L2)														
		Baseline		'Be Lean'	'Be Green'			Baseline		'Be Lean'			'Be Green'	
Building Use	Model Area	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)	($kgCO_2$ / m^2)	(kWh / m^2)	($kgCO_2$ / m^2)	($kgCO_2$ / m^2)			($kgCO_2$ 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.)
Commercial	181.98	4.23	0.00	3.49	3.20			769	0.00	635.81	636	133	582	54
Sum		4.2	0.0	3.5	3.2			*769*	*0*	*636*	*636*	*133*	*582*	*54*
SITE-WIDE ENERGY CONSUMPTION AND CO_2 ANALYSIS														
Total Sum		-	-	-	-			*29,423*	*-2,571*	*29,102*	*26,531*	*2,892*	*3,428*	*23,103*

BACKGROUND

Irvineering Ltd have been appointed to provide an Energy Statement for the proposed development at 157-159 Hornsey Park Road.
This statement covers possible active and passive measures including renewable energy sources to make this development sustainable and environmentally friendly.

DESCRIPTION OF THE SITE

The proposal is a demolition of existing warehouse buildings on site and construction of new part four and part five to six storeys in height, mixed use scheme.

Demolition of existing structures and erection of two buildings to provide residential units and Class E floorspace; and provision of associated landscaping, a new pedestrian route, car and cycle parking, and refuse and recycling facilities.

NATIONAL POLICY

DCLG 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. 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 NEW LONDON PLAN 2021

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 New 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.151 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 sample of the expected worst performing top floor residential units have 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 all tested residential units meet the TM59 thermal comfort overheating criteria using the main TM49 weather file (DSY1) for the 'future near extreme summer', demonstrating that the building is resilient to overheating during its lifetime. Mechanical cooling is not necessary for the residential units.

RESIDENTIAL CRITERIA
CIBSE TM59

Compliance is based on passing both of the following two criteria:

Criterion 1a: Hours of Exceedence (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

Criterion 1a: Hours of Exceedence (He):

For living rooms, kitchens and bedrooms:
Same as CIBSE TM52 Criterion 1.

COMMERCIAL SPACES

The commercial unit, which is assessed as retail, is not included in the dynamic overheating simulations, as it is by nature expected to have mechanical cooling in any case, due to high equipment gains and occupancy density. Solar control glazing with g-value of 0.2 is proposed for the commercial unit in order to minimise solar gains.
Compliance with 2021 Part L2 limits on solar gains is shown in BRUKL report.

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.

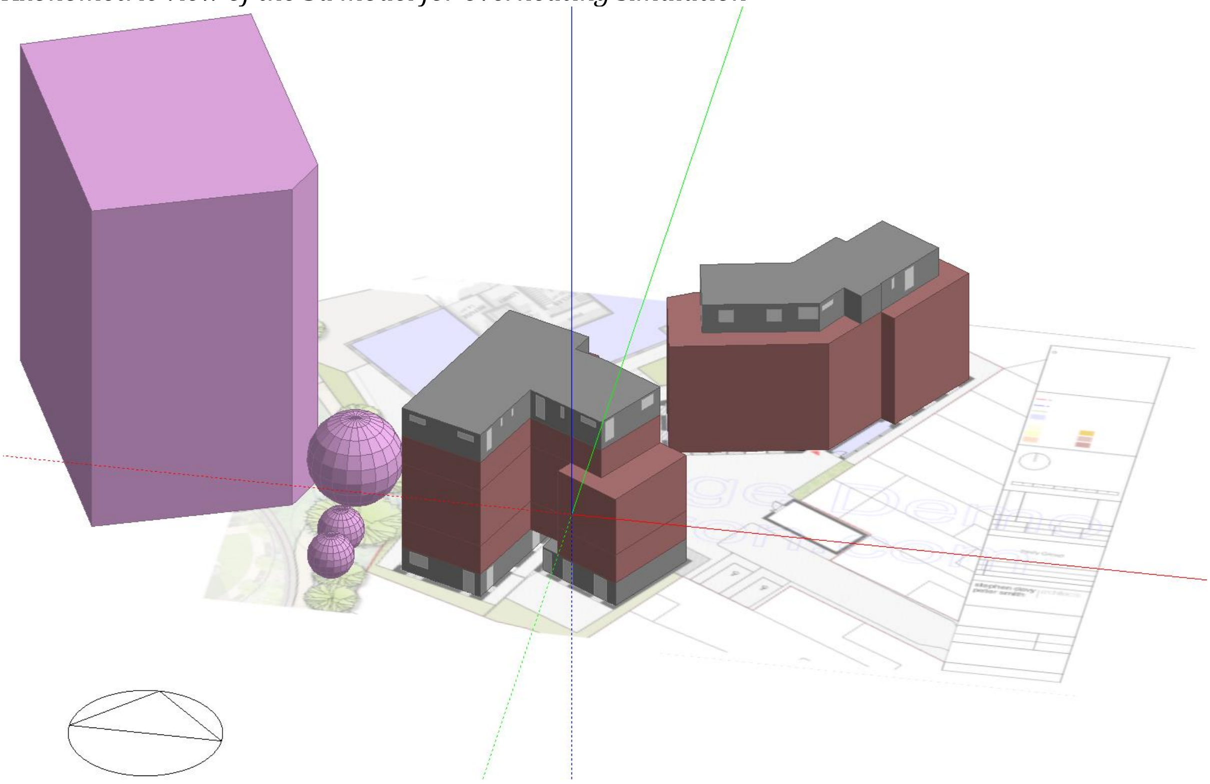
DSY3 - 1976: a year with a prolonged period of sustained warmth. It is not mandatory for the building to comply: as such this data has been used to evaluate risk and inform the design.

