Sustainability Statement

Oak Grove

For Pocket Living

January 2014

XCO2 energy

w: www.xco2energy.com :: e: mail@xco2energy.com
t: +44 (0) 20 7700 1000 :: f: +44 (0) 20 7183 6620
17-18 Hayward's Place :: Clerkenwell :: London :: EC1R 0EQ

Contents

Executive Summary **3**

Site **4**

Planning Policies **5**
- Camden Core Strategy 2010 5
- Camden Development Policies 2010 6
- Camden Planning Guidance - Sustainability CPG3-2011 7
- The London Plan 2011 8

Response to Planning Policies **9**

Sustainability Assessment Tools **12**

Code for Sustainable Homes **13**

About us:
XCO2 Energy are a low-carbon consultancy working in the built environment. We are a multi-disciplinary company consisting of both architects and engineers, with specialists including CIBSE low carbon consultants, Code for Sustainable Homes, EcoHomes and BREEAM assessors and LEED accredited professionals.

	Issue 01	Issue 02	Issue 03	
Remarks	Draft			
Prepared by	BG			
Checked by	SP			
Authorised by	CM			
Date	28/01/2014			
Project reference	8.396			

Executive Summary

This report outlines the sustainability strategy for the proposed development at Oak Grove, in line with the requirements set out by the London Borough of Camden.

This sustainability statement is divided into two parts:

- Local sustainability policies
- Code for Sustainable Homes

The first part provides an overview of the site and planning policies applicable to this development base on the Camden Local Development Framework. The report then demonstrates how the policies have been met. In accordance with the Camden Planning Guidance - Sustainability CPG3 (2013), the sustainability requirements have also been addressed.

The body of this report outlines the sustainability measures that have been adopted to achieve Code for Sustainable Homes level 4. A summary of the pre-assessment credits for the Code for Sustainable Homes is provided at the end of the report.

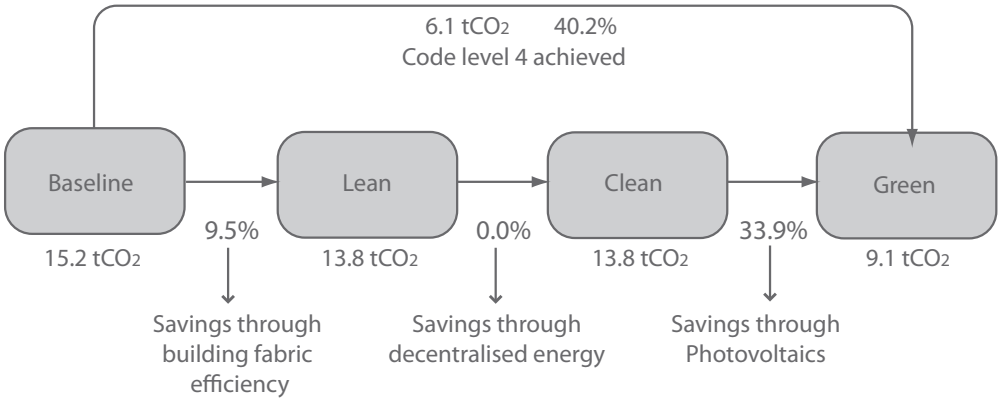
In summary, the proposed development at Oak Grove meets the targets set out by Camden Council.

The dwelling achieves 71.68 credits, which exceeds the required 68 credits for Code for Sustainable Homes level 4. In addition, over 50% of the credits in the Energy, water and materials categories have been achieved in line with the Code requirements specified in the Camden Planning Guidance - Sustainability CPG3 (2013). The proposed development will also meet all principles of Lifetime Homes as required by Camden Council's Policy DP6.

The diagram below provides a summary of the CO_2 savings achieved over Part L Building Regulations (2010) for the development. The 40.2% reduction in CO_2 emissions reflects regulated energy use only, in accordance with Part L Building Regulations. Unregulated energy use is also not taken into account in the calculation of Code credits.

This report demonstrates that the project is designed to exceed the Planning Policy requirements set out by the Council and the GLA. It also indicates that the client/design team's aspiration to incorporate a number of sustainable measures which are suitable to the development.

