25-26 Redington Gardens

Energy and Sustainability Statement

Job No: 1011533

Doc No: 1010533-RPT-SU001

Latest Revision: A

Date: 26/05/2015

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Project name	25-26 Redington Gardens	**Job Number**
Report Name	Energy and Sustainability Statement	1011533

Document Revision History

Revision Ref	Issue Date	Purpose of issue / description of revision
-	14/05/2015	Draft for Comment

Document Validation (latest issue)

Revision	Issue Date	Purpose of issue / description of revision / version			
-	26/05/2015	Issued for planning			
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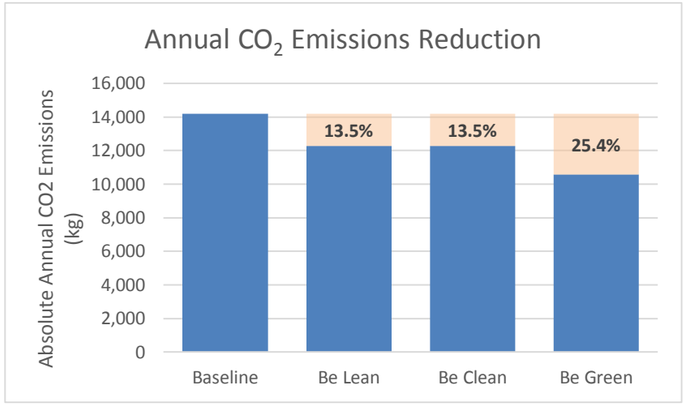


	Absolute	kgCO2/m2	Cumulative Reduction (kgCO2)	Cumulative % Reduction
Baseline	14,176	11	-	-
Be Lean	12,259	9.6	1917	13.5%
Be Clean	12,259	9.6	1917	13.5%
Be Green	10,572	8.2	3604	25.4%

Carbon Emission Reduction for 25-26 Redington Gardens

1. Executive Summary

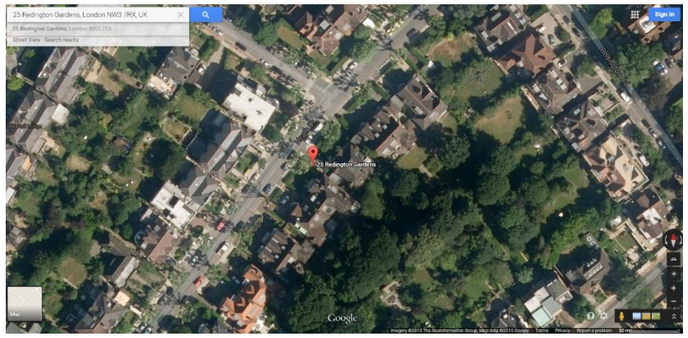
Low environmental impact will be an essential feature of the design of the proposed 25-26 Redington Gardens redevelopment. This Energy and Sustainability Statement outlines the development's approach to sustainability, energy efficiency and renewable energy strategies in order to meet the targets set out in the guidance from Camden Council.

The development is located in the Redington Conservation Area and as such is subject to special consideration under Camden Planning Guidance 3 (CPG3).

As part of the Government's response to the Housing Standards Review it has been confirmed that the Code for Sustainable Homes (CfSH) will be wound down, with many of its requirements consolidated into the Building Regulations. Whilst this means that a formal certification of the scheme may not be possible, the methodology and targets are still a useful tool in benchmarking the sustainable design of residential development. As such, the CfSH methodology has been used to guide and benchmark the design.

A number of the sustainable features included in the proposed design are listed below with consideration of their feasibility within the listed development accounted for:

- Thermal insulation levels for all building elements will be increased beyond the Building Regulation requirements, thereby substantially reducing the building's heat losses;
- Mechanical Ventilation with Heat Recovery will be provided to reduce the heating loads associated with providing fresh air;
- High efficiency individual gas boilers for each house will provide the heating and domestic hot water;
- The combination of proposed energy efficient measures (Be Lean) result in a reduction in CO_2 emissions of 13.5%;
- The London heat map indicates that there is currently no opportunities to connected to an existing or proposed district heating network;
- The limited size of the development's thermal load and the mismatch with its electrical profile suggest that CHP is not viable for this development (Be Clean);
- An extensive range of low and zero carbon technologies have been considered in terms of providing a proportion of the development's energy demand in line with planning policy (Be Green);
- The analysis indicates that a Photo-Voltaic array of approx. 30-35m^2 could be accommodated, which could provide a further 14% reduction in the site's CO_2 emissions;
- The combination of the measures outlined could potentially provide a 25% reduction over the Building Regulations CO_2 emissions targets.
- The development can achieve Camden's requirement for a minimum 50% of Energy credits in CfSH;
- The development can achieve Camden's requirement for a minimum 50% of Water credits in CfSH, with a consumption target of less than 105 litres per person per day;
- The development can achieve Camden's requirement for a minimum 50% of Materials credits in CfSH;
- All timber used on site will be purchased from responsible sources such as FSC approved vendors;
- New materials will be selected to take into account their overall environmental impacts and that they follow the Redington Conservation Area guidelines to preserve the look of the area;
- Recycling facilities will be provided for home owners to reduce waste during operation;
- Water use will be minimised by the specification of water efficient taps, shower heads and dual flush toilets;
- All construction on site will be managed in an environmentally sound manner in terms of resource use, storage, waste management, and potential sources of nuisance or pollution.



Proposed Site Location

Proposed Front Elevation

Proposed Rear Elevation

2. Introduction

This Energy and Sustainability Statement has been prepared in support of the planning application for the proposed residential redevelopment at 25-26 Redington Gardens, London NW3 7RX. It aims to meet the energy and climate change requirements of the London Borough of Camden and the Greater London Authority.

The format of the statement is intended to reflect and respond to the issues raised in the GLA's 'Spatial Development Strategy for Greater London' - the 'London Plan'.

The principal objectives are to reduce the site's contribution to the causes of climate change by minimising the emissions of CO_2, by reducing the site's needs for energy and providing some of the requirement by renewable/sustainable means. Issues such as water, waste, biodiversity, etc. have also been addressed in the study.

The GLA London Plan and GLA Energy Strategy are considered to be the benchmark for local planning regulation. Together they provide a useful tool against which to undertake energy and sustainability assessment. As this is not a major development and therefore not technically applicable they have been used in an advisory nature secondary to the requirements of the London Borough of Camden, to help incorporate a number of energy efficiency measures into the proposed development.

As part of the Government's response to the Housing Standards Review it has been confirmed that the Code for Sustainable Homes (CfSH) will be wound down, with many of its requirements consolidated into the Building Regulations. Whilst this means that a formal certification of the scheme may not be possible, the methodology and targets are still a useful tool in benchmarking the sustainable design of a residential accommodation. As such, the CfSH methodology has been used to guide and benchmark the design. A preliminary assessment indicates that a Level 4 rating could be achieved (see Appendix A).

The CfSH considers the broad environmental concerns of climate change, pollution, impact on residents and the wider community. It balances these with the need for high-quality, safe and healthy internal living and working environment. These standards go beyond the requirements of the Building Regulations.

This Statement forms a checklist of the sustainable initiatives considered for the proposed development. Each of the proposed initiatives is assessed on the relative sustainability potential, in addition to a "rule of thumb" financial/pay back implication, and suitability to this particular site.

2.1 Outline Description of Development

The proposals for the redevelopment of 25-26 Redington Gardens will provide two new five bedroom semi-detached houses.

