26 Netherhall Gardens

Energy & Sustainability Statement

Issue 3.0 - May 2015
C5697

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Document history

Job number: C5697		**Document ref:**			
Revision	Purpose description	Origination	Reviewed	Authorised	Date
03	Draft report for comments	N.Dabidian	A.Pathan		14/05/15

Client	Atlas Property Lettings & Services Ltd
Project	26 Netherhal Gardens , Camden
Document title	Energy & Sustainability Statement
Job No.	C5697
Version	3.0
Document reference	L:\PROJECTS\C5697 Netherhal Gardens – planning\Reports\C5697-150514-Energy & Sustainability Statement 3.0

COMMENTS:

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Executive Summary

This Energy and Sustainability Statement outlines the environmental performance of the proposed 26 Netherhall Gardens scheme in Camden. The development aspires to maximise sustainable design features, wherever practicable and feasible, that comply with the current Building Regulations.

The report, prepared in support of the planning application for works at 26 Netherhall Gardens, reviews all applicable policies and requirements in terms of sustainability for the development. Camden Council planning policies and the development's response to these policies are described in the following sections. Detailed energy calculations have been completed for the scheme, including SAP 2012 Calculation for Part L 2013 of the Building Regulations.

The following key energy efficiency measures should be incorporated in the proposed design to enhance the building's energy performance and reduce its annual carbon emissions:

- Enhanced passive design with low U-values that exceed Part L standards and detailing that conforms with Accredited Construction Details should be specified to reduce heat losses and eliminate thermal bridging.
- Double glazed, draught proofed units of high performance should be installed to increase the air tightness of the structure.
- Fixed internal and external lighting should be of low energy light fittings.
- Very energy efficient boilers and well insulated hot water cylinders are proposed
- Low/Zero Carbon Technologies considered for the scheme:

As a result of the recommended energy strategy, the dwelling's energy performance is improved by 4.2% over Part L 2013 and over 10% compared to Part L 2010 Target Emission Rate.

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1 Introduction

Over recent years, global public opinion has been increasingly concerned with the state of the environment and the impact of climate change. Buildings are responsible for a significant proportion of the world's energy consumption. In the United Kingdom, domestic, commercial buildings and industry contribute 43%[1] of the total CO2 emissions. These figures highlight the need for building owners, developers and designers to design environmentally sustainable buildings.

This report provides a review of the sustainability and efficiency benchmarks for the development and sets out targets for the development in terms of both sustainability and energy. An overview of different sustainability and energy-efficiency technologies that are likely to be appropriate for the development are also included in this statement.

As the design progresses, the strategies outlined in this report will be further developed and subjected to detailed financial feasibility studies. The environmental strategies and options outlined in this report are based on the current information available and are likely to evolve with the design. The energy calculations presented in this report will need to be continually updated through the detailed design stages to reflect any changes. The energy analysis presented here should be treated as preliminary information based on the currently available data.

1.1 The Development

The proposed 26 Netherhall Gardens scheme (Figure 1), located within the Fitzjohns Netherhall Conservation area, in Camden, includes the erection of a block of five residential units. The development comprises four maisonettes and one flat.

For a detailed description of the proposed design, please refer to the Design and Access Statement prepared by Squire and Partners Architects.

[1] Department for Environment, Food and Rural Affairs, http://www.defra.gov.uk/, 2008

