Falkland Road
Energy Strategy Report

Date Published:	09/03/2022
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Version:	1

JAWSustainability

Contents

1 Introduction

This energy strategy has been prepared for the development at Falkland Road. The development consists of the new construction of 6 residential dwellings, including 4 flats and 2 duplexes.

This statement summarises the sustainable design and construction measures that have been incorporated into the project in order to meet the sustainability requirements of the London Borough of Camden and the London Plan.

Figure 1-1 the location of the site at 42 Falkland Road

1.1 Assessment approach

This report summarises the work undertaken to support the development of an energy strategy for the new development, following the energy hierarchy 'Be Lean, Be Clean, Be Green and Be Seen'.

Standard Assessment Procedure for the Energy Rating of Dwellings (SAP) calculations have been carried out. These are used to assess the impact on energy demand and CO_2 emissions of improvements through the hierarchy and demonstrate the most appropriate solution for the development to meet the relevant planning requirements.

2 London Borough of Camden Policies Local Plan

London Borough of Camden Local Plan 2017

Policy CC1 Adapting to Climate Change

The Council will require all development to minimise the effects of climate change and encourage all developments to meet the highest feasible environmental standards that are financially viable during construction and occupation.

We will:
a. promote zero carbon development and require all development to reduce carbon dioxide emissions through following the steps in the energy hierarchy;
b. require all major development to demonstrate how London Plan targets for carbon dioxide emissions have been met;
c. ensure that the location of development and mix of land uses minimise the need to travel by car and help to support decentralised energy networks;
d. support and encourage sensitive energy efficiency improvements to existing buildings;
e. require all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building; and
f. expect all developments to optimise resource efficiency

For decentralised energy networks, we will promote decentralised energy by:
g. working with local organisations and developers to implement decentralised energy networks in the parts of Camden most likely to support them;
h. protecting existing decentralised energy networks (e.g. at Gower Street, Bloomsbury, King's Cross, Gospel Oak and Somers Town) and safeguarding potential network routes; and
i. requiring all major developments to assess the feasibility of connecting to an existing decentralised energy network, or where this is not possible establishing a new network.

To ensure that the Council can monitor the effectiveness of renewable and low carbon technologies, major developments will be required to install appropriate monitoring equipment.

Policy CC2 Adapting to Climate Change

The Council will require development to be resilient to climate change.

All development should adopt appropriate climate change adaptation measures such as:
a. the protection of existing green spaces and promoting new appropriate green infrastructure;
b. not increasing, and wherever possible reducing, surface water runoff through increasing permeable surfaces and use of Sustainable Drainage Systems;
c. incorporating bio-diverse roofs, combination green and blue roofs and green walls where appropriate; and
d. measures to reduce the impact of urban and dwelling overheating, including application of the cooling hierarchy.

Any development involving 5 or more residential units or 500 sqm or more of any additional floorspace is required to demonstrate the above in a Sustainability Statement.

Sustainable design and construction measures The Council will promote and measure sustainable design and construction by:

e. ensuring development schemes demonstrate how adaptation measures and sustainable development principles have been incorporated into the design and proposed implementation;
f. encourage new build residential development to use the Home Quality Mark and Passivhaus design standards;
g. encouraging conversions and extensions of 500 sqm of residential floorspace or above or five or more dwellings to achieve “excellent” in BREEAM domestic refurbishment; and
h. expecting non-domestic developments of 500 sqm of floorspace or above to achieve “excellent” in BREEAM assessments and encouraging zero carbon in new development from 2019.

Camden Planning Guidance Chaper 7

All new build residential development (of 1 – 9 dwellings) must meet 19% carbon dioxide reduction.

3 The London Plan Policies on Energy

The policies referred to in order to develop this energy strategy, are those in the London Plan.

The policies that refer to major developments do not apply, because this is a minor development.

Policy SI 2 Minimising greenhouse gas emissions

A Major development should be net zero-carbon. This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy:

1) be lean: use less energy and manage demand during operation
2) be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly
3) be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site
4) be seen: monitor, verify and report on energy performance.

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

C A minimum on-site reduction of at least 35 per cent beyond Building Regulations156 is required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either:

1) through a cash in lieu contribution to the borough’s carbon offset fund, or
2) off-site provided that an alternative proposal is identified, and delivery is certain.

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

E Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.