The site is located in Hampstead, North London just to the south of West Heath and falls within the Redington Conservation Area, a protected area that aims to retain the look and quality of the local area.

The following accommodation schedule has been used as the basis for the energy assessment;

Floor	House 1	House 2	Total
Basement	242	216	458
Lower Ground	141	144	285
Upper Ground	94	94	188
First Floor	102	102	204
Second Floor	74	74	148
Total	**653**	**630**	**1283**

Area Schedule

3. Planning Policy

The National Planning Policy Framework (NPPF) was published in March 2012, which states a clear presumption in favour of sustainable development. The NPPF supports the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change, and encourage the reuse of existing resources, including conversion of existing buildings, and encourages the use of renewable resources.

The NPPF replaces PPS22 and in Section 10 outlines its energy and climate change policies. To support the move to a low carbon future, local planning authorities should:

- Plan for new development in locations and ways which reduce greenhouse gas emissions;
- Actively support energy efficiency improvements to existing buildings; and
- When setting any local requirement for a building's sustainability, do so in a way consistent with the Government's zero carbon buildings policy and adopt nationally described standards.

In determining planning applications, local planning authorities should expect new developments to:

- comply with adopted Local Plan policies on local requirements for decentralised energy supply unless it can be demonstrated that this is not feasible or viable; and
- take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption;
- have a positive strategy to promote energy from renewable and low carbon sources;
- consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure the development of such sources;
- Identify opportunities where development can draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

The key focus of the NPPF is to support local and regional planning authorities.

3.1 The London Plan

The GLA London Plan 2011, London Plan REMA October 2013 and GLA's Guidance on Preparing Energy Assessments September 2013 document are considered to be the benchmark for local planning regulation. Together they provide a useful tool against which to undertake energy and sustainability assessments. As the development does not qualify as 'major' the London Plan targets are not technically applicable and therefore they have been used in an advisory way secondary to the requirements of the Borough of Camden, to help incorporate a number of energy efficiency measures into the proposed development.

The London Plan sets out a number of core policies for major developments with regards reducing CO_2 emissions and providing energy in a sustainable manor. As this is not classified as a major development is does not technically have to comply with these requirements, but the design team have used them as guidance and sought to achieve them, where possible within the limitations of the existing constrained site.

Policy 5.2 - requires that major developments achieve a 35% improvement over the 2013 Building Regulation CO_2 Emission Target.

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

- Be lean: use less energy
- Be clean: supply energy efficiently
- Be green: use renewable energy

Policy 5.6 - requires all major developments to evaluate the feasibility of connecting to existing or proposed district heating networks and where no opportunity existing consider a site wide Combined Heat and Power (CHP) systems.

Policy 5.7 - requires that all major developments seek to reduce their CO_2 emissions by at least 20% through the use of onsite renewable energy generation wherever feasible. Individual development proposals will also help to achieve these targets by applying the energy hierarchy in Policy 5.2.

3.2 London Borough of Camden

The London Borough of Camden set out their approach to sustainable development through their Core Strategy, Development Policies and Supplementary Planning Documents. Core Strategy Policy 13 sets out the overarching approach to sustainability in the borough, with the aims of mitigating and adapting to climate change, promoting local energy generation, managing water resources and reducing carbon dioxide emissions

The Development Policies provide further detail as to how the Core Strategy policies can be achieved. In this instance *"Development Policy 22 – Promoting Sustainable Design and Construction*" provides the details as to how the targets of CS13 will be meet and states:

"The council will require development to incorporate sustainable design and construction measures. Schemes must:

- Demonstrate how sustainable development principles, including relevant measures set out in paragraph 22.5 below, have been incorporated into the design and proposed implementation; and
- Incorporate green or brown roofs and green walls wherever suitable."

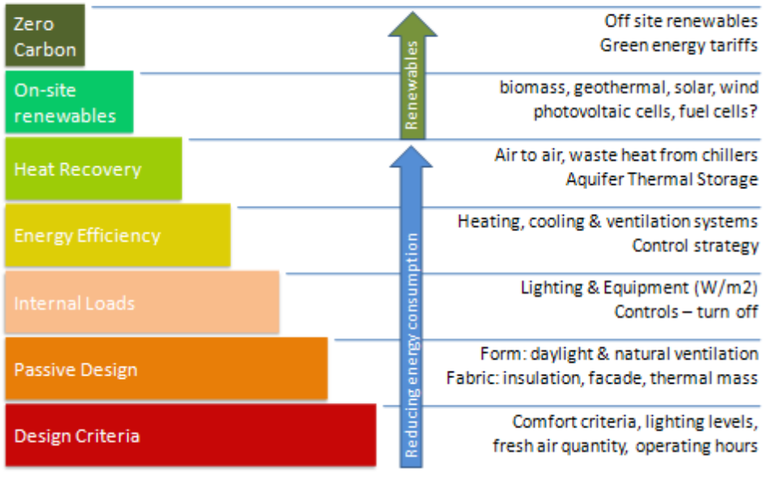
The council will promote and measure the sustainable design and construction by:

- Expecting residential developments to achieve a Code for Sustainable Homes Level 4 rating

The council will require developments to be resilient to climate change by ensuring scheme include appropriate climate change adaption measures, such as:

- Summer shading and planting;
- Limiting run-off;
- Reducing water consumption;
- Reducing air pollution;
- No locating vulnerable uses in basements in floor-prone areas.

In addition to this policy, the Supplementary Planning Document *"Camden Planning Guidance 3 – Sustainability"* provides greater detail on the targets for developments and the approach that should be adopted in meeting these targets.



Steps to Low Carbon

4. Energy Strategy

The application proposes the redevelopment of the site to provide two new five bedroom semi-detached houses. The new development will integrate with the London Borough of Camden's Sustainability guidance for the energy strategy.

The designs of the proposed houses have been developed to reduce their annual energy consumption, whilst providing energy in the most environmentally friendly way to reduce the annual CO_2 footprints. In order to achieve this, a "Steps to Low Carbon" methodology has been applied.

4.1 Passive Design

Substantial reductions in energy usage for the scheme will be achieved by enhancing passive building elements.

4.1.1 Building Envelope

Improving the thermal insulation standards beyond the minimum Building Regulation standards will help to reduce the annual CO_2 emissions associated with all of the building's heating and cooling systems, by limiting the heat loss through the building's fabric.

All new thermal elements will therefore be specified to achieve an improvement over the minimum standards of the Building Regulations. The targeted area weighted u-values match or exceed the performance guidance given in CPG 3 and are shown in the table below.

Building Element	Target U-values
Floors	0.12 W/m²K
Roofs	0.12 W/m²K
External Walls	0.20 W/m²K
Glazing	1.50 W/m²K
Doors	1.50 W/m²K

4.1.2 Accredited Construction Details

All new architectural details will ideally be assessed with their thermal bridging Ψ values calculated. Where this is not possible, all architectural details should be in accordance with the enhanced construction details listed on the Energy Trust's website or as an absolute minimum as per the requirements of the Accredited Construction Details document.

Accredited Construction Details (ACD's) have been developed to assist the construction industry to comply with the performance standards in Part L of the Building Regulations. They focus on issues concerning insulation continuity and airtightness and suggest a common approach to design, construction and testing methodology, and general improvements of the process.

4.1.3 Air Permeability

An air leakage rate of $3m^3/hr/m^2$ at 50Pa is being targeted for the new houses, in comparison with the Building Regulation minimum standards of $10m^3/hr/m^2$ at 50Pa. This also matches the performance guidance in CPG 3. With these improved air tightness levels, it is important that the all of the ventilation systems are sized and installed correctly.