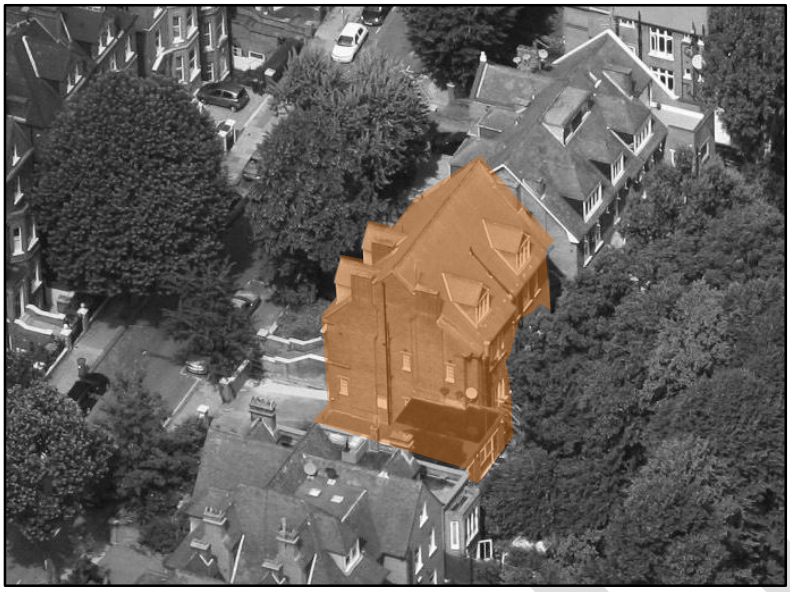

Figure 1: Existing Site - Bird's Eye View

2 Overview of Environmental Standards, Targets and Policies

2.1 National Policies

This section provides an overview of the environmental rating schemes, mandatory regulations and policy documents applicable to the development.

Environmental benchmarks are principally derived from the following documents:

- The London Plan – Spatial Development Strategy for Greater London[2], July 2011.
- Core strategies CS13[3] and CS18[4], Camden Core Strategy 2010-2025
- Part L of the 2013 Building Regulations: Conservation of fuel and power

Key national and regional environmental policy documents consulted in the development of this report and environmental strategies include:

- National Planning Policy Framework[5]
- Development Policies DP22[6] and DP23[7], Camden Development Policies 2010-2025
- Camden planning Guidance CPG3 Sustainability, September 2013

2 The London plan – Spatial Development Strategy for Greater London, http://www.london.gov.uk/mayor/strategies/sds/london_plan/lon_plan_all.pdf

3 CS13 Tackling Climate change through promoting higher environmental standards, Camden Core Strategy 2010-2025

4 CS18 Dealing with our waste and encouraging recycling, Camden Core Strategy 2010-2025

5 National Planning Policy Framework, http://www.communities.gov.uk/documents/planningandbuilding/pdf/2116950.pdf

6 DP22 Promoting sustainable design and construction, Camden Development Policies 2010-2025

7 DP23 Water, Camden Development Policies 2010-2025

In addition to the standards, targets and policies discussed above, the relevant British Standards and CIBSE Guidelines were used to assist in determining the most appropriate Ecologically Sustainable Design (ESD) initiatives for the development.

2.2 Camden Council Planning Requirements

The 26 Netherhall Gardens scheme falls under the planning requirements of Camden Council. According to Development Policy 22, the Council require development to incorporate sustainable design and construction measures. The council has chosen Code for Sustainable Homes as the environmental assessment method to assess the sustainability performance of new build housing.

Development Policy 23 requires developments to reduce their water consumption, the pressure on the combined sewer network and the risk of flooding

The government has now withdrawn the code, aside from the management of legacy cases. We will therefore address the general requirements of both DP22 and 23 but will not provide a Code pre-assessment with this statement.

Mecserve Ltd. has been appointed by the client to provide sustainability advice for the scheme and complete a Code for Sustainable Homes pre-assessment for the development. Mecserve is an engineering design consultancy with more than 30 years' experience in construction industry.

3 Sustainable Construction and Water Consumption

In response to Development policies 22 and 23, the following key elements/strategies are considered in the 26 Netherhall Gardens development:

- Enhanced passive design and energy efficient systems installed to reduce the dwelling's emission rate
- Energy efficient light fittings for internal and external lighting
- Water efficient sanitaryware to be installed to reduce water consumption
- Building materials and insulation used will be responsibly sourced
- A waste strategy to be developed in regards to construction site waste management
- Dedicated internal storage to be provided in combination with Camden's collection scheme for household waste
- Appropriate cycle storage spaces to be provided
- Sustainable urban drainage and inclusion of green areas in the site where possible
- Responsible construction practices will be adopted for the scheme

The following sections describe the strategy developed for the main sustainability areas, i.e. Water, Materials and Waste.