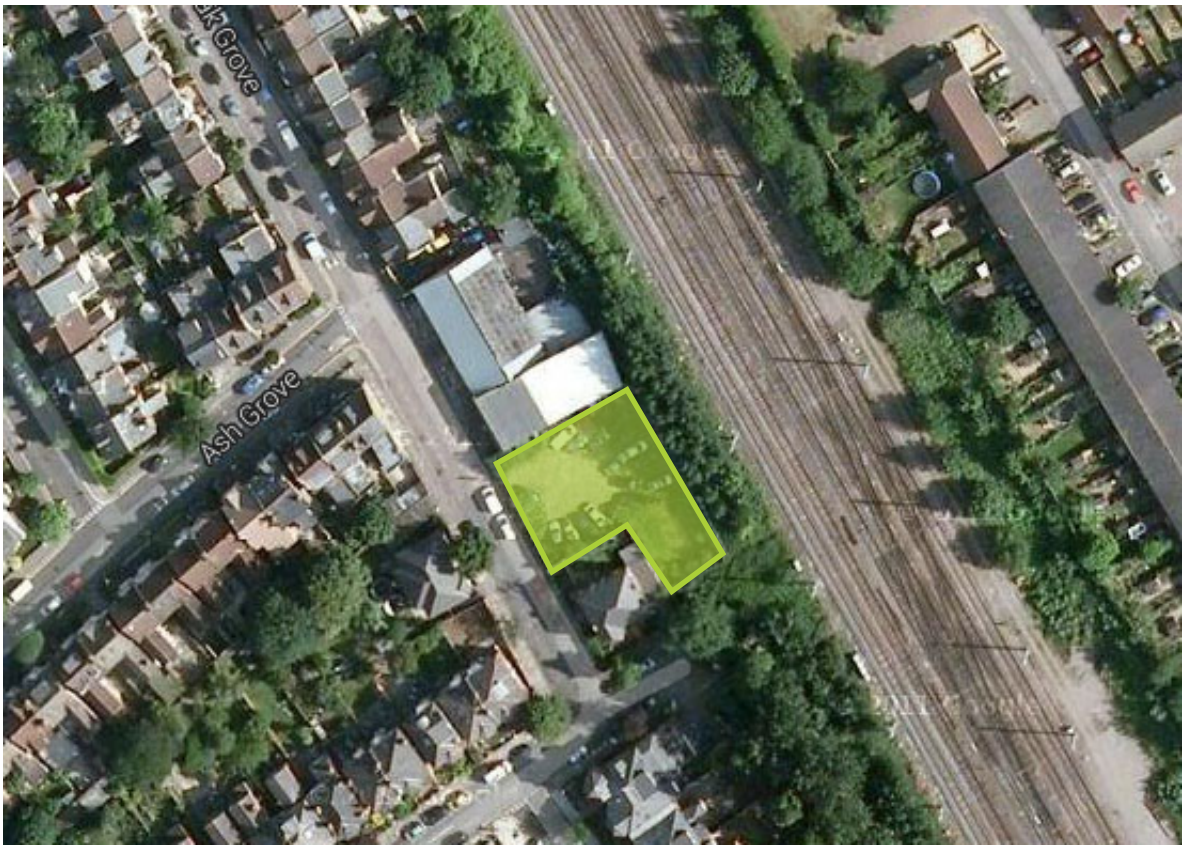
Total savings over Part L 2010 Building Regulations
(savings is based on regulated energy only in accordance with Part L)



Site

The proposed development includes 17 apartments to be located towards the south-eastern end of Oak Grove adjacent to a garage, a two storey dwelling and railways to the northeast. The site is located within the London Borough of Camden.

The building comprise of 17 one bedroom apartments distributed over three storeys. The development will replace an existing car park. The approximate site location and boundary is shown in the figure below.



Approximate site location and site boundary of the proposed development at Oak Grove.

Planning Policies

The development is in line with the requirements set out by the London Borough of Camden.

Camden Core Strategy 2010

The Camden Core Strategy sets out the Council's key planning policies and is a central part of their Local Development Framework (LDF). The recommendations for the sustainability policy is inserted below:

CS13 – Tackling climate change through promoting higher environmental standards

Reducing the effects of and adapting to climate change

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

a) Ensuring patterns of land use that minimise the need to travel by car and help support local energy networks;

b) Promoting the efficient use of land and buildings;

c) Minimising carbon emissions from the redevelopment, construction and occupation of buildings by implementing, in order, all of the elements of the following energy hierarchy:

1. Ensuring developments use less energy,
2. Making use of energy from efficient sources, such as the King's Cross, Gower Street, Bloomsbury and proposed Euston Road decentralised energy networks;
3. Generating renewable energy on-site; and

d) Ensuring buildings and spaces are designed to cope with, and minimise the effects of, climate change.

The Council will have regard to the cost of installing measures to tackle climate change as well as the cumulative future costs of delaying reductions in carbon dioxide emissions

Local energy generation

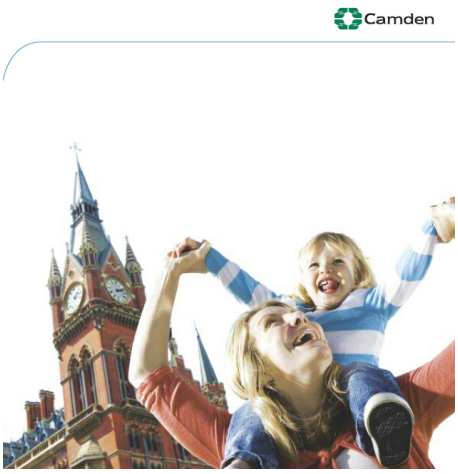
The Council will promote local energy generation and networks by:

e) Working with our partners and developers to implement local energy networks in the parts of Camden most likely to support them, i.e. in the vicinity of:

- housing estates with community heating or the potential for community heating and other uses with large heating loads;
- the growth areas of King's Cross; Euston; Tottenham Court Road; West Hampstead Interchange and Holborn;
- schools to be redeveloped as part of Building Schools for the Future programme;
- existing or approved combined heat and power/ local energy networks;

and other locations where land ownership would facilitate their implementation.

f) protecting existing local energy networks where possible (e.g. at Gower Street and Bloomsbury) and safeguarding potential network routes (e.g. Euston Road);



Oak Grove

Water and surface water flooding
We will make Camden a water efficient borough and minimise the potential for surface water flooding by:

g) protecting our existing drinking water and foul water infrastructure, including Barrow Hill Reservoir, Hampstead Heath Reservoir, Highgate Reservoir and Kidderpore Reservoir;

h) making sure development incorporates efficient water and foul water infrastructure;

i) requiring development to avoid harm to the water environment, water quality or drainage systems and prevents or mitigates local surface water and downstream flooding, especially in areas up-hill from, and in, areas known to be at risk from surface water flooding such as South and West Hampstead, Gospel Oak and King's Cross.