Good air tightness could be achieved by prefabrication of a number of key building components under factory conditions, robust detailing of junctions and good building practices on site.

4.2 Ventilation - MVHR

Both houses will be provided with mechanical ventilation with heat recovery, which will substantially reduce their heating requirements. The mechanical ventilation system will incorporate high efficiency heat recovery with a target efficiency of 90%, minimising the heating and cooling loads associated with conditioning the supply air. It should be noted that the MVHR system should be sized to provide the fresh air requirement and NOT to maintain internal temperatures in summer, which will be achieved with comfort cooling..

4.3 Energy Efficient Systems & Appliances

After assessing the contribution of the passive elements to the overall energy balance, the aim is to further reduce CO_2 emissions by selecting efficient mechanical and electrical systems and efficient controls to manage the energy used during operation.

4.3.1 Eco-Labelled Goods

As lights and appliances account for about a third of the CO_2 emissions in dwellings, where domestic appliances are installed energy efficient units will be incorporated, including A and A+ rated appliances.

4.3.2 Low-Energy Lighting

To reduce the energy consumption associated with artificial lighting, 100% of all internal lighting fittings in each dwelling will be dedicated energy efficient light fittings*:

** Fittings that comprise the lamp, base, control gear, and an appropriate housing, reflector, shade or diffuser. The fitting must be dedicated in that it must be capable of only accepting lamps having a luminous efficacy greater than 40 lumens per circuit Watt. The fixing must be permanently fixed to the ceiling or wall.*

4.3.3 HVAC Plant Efficiencies

The design will include plant that meets or exceeds the minimum requirements of the Domestic Building Services Compliance Guide. It provides guidance on the means of complying with the requirements of Part L1A of the Building Regulations for conventional space heating systems, hot water systems, ventilation and cooling systems.

4.3.4 Energy metering

Separate metering of the energy uses within the development will help the building users identify areas of increased consumption and highlight potential energy-saving measures for the future, hence reducing the associated annual CO_2 emissions from these systems. All gas/heat and electrical supplies will be metered using smart meters to enable homeoweners to be responsible for their own consumption and hence CO_2 emissions. There will be a central display for each house providing live and historic energy consumption data.

4.4 Estimated Annual Energy Consumption

Individual energy assessments have been carried out for both houses to determine their estimated energy consumption and associated CO_2 emissions. The SAP 2012 methodology has been applied using approved software Elmhurst Energy.

The analysis indicates that the proposed houses will perform better than the minimum requirements of the Building Regulations, achieving improvements of 13.4% and 13.6%. The aggregated area weighted improvement over the Building Regulation's for the residential development is 13.5% based on the design parameters given.

As stated all of the dwellings will be required to achieve the mandatory 19% reduction in CO_2 emissions requirements for Code level 4. In order to achieve the required reduction in annual CO_2 emissions a proportion of the development's energy requirements will need to be meet by on-site energy generation and/or renewable energy technologies.

4.4.1 Building Fabric Performance

Detail	Design
Ground floor average U-value	0.12 W/m^{2}K
External wall average U-value	0.20 W/m^{2}K
Roof average U-value	0.12 W/m^{2}K
Window U-value (including frame)	1.50 W/m^{2}K
Glazing total solar transmission	60%
Y-value	0.08
Air permeability @ 50 Pascals	3.0 m^3/hr/m^2

4.4.2 Fixed Building Services

Detail	Design
Heating type	Individual Boilers
Heating fuel	Natural gas
Gross boiler seasonal efficiency	89.9%
Heating Emitters	Fan Coil Units
Boiler Compensator	Weather
Heating system controls	Time and Temperature Zone Control
Ventilation	Mechanical Ventilation with Heat Recovery
Specific Fan Power	0.86
Heat recovery efficiency	89%
Hot water pipework insulated	Yes
Cooling SEER	3.5
Low energy light fittings	100%
Hot water daily usage	< 125 l/p/day

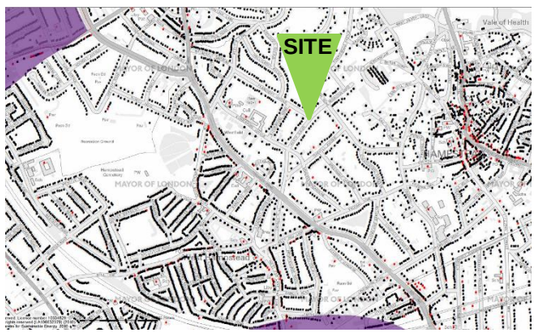
4.4.3 Area Weighted SAP 2009 Results

Area Weighted Results	Be Lean	
	Absolute	per sqm
Heating (kWh)	40,553	31.6
Hot water (kWh)	5,754	4.5
Lights (kWh)	2,906	2.3
Fans & Pumps(kWh)	6,240	4.9
Cooling (kWh)	103	0.1
Total Energy (kWh)	55,556	43.3
TER (kgCO_2)	14,176	11.1
DER (kgCO_2)	12,259	9.6
Improvement (%)	**14%**	

4.6 Decentralised Energy Networks

The feasibility of connecting to an existing or proposed district network has been investigated for the site in accordance with Policy 5.6 of the London Plan.

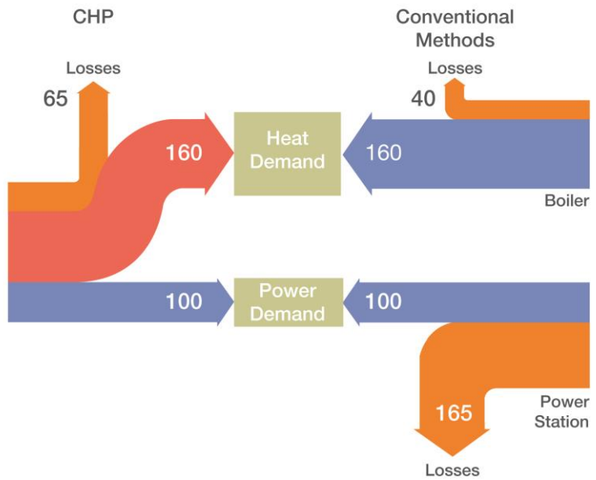
The London Heat Map indicates that there are no existing or potential district heat networks planned in the vicinity of the site. Therefore, it is not viable to connect to a district network at this moment.



District Heating Networks in Proximity to the site (yellow = potential, red = installed)

4.7 Combined Heat & Power (CHP)

In accordance with the Decentralised Energy Hierarchy in Policy 5.6 (Be Clean) the feasibility of a CHP network has been investigated. However the nature of the development and its predicted energy demands are insufficient to support the efficient operation of a CHP unit.



CHP Efficiency Diagram

The Domestic Hot Water (DHW), which normally provides the base load for a CHP, is a relatively small proportion of the overall heat load with heating being the predominate requirement. This is to be expected given the size and form of the houses. As such the heat load of the houses with be more variable, which is not necessarily suited to the efficient operation of CHP units.

Therefore, CHP is not considered viable for the proposed development.

4.8 Low and Zero Carbon Energy Sources

Policy 5.7 of the London Plan requires that all major developments seek to reduce their CO_2 emissions by at least 20% through the use of onsite renewable energy generation wherever feasible. Despite this not being a major development, the following technologies have been investigated to determine the feasibility of delivering a reduction in the CO_2 emissions through renewables. The feasibility of each of the energy sources listed has been assessed with regard to the potential contribution each could make to supply a proportion of the development's delivered energy requirement, whilst considering the technical, planning, land use and financial issues.

