

Technical Note – 29th July 2019

Hillingdon Gardens – Summary of Proposed Energy Strategy and Sustainability Requirements

Introduction

The following Sustainability Reports will be provided as part of the planning application:-

- Energy and Statement targeting a 35% carbon reduction against a base Part L 2013 compliant build for the commercial element and a zero carbon target for the residential element.

It is recommended early dialogue is established with the GLA energy officer through either pre-app consultations or email to establish the viability of the proposed energy strategy.

Policy Requirements

The London Plan (March 2016)

Policy 5.2 Minimising Carbon Dioxide Emissions

Development proposals should make the fullest contribution to minimising carbon dioxide emissions in accordance with the following energy hierarchy:

- Be Lean: use less energy –This involves the use of passive and energy efficiency design measures to reduce the energy requirement and subsequent carbon footprint of the site. These provide a footprint which delivers compliance with Building Regulations Part L (2013) and the Baseline Energy and Carbon emission figures for the development.
- Be Clean: supply energy efficiently – The use of a central energy centre has been considered to serve the development, to provide the primary heating and cooling requirements for the development.
- Be Green: use renewable energy – The use of renewable energy has been investigated in the context of the site and the overall usage patterns of energy throughout the development.

The Mayor will work with boroughs and developers to ensure that major developments meet the following targets for carbon dioxide emissions reduction in buildings. These targets are expressed as minimum improvements over the Target Emission Rate (TER) outlined in the national Building Regulations leading to zero carbon residential buildings from 2016 and zero carbon non-domestic buildings from 2019.

Residential Buildings:

Year	Improvement on 2010 Building Regulations
2010 – 2013	25 per cent (Code for Sustainable Homes level 4)t
2013 – 2016	40 per cent
2016 – 2031	Zero Carbon

Major development proposals should include a detailed energy assessment to demonstrate how the targets for carbon dioxide emissions reduction outlined above are to be met within the framework of the energy hierarchy.

As a minimum, energy assessments should include the following details:

- calculation of the energy demand and carbon dioxide emissions covered by Building Regulations and, separately, the energy demand and carbon dioxide emissions from any other part of the development, including plant or equipment, that are not covered by the Building Regulations (see paragraph 5.22) at each stage of the energy hierarchy
- proposals to reduce carbon dioxide emissions through the energy efficient design of the site, buildings and services c proposals to further reduce carbon dioxide emissions through the use of decentralised energy where feasible, such as district heating and cooling and combined heat and power (CHP)
- proposals to further reduce carbon dioxide emissions through the use of on-site renewable energy technologies.

The carbon dioxide reduction targets should be met on-site. Where it is clearly demonstrated that the specific targets cannot be fully achieved on-site, any shortfall may be provided off-site or through a cash in lieu contribution to the relevant borough to be ring fenced to secure delivery of carbon dioxide savings elsewhere.

The GLAs Energy Planning guidance requires carbon reduction for schemes received on or after the 1st October 2016 to be zero carbon for residential development and 35% below Part L 2013 for commercial development.

The carbon dioxide reduction targets should be met on-site. Where it is clearly demonstrated that the specific targets cannot be fully achieved on-site, any shortfall may be provided off-site or through a cash in lieu contribution to the relevant borough to be ring fenced to secure delivery of carbon dioxide savings elsewhere.

Within LDFs boroughs should consider the need to develop more detailed policies and proposals based on the sustainable design principles outlined above and those which are outlined in the Mayor's supplementary planning guidance that are specific to their local circumstances

Draft London Plan – Consolidated Changes Version (July 2019)

Policy SI2 Minimising greenhouse gas emissions

- A) Major development should be net zero-carbon. This means reducing greenhouse 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.
- 3A. be seen: monitor, verify and report energy performance.
- B) Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.
- C) A minimum on-site reduction of at least 35 per cent beyond Building Regulations is required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either:
 1. through a cash in lieu contribution to the borough's carbon offset fund, or
 2. off-site provided that an alternative proposal is identified and delivery is certain.
- D) Boroughs must establish and administer a carbon offset fund. Offset fund payments must be ring-fenced to implement projects that deliver carbon reductions. The operation of offset funds should be monitored and reported on annually.
 - a. Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.
 - b. Development proposals referable to the Mayor should calculate whole life-cycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

Energy Assessment Guidance (October 2018)

The report will adhere to the guidance as part of the document stated above.

Please note that from January 2019, planning applicants are encouraged to use updated (SAP 10) carbon emission factors to assess the expected carbon performance of a new development. Applicants should continue to use the current Building Regulations methodology for estimating energy performance against Part L 2013 requirements but with the outputs manually converted for the SAP 10 emission factors.