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

Policy SI 3 Energy infrastructure

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

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

1) major heat loads (including anchor heat loads, with particular reference to sites such as universities, hospitals and social housing)
2) heat loads from existing buildings that can be connected to future phases of a heat network
3) major heat supply plant including opportunities to utilise heat from energy from waste plants
4) secondary heat sources, including both environmental and waste heat
5) opportunities for low and ambient temperature heat networks
6) possible land for energy centres and/or energy storage
7) possible heating and cooling network routes
8) opportunities for futureproofing utility infrastructure networks to minimise the impact from road works
9) infrastructure and land requirements for electricity and gas supplies
10) implementation options for delivering feasible projects, considering issues of procurement, funding and risk, and the role of the public sector
11) opportunities to maximise renewable electricity generation and incorporate demand-side response measures.

C Development Plans should:

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

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

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

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

   a) connect to local existing or planned heat networks
   b) use zero-emission or local secondary heat sources (in conjunction with heat pump, if required)
   c) use low-emission combined heat and power (CHP) (only where there is a case for CHP to enable the delivery of an area-wide heat network, meet the development's electricity demand and provide demand response to the local electricity network)
   d) use ultra-low NOx gas boilers
2) CHP and ultra-low NOx gas boiler communal or district heating systems should be designed to ensure that they meet the requirements in Part B of Policy SI 1 Improving air quality
3) where a heat network is planned but not yet in existence the development should be designed to allow for the cost-effective connection at a later date.

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

Policy SI 4 Managing heat risk

A Development proposals should minimise adverse impacts on the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure.

B Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the following cooling hierarchy:

1) reduce the amount of heat entering a building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure
2) minimise internal heat generation through energy efficient design
3) manage the heat within the building through exposed internal thermal mass and high ceilings
4) provide passive ventilation
5) provide mechanical ventilation
6) provide active cooling systems.

4 Energy Strategy

An energy strategy has been developed following the energy hierarchy 'Be Lean, Be Clean, Be Green', 'Be Seen'. Energy calculations using Building Regulations approved and accredited software have been undertaken at each stage to calculate the savings associated with the measures incorporated.

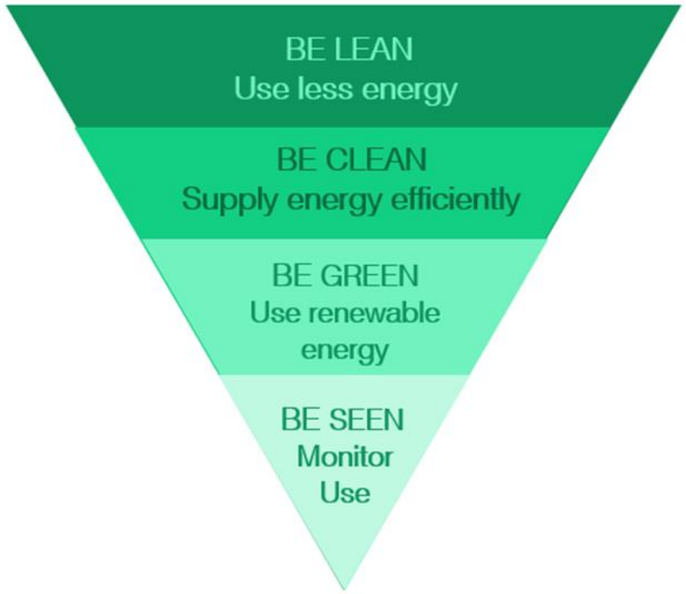


Figure 4-1 The Energy Hierarchy

The energy consumption and carbon emission figures within this report have been calculated using the approved Standard Assessment Procedure for the Energy Rating of Dwellings (SAP) for the residential. SAP 10 carbon factors are used to represent the carbon intensity of mains gas and electricity.

4.1 Energy Targets

In line with the London Borough of Camden's energy policies there is a target of at least a 19% reduction over Part L 2013 on site. Table 4-1 below details the energy and carbon breakdown of the Part L target emission rate. These have been calculated using the SAP10 carbon factors.

	Gas (kWh/yr)				Electricity (kWh/yr)						
Use Type	Space Heating	Hot Water	Total	Gas CO2 (kg/yr)	Space Heating	HW	Cooling	Pumps & Fans	Lighting	Total	Electricity CO2 (kg/yr)
Resi	20,381	14,084	34,465	7,238	0	0	0	450	2,086	2,536	591

Use Type	Total Energy	Total CO2
Total	37,001	7,829

Table 4-1 Target regulated energy demand and carbon emissions per energy source

4.2 Be Lean

As part of the Be Lean approach, passive design measures have been considered throughout the pre-planning stage to reduce initial energy demand.