Camden Development Policies 2010
In addition to the Core Strategy Document the Camden Development Policies also forms part of the LDF. The policy relating to sustainability is listed below:

DP22 – Promoting sustainable design and construction
The Council will require development to incorporate sustainable design and construction measures. Schemes must:

a) demonstrate how sustainable development principles have been incorporated into the design and proposed implementation; and

b) incorporate green or brown roofs and green walls wherever suitable.

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

c) expecting new build housing to meet Code for Sustainable Homes Level 3 by 2010 and Code Level 4 by 2013 and encouraging Code Level 6 (zero carbon) by 2016.;

d) expecting developments (except new build) of 500 sq m of residential floorspace or above or 5 or more dwellings to achieve "very good" in EcoHomes assessments prior to 2013 and encouraging "excellent" from 2013;

e) expecting non-domestic developments of 500sqm of floorspace or above to achieve "very good" in BREEAM assessments and "excellent" from 2016 and encouraging zero carbon from 2019.

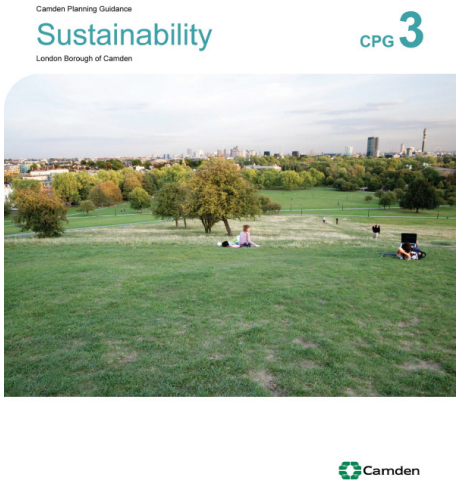
The Council will require development to be resilient to climate change by ensuring schemes include appropriate climate change adaptation measures, such as:

f) summer shading and planting;
g) limiting run-off;
h) reducing water consumption;
i) reducing air pollution; and
j) not locating vulnerable uses in basements in flood prone areas.

DP6 – Lifetime homes
Lifetime homes standards will be applied to all developments of self-contained housing, including conversions, re-configurations and changes of use.

Camden Planning Guidance - Sustainability CPG3 - 2013

The Camden Planning Guidance support the policies set out in the Local Development Framework (LDF). While the Camden LDF contains policies relating to sustainability in their Core Strategy and Development Policies documents, the Council also has a separate planning guidance specific to sustainability. The sections that will be covered by a combination of the Sustainability Statement and accompanying Energy Statement are listed below:



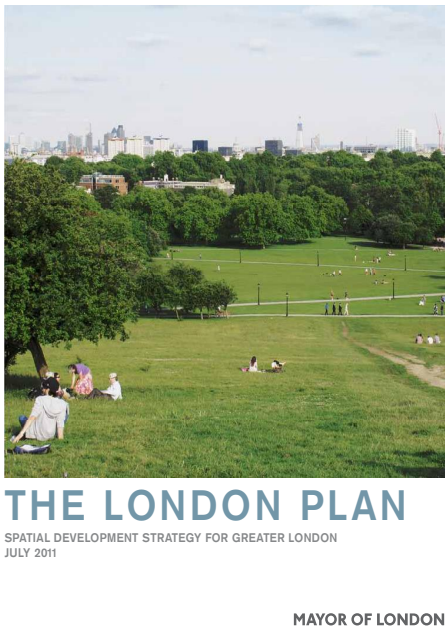
- The energy hierarchy
- Energy efficiency: new buildings
- Decentralised energy networks and combined heat and power
- Renewable Energy
- Water Efficiency
- Sustainable use of materials
- Sustainability assessment tools
- Brown roofs, green roofs and green walls
- Flooding
- Adapting to climate change
- Biodiversity

Guidance also recommends that developments should achieve at least 50% of the unweighted Energy, Water and Materials credits, under the Code for Sustainable Homes (CPG3 - paragraph 9.8).

The London Plan 2011

In addition to the Camden policies the London Plan 2011 contains the following:

- Policy 5.2 Minimising Carbon Dioxide Emissions (refer to the supplementary Energy Report)
- Policy 5.3 Sustainable Design and Construction Policy 5.5 Decentralised Energy Networks (refer to the supplementary Energy Report)
- Policy 5.6 Decentralised Energy in Development Proposals (refer to the supplementary Energy Report)
- Policy 5.7 Renewable Energy (refer to the supplementary Energy Report for more details)
- Policy 5.9 Overheating and Cooling
- Policy 5.10 Urban Greening
- Policy 5.11 Green Roofs
- Policy 5.12 Flood Risk Management
- Policy 5.13 Sustainable Drainage
- Policy 5.15 Water use and Supplies
- Policy 5.16 Waste Self-Sufficiency
- Policy 5.18 Construction, Excavation and Demolition Waste



Response to Planning Policies

The relevant sections of the CPG3 Sustainability Planning Guidance have been addressed below:

Energy efficiency: new buildings

Sunlight and Daylight

The development has been designed to provide good levels of daylight and sunlight. This will reduce the use of energy-intensive artificial lighting during the day. The proposal incorporates full height windows for all living and bedroom spaces to maximise daylight penetration into each of the apartments. An internal daylight assessment has been carried out for this proposal, the results of which are presented on the following page.