3.1 Water strategy

Camden Council requires new built developments to reduce their water consumption by incorporating water efficient features. Limiting the amount and rate of run-off is also crucial for decreasing the pressure on the combined sewer network and the risk of flooding.

The proposed dwellings will be designed to be water efficient so as to reduce the consumption of potable water from all sources. The development will comply with Part G 2010 of Building Regulations, in regards to sanitation, hot water safety and water efficiency. This can be achieved through the installation of low water use sanitaryware.

The development is within an area of low annual probability of flooding. However, the drainage design will meet Camden Council's requirements and Building Regulations to minimise the risk of flooding and other environmental damage in watercourses.

3.2 Materials

Re-use of materials on-site or the salvage of appropriate materials to enable their re-use off-site will be considered throughout the project. New construction materials with low environmental impact across their entire life cycle will be specified for the scheme. Selection of appropriate materials will be done in accordance to BRE Green Guide that ranks materials and components on an A+ to E rating scale, where A+ represents the best environmental performance and least environmental impact.

In addition, responsible sourced materials from suppliers that participate in responsible sourcing schemes will be specified. All timber specified would also be sourced from schemes supported by the Central Point of Expertise for Timber Procurement such as Forest Stewardship Council (FSC) accreditation, which ensures that the harvest of timber and non-timber products maintains the forest's ecology and its long-term viability.

Thermal and acoustic insulation materials in the main elements of the dwelling using substances that have a Global Warming Potential (GWP) less than 5 will be also specified. Non-toxic but environmentally sensitive building materials that do not produce VOC (volatile organic compounds and formaldehyde) which can affect human health will be used.

3.3 Waste strategy

A Site Waste Management Plan (SWMP) will be developed for the scheme to promote resource efficiency via the appropriate management of construction site waste, minimise non-hazardous construction waste and monitor, measure and report site waste production. SWMP will follow Camden Council's waste hierarchy wherever possible and feasible by promoting reduction, re-use and recycle of materials on site.

Camden Council provides an efficient weekly collection scheme. In terms of recycling Camden provides four types of doorstep recycling collections i.e. paper and card collections, glass, cans and plastics collections, food waste collections and green garden waste collections. Camden's collecting

scheme in combination with adequate internal storage capacity will be provided to the occupants to promote recycling.

4 Energy Efficiency Assessment

The following section of this report details the energy demand for the development. The building is first assessed against the requirements of Building Regulations Part L to establish a baseline energy performance. Then the improvements in energy efficiency from passive and active energy measures are introduced. A feasibility assessment is then completed to look at most appropriate low and zero carbon technologies for the development.

This approach conforms to the GLA energy hierarchy of improving energy efficiency and providing on-site renewables. Our approach also follows the emerging London plan policy of prioritising reductions in carbon emissions over provision of on-site LZC technologies.

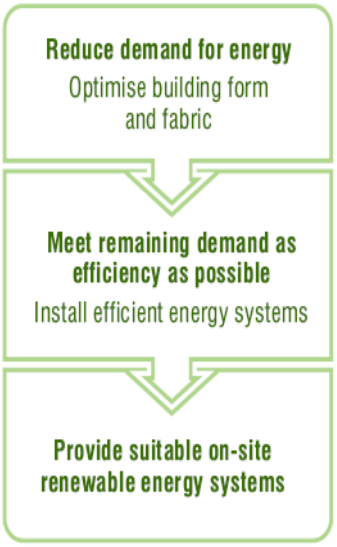

Figure 2: Energy Optimisation Process

4.1 Energy Calculations

STROMA FSAP 2012 software, approved by BRE for full implementation of the Standard Assessment Procedure (SAP 2012), was used to assess the energy performance and annual carbon emissions of the new built scheme after energy efficient measures have been applied. The energy calculation completed for the building gives the predicted CO_2 emission rate.