DYNAMIC SIMULATIONS

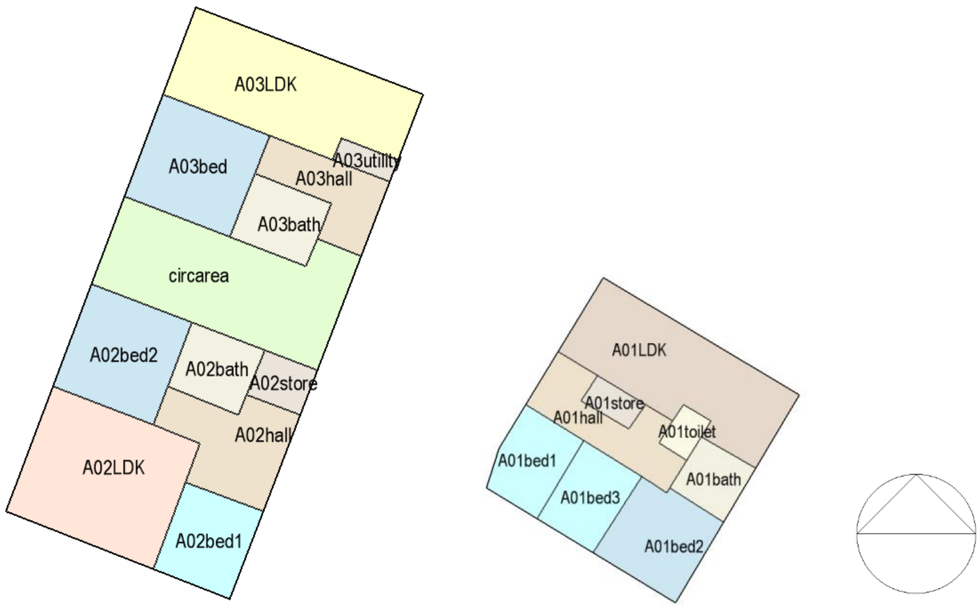
The analysis was carried out using DesignBuilder v6 - EnergyPlus v8 engine. The 3D model is based on the architectural drawings and specifications.

Weather data set used for the simulation is CIBSE DSY1 (design summer year) London Weather Centre for the 2020s, high emissions, 50% percentile scenario

Axonometric view of the 3d model for overheating simulation



Modelled areas – Ground floor



Modelled areas – 4th floor

Modelled areas – 5th floor

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.