Natural Ventilation

While there is a potential for single-sided ventilation in all living and bedroom spaces, it should be noted that the site is adjacent to a building on its north-western side, and surrounded by dwellings from the southeast to the west. Thus, it is sheltered from the prevailing winds. However, large windows have been included in order to increase air flow and maximise the ventilation rate.

Thermal Mass

The proposed dwellings will be constructed primarily from thermally heavy materials including concrete and brickwork. High thermal mass of the building will act as a buffer against high fluctuations in internal temperature and improve thermal comfort for occupants.

Insulation

The internal and external walls have been designed to allow for suitable levels of insulation within the wall construction, to ensure a good thermal performance of the building fabric.

Overheating

The building has been designed to balance good levels of daylight with overheating risks, and measures have been taken to mitigate overheating where possible.

Water Efficiency

The proposed development intends to specify low flow shower heads and taps, as well as dual flush toilets to reduce water consumption. Irrigation of the communal garden will mostly rely on rainwater. Further information is provided in the Water section of the Code of Sustainable Homes assessment in this report.

Sustainable use of materials

This will primarily include the use of demolition materials such as hard core. A Site Waste Management Plan will be implemented to comply with the Code assessment for this development.

Landscape and Garden

A communal garden area at the ground level has been incorporated into the design, at the rear of the proposed building.

Biodiversity

Biodiversity on site will be enhanced in comparison with the existing car parking space.

Adapting to climate change

The development has used the following measures to mitigate against climate change:

- Landscaped gardens have been used to soak up excess rainwater and cool the surrounding air through transpiration.
- Natural ventilation has been used to ventilate the dwellings.

Lifetime Homes

The proposed dwelling will meet all 16 principals of Lifetime Homes.

Internal Daylight Assessment

An internal daylight assessment was carried out for the proposed development at Oak Grove, in line with British Research Establishment's (BRE) publication Site Layout Planning for Daylight and Sunlight - A Guide to Good Practice, by PJ Littlefair (2011). The BRE publication gives advice on site layout planning to achieve good daylighting in buildings, and states that daylighting in new habitable rooms can be determined using average daylight factor (ADF) calculations. BS8206-2 Code of Practice for Daylighting recommends different average daylight factors for different habitable spaces:

- 1% for bedrooms
- 1.5% for living rooms and
- 2% for kitchens

The assessment was carried out for the units considered to be worst cases in terms of daylight access. These include 5 no. units at ground floor.

The incorporation of large full height windows into the design maximises the provision of daylight to all habitable rooms. This enhances well being of the occupants and reduces demand for artificial lighting during the day. The analysis results showed that all habitable rooms at the selected units achieved ADF levels above the recommended targets set out by the BRE. All units will receive satisfactory daylight levels at the proposed development.

Ground floor plan

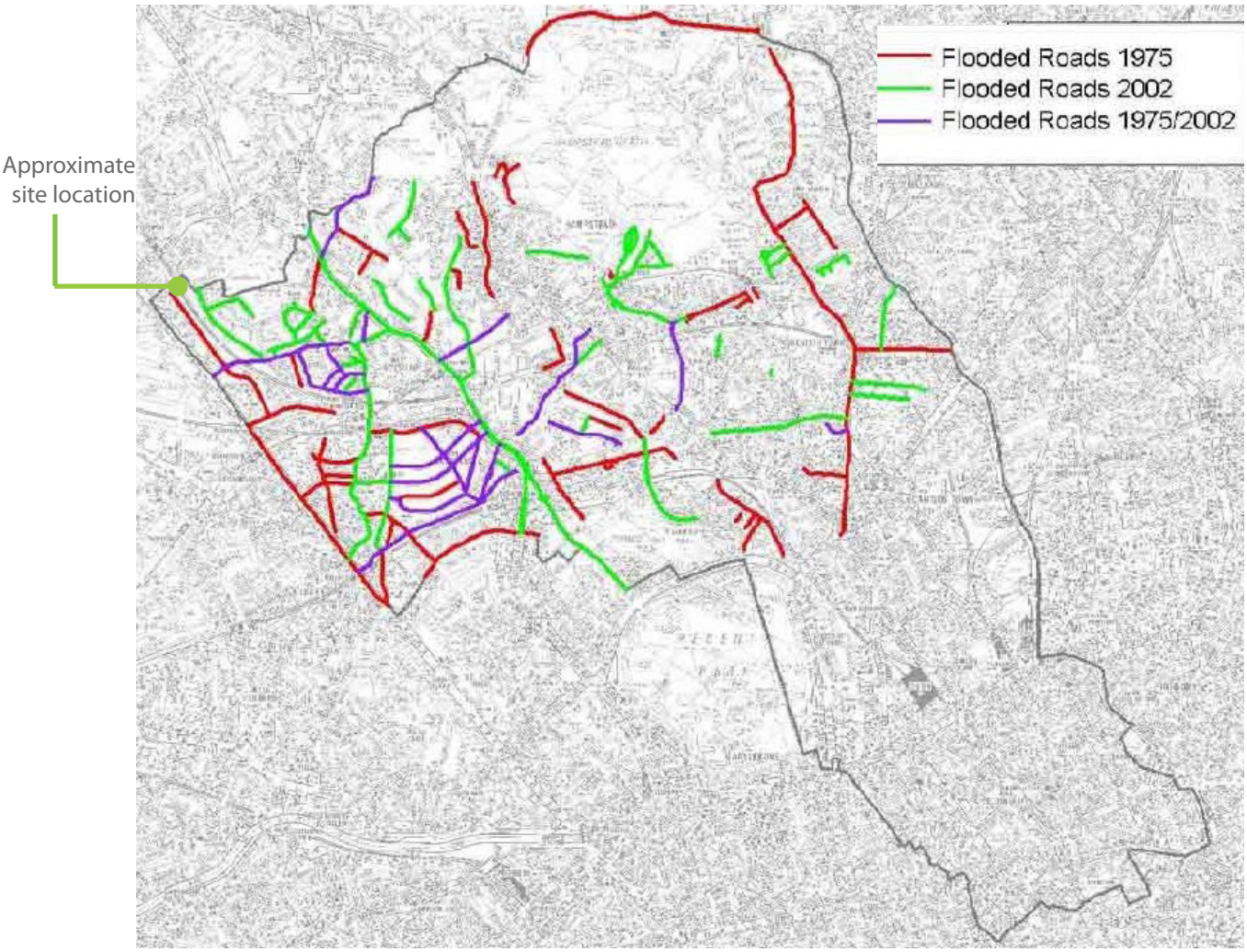
Average daylight factor results for selected units