A 20% reduction in CO_2 emissions equates to approximately 2.9 tonnes of CO_2 annually.

	Annual CO_2 Emissions
Grid Supplied Electricity	4,800 kgCO2/yr
Natural Gas	10,002 kgCO2/yr
Site Total	**14,802 kgCO2/yr**
20% Renewable Target	2,960 kgCO2/yr

20% Renewable Target

4.8.1 ASHP (Air Source Heat Pump)

Air source heat pumps exchange heat between the outside air and a building to provide space heating in winter and cooling in the summer months. The efficiency of these systems are inherently linked to the ambient air temperatures.

Heat pumps supply more energy than they consume, by extracting heat from their surroundings. Heat pumps can supply as much as 3kW of heat output for just 1kW of electrical energy input. They can also be used to provide cooling, however the development has been designed to be natural ventilated in summer negating the requirement for cooling on site.

They are most efficient when they work at lower temperatures, typically around 40ºC. As the output temperature increases above this the efficiency of the system drops off. Therefore, as DHW is required at 60-65ºC, two systems would need to be installed if a heat pump system was considered; a conventional Low Temperatrue Hot Water (LTHW) system for the DHW and

either a under floor heating system for space heating or a heating coil on the MVHR feed off the heat pumps.

There are also limitations on locating the external heat pump units within the site. Therefore, ASHPs are not considered a viable technology for this development.

4.8.2 GSHP (Ground Source Heat Pumps)

Ground sourced heat pumps differ from air source heat pumps in that they extract heat from the ground and pump it into a building to provide space heating and to pre-heat domestic hot water. In the summer months this process can be reversed, rejecting heat to the ground, to meet the cooling requirements of a building.

The site has an imbalance in the heating and cooling requirements meaning that a large ground collector array would be required to meet the annual heating load without depleting the resource available. A ground collector of the size required is not viable given the scale of the of the development.

4.8.3 Wind Turbines

The output from wind turbines are highly sensitive to wind speed. Hence it is essential that turbines should be sited away from obstructions, with a clear exposure or fetch for the prevailing wind.

The location of the site in a conservation area, coupled with the likely reduced output available due to turbulent wind flow across the site means that wind turbines are not considered appropriate for this development.

4.8.4 Solar Thermal

Solar thermal collectors utilises solar radiation to heat water for use in water heating of a building. The optimum orientation for a solar collector in the UK is a south facing surface, tilted at an angle of 30º from the horizontal.

Solar collectors are typically designed to meet a development's base heat load, associated with its domestic hot water requirements. For residential development these usually equates to 60-70% of the total DHW annual load, with the natural gas-fired boilers meeting the remainder of the load.

However, as previously stated the DHW load only constitutes a small proportion of the heat requirements of the development so the application of other LZC technologies have the potential to offer greater CO_2 savings. As such it is not proposed to included solar thermal collectors.

4.8.5 Biomass Heating

The development's thermal load profile suggests that a biomass boiler could potentially be installed as a lead boiler for each house with gas-fired boilers provided to meet peak loads. However, biomass boilers require significant space for the storage and delivery of the fuel, coupled to this is the higher particulate emissions associated with their use which can be a concern given the air quality issues in London and Camden, in particular.

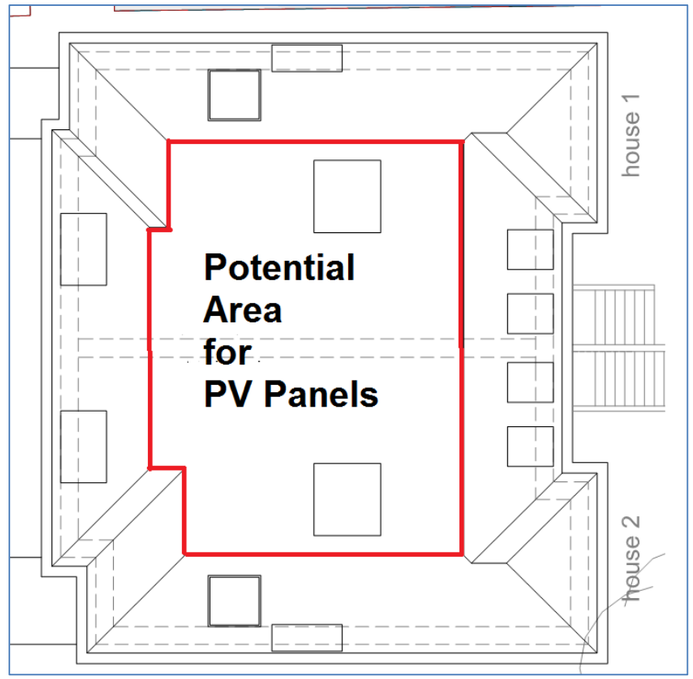
Therefore biomass boilers have not be considered feasible for the proposed development.

4.8.6 Photovoltaics

Photovoltaic solar cells convert solar energy directly into electricity. The cells consist of two layers of silicon with a chemical layer between. The incoming solar energy charges the electrons held within the chemical. The energised electrons move through the cell into a wire creating an electrical current.

A study into the feasibility of onsite electric generation using south facing photovoltaic panels on the roof of the development to meet a proportion of the residential development's electricity demand has been undertaken. This indicates that the combined roof area is approximately 100m^2 and could accommodate a PV array of 30-35m^2 once access, packing density and the lift overruns positions are accounted for.

Therefore it is proposed that a PV array of approximately 4.5 kWp is installed which could provide a further 14% reduction in the site's CO_2 emissions from the 'Be Lean' case. This would provide a total improvement over the Part L1A (2013) baseline of 25%.



Roof Diagram

4.9 Proposed Energy Strategy

Although the proposed development is not a major development, we have followed the methodology of the Mayor's Energy Hierarchy and the London Borough of Camden's policy, with the estimated energy consumption for the development based on the National Calculation Methodology (NCM) calculated with the approved software Elmhurst Energy SAP 2012.

Energy Strategy

The houses will be well insulated ensuring heat losses are kept to a minimum with enhanced fabric U-values and improved detailing making the development significantly more air tight. Energy efficient lighting and metering will be used to ensure that the tenants will be informed on the performance of the development.

High efficiency individual gas boilers will provide each dwelling with heat and domestic hot water.

The combination of passive and energy efficiency measures result in the residential development achieving an area weighted improvement of **13.5%** over the Building Regulations target (Be Lean).

Renewable Energy Strategy

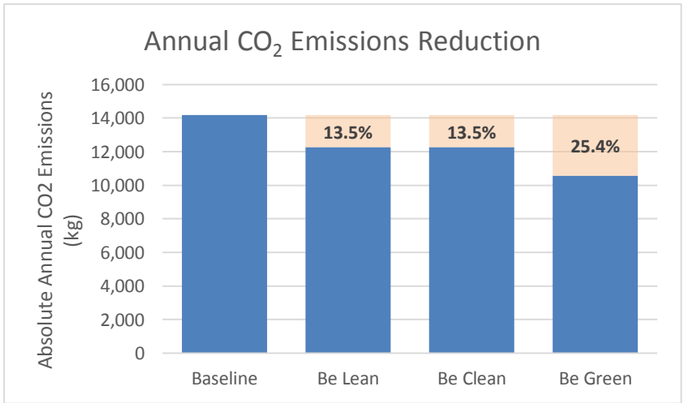
In accordance with the Decentralised Energy Hierarchy in Policy 5.6 (Be Clean) the feasibility of a site wide CHP network has been investigated. A CHP unit would greatly assist in achieving the GLA's 35%. However, the development's predicted energy demands are insufficient to support its efficient operation, so any installation would be classed as 'Poor Quality'. As such is it not proposed to install one. Whilst this is detrimental to achieving the 35% reduction target it does avoid the unsuitable application of CHP.