In order to comply with the requirements of Part L of the building regulations it is necessary to reduce energy consumption by good design. The first step in the hierarchy is to reduce greenhouse gas emissions through energy efficient building design. Our approach to this has been to concentrate on passive design measures that will reduce energy demand in the first instance before looking at active energy efficiency measures.

4.1.1 Passive Energy Efficiency Design

Building fabric will be specified to exceed Part L1A 2013 standards. Thermal elements of low U-values will reduce heat losses and therefore decrease heating demand. The layout is designed such that it maximises daylight in the relevant zones and reduces reliance on artificial lighting. Double glazed windows of high performance will provide daylight to the occupied spaces and solar gains for passive heating in winter. All openings will be draught proofed to increase the structure's air-tightness. All details will conform with Accredited Construction Details to minimise inconsistency in thermal envelope performance by avoiding thermal bridging.

4.1.2 Active Energy Efficiency Design

High efficiency boilers, will provide the dwellings with space heating and domestic hot water demand throughout the year. Mechanical Ventilation with heat recovery is specified for the dwellings to minimise heat losses through ventilation.

The base lighting scheme throughout will use dedicated low-energy fittings either fluorescent or LEDs. All lighting systems will be provided with sufficient controls to allow efficient operation.

4.2 District Energy Networks

There is currently no district heating network in the area.

4.3 On-site low carbon and renewable energy generation

There is no specific target set for developments to achieve in regards to renewable energy systems. The following section of the report briefly assesses the feasibility of LZC technologies for the development.

4.3.1 CHP

As the annual demand for space heating and domestic hot water for a small-scale residential project, consisting of only five units, is low and not stable throughout the year, the option of a combined heat and power (CHP) unit is considered unfavourable. Provision of a CHP system would also require excessive space for the plant and may also result in high noise levels for a residential unit. Moreover, CHP units have high capital and maintenance costs.

4.3.2 Biomass Boilers

A biomass boiler would work effectively against a consistent heating load. Within a residential area, there are concerns about the effect of small-scale biomass systems on air-quality particularly with respect to particulates released through the boiler flue. Within this constrained site, it would be difficult to provide sufficient space for biomass storage. For these reasons, we would not recommend a biomass boiler for this development.

4.3.3 Wind Turbines

Wind turbines installed within urban areas are less efficient mainly due to turbulences on air movement in the urban environment. They require a certain level of wind to reach their peak efficiency, which is often difficult in London where there are large obstacles, such as buildings and trees, which distort the flow of wind. Furthermore, installation of such a system might have a negative impact to the surroundings in terms of aesthetics, given that the scheme is within a conservation area, as well as due to its noise and vibration levels. Therefore, this technology is not suitable for this site.

4.3.4 Ground Source Heating & Cooling

Heating and cooling demand in the scheme is not balanced throughout the year. This would make a ground source heat pump (GSHP) to work at a much lower efficiency. Moreover, GSHPs have high

capital cost mainly due to the excavation of trenches or boreholes. For these reasons, installation of GSHP is not recommended for this development.

4.3.5 Photovoltaic Panels

Photovoltaic panels could efficiently provide a fraction of the dwelling's daily electricity consumption. The design team has reviewed the building roofscape of the development. PV panels work more efficiently if they are facing south and not overshaded by neighbouring buildings or topographical features. Therefore, PV panels installed on the W/E facing pitched roof of the development would not reach their peak efficiency. In addition, the panels could have a negative visual impact on the character of the conservation area, where the scheme is located. For these reasons, PV panels are not recommended for this development.