Unit	Floor	Room Type	Room ADF(%)	Target ADF (%)
Unit A	Ground floor	Kitchen, living and dining room	3.28	2.0
		Bedroom	3.63	1.0
Unit B	Ground floor	Kitchen, living and dining room	3.36	2.0
		Bedroom	3.62	1.0
Unit C	Ground floor	Kitchen, living and dining room	3.31	2.0
		Bedroom	5.33	1.0
Unit D	Ground floor	Kitchen, living and dining room	3.05	2.0
		Bedroom	4.17	1.0
Unit E	Ground floor	Kitchen, living and dining room	2.72	2.0
		Bedroom	4.16	1.0

Flooding

The proposed development will result in a net increase in permeable surface areas on site. The ground level garden, as well as a communal rainwater collection butts, will retain a notable proportion of rainfall. The majority of the hard surface areas will be permeable where possible, to enable the infiltration of rainwater into the ground and minimise surface water runoff.

The Surface Water Flood Risk Potential map extracted from the Camden Core Strategy document shows that the site is not at risk of flooding (see below). A review of the Environment Agency flood map is provided in the Water Surface Run-off section in the Code of Sustainable Homes assessment included in this report..



Sustainability Assessment Tools

Sustainability Standards

The new residential component of this development will be assessed using Code for Sustainable Homes 2010 as required by planning Policy DP22.

The following section provides an overview of the Code for Sustainable Homes assessment tool and the pre-assessment scores of the proposed development at Oak Grove..

Code for Sustainable Homes

The Code for Sustainable Homes is the national standard for the design and construction of sustainable homes for new residential developments. It was established by the government in close working consultation with the Building Research Establishment (BRE) and Construction Industry Research and Information Association (CIRIA). The Code measures the sustainability of a development against design categories, rating each dwelling individually.

Although the Code is currently voluntary, many councils are now setting Code levels as mandatory targets and it is likely to become a national requirement in the future.

Each standard requires new developments to gain credits by meeting sustainable design principles over nine key areas:

- Energy
- Water
- Materials
- Surface Water Run-Off
- Waste
- Pollution
- Health and Wellbeing
- Management
- Ecology

In order to meet Camden's planning policy DP22-Promoting Sustainable Design and Construction, the development will meet Code Level 4 by implementing the measures detailed. In addition, Camden stipulates in the CPG 3-Sustainability planning guidance that dwellings should achieve at least 50% of un-weighted credits in the Energy, Water and Materials categories.

Energy

ENE 1 Dwelling Emission Rate

The Dwelling Emission Rate (DER) is the estimated CO_2 emissions per m^2 per year ($kgCO_2/m^2/year$) for a development. It accounts for energy used in heating, fixed cooling, hot water and lighting. To achieve Code Level 4, the Code stipulates that CO_2 emissions must exceed Part L 2010 Building Regulations i.e the Dwelling Emission Rate (DER) should be at least 25% better than the Target Emission Rate (TER).

The methodology set out by the Department of Energy and Climate Change (DECC) for assessing the energy use of dwellings is the Standard Assessment Procedure (SAP). The current version is SAP 2009.

A preliminary SAP calculation was carried out to assess the potential CO_2 savings achieved through,

- energy efficiency measures
- the efficient supply of energy
- renewable systems

A 25% reduction in regulated CO_2 is mandatory for the proposed dwelling to achieve Code Level 4. The preliminary calculations showed an improvement in CO emissions over Part L Building Regulations 2010, amounting to 40.2%.

Given the improvement in DER over TER, the development at Oak Grove exceeds the mandatory credits within the Energy category in order to meet Code Level 4 and Camden's requirement.

ENE 2 Fabric Energy Efficiency (FEE)

An improvement in the building fabric efficiency will significantly reduce energy demand. This will be achieved through the adoption of high levels of insulation and good levels of air tightness. SAP calculations were based on a building fabric with low U-values and an air permeability rate of $5m^3/m^2$ at 50 Pa, thereby achieving a Fabric Energy Efficiency (FEE) of 47.17 $kWh/m^2/year$.