In accordance with Policy 5.7 (Be Green) of the London Plan, investigations into providing a proportion of the site's energy requirements through renewables were undertaken.

The feasibility study indicates that PV panels are the most appropriate technology for the site and that a 4.5kWp system could provide a further **14%** reduction in the site's CO_2 emissions.

The combination of the measures identified in this report could provide an overall reduction of **25.4%** of the Building Regulations 2013 requirements, as shown in the graph and table below.

The proposed energy strategy has maximised the emission reduction possible for the site given the size and constraints of the development. The CO_2 reductions indicated do not quite achieve the emission reduction target of GLA Policy 5.2, which is due to the development being unsuitable for CHP. The proposed PV array also achieves a significant reduction in CO_2 emissions but does fall short of GLA Policy 5.7 target. However, the addition of further PV area is not considered feasible as it would be operating at a reduced efficiency due to overshading.



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5. Materials

The aim for the proposed 25-26 Redington Gardens development will be for its overall environmental impact to be minimised through the specification of sustainable materials. The demolition of the existing building will identify the those materials that can usefully be reused in the proposed development to minimise the environmental impact of the demolition.

5.1 Environmental Impact of Materials

New materials with low overall environmental impact will be chosen and advice from the Green Guide to Specification will be taken into consideration for the selection. The Green Guide rates the environmental impact of different materials and components, taking into account factors like toxicity, ozone depletion, ease of recycling, waste disposal etc. Where viable, at least 80% (by area) of the new main elements in the building, fabric & building services insulation should be specified to achieve the best performing "A" and "A+" ratings from the Green Guide. Insulation materials containing substances known to contribute to stratospheric ozone depletion or with the potential to contribute to global warming must not be used. Developments should also minimise use of new aggregates.

Another Essential Standard will be met through the specification of insulation materials with a Global Warming Potential (GWP) of less than 5.

5.2 Sustainable Timber

All timber used for basic or finishing building elements will be sourced from responsibly managed and sustainable forests or plantations. Such timber products are the only truly renewable construction material in common use and growing trees also absorb and fix CO_2. Forests can also provide the habitat for a wide variety of plant and animal life, preserving important ecology and promoting biodiversity.

5.3 Locally Sustainable Materials

The GLA's SPG states that 50% of timber and timber products are to be sourced from Forest Stewardship Council (FSC) approved timber and balance from a known temperate source. The design team will commit to at least 50% FSC approved timber and 100% legally sourced timber for the proposed development. Where practicable, materials should be sourced from local suppliers, reducing the environmental impacts and CO_2 emissions associated with transportation to the site.

5.4 Recycled Materials

Scope for increased recycling will be incorporated by specifying recycled materials where possible and ensuring that even where new materials are used, as much as possible can be recycled at the end of the buildings' life.

The design team will also commit to minimising the use of new aggregates thus complying with the Mayor's Essential Standards.

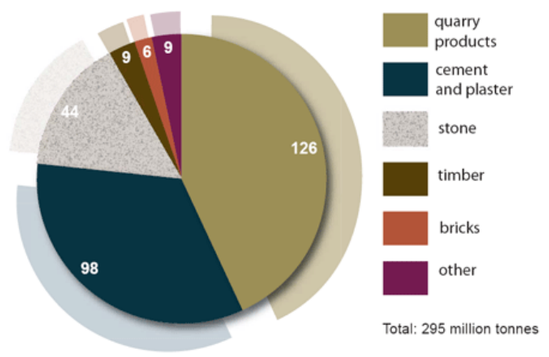
Specifying materials with a high-recycled content is also another method of saving processing or manufacturing energy. The recycled content of a material can be described as either post-consumer or post-industrial to indicate at what point in the life cycle a material is reclaimed.

5.5 Ozone Depletion and Global Warming

CFCs and HCFCs, compounds commonly used in insulation materials and refrigerants, can cause long-term damage to the Earth's stratospheric ozone layer, exposing living organisms to harmful radiation from the sun. They also significantly increase global-warming if they leak into the atmosphere. Following the Montreal Protocol, production and use of CFCs is no longer permitted and EC regulations will require phasing out of HCFCs by 2015. However, products that replace these gases are often still potent global warming contributors.

All insulation materials specified for the proposed scheme will have zero Ozone Depleting Potential and low Global Warming Potential, (GWP<5) in either manufacture or composition in line with the CfSH requirements. This will include insulation for building elements (roof, internal & external walls, floor – including foundations) as well as insulation for hot water vessels and pipe or duct work.

Construction related UK consumption of primary resources (2006)



6. Water Conservation

Water consumption in the UK has risen by 70% over the last 30 years. Trying to meet the increasing demand by locating new sources of water supply is both expensive and damaging to the environment. Therefore, the design team have focused on reducing the demand for water and managing the existing resources.

6.1 Demand Reduction and Water Efficiency

The aim is to minimise internal and external potable water use within the development. Good water management can contribute to reducing the overall level of water consumption maintaining a vital resource and having environmental as well as cost benefits in the life-cycle of the building. The following water saving measures are being considered for a range of areas in line with the CfSH requirements:

Dual Flush Cisterns on WC's - These units have the ability to provide a single flush of 4L and/or a full flush of 6L.

Flow Restrictors to Taps - Flow restrictors reduce the volume of water discharging from the tap. Spray taps have a similar effect and are recommended to reduce both hot and cold-water consumption. Low flow taps in one of the above forms will be installed in all of areas.

Low Flow Showers - The average shower uses 15 litres of water a minute, by restricting the output of the showers in the development to a maximum of 9 litres/ min a 40% water saving can be achieved. Flow rate can be reduced down to 6 litres/ min without compromising on water pressure and hence should be considered.

Water Meters - In 1995 approximately 33,200 million litres of water a day were extracted in England and Wales, this increased to 44,130 million litres/day in 2001, and much of this was for domestic water supply. To reduce this figure, accurate information on usage is required for management of a building's consumption. Water meters will be specified on the main supply.

The application of a combination of the these measures will result in the development achieving a potable water consumption of less than 105 litres per person per day, in line with the requirements of CfSH Level 4.

7. Sustainable Urban Drainage

The main aim for the redevelopment will be to improve the water retention of the site and minimise the risk of flooding from all water sources.

As a minimum, the design will aim to ensure that the peak rate of runoff into watercourses no worse than the existing site's run off rate. This will comply with the Interim Code of Practice for Sustainable Drainage systems (SUDS) (CIRIA, 2004) for at least the 1 year and 100 year return period events.

8. Waste Management

Buildings and building sites produce a significant amount of waste per year. Most of the waste produced in the UK is disposed of in landfill sites and only a small percentage of it is recycled or reused.