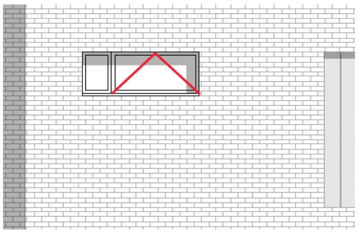
SOLAR SHADING

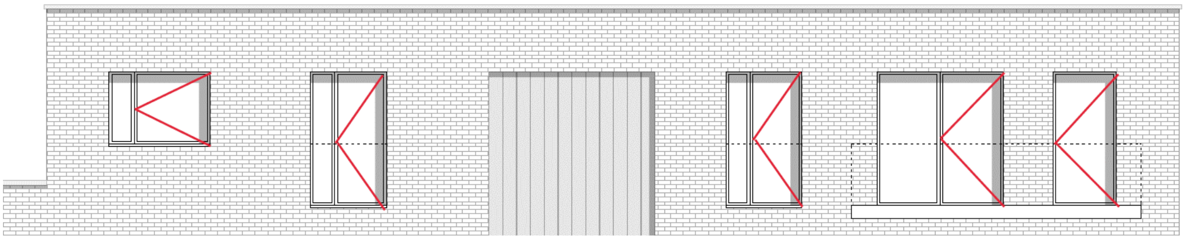
All windows in the development are modelled without internal blinds, in line with Part O guidance.
g-value of 0.45 is used for all residential glazing

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 intermittent extracts in bathrooms and kitchens. 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.

Natural ventilation through openable windows is included in the model. Openability of windows is modelled as follows. This is a minimum openability of typical windows, which will have to be implemented in order to comply with Part O:





All windows and glazed doors in habitable rooms of ground floor flats will have to be openable as Tilt and Turn so that they provide at least 15cm gap at the top when tilted. These windows are assumed to be unable to be left fully open during night and are modelled as tilted only during night time.

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

COOLING HIERARCHY SUMMARY

London Plan policy SI 4 is addressed by following the cooling hierarchy:

1) amount of heat entering the buildings is limited by:
   - building orientation – glazing is evenly distributed to various sides (SE, SW, NW, NW) achieving balance between sunlight requirements, positive impact of solar gains in winter and reducing the excessive solar gains in summer
   - glazing g-value of 0.45 is specified for residential units and 0.20 for commercial
   - U-values of opaque elements exceed the stringent 2021 Part L1 requirements
2) Internal heat generation through energy efficient design is minimised by
   - low energy lighting
   - pipework and any heat interface units or hot water storage withing dwellings will be insulated with levels of insulation exceeding current building regulation requirements
3) Opportunities for internal thermal mass and high ceilings are limited due to technical, functional and acoustic reasons
4) Natural ventilation through openable windows is included as described above
5) Mechanical ventilation with heat recovery and summer bypass in all flats
6) Active cooling system is proposed only for the commercial unit

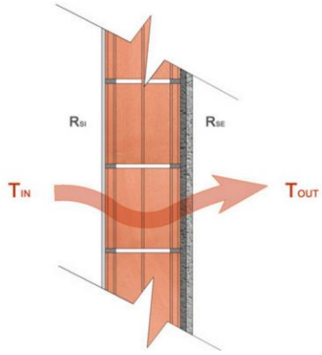
OVERHEATING SIMULATION RESULTS – DSY1

Criteria for predominantly naturally ventilated homes				
Block	Zone	Criterion A (%)	Criterion B (hr)	Pass/Fail
A-0GF1	A01LDK	0	N/A	Pass
A-0GF1	A01bed1	0	18.5	Pass
A-0GF1	A01bed2	0	23	Pass
A-0GF1	A01bed3	0	19.5	Pass
A-0GF23	A02LDK	0	N/A	Pass
A-0GF23	A02bed1	0	12	Pass
A-0GF23	A02bed2	0	13	Pass
A-0GF23	A03LDK	0	N/A	Pass
A-0GF23	A03bed	0	8	Pass
A-5th	A519LDK	0	N/A	Pass
A-5th	A519bed	0	11.5	Pass
A-5th	A520LDK	0	N/A	Pass
A-5th	A520bed1	0	10	Pass
A-5th	A520bed2	0	9.5	Pass
A-5th	A521LDK	0	N/A	Pass
A-5th	A521bed	0	5.5	Pass
B-4th	B410LDK	0	N/A	Pass
B-4th	B410bed1	0	10	Pass
B-4th	B410bed2	0	16.5	Pass
B-4th	B411LDK	0	N/A	Pass
B-4th	B411bed	0	11	Pass

Be Lean: Passive Design and Efficient Services

Number of 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:

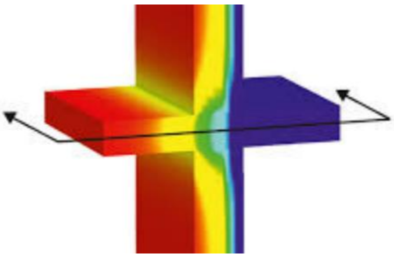
Low U-values of building fabric



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

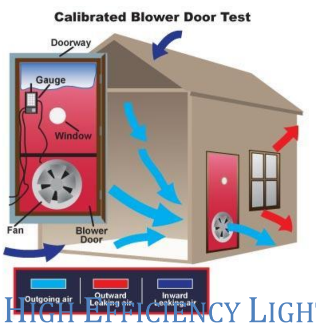


Thermal bridges occur at all junctions between building thermal elements, typically at junctions between wall/floor, wall/roof etc. Recent changes in the building regulations have emphasized the significance of thermal bridging in building design.

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 set out in SAP table R2 as reference Psi-values representing a good practice level of thermal bridging. 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

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 the new 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

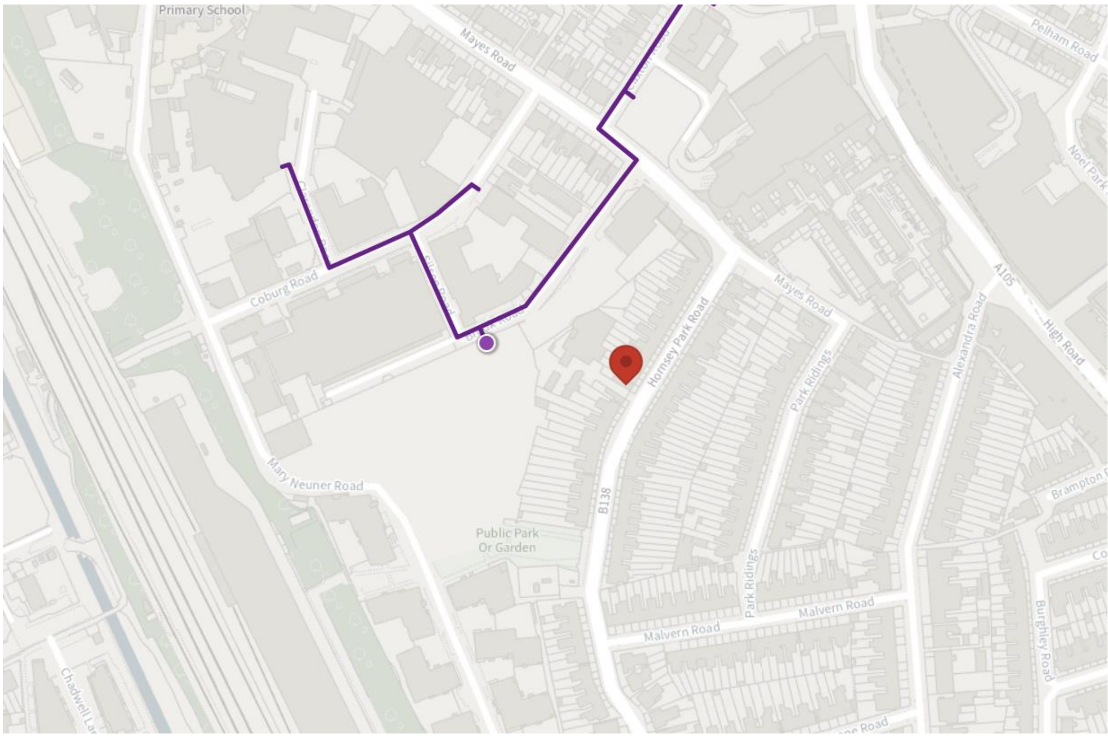
Reducing general water consumption in dwellings also reduces amount of energy needed to provide hot water. New Part L1 notional building therefore allows for overall water consumption of 125 l/person.day and more specifically, showers with flow rate of 8 l/min.