4.3.6 Solar Hot Water Heating (SHWH)

Solar thermal hot water systems can work well on residential developments. These should be facing 30 degrees within South to maximise their efficiency. Given the roof layout, however, the systems would not perform well as the panels would also be overshaded by neighbour buildings and obstacles like trees. Taking also into consideration the negative impact these may have on the special character of the surroundings, we would not recommend SHWH panels to be installed on the roof.

4.3.7 Air Source Heat Pump

An air-to-water system uses renewable heat absorbed form outside air to raise the temperature of the water that circulates in the underfloor system. Air Source Heat Pumps perform better when connected to an underfloor heating that requires lower water temperature in comparison to radiators. However, it uses electricity and therefore the carbon saving from the technology is not significant. In addition, there is little appropriate space to install the external units for the flats such that it does not have any negative visual or acoustic impact on the surrounding. As a result, ASHPs are not proposed for this building.

4.4 Carbon Emissions Calculation Results

The strategies described in this report result in a 4.2% reduction in CO_2 emissions over Part L 2013 standards. The scheme therefore achieves a reduction of over 10% over Part L 2010 Target Emission Rate. Table 2 summarises the reduction in annual carbon emissions of the development.

Applying the strategies listed above and building a new modern energy efficient construction, the new construction could save more than 50% of the carbon emission associated with the existing building. The energy and carbon saving throughout the life of the building is therefore significant.

	Annual Carbon Emissions
	$kgCO_2/m^2/year$
Part L1A 2013 Target Emission Rate	14.82
DER with energy efficient measures proposed	14.19

Table 1: Summary of Building Baseline Emission Rates

5 Conclusions

This report and the accompanying pre-assessment demonstrate that the development team has carefully considered sustainable design issues that exceed the statutory minimum requirements across a wide range of environmental design criteria.

SAP 2013 energy calculations, carried out for the scheme, demonstrate how the development responds to the Camden Council policies relating to energy efficiency and compliance with current Building regulations is achieved. The scheme complies with both Part L 2013 targets set in terms of carbon emission rate and fabric energy efficiency.

This report has demonstrated how energy efficiency measures have been incorporated into the development in order to deliver CO_2 emissions savings. These measures include:

- Thermal elements of low U-values that exceed Part L1A 2013 standards.
- Double glazed and draught proofed units of high performance will be installed and Accredited Construction Details will be used to avoid thermal bridging, reduce heat losses and increase the air tightness of the structure
- Extensive provision of metering and controls.
- Energy efficient lighting, featuring low energy fittings, will be used extensively throughout the development.

The energy efficiency section of this report has demonstrated that with the application of good energy efficient design, predicted carbon emissions from the development are 4.2% below the baseline emissions based on Part L 2013 standards (therefore over 10% reduction compared to Part L 2010).

APPENDIX A - SAP 2012 Calculation Parameters

STROMA FSAP 2012 software, approved by BRE for full implementation of the Standard Assessment Procedure (SAP 2012), was used to assess the energy performance and annual carbon emissions of 26 Netherhall Gardens scheme after energy efficiency measures have been integrated in the design. SAP Calculations were based on architectural layouts and the following assumptions on building fabric and service systems:

Building Fabric Performance		
U-values [W/m2.K]	Wall	0.25
	Roof	0.15
	Floor	0.15
	Windows	1.40 (g-value: 0.63)
	Doors	1.00
Air tightness		4.0 m3/m2.hr
Thermal Bridging		Construction Details will be Accredited to minimise inconsistency in thermal envelope performance thus avoiding thermal bridging and reducing heat losses.
Building HVAC systems		
Heating system		Efficient boiler (SAP annual efficiency of 89% or more)
		Secondary heating system: None
Heating controls		In compliance with Domestic Building Services Compliance Guide 2013 Charging system linked to use of community heating, programmer and TRVs
Domestic Hot Water		Same as heating system plus well insulated hot water storage
Ventilation		Mechanical Ventilation with Heat Recovery (SFP: 0.45 W/l/s, 94% efficiency)
Comfort cooling		None
Lighting		
All light fittings will be dedicated low energy types; either LEDs or CFL		