8.1 Waste Targets

Under EU legislation the UK will have to ensure that less than a third of its waste is sent for burial in landfill sites by 2020 and the figure at present is about 80%. To achieve this target a number of measures are implemented, including landfill tax, aiming to discourage disposal of waste to landfill. Good waste management is a key component of sustainable development. Reducing waste is an important means of:

- Reducing unnecessary expenditure
- Reducing the amount of natural resources used for production of new materials
- Reducing energy for waste disposal
- Reducing levels of contamination and pollution arising from waste disposal

The proposed development will minimise the impact of waste in the environment.

8.2 Demolition & Construction

During the construction phase a large amount of waste material will be generated through construction, demolition and land clearing procedures. In building construction, the primary waste products in descending percentages are: wood, asphalt/concrete/masonry, drywall, roofing, metals, and paper products.

Prior to commencement on a Site Waste Management Plan (SWMP) that complies with the requirements of current legislation and CfSH will be prepared. This plan will identify the local waste haulers and recyclers, determine the local salvage material market, identify and clearly label site spaces for various waste material storage and require a reporting system that will quantify the results and set targets. As a minimum the SWMP will contain:

a. The target benchmark for resource efficiency e.g. m^3 of waste per $100m^2$ or tonnes of waste per $100m^2$;

b. Procedures and commitments for minimising non-hazardous waste in line with the benchmark;

c. Procedures for minimising hazardous waste;

d. Procedures for monitoring, measuring and reporting hazardous and non-hazardous site waste;

e. Procedures for sorting, reusing and recycling construction waste into defined waste groups either on site or through a licensed external contractor;

f. The name or job title of the individual responsible for implementing the above.

As the proposed development is on land that has previously been built upon, there is the potential for using waste materials from the existing buildings and hard paved areas. Bricks and concrete could possibly be reused as hard-core materials etc. Opportunities for introducing more reused or reusable materials / components will be explored during detailed design.

8.3 Waste Management & Reporting in Operation

The detailed design phases will identify the potential waste streams that the development will produce. At a minimum, plans will be formulated to handle the separation, collection, and storage of common recyclable materials such as paper, glass, plastics, and metals. The collection points will be easily accessible to all of the users.

The main aim will be to recycle as much waste as possible; this will be achieved by making sure that waste recycling facilities are placed in convenient locations.

Dedicated storage space for recyclable materials generated by the site during occupation, will include the following:

- Be clearly labelled for recycling
- Be placed within accessible reach of the buildings
- Be in a location with good vehicular access to facilitate collections.

Storage of household waste

The space allocated for waste storage should be able to accommodate containers with at least the minimum volume recommended by British Standard 5906 (British Standards, 2005) based on a maximum collection frequency of once per week. This is 100 litres volume for a single bedroom dwelling, with a further 70 litres volume for each additional bedroom.

Large integrated recycling bin with at least 3 containers for recyclable waste and one general waste will be considered for each house similar to the following image:

80 Litre Capacity (2 x 32L & 2 x 8L)
Cabinet size - 600mm

9. Environmental Management

Construction sites are responsible for significant impacts, especially at a local level. These arise from noise, potential sources of pollution and waste and other disturbances. Impacts such as increased energy and water use are also significant. Therefore attention is being given to site-related parameters with the aim to protect and enhance the existing site & its ecology.

The aim is to have a construction site managed in an environmentally sound manner in terms of resource use, storage, waste management, pollution and good neighbourliness. To achieve this, there will be a commitment to comply with the Considerate Constructors Scheme and get a formal certification under the scheme in line with the CfSH requirements. As a minimum a score of greater than 35 of out 50 will be achieved with an aspiration to exceed 40, with no individual section achieving a score of less than 7.

Areas that can be taken into consideration in order to minimise the impact of the construction site on its surroundings and the global environment as outlined in the CfSH methodology:

- Monitor, report and set targets for CO_2 or energy usage arising from site activities
- Monitor, report and set targets for CO_2 or energy usage arising from transport to and from site
- Monitor, report and set targets for water consumption arising from site activities
- Monitor construction waste on site, sorting and recycling construction waste where applicable
- Adopt best practice policies in respect of air and water pollution arising from site activities
- Operates an Environmental Management System
- Additionally, all timber used on site should be responsibly sourced

10. Land Use and Ecology

The site currently comprises of a mix of existing buildings, hard landscaping and grass areas with some ecological value to the site.

The proposed development will aim to achieve no negative change to the ecology of the site and will target an improvement.

11. Pollution

Global concern for environmental pollution has risen in recent years, as concentrations of harmful pollutants in the atmosphere are increasing. Buildings have the potential to create major pollution both from their construction and operation, largely through pollution to the air (dust emissions, NOx emissions, ozone depletion and global warming) but also through pollution to watercourses and ground water. The proposed development will aim to minimise the above impacts, both at the design stage and onsite.

11.1 Ozone Depletion

CFCs and HCFCs, compounds commonly used in insulation materials and refrigerants, can cause long-term damage to the Earth's stratospheric ozone layer, exposing living organisms to harmful radiation from the sun. They also significantly increase global-warming if they leak into the atmosphere. Following the Montreal Protocol, production and use of CFCs is no longer permitted and EC regulations will require phasing out of HCFCs by 2015. However, products that replace these gases are often still potent global warming contributors. Where refrigerants are used for air-conditioning and comfort cooling they will be CFC and HCFC-free.

11.2 Internal pollutants

Volatile organic compounds (VOCs) are emitted as gases (commonly referred to as offgassing) from certain solids or liquids. VOCs include a variety of chemicals, some of which are known to have short-term and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors.

VOCs are emitted by a wide array of products numbering in the thousands. Examples include: paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials, furnishings, adhesives, Urea-formaldehyde foam insulation (UFFI), pressed wood products (hardwood plywood wall panelling, particleboard, fibreboard) and furniture made with these pressed wood products.

'No' or 'low' VOC paints are available from most standard mainstream paint manufacturers. There 'eco-friendly' paints are made from organic plant sources and also powdered milk based products.

The design team will seek to select internal finishes and fittings with low or no emissions of VOCs and comply with European best practice levels as a minimum.

11.3 NOx emissions from boilers

Nitrous oxides (NOx) are emitted from the burning of fossil fuels and contribute to both acid rain and to global warming in the upper atmosphere. At ground level, they react to form ozone, a serious pollutant and irritant at low level. Burners in heating systems are a significant source of low-level NOx, while power stations (and therefore electric heating) are a significant source of NOx in the upper atmosphere.

The amount of NOx emissions varies between products. New gas boilers vary from 40 NOx/kW to <70mg NOx/kWh (class 5). The proposed high efficiency gas boilers will be specified to have less than 40 NOx/kWh.

11.4 Night Sky Pollution

External lighting encompasses vehicle and pedestrian access lighting, security lighting, facility illumination and general feature lighting. Where present it will be designed on a site wide basis to meet the mandatory requirements and aesthetic considerations. The strategy is to provide a balance between adequate external lighting for safe and secure operation of the site without unnecessary illumination or power consumption.

The intention is to be a good neighbour and not to introduce nuisance glare or light pollution of the night sky from miss directed or unnecessary lighting. Feature lighting, where required, will be focussed to the task/subject. Where necessary luminaires will be further screened in cases where there may be an issue of close proximity and light spill to the adjacent neighbouring residential areas, although the intention is to avoid this situation arising wherever possible from the outset. The external lighting design will take into consideration the relevant guidance from the British Standards and other recommended documents including the following Standards and Design Guides:

- CIBSE Lighting Guide for the Outdoor Environment
- CIBSE Lighting Design Guides
- BS5489 Code of Practice for the Design of Road Lighting
- BS EN 13201-1 Road Lighting, Selection of Lighting Classes
- BSEN 13201-2 Road Lighting, Performance requirements
- Institute of Lighting Engineers Guidance Notes for the Reduction of Obtrusive Light

12. Green Transport

The transport of people between buildings is the second largest source of CO_2 emissions in the UK after energy use in buildings and remains the main source of many local pollutants. Energy use and emissions from transport are growing at 4% per year, and at the same time, the effects of climate change are becoming more severe; there will be greater pressure to control CO_2 emissions from transport and sites without good access to public transport will be at much greater risk from these controls.