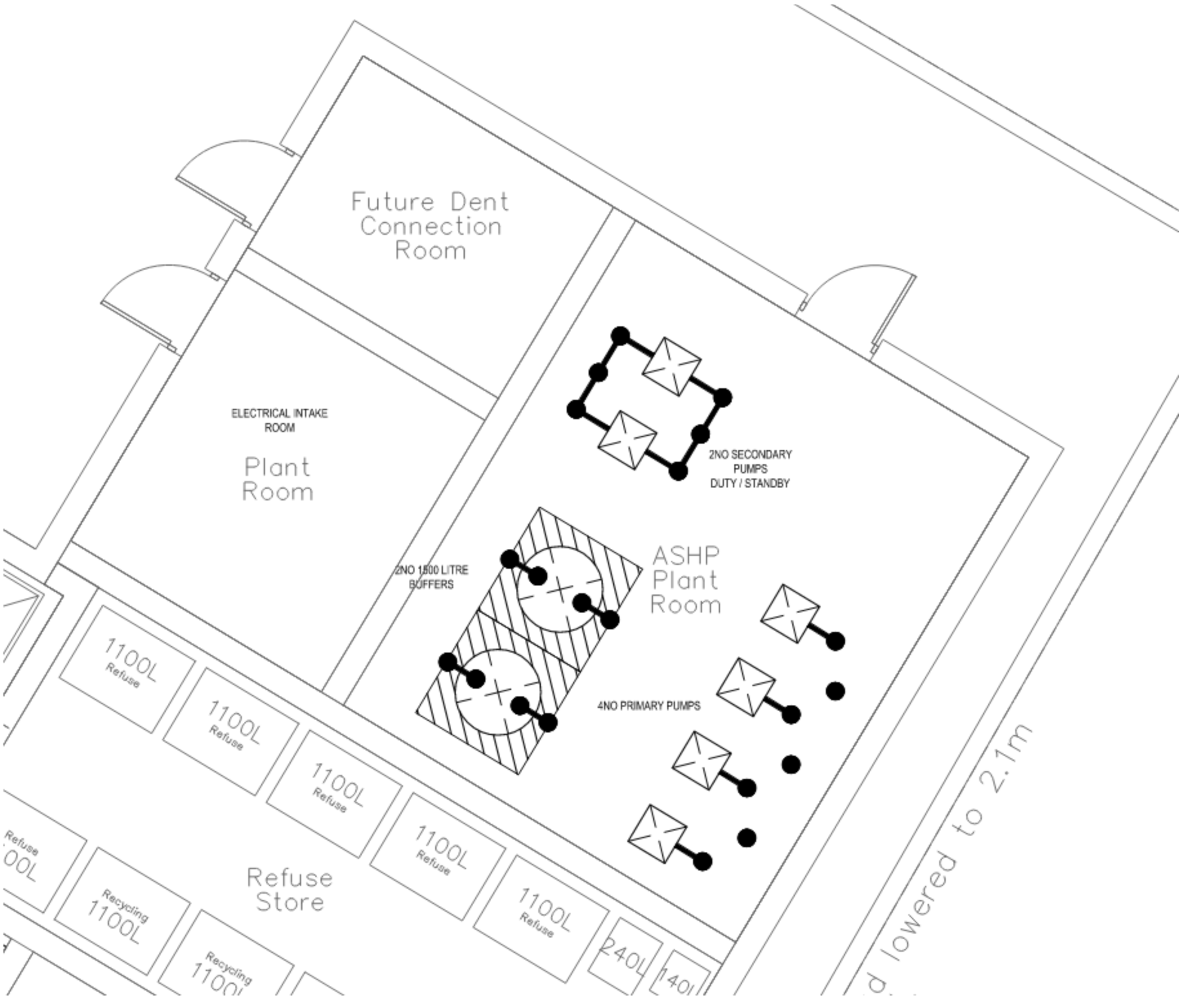
COMBINED HEAT AND POWER

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 an energy centre with planned heat network proposed on the adjacent site. The communal heating pipework will be designed and installed in a way to allow for future DHN connections. Following discussions with the councils DEN officer an incoming DEN room has been allocated at ground floor level for the primary connection, the primary connection will extend to the adjacent secondary plantroom (ASHP Plant Room) and shall utilise existing, pumps, buffers and pipework distribution for a simple future connection to the district heat network.