LBH Local Plan Part 1 Strategic Policies (2012)

Policy EM1: Climate Change Adaptation and Mitigation

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

1. Prioritising higher density development in urban and town centres that are well served by sustainable forms of transport.
2. Promoting a modal shift away from private car use and requiring new development to include innovative initiatives to reduce car dependency.
3. Ensuring development meets the highest possible design standards whilst still retaining competitiveness within the market.

4. Working with developers of major schemes to identify the opportunities to help provide efficiency initiatives that can benefit the existing building stock.
5. Promoting the use of decentralised energy within large scale development whilst improving local air quality levels.
6. Targeting areas with high carbon emissions for additional reductions through low carbon strategies. These strategies will also have an objective to minimise other pollutants that impact on local air quality. Targeting areas of poor air quality for additional emissions reductions.
7. Encouraging sustainable techniques to land remediation to reduce the need to transport waste to landfill. In particular developers should consider bioremediation as part of their proposals.
8. Encouraging the installation of renewable energy for all new development in meeting the carbon reduction targets savings set out in the London Plan. Identify opportunities for new sources of electricity generation including anaerobic digestion, hydroelectricity and a greater use of waste as a resource.
9. Promoting new development to contribute to the upgrading of existing housing stock where appropriate.

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

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

LBH Local Plan Part 2 Development Management Policies (2019)

Policy DME2: Reducing Carbon Emissions

- A. All developments are required to make the fullest contribution to minimising carbon dioxide emissions in accordance with London Plan targets.
- B. All major development proposals must be accompanied by an energy assessment showing how these reductions will be achieved.
- C. Proposals that fail to take reasonable steps to achieve the required savings will be resisted. However, where it is clearly demonstrated that the targets for carbon emissions cannot be met onsite, the Council may approve the application and seek an offsite contribution to make up for the shortfall.

Policy DMEI 3: Decentralised Energy

- A. All major developments are required to be designed to be able to connect to a Decentralised Energy Network (DEN).
- B. Major developments located within 500 metres of an existing DEN, and minor new-build developments located within 100 metres, will be required to connect to that network, including provision of the means to connect to that network and a reasonable financial contribution to the connection charge, unless a feasibility assessment demonstrates that connection is not reasonably possible.
- C. Major developments located within 500 metres of a planned future DEN, which is considered by the Council likely to be operational within 3 years of a grant of planning permission, will be required to provide a means to connect to that network and developers shall provide a reasonable financial contribution for the future cost of connection and a commitment to connect via a legal agreement or contract, unless a feasibility assessment demonstrates that connection is not reasonably possible.
- D. The Council will support the development of DENs and energy centres in principle, subject to meeting the wider policy requirements of this plan and in particular on design and air quality.

Energy Strategy

The preliminary energy strategy for the Hillingdon Gardens development shall follow the hierarchy set out below, in compliance with local policy and the London Plan:

- Be lean;
- Be clean;
- Be green.

Be Lean

In order to initially reduce carbon emissions from a base Part L1A and L2A (2013) compliant development, the following passive design and energy efficiency measures will be investigated:-

Building Fabric

The following 'U' values shall be targeted within the residential element of the development, in accordance with Part L1A (2013), these 'U' values go beyond the minimum requirements of Part L1A 2013.

- External Walls - $U = 0.16 \text{ W/m}^2.\text{K}$;
- Exposed Floors - $U = 0.11 \text{ W/m}^2.\text{K}$;
- Exposed Roofs - $U = 0.11 \text{ W/m}^2.\text{K}$;
- Glazing - $U = 1.2 \text{ W/m}^2.\text{K}$; G' value of 0.43;
- Air Permeability - $3 \text{ m}^3/\text{hr/m}^2@ 50 \text{ Pa}$;

Please note that Accredited Construction Details in accordance with Table K1 of Appendix K of Part L are to be achieved.

The following 'U' values shall be targeted within the commercial element of the development, in accordance with Part L2A (2013), these 'U' values go beyond the minimum requirements of Part L2A 2013.

- External Walls - $U = 0.20 \text{ W/m}^2.\text{K}$;
- Exposed Floors - $U = 0.20 \text{ W/m}^2.\text{K}$;
- Exposed Roofs - $U = 0.16 \text{ W/m}^2.\text{K}$;
- Glazing - $U = 1.4 \text{ W/m}^2.\text{K}$; G' value of 0.43;
- Air Permeability - $3 \text{ m}^3/\text{hr/m}^2@ 50 \text{ Pa}$.