Solar Gain Control and Daylight

Solar gains are a passive form of heating from the sun's radiation and are beneficial to a building during winter months as they provide an effective source of heat and reduce internal heating requirements. However, in summer months they must be controlled in order to mitigate the risk of overheating. They can be controlled through glazing and shading design in order to allow low level winter sun to enter the building and to limit access to high level summer sun.

The glazing strategy design has carefully considered orientation and window size in order to maximise daylight while controlling excessive solar gains. Glazing will incorporate low emissivity coatings to limit overheating without compromising light transmittance.

Building Fabric

Designing an efficient thermal envelope will greatly reduce the need for space heating and cooling as heat transmittance through the thermal elements is reduced.

Low air permeability rates will also reduce heating and cooling energy demand by reducing the volume of air that can penetrate the building.

As part of a 'fabric first' approach, the building fabric has been carefully considered and specified to meet or exceed current Building Regulations minimum requirements, as detailed in table 4-2 below.

Fabric Component	Performance Specification
External walls	0.15 W/m^{2}K
Wall to unheated	0.18 W/m^{2}K
Party walls	Fully filled cavity with edge sealing
Roof	0.13 W/m^{2}K
Ground and exposed floor	0.11 W/m^{2}K
Windows	1.4 W/m^{2}K
Doors	1 W/m^{2}K
Thermal Bridging	ACD Bridges
Air Permeability	3 m3/m2/hr

Table 4-2 Proposed Be Lean passive design measures

With regards to party walls, to reach the required standards, these must be fully filed. Partially filled cavities will not comply.

Thermal bridging

Non-repeating thermal bridges at junctions will be designed carefully in order to ensure that they perform better than typical constructions. Thermal bridging Y values will be calculated for each dwelling. This will be achieved through the use of Accredited Construction Details (ACDs) for more standard junctions (e.g., corners, external wall junctions with floors and party walls). At this stage of design further information is not available but all designs will ensure the 0.15 value is achieved on construction.

Building Services

Services have been specified to maximise efficiency therefore reducing energy used to deliver services. Table 4-3 shows the proposed services strategy and energy efficiency measures for the development.

Services Component	Residential Specification
Space Heating	Electric Panel Heaters Programmer and Room Thermostat
Hot Water	Electric immersion, 210l cylinder
Heating Controls	Time and temperature zone control
Ventilation	MVHR 89% Efficiency SPF: 0.6 Approved Installation
Lighting & Controls	100% low energy lighting

Table 4-3 Proposed energy efficient design measures

The breakdown of carbon and energy use has been identified for the site. Table 4-4 shows the breakdown of carbon and energy use once the strategies proposed at the be lean are incorporated.

	Gas (kWh/yr)				Electricity (kWh/yr)						
Use Type	Space Heating	Hot Water	Total	Gas CO2 (kg/yr)	Space Heating	HW	Cooling	Pumps & Fans	Lighting	Total	Electricity CO2 (kg/yr)
Resi	0	0	0	0	11,617	10,850	0	1,127	2,037	25,630	5,972

Use Type	Total Energy	Total CO2
Total	25,630	5,972

Table 4-4 Estimated regulated energy demand and carbon emissions per energy source

Carbon Savings

Table 4-5 and figure 4-2 demonstrate the percentage improvement over the notional baseline levels for the be lean stage.

Energy Hierarchy stage	Residential		
	CO_2 Emissions (T/yr)	CO_2 Savings (T/yr)	% Saving
Baseline	7.83		
Be Lean	5.97	1.86	23.72%