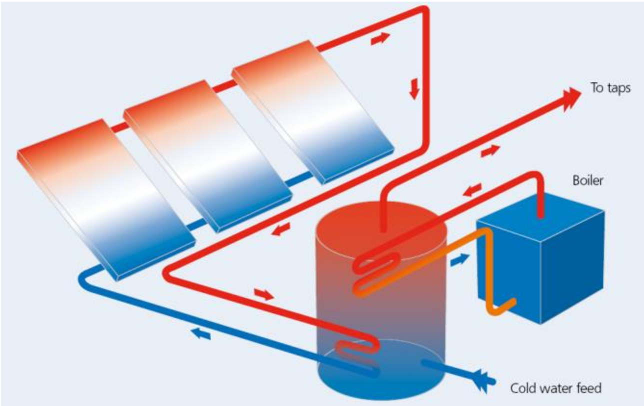


Ground Floor Plant Space

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.

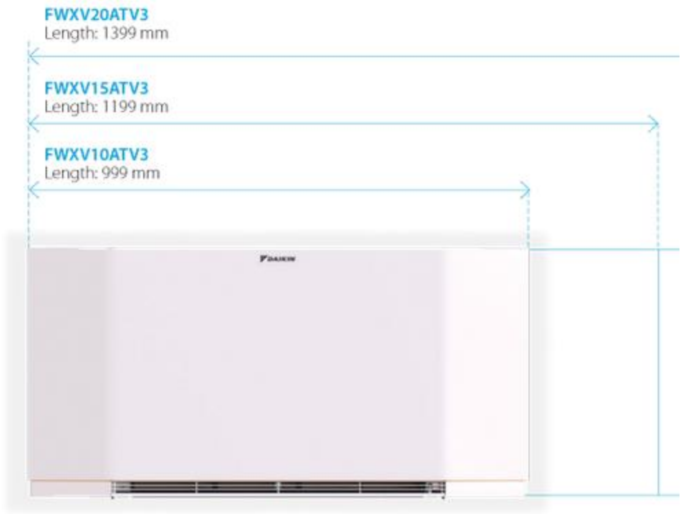
RECOMMENDATIONS SPECIFIC TO THIS DEVELOPMENT

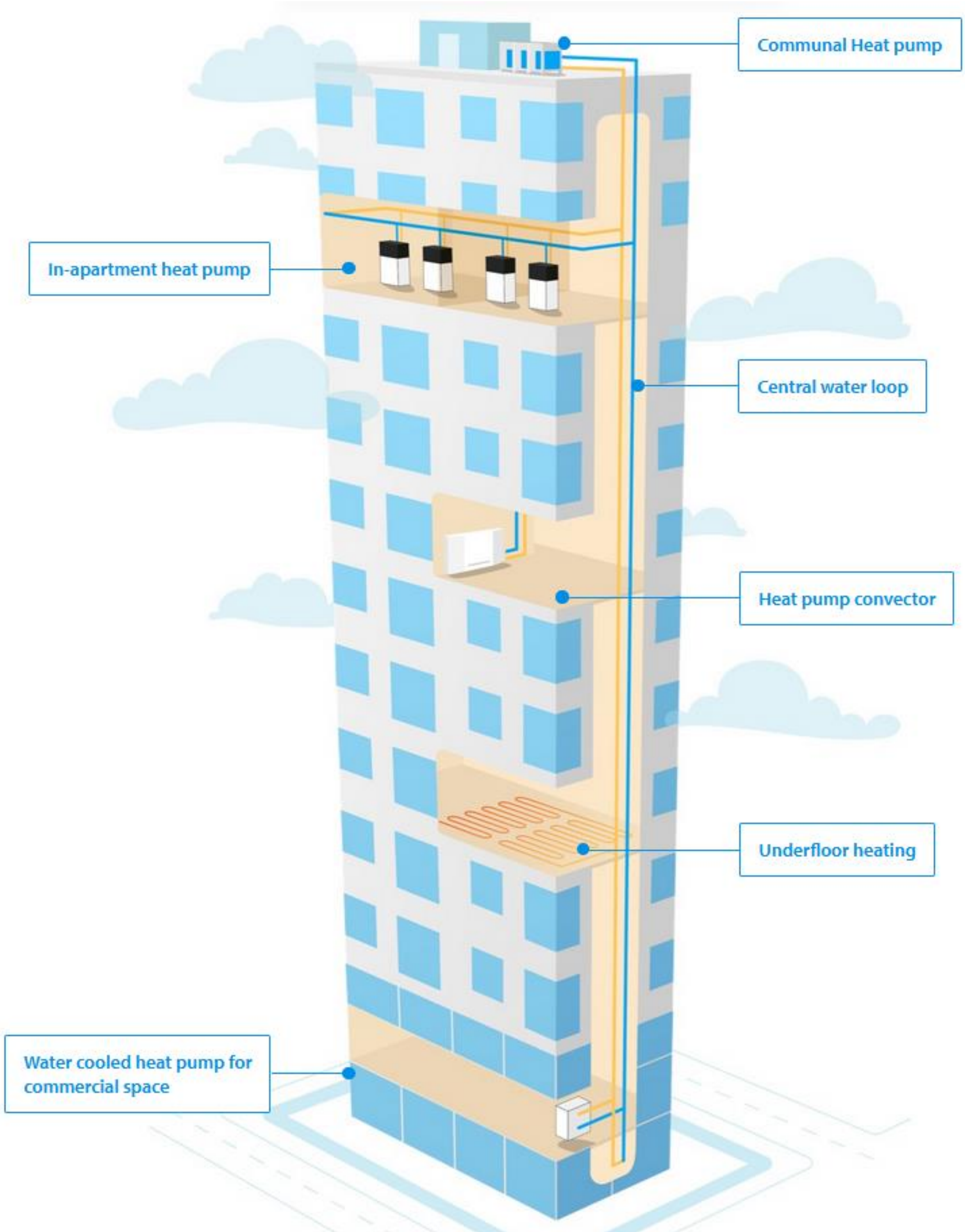
It is proposed to install a communal cascade water-loop air source heat pump system DAIKIN EWYT-CZN or equivalent, which will provide space heating through low temperature convectors or underfloor heating, as well as all hot water demand.
The system will comprise:

- Outdoor EWYT-CZN or similar units located at the roof plant area. Outdoor units as the first stage of cascade system will provide a water loop with a constant temperature of 10-35°C

- Individual indoor units with integrated 180 L hot water storage in each apartment.

- Daikin Altherma HPC convectors or underfloor heating




Communal Heat pump
In-apartment heat pump
Central water loop
Heat pump convector
Underfloor heating
Water cooled heat pump for commercial space

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

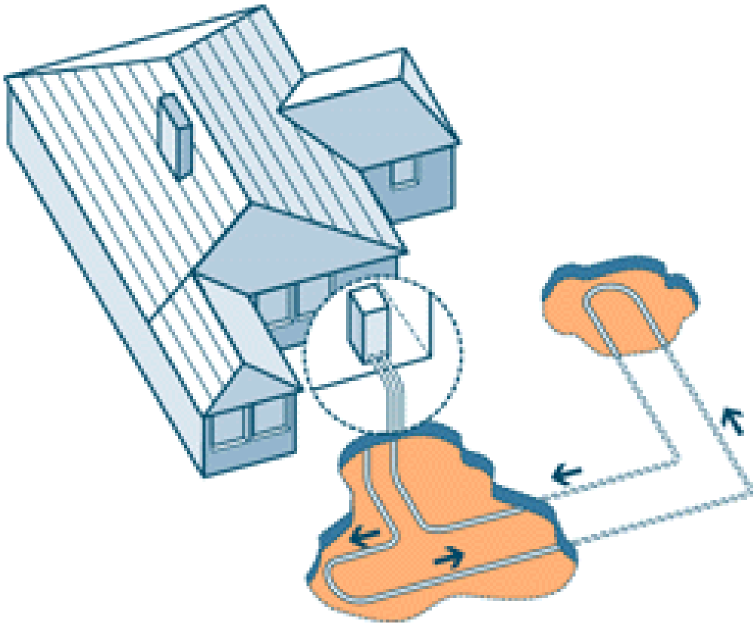
The proposed development has a flat roof suitable for solar PV panels with a total roof area of ca 220 m2 after accounting for plant and man safe systems. It is currently estimated, that if fully utilised for solar PV, this roof area can accommodate PV system with a total peak output of 25 kWp.