ENE 3 Energy Display Devices
An energy display device capable of displaying both electricity and heat energy will be installed in all dwellings.

ENE 4 Drying Space
The proposed dwellings will include provisions for clothes drying, thereby reducing the amount of electricity consumed through the use of tumble dryers.

All the apartments in this development will be provided with an internal drying line of a minimum 4m in length, to be installed in a suitable location within the bathroom.

ENE 5 Energy Labelled White Goods
White goods are not provided within the development. However, to encourage the purchasing of efficient appliances all dwellings will be supplied with EU Energy Efficiency Labelling Scheme information.

ENE 6 External Lighting
Energy efficient light fittings will be installed throughout the development. In addition, external lights will be fitted with controls to reduce the energy consumption of the building during periods of infrequent use, and all security lighting will include daylight cut-off devices, with a maximum wattage of 150W and movement control devices.

ENE 7 Contribution of Low or Zero Carbon Technologies
A feasibility study was carried out to determine the Energy Strategy for the proposed development, and photovoltaics were considered to be the most feasible low and zero carbon solution for this development. The total low and zero carbon reduction from these measures exceeds 10% of the 2010 baseline figure.

ENE 8 Cycle Storage
Cycle storage spaces will be provided within the development in order to reduce the frequency of short car journeys. One cycle space has been allocated to each 1 bedroom dwelling at this stage.

ENE 9 Home Office
The proposed dwellings will accommodate a home office space that consists of:

- sufficient space for a chair, desk and bookshelf
- minimum 1.8m wall space
- adequate ventilation
- an average daylight factor of 1.5%
- 2 No. double power sockets and
- 2 No. telephone sockets (or one telephone socket where broadband is provided)

For dwellings with one bedroom, a suitable room is the living room or any other suitable area in the home.

Water

WAT 1 Indoor Water Use

The indoor water use category aims to reduce the consumption of potable water in the home from all sources. These are mandatory credits within Code for Sustainable Homes, with Level 4 setting an upper limit of 105 litres per person per day.

The development at Oak Grove aims to reduce water consumption through the use of water efficient fittings which are listed below, and subsequently achieve a water consumption rate for 103.5 litres/ person/day which is within the Code level 4 target.

WAT 2 External Water Use Provision

The External water use category intends to promote the recycling of rainwater and reduce the amount of mains potable water used for external water uses.

This development includes a communal garden space to be used by the residents of all the apartments. Rainwater collection butts will be provided to the communal garden in order to meet the criteria to achieve this credit.

Estimated Water Consumption

	All Units	
Fitting	**Consumption per Use**	**Consumption (l/person/day)**
WC (full flush)	6 litres per flush	
WC (half flush)	3 litres per flush	
All WCs		17.64
Kitchen sink tap	6 litres per min	13
Wash basin tap	3 litres per min	11.06
Shower	8 litres to overflow	50.40
Washing machine	8.17 litres/kg dry load	17.16
Dishwasher	1.25 litres/place setting	4.5
Net internal water consumption		113.8
Normalisation factor		0.91
Total		103.5

Materials

MAT 1 Environmental Impact of Materials

Embodied energy is the energy that is used in the manufacture, processing and the transportation of the materials to site.

The construction build-ups for each of the main building elements are rated from A+ to E. Each element to be used in the building has been rated according to the BRE Green Guide to Specification whereby:

- A+ rated elements are least likely to affect the environment
- E rated elements are most likely to affect the environment

It is assumed that most of the main building elements within this development will achieve between an A+ to C rating.

MAT 2 & MAT 3 Responsible Sourcing of Materials

At least 50% of the materials specified will be obtained from responsible sources. This includes all basic building elements, comprising the building frame, floors, roof, external walls, foundations and internal walls and all finishing elements.

In addition, 100% of all timber used on site will be legally sourced, thereby satisfying the mandatory requirements set out in this category. Any timber used in the structural and finishing elements will be specified from certified sustainable sources such as FSC or PEFC.

Where possible, on-site materials will be reused and recycled to lower transport CO_2 emissions associated with off-site recycling. Where practicable, materials with a high recycled or waste content will be specified.

Aggregates from the demolition of any existing hard surfacing/landscaping on site will be crushed and used as substrate material for the building base and road surfaces where possible.