Table 4-5 improvements over Part L

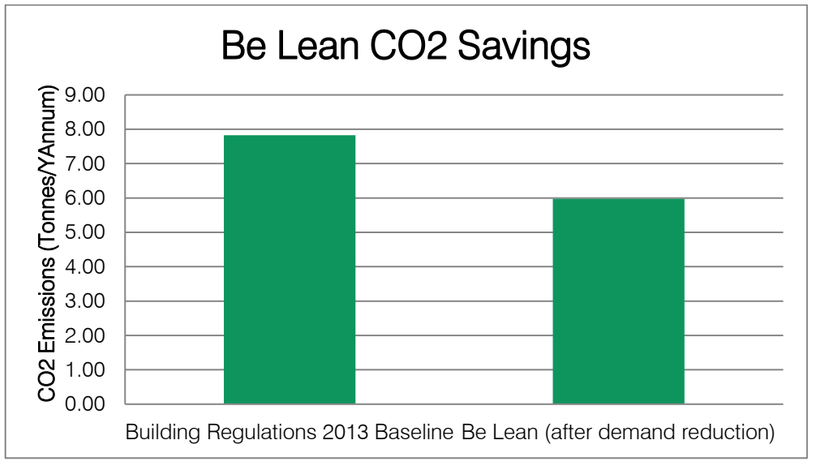
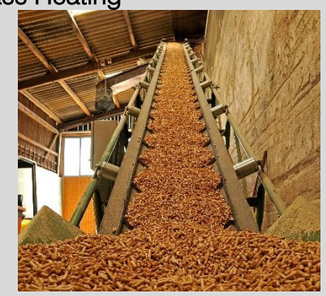


Figure 4-2 Be lean improvements over part L

4.3 Be Green

At the Be Green stage, renewable technologies are investigated. Table 4-6 considers the feasibility of renewable energy technologies for the scheme.

LZC Technologies	Description	Noise	Visual impact	Internal Space	External Space	Capital Cost	Maintenance	Feasibility	
Solar Thermal Collectors 	Solar thermal collectors can be used to provide hot water using the irradiation from the sun. They can generally provide approx. 50% of the hot water demand	🟢	🟡	🟢	🟡	🔴	🟡	There are areas of roof that can incorporate solar technologies. However, carbon savings are quite low, and it is quite a high-cost technology.	×
Solar Photovoltaic Panels 	Solar PV panels generate electricity from the sun's energy. They should be installed within 90° of due south ideally at a 30° angle. The electricity can be used to supply the landlord's load.	🟢	🟡	🟢	🟡	🟡	🟡	There are areas of flat roof that can incorporate solar technologies. Solar PV is ideal for making carbon savings while being a simple technology.	✓
Biomass Heating 	Solid, liquid or gaseous fuels derived from plant material can provide boiler heat for space and water heating A biomass boiler would supplement a standard gas heating system so some of the cost may be offset through money saved on using smaller traditional boiler's reliability of fuel access/supply can be a problem	🟡	🟢	🔴	🟡	🔴	🔴	Biomass is not considered feasible for this development due to issues with fuel storage, access for delivery vehicles and local NO_x emissions	×

Wind Turbines 	Vertical and horizontal axis wind turbines enable electricity to be generated using the power within the wind Not suitable for urban environments due to low wind conditions and obstructions	🔴	🔴	🟢	🔴	🔴	🟡	This development is in an urban environment and so a wind turbine will not generate much energy	×
Ground Source Heat Pumps (GSHP) 	Utilising horizontal loops or vertical boreholes, GSHP make use of the grounds almost constant temperature to provide heating and/or cooling using a heat exchanger connected to a space/water heating delivery system. Optimum efficiency with underfloor heating systems.	🟡	🟢	🟡	🟡	🔴	🟡	GSHP are not a feasible technology for the site since there is a limited external space available for installation of boreholes	×
Air Source Heat Pumps (ASHP) 	Air Source Heat Pumps extract latent energy from the external air in a manner similar to ground source heat pumps Optimum efficiency with underfloor heating systems	🟡	🟡	🟡	🟡	🟡	🟡	The roof space is to utilised for amenity space in order to achieve amenity requirements. As a result there is no available space for heat pump condensers and ASHPs are deemed as un-feasible.	×

Table 4-6 Feasibility of LZC technologies for the development

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Renewable systems

The feasibility study has identified PV is most appropriate for the development. The following system has been proposed:

Services Component	Residential Specification
Photovoltaic panels	Peak Power – 2kWp Orientation – S Angle of elevation – 30˚ Panel specification – Min 20% efficiency Approx. no of panels – 7

Table 4-7 Renewable and LZC technologies on site

4.4 Energy and Carbon Savings

Energy Use

The breakdown of carbon and energy use has been identified for the site. Table 4-8 shows the breakdown of carbon and energy use once the strategies proposed in this report are incorporated.