12.1 Site location

The site for the proposed 25-26 Redington Gardens development is located in Hamptead, North London, near the A41 (Finchley Road). The site is also approx. 900m from Hampstead Underground station.

The London PTAL (Public Transport Accessibility) analysis indicates that 3 different bus routes have stops within 8 minutes' walk of the site. The Accessibility Index for the site is 5.13, with a PTAL rating of 2.

12.2 Cycling Facilities

Secure cycling spaces will be provided for the residences in order to encourage the occupants to use this carbon-free mode of transport. Secure, convenient and weather-proof cycle storage areas for use by the home owners will be provided in some form.

12.3 Car Parking Spaces

The proposed developments includes space at the entrance to the site to allow for off-street parking for both houses.

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Appendix A – Code for Sustainable Homes Pre-Assessment

Code for Sustainable Homes (May 2014 version)

Job Number: *1011533*
Building Name: *25-26 Redington Gardens*

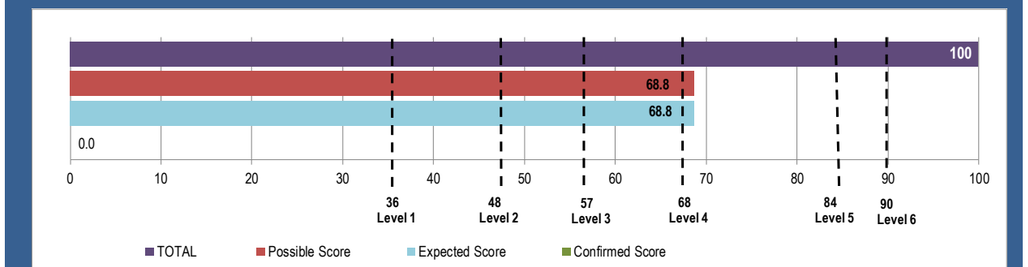
CSH Ref No: *Not Registered*
Assessor: *RP*
Issue: *1*

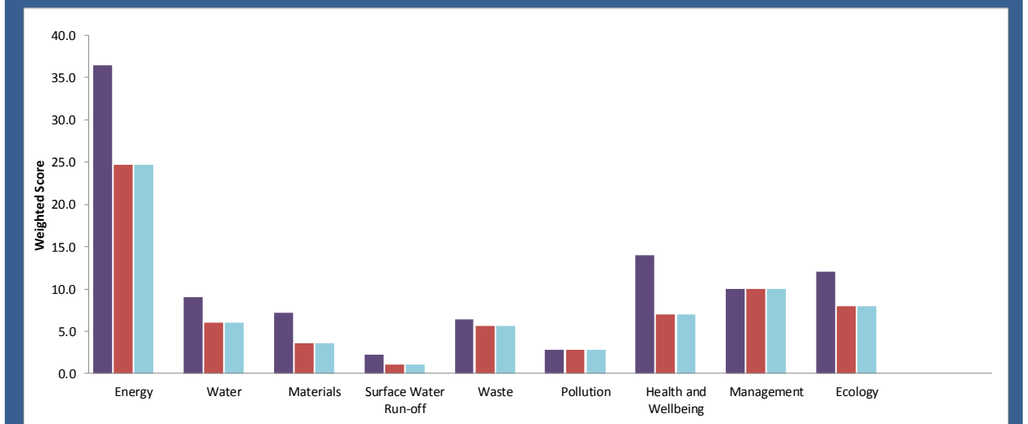
Code Levels

Rating	Score
Level 1	36
Level 2	48
Level 3	57
Level 4	68
Level 5	84
Level 6	90

SUMMARY CODE 2010 SCORE

Category	Total credits	Total weighted available score	Possible Score	Expected Score	Confirmed Score
Energy	31	36.4	25	25	0
Water	6	9.0	6	6	0
Materials	24	7.2	4	3.6	0
Surface Water Run-off	4	2.2	1	1	0
Waste	8	6.4	6	6	0
Pollution	4	2.8	3	3	0
Health and Wellbeing	12	14.0	7	7	0
Management	9	10.0	10	10	0
Ecology	9	12.0	8	8	0
TOTAL	**-**	**100**	**68.8**	**68.8**	**0.0**





Note: Check required mandatory credits are achieved for applicable rating

Credit Ref	Title	Credit Criteria	Available credits	Confirmed credits - evidence received	Expected credits - subject to evidence	Mandatory Credits Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Energy			**36.4%**								
Ene 1	Dwelling Emission Rate	**Ten credits** available – % improvement 2014 DER/TER									
		≥ 6%	1								
		≥ 12%	2								
		≥ 19% **Mandatory for Code Level 4**	3		3						
		≥ 32%	4								
		≥ 44%	5			-	-	-	3	9	10
		≥ 56%	6								
		≥ 70%	7								
		≥ 84%	8								
		≥ 100% **Mandatory for Code Level 5**	9								
		Zero Net CO2 Emissions **Mandatory for Code Level 6**	10								
Ene 2	Fabric Energy Efficiency	**Nine credits** available for fabric energy efficiency (kWh/m2/yr) (figure taken from SAP2012 calculations)									
		Dwelling type: Apartment Blocks, Mid-Terrace									
		≤ 48	3								
		≤ 45	4								
		≤ 43	5								
		≤ 41	6			-	-	-	-	7	7
		≤ 39 **Mandatory for Code Levels 5 &6**	7								
		≤ 35	8								
		≤ 32	9								
		OR Dwelling type: End Terrace, Semi-Detached & Detached									
		≤ 60	3								
		≤ 55	4								
		≤ 52	5								
		≤ 49	6			-	-	-	-	7	7
		≤ 46 **Mandatory for Code Levels 5 &6**	7								
		≤ 42	8		8						
		≤ 38	9								
Ene 3	Energy Display Devices	**Two credits** available:									
		Where current electricity **OR** primary heating fuel consumption data are displayed to occupants by a correctly specified energy display device.	1			-	-	-	-	-	-
		Where current electricity **AND** primary heating fuel consumption data are displayed to occupants by a correctly specified energy display device.	2		2						
Ene 4	Drying Space	**One credit** available to provide a reduced energy means of drying clothes									
		Where space and equipment are provided for drying clothes: • For 1 – 2 bed dwellings, drying equipment capable of holding 4m+ of drying line • For 3+ bed dwellings, drying equipment capable of holding 6m+ of drying line The drying space (internal or external) must be secure	1		1	-	-	-	-	-	-
Ene 5	Energy Labelled White Goods	**Two credits** available:									
		All fridges, freezers, fridge-freezers are provided and have an A+ rating	1		1						
		All washing machines and dishwashers are provided and have an A rating **AND EITHER:** Washer-dyers or tumble dryers where provided have a B rating or higher **OR:** EU Energy Efficiency Labelling Scheme Information is provided to each dwelling in place of a tumble dryer or a washer dryer	1		1	-	-	-	-	-	-
		Where no white goods are provided but EU Energy Efficiency Labelling Scheme Information is provided to each dwelling	1								
Ene 6	External Lighting	**Two credits** available:									
		Space Lighting Where all external space lighting, including lighting in common areas, is provided by energy efficient light bulbs/lamps with appropriate control systems. Note: Statutory safety lighting is not covered by this requirement	1		1						
		Security Lighting All burglar security lights have: • A maximum wattage of 150 W AND • Movement detecting control devices (PIR) AND • Daylight cut-off sensors All other security lighting: • Is provided by dedicated energy efficient fittings AND • Is fitted with daylight cut-off sensors OR a time switch	1		1	-	-	-	-	-	-
		Default cases: If no security lighting is installed, the security lighting credit can be awarded by default, provided all the requirements related to space lighting have been met. Dual lamp luminaires with both space and security lamps can be awarded both credits provided they meet the criteria									