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

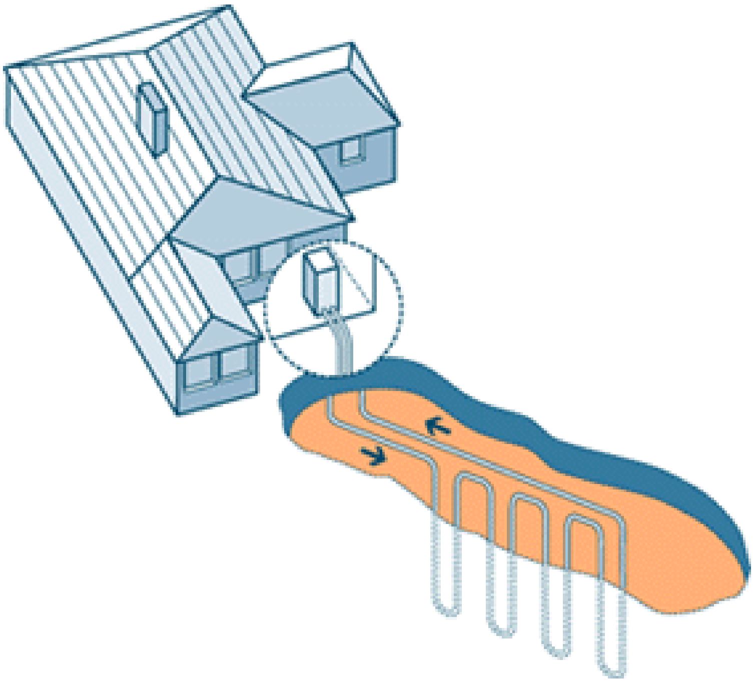
GENERAL INFORMATION

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 CO2 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

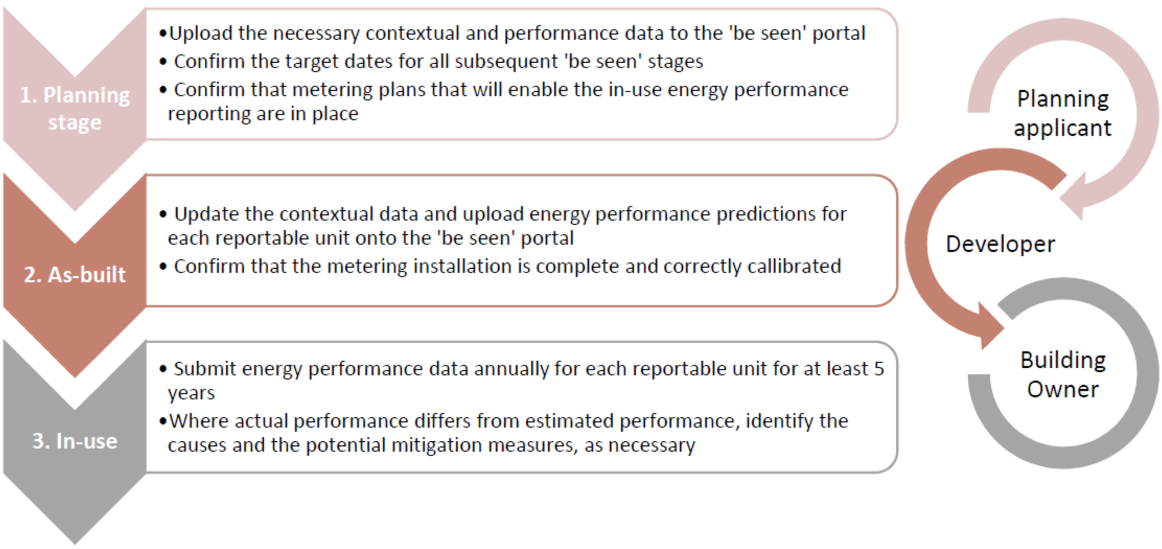
Wind power is a clean, renewable source of energy which produces no carbon dioxide emissions or waste products. The turbines can have horizontal or vertical axis (Darrieus type). Wind turbines use the wind's lift forces to rotate aerodynamic blades that turn a rotor which creates electricity. Most small 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.

New 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



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:

- 88% overall regulated CO2 reduction against 2021 Part L compliant baseline exceeding the GLA energy assesment guidance 2022 benchhamark of 50%.

- 79% overall regulated CO2 reduction by renewable sources

- 10% overall regulated CO2 reduction by efficiency measures (“Be Lean” stage of the energy hierarchy)