	Gas (kWh/yr)			Gas CO2 (kg/yr)	Electricity (kWh/yr)							Electricity CO_2 (kg/yr)	Total Energy (kWh/yr)	Total CO_2 (kg/yr)
	Space Heating	Hot Water	Total		Space Heating	Hot Water	Cooling	Pumps & Fans	Lighting	PV	Total			
Resi	0	0	0	0	11,617	10,850	0	1,127	2,037	-1,643	23,987	5,589	-1,643	23,987

Table 4-8 Estimated regulated energy demand and carbon emissions per energy source

Carbon Savings

Table 4-9 and Figure 4-3 demonstrate the percentage improvement over the notional baseline levels for the development.

Energy Hierarchy stage	Residential		
	CO_2 Emissions (T/yr)	CO_2 Savings (T/yr)	% Saving
Baseline	7.83		
Be Lean	5.97	1.86	23.72%
Be Clean	5.97	0.00	0.0%
Be Green	5.59	0.38	4.89%
Total Cumulative Savings		2.24	28.61%

Table 4-9 Improvement over part L

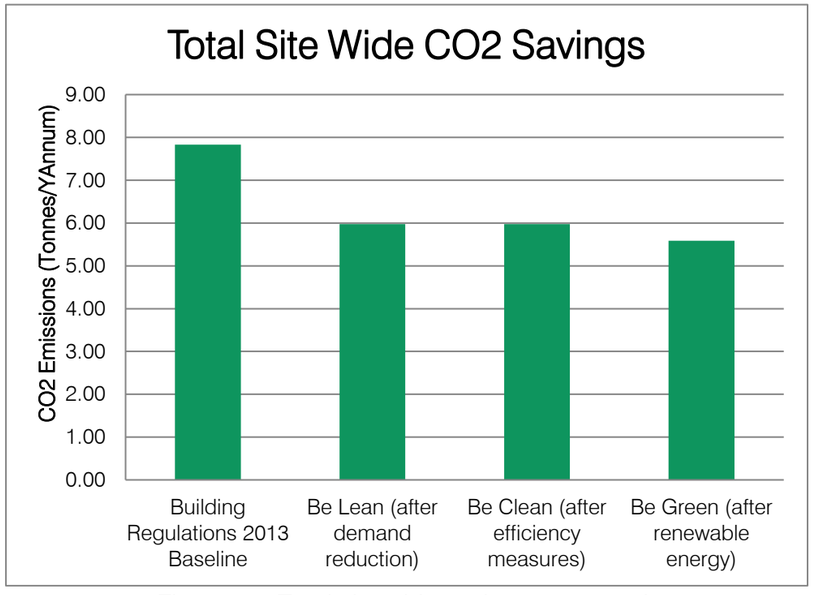

Figure 4-3 Total site wide savings over part L

4.5 Be Seen

All major plant will be fitted with meters to allow remote monitoring of energy used by the heating systems and distribution boards. A contract will be put in place to monitor the readings so that they can be compared with the predicted energy performance, and this information will be reported, as details in the GLA 'Be Seen' guidance.

5 Sustainability

5.1 Water efficiency

Water fittings will be specified with the following or similar flow rates to meet the target water consumption of 105 l/p/day for the residential aspect of the development:

- Wash basin taps – 6.5 l/min
- Showers – 7.5 l/min
- Bath – 120l to overflow
- Dishwasher - 1.2 l/place setting
- Washing machine - 9 l/kg load
- WC – 6/4 litre dual flush
- Kitchen taps – 6.5 l/min

Water meters will be installed to encourage residents to limit their consumption.

5.2 Materials

Materials will be specified to reduce the embodied carbon of the development, wherever possible. Demolition waste will be used as hardcore where appropriate.

Insulating materials will be specified to maximise thermal performance whilst still paying attention to the environmental impact of the materials used, by specifying mineral wool. If possible, materials with a high recycled content will be specified.

Responsible sourcing will also be pursued. All timber used on site during the construction phase and within the building will be from legal sources. Where possible, FSC or equivalent timber will be used. Sourcing of other materials will include products where the manufacturer employs an environmental management system such as ISO 14001 or BES 6001. Where possible, materials will be sourced locally.

Non-toxic materials will be used wherever possible, including the specification of products with low VOC content in line with European testing standards.

All the building elements will achieve high ratings on the BRE Green Guide to Specification. Materials will be specified to have a low embodied energy, taking into account whole life cycle analysis.