Ene 7	Low or Zero carbon (LZC) Technologies	**Two credits** available:											
		Where energy is supplied by low or zero carbon technologies **AND** There is a 10% reduction in CO2 emissions as a result	1		1	-	-	-	-	-	-
		OR There is a 15% reduction in CO2 emissions as a result	2									
		Note: Eligible technologies for this credit must meet any additional requirements defined in Directive 2009/28/EC as applicable, and be certified under the Microgeneration Certification Scheme, OR certified under the CHPQA standard										
Ene 8	Cycle Storage	**Two credits** available:											
		Individual or communal cycle storage provided, that is adequately sized, secure and convenient, for the following number of cycles: Studios or 1bed - 1 cycle for every two dwellings, 2 and 3bed dwellings - storage for 1 cycle per dwelling, 4beds and above - storage for 2 cycles per dwelling	1		1	-	-	-	-	-	-
		OR Studios or 1bed - 1 cycle for per dwelling, 2 and 3bed dwellings - storage for 2 cycles per dwelling, 4beds and above - storage for 4 cycles per dwelling	2									
Ene 9	Home Office	**One credit** available: Where *sufficient* space and services have been provided which allow occupants to set up a home office in a *suitable* room. The space dedicated for use as a home office must have *adequate* ventilation and achieve an average daylight factor of 1.5%. Sufficient space: Min 1.8m wall length to allow a desk, chair and filing cabinet or bookshelf, with space to move around and use those properly Sufficient services: 2 double power sockets; 2 telephone points (or double), or one point where cable or broadband is available); a window; adequate ventilation Adequate ventilation: openable window (min. openable casement 0.5m2) or alternative e.g. passive stack	1		1	-	-	-	-	-	-
		Total Credits	31	0.0	21.0							
		Category Score		0%	68%							
		Weighted Points	1.17 per credit	0.0	24.7							

Credit Ref	Title	Credit Criteria	Available credits	Confirmed credits - evidence received	Expected credits - subject to evidence	Mandatory Credits Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Water			9.0%								
Wat 1	Indoor water use	**Five credits** available (assessed using Water Efficiency Calculator, taking into account sanitary fittings specifications, and any rain/grey water recycling systems)									
		≤ 120 l/p/day **Mandatory for Code Levels 1 & 2**	1			1	1	3	3	5	5
		≤ 110 l/p/day	2								
		≤ 105 l/p/day **Mandatory for Code Levels 3 & 4**	3		3						
		≤ 90 l/p/day	4								
		≤ 80 l/p/day **Mandatory for Code Levels 5 & 6**	5								
Wat 2	External water use	**One credit** available: Where a correctly specified and sufficient sized system to collect rainwater for external/internal irrigation/use has been provided to a dwelling with a garden, patio or communal garden space (examples of such systems include rainwater butts and central rainwater collection systems) *Default case: If no individual or communal garden spaces are specified or if only balconies are provided, the credit can be awarded by default.*	1		1	-	-	-	-	-	-
		Total Credits	6	0.0	4.0						
		Category Score		0%	67%						
		Weighted Points	1.50 per credit	0.0	6.0						

Credit Ref	Title	Credit Criteria	Available credits	Confirmed credits - evidence received	Expected credits - subject to evidence	Mandatory Credits Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Materials			7.2%								
Mat 1	Environmental Impact of Materials	**Mandatory** requirement for at least 3 of the 5 following key elements to achieve A+ to D rating, from the 2008 version of the BRE Green Guide to Specification:				0.75 - All levels					
		Fifteen credits available (assessed using the Code Mat1 Calculator):									
		Roof	15		3						
		External walls			3						
		Internal walls (including separating walls			3						
		Upper and Ground floors (including separating floors)			1						
		Windows			1						
		Credits are awarded on the basis of the Green Guide rating as follows: A+ rating = 3 credits; A rating = 2 credits; B rating = 1 credit; C rating = 0.5 credits; D rating = 0.25 credits; E rating = 0 credits									
Mat 2	Responsible Sourcing of Materials - Basic Building Elements	**Six credits** available (assessed using the Code Mat2 Calculator): Where 80% of the assessed materials in the following Building Elements are a. Frame b. Ground Floor c. Upper Floors (including separating floors) d. Roof e. External Walls f. Internal Walls (including separating walls) g. Foundation/substructure (excluding sub-base materials) h. Staircase 100% of any timber in these elements must be legally sourced. Other materials - based on compliance accreditation under EMS/BES6001 etc. for key and supply chain processes	6		1	-	-	-	-	-	-
Mat 3	Responsible Sourcing of Materials - Finishing Elements	**Three credits** available (assessed using the Code Mat3 Calculator): Where 80% of the assessed materials in the following Finishing Elements are a. Stair b. Window c. External and Internal door d. Skirting e. Panelling f. Furniture g. Fascias h. Any other significant use 100% of any timber in these elements must be legally sourced. Other materials - based on compliance accreditation under EMS/BES6001 etc. for key and supply	3		0	-	-	-	-	-	-
		Total Credits	24	0	12.0						
		Category Score		0%	50%						
		Weighted Points	0.30 per credit	0.0	3.6						

Credit Ref	Title	Credit Criteria	Available credits	Confirmed credits - evidence received	Expected credits - subject to evidence	Mandatory Credits Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Pollution			2.8%								
Pol 1	Global Warming Potential (GWP) of Insulants	**One credit** where all insulating materials in the building fabric and services only use substances that have a GWP<5 (manufacture AND installation). Elements included: roof, internal and external walls, floors, hot water cylinders, pipe insulation, cold water storage, external doors (see guidance for detailed list).	1		1	-	-	-	-	-	-
Pol 2	NOx emissions	**Three credits** are available, depending on the average dry NOx emissions of heating systems (space heating/hot water)				-	-	-	-	-	-
		≤ 100 mg/kWh	1								
		≤ 70 mg/kWh	2								
		≤ 40 mg/kWh	3		3						
		Default cases: Where all the space heating and hot water energy requirements are fully met by systems which do not produce NOx emissions (3 credits)									
		Total Credits	4	0.0	4.0						
		Category Score		0%	100%						
		Weighted Points	0.70 per credit	0.0	2.8						

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Surface Water Run-off

2.2%

Credit Ref	Title	Credit Criteria	Available credits	Confirmed credits - evidence received	Expected credits - subject to evidence	Mandatory Credits Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Sur 1	Management of Surface Water Run-off from developments	**Mandatory** requirements (see guidance, detailed requirements apply): 1) Peak Rate of Run-off - Ensure that the peak rate of run-off allowing for climate change, will be no greater for the developed site than it was for the pre-development site, at the 1 