Note: These U values will require confirmation upon completion of detailed SAP and SBEM calculations. The development will need to comply with Building Regulations Part L1A and L2A by the above measures alone.

In conjunction with the GLAs Energy Assessment Guidance, the domestic element of the development will target a 10% carbon emission improvement beyond Part L from passive and energy efficiency measures. Similarly, the non-domestic development will target at least a 15 % carbon emission improvement beyond Part L from energy efficiency. The following energy efficiency and passive measures will be considered for incorporation:

- Improved double glazing with low G values and shading co-efficient to limit the effects of solar gain;
- Mechanical Whole House Ventilation with Heat Recovery (in areas where required);
- The provision of energy efficient lighting;
- The provision of time and temperature zone control on HVAC systems;
- Improved specific fan powers;
- Electric power factor >0.95 (commercial element only);
- Sub metering of energy and lighting (commercial element only).

Be Clean

Existing District Heating Networks have been investigated through London Heat Map (see below in Figure 1) from the GLA which confirms there is no district heating network to which a connection is technically feasible. The red line within Figure 1 displays available district heat networks, which is not in proximity to the development.

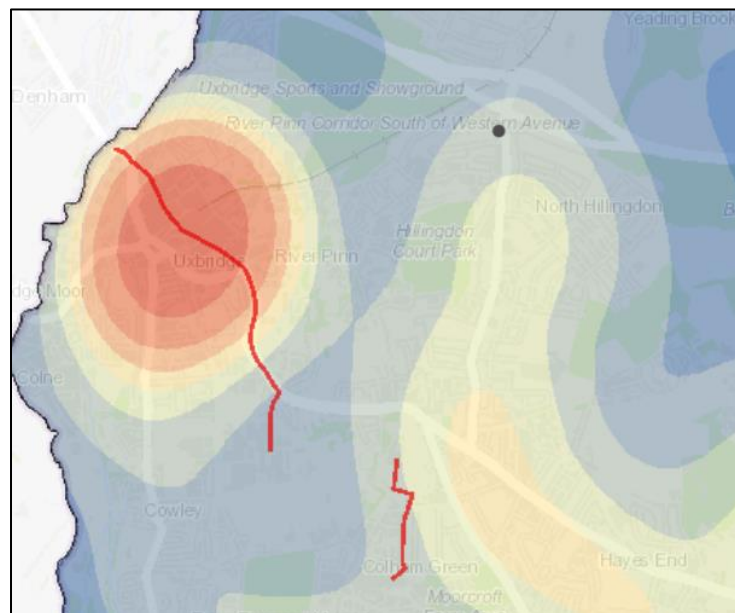


Figure 1 – London Heat Map

Furthermore, as the development is less than 800 dwellings, GLA Energy Assessment Guidance suggests that a connection with an ESCO wide heat network is unlikely to be a feasible option.

Be Green

A range of low or zero carbon technologies shall be considered for incorporation within the proposed development. Initial analysis anticipates Air Source Heat Pumps (ASHP) and Photovoltaics as being currently viable options for the scheme.

The recommended scheme will take into consideration the site layout and requirements for the building type to produce a design that incorporates the most appropriate technologies available to the site, to provide a scheme that is commercially viable whilst keeping in compliance with all policies applicable to this development. Please note within the Appendix section are further details required in relation to ASHP location.

Proposed Energy Strategy

In line with the Draft London Plan, Policy SI3 Energy infrastructure the following strategies will be explored: -

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 or existing 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)
 - 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 of policy SI1 (A)
3. Where a heat network is planned but not yet in existence the development should be designed for connection at a later date

Connecting to local or existing planned heat networks

Existing District Heating Networks have been investigated through London Heat Map from the GLA which confirms there is no district heating network to which a connection is technically feasible.

During the planning application process further investigation is required to confirm there is no possibility of connecting to a nearby district heating network (DHN). This will involve correspondence with Hillingdon Council and the Energy Officer at the GLA.

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

The use of Air Source Heat Pumps (ASHP) will be reviewed to initially establish if a central heat pump plant for each building solution can be adopted for the scheme to provide heating and hot water for the residential units. The plant allocation space required by a building by building system is to be spread across each building, indicative locations are shown in Appendix B. A route for pipework to connect all buildings will be indicated, however not installed, and future connections to a district heating network shall be provided from one of the buildings to the site boundary (including indicative area for a heat interface unit within the plant room). The pipework to connect all buildings will not be installed at this time due to:-

- Contamination;
- Potential for mechanical damage;
- Deterioration of pipework;
- Future issues with pressure testing i.e. leaks.