Surface Water Run-off

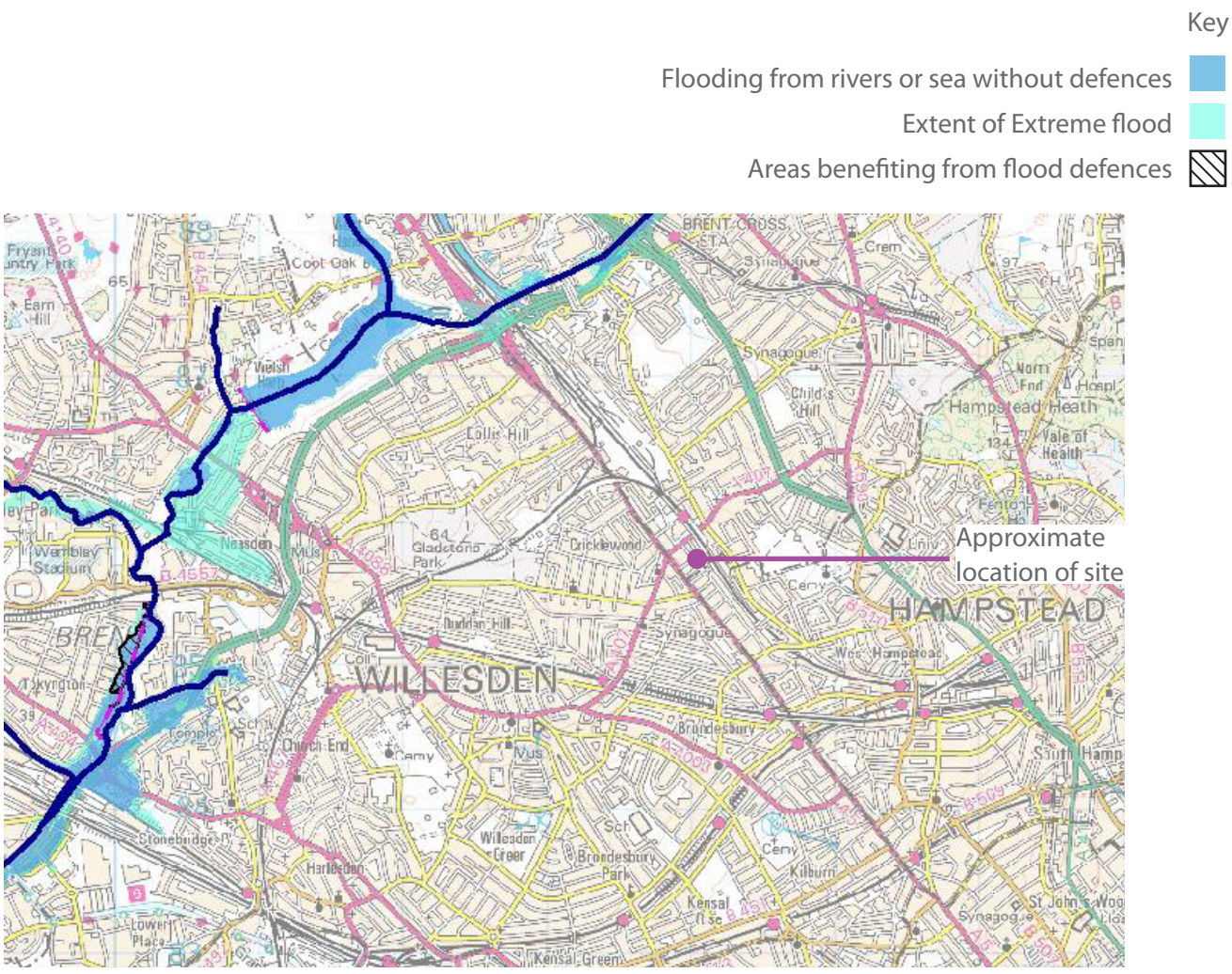
SUR 1 Surface Water Run-off

The aim of this category is to avoid, reduce and delay the discharge of rainfall run-off to watercourses and public sewers using sustainable drainage systems (SuDS).

The development at Oak Grove will meet the mandatory requirements for surface water run-off, where the system has also been designed for Local Drainage System Failure.

SUR 2 Flood Risk

The Environment Agency flood map shows that there is a low risk of flooding on site. A Flood Risk Assessment will be carried out at the post planning stage to confirm this. Precautions will be taken to reduce the risk of flooding on site.



Environment Agency flood map indicating the risk of flooding

Waste

WAS 1 Household Waste

Dedicated external waste storage for the dwellings will be provided to meet the Code and Local Authority requirements. Space for a 1500 mm diameter turning circle or 1700 x 1400 mm turning ellipse will be provided adjacent to the bins. Provisions will also be made to ensure that adequate internal storage for recyclable waste, of at least 30 litres capacity and in a dedicated position, are present in all dwellings. The Local Authority provides recyclable household waste collection and sorting.

WAS 2 Construction Site Waste Management

The development will minimise the impact of construction waste on the environment through a compliant Site Waste Management Plan (SWMP). This plan will include:

- benchmarks for resource efficiency
- procedures and commitments to reduce hazardous and non-hazardous waste
- monitoring hazardous and non-hazardous waste

Additional credits have been taken into account whereby 85% of non-hazardous waste will be diverted from landfill. Details of the SWMP will be developed at a later stage, prior to construction.

WAS 3 Composting Provision

Camden Council has made provisions to collect kitchen waste from households, including high-rise and low-rise flats. This waste is transferred to a processing plant which turns it into compost. Thus, the maximum credits may be achieved in this section.

Communal kitchen waste bins from Camden Council.

Pollution

POL 1 Global Warming Potential (GWP) of Insulants

Global warming potential (GWP) is a measure of how effective a gas is at preventing the passage of infrared radiation. Blowing agents, used in the production of insulation, are a common source of gases with high GWPs.

The development will specify insulation materials that have a Global Warming Potential (GWP) of less than 5 to achieve the maximum credits in this category.

POL 2 NOx Emissions

This section aims to reduce the release of nitrogen oxide (NOx) into the atmosphere.

Space heating and hot water requirements will be met through a high efficiency gas boilers., with NOx emissions lower than 40mg/kWh.

Internal waste storage and separation

Health and Wellbeing

HEA 1 Daylighting

The dwellings have been designed with daylight in mind and measures have been taken to increase it where possible. Large windows have been included to maximise the amount of daylight entering the apartments.