5.3 Climate Change Adaptation

5.3.1 Tackling Increased Temperature and Drought

Windows will incorporate low emissivity coatings to reduce solar gain, and overhangs are built to some of the windows.

As described above in water consumption, measures have been put in place to reduce potable water use internally. There is limited planting associated with the development and this will all be specified to be drought resistant rely mainly on rainwater.

5.3.2 Flooding and Surface Water Management

The development is in flood Zone 1 and is at no risk of flooding. For more information on flood risk drainage please find attached the Sustainable drainage system report.

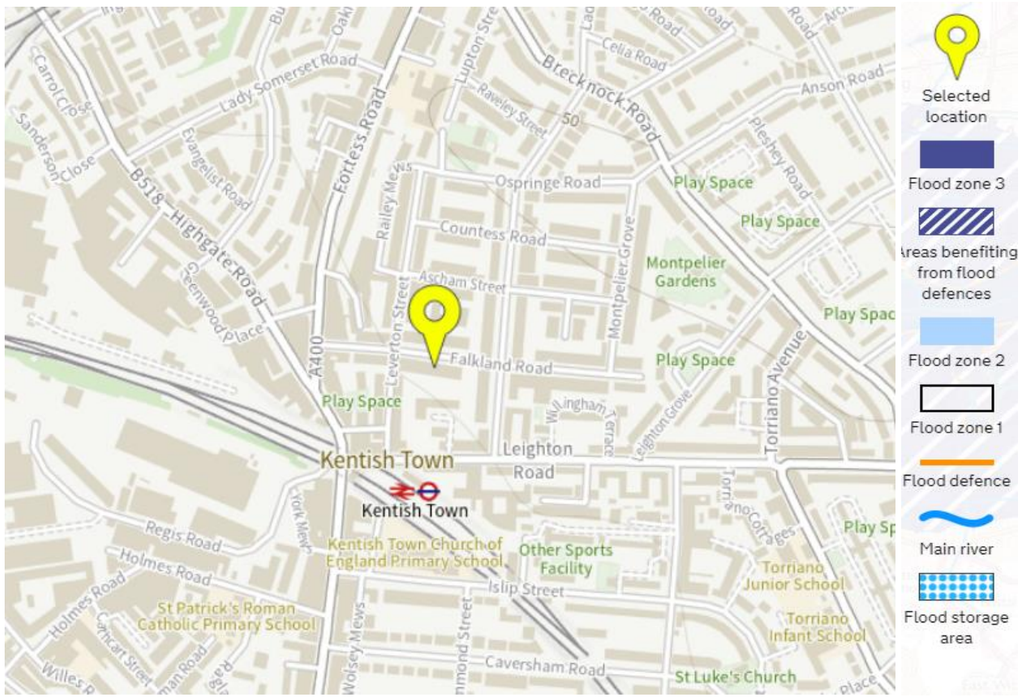

Figure 5-1 Flood Risk Map

5.4 Waste Management and Construction

Construction site waste will be managed in such a way to reduce the amount of waste produced as much as possible, and the waste hierarchy will be followed. In addition, at least 85% of waste that does arise will be recycled using an external waste contractor.

Regular waste and recycling bins will be provided for separation of waste to facilitate recycling.

The contractor will enrol in the Considerate Contractors Scheme to ensure best practice construction standards are met during the build of the development.

5.5 Nature Conservation and Biodiversity

The site is in central London and is considered to be of negligible ecological value. Measures will be taken during construction to minimise impact on ecology by timing works appropriately and following best practice guidance. Incorporating bat boxes and biodiverse flora into the developments soft landscaping.

6 Conclusion

The development at Falkland Road proposes 6 new build dwellings. As required by the London Plan and the London Borough of Camden, the development follows the energy hierarchy, incorporating passive design measures, energy efficient equipment and renewable energy.

The development employs an efficient building fabric, including well insulated walls and highly efficient glazing, efficient systems and a PV array are all specified to maximise carbon savings for the site. The development achieved a 28.61% saving over the baseline scenario, which surpasses the 19% saving required in the Camden Planning Policies.

The development follows the energy hierarchy, heating hierarchy and cooling hierarchy. The proposals therefore represent the best on site savings.

The figures within this report are based on preliminary analysis only and further detailed studies will be required at the detailed design stage before specifying any of the proposed systems.