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)

CHP is one of various technology options that could be selected to produce the heat to serve district heat networks. Gas-engine CHP has been the most commonly used technology to serve heat networks to date.

As the electricity grid decarbonises the carbon savings achieved from gas-engine CHP will decrease and with growing concerns of the impact of the technology on air quality, applicants will be expected to utilise other low carbon technologies that make use of local secondary heat sources using heat pumps. Other forms of low-emission CHP, such as fuel cell CHP, may also come forward in the future and are encouraged.

Gas-engine CHP may still be an appropriate energy solution for area-wide heat networks due to the greater electrical efficiencies achievable at a larger scale. Developments that have the potential to connect to a district heating network served by gas-engine CHP will continue to be expected to do so and to maximise carbon reductions from the 'be lean' and 'be green' elements of the energy hierarchy. Longer-term, it is expected that such systems will be replaced with lower carbon alternatives. Any applications based on gas engines technology will be expected to provide sufficient information to justify its use and ensure that the carbon and air quality impact is minimised, for example through the selection of a lower emission unit and use of abatement technology.

The proposed energy strategy for the residential element of the Hillingdon Gardens development is detailed below in Table 1. Table 2 details the energy strategy for the commercial element of the Hillingdon Gardens development. The energy strategy proposes a building by building central ASHP plant system that provides the heating to both.

Residential Element	
Heating	Individual Building ASHP system
Hot water (DHW)	Individual Building ASHP system
Cooling	N/A
Ventilation	Mechanical ventilation with heat recovery (MVHR) where required.
Lighting	Energy efficient LED lighting where applicable

Table 1 – Proposed Energy Strategy for Residential Element

Commercial Element	
Heating	Individual Building ASHP system
Hot water (DHW)	Individual Building ASHP system
Cooling	Individual Building ASHP system
Ventilation	Mechanical ventilation where required
Lighting	Energy efficient LED lighting where applicable

Table 2 – Proposed Energy Strategy for Commercial Element

Appendix A

Additional ASHP details to be provided:

The following information will also be required:

- Clarification as to how the ASHP will operate alongside any other heating/cooling technologies being specified for the development (i.e. how will the ASHP operate alongside communal heating systems, and/or combined heat and power plant, solar thermal, etc. if they are also being proposed by the applicant).
- An estimate of the heating and/or cooling energy the ASHP would provide to the development and the electricity the heat pump would require for this purpose
- Details of the Seasonal Coefficient of Performance (SCOP) and Seasonal Energy Efficiency ratio (SEER), which should be used in the energy modelling. This should be based on a dynamic calculation of the system boundaries over the course of a year i.e. incorporating variations in source temperatures and the design sink temperatures (for space heat and hot water). Details of the assumptions should be included in the energy assessment, including manufacturer datasheets showing performance under test conditions for the specific source and sink temperatures of the proposed development and assumptions for hours spent under changing source temperatures.
- Whether any additional technology is required for hot water top up and how this has been incorporated into the energy modelling assumptions.
- Evidence that the heat pump complies with the minimum performance standards as set out in the Enhanced Capital Allowances (ECA) product criteria for the relevant ASHP technology.
- Evidence that the heat pump complies with other relevant issues as outlined in the Microgeneration Certification Scheme Heat Pump Product Certification Requirements document at: <http://www.microgenerationcertification.org>
- A calculation of the CO2 savings that may be realised through the use of this technology.
- An estimate of the expected heating costs to occupants, demonstrating that the costs have been minimised through energy efficient design.
- Confirmation that end-users will be supplied with regular information to control and operate the system e.g. at point of occupancy and maintenance visits
- The expected heat source temperature and the heat distribution system temperature with an explanation of how the difference will be minimised to ensure the system runs efficiently.
- Confirmation of the approach to generating domestic hot water and the integration of thermal storage.
- A commitment to monitor the performance of the heat pump system postconstruction to ensure it is achieving the expected performance approved during planning. (It is recommended that boroughs condition this).

Appendix B

General Notes

This drawing to be read in conjunction with all standard details and specifications. All dimensions to be verified on site.
All works to comply with current building regulations.



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PRELIMINARY

Client
INLAND HOMES

Project/Site Location
HILLINGDON GARDENS

Drawing Title
POSSIBLE AIR SOURCE
HEAT PUMP LOCATIONS
NO STORAGE

Scale	CAD	Engineer	Approved	Date
1:500@a1	LSH	RS	GG	Jul'19

CAD Reference
T:\5550\Mechanical\5550-CBC-XX-XX-DR-M-50002.dwg

Drawing No.
5550-CBC-XX-XX-DR-M-50001

Revision
P01

Rev	Description	Init	Date
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