HEA 2 Sound Insulation

The development proposes that airborne sound insulation is at least 5dB higher and impact sound insulation at least 5dB lower than required by current Building Regulations. This will be determined through either robust details or a programme of pre-completion testing.

HEA 3 Private Space

A communal garden will be accessible to all occupants, and it is sufficiently sized to achieve the maximum amount of credits in this category.

HEA 4 Lifetime Homes

All dwellings will be Lifetime Homes compliant, ensuring the dwellings are easily adaptable for future use.

Management

MAN 1 Home User Guide

A 'Home User Guide' will be made available to the dwelling, providing occupants with an understanding of the energy associated with the operation of their home. This non-technical guide will include operational instructions as well as information on the surrounding area (local amenities) to obtain full credits in this section.

MAN 2 Considerate Constructors Scheme

The tender specification will require contractors to be compliant with the Considerate Constructors Scheme (CCS). Additional credits have been awarded as it is expected that formal certification will be achieved and that contractors will go significantly beyond best practice.

MAN 3 Construction Site Impacts

To minimise the construction impacts of the site, contractors will be required to monitor, report and set targets for the production of CO_2 and use of water arising from site activities.

In addition, contractors will be required to adopt best practice policies for air (dust) and water (ground and surface) pollution occurring on site, and all timber will be sourced following the Government's Timber Procurement Policy.

MAN 4 Security

An Architectural Liaison Officer will be consulted and their advice will be incorporated into the design of the development in accordance with Sections 1 and 2 of 'Secured By Design'.

Ecology

ECO 1 and 3 Ecological Assessment

The development is currently located on a brownfield site. A habitat overview and protected species assessment shall be carried out by a suitably qualified ecologist (SQE) and will confirm that the site is of low ecological value.

ECO 2 Ecological Enhancement

An SQE will be appointed to propose appropriate ecological features that will positively enhance the ecology of the site. All key recommendations and at least 30% of additional recommendations will be adopted.

ECO 4 Change in Ecological Value of the Site

Once the recommendations of the ecologist are adopted, a neutral enhancement to the existing ecological value of the site is expected, and the overall change in hectare per species is expected to be greater than -3 and less than or equal to +3.

ECO 5 Building Footprint

This development promotes an efficient use of the building's footprint, as it is a three storey block of flats. Therefore, the ratio of the net internal floor area to the net internal ground floor area is 3:1.

Code for Sustainable Homes Pre-Assessment Results

A Code for Sustainable Homes pre-assessment was carried out for the proposed development at Oak Grove, using the targets set by the client and project team. This reflects the client's and project team's commitment in adopting a range of sustainability measures over the life-cycle of the development.

The following table summarises the number of credits achieved in each of the Code categories, using the Stroma Core software. The proposed development achieves a total of 71.68 credits, which exceeds Code level 4. Over 50% of the credits in the Energy, water and materials categories have been achieved.

				Score Assessment		
92 Fitzjohn's Avenue		Credit Score	Credits Available	Sub Total	Weighting Factor	Points Score
Energy & CO2 Emissions	ENE 1 Dwelling Emission Rate	4.3	10	17.7	36.4%	20.78
	ENE 2 Fabric Energy Efficiency	3.4	9			
	ENE 3 Energy Display Device	2	2			
	ENE 4 Drying Space	1	1			
	ENE 5 Energy Labelled White Goods	1	2			
	ENE 6 External Lighting	2	2			
	ENE 7 Low or Zero Carbon Energy Technologies	1	2			
	ENE 8 Cycle Storage	2	2			
	ENE 9 Home Office	1	1			
Water	WAT 1 Internal Water Use	3	5	4	9%	6.00
	WAT 2 External Water Use	1	1			
Materials	MAT 1 Environmental Impact of Materials	8	15	12	7.2%	3.60
	MAT 2 Responsible Sourcing (Basic Building Elements)	2	6			
	MAT 3 Responsible Sourcing (Finishing Elements)	2	3			
Surface Water Run-off	SUR 1 Management of Surface Water Run-Off from Site	0	2	2	2.2%	1.10
	SUR 2 Flood Risk	2	2			
Waste	WAS 1 Household Waste Storage and Recycling Facilities	4	4	8	6.4%	6.40
	WAS 2 Construction Site Waste Management	3	3			
	WAS 3 Composting	1	1			
Pollution	POL 1 Global Warming Potential of Insulants	1	1	4	2.8%	2.8
	POL 2 NOx Emissions	3	3			
Health & Wellbeing	HEA 1 Daylighting	2	3	10	14%	11.67
	HEA 2 Sound Insulation	3	4			
	HEA 3 Private Space	1	1			
	HEA 4 Lifetime Homes	4	4			
Management	MAN 1 Home User Guide	3	3	9	10%	10.00
	MAN 2 Considerate Constructors Scheme	2	2			
	MAN 3 Construction Site Impacts	2	2			
	MAN 4 Security	2	2			
Ecology	ECO 1 Ecological Value of Site	1	1	7	12%	9.33
	ECO 2 Ecological Enhancement	1	1			
	ECO 3 Protection of Ecological Features	1	1			
	ECO 4 Change of Ecological Value of Site	2	4			
	ECO 5 Building Footprint	2	2			
	Level Achieved:	**4**		**Total Points Scored:**		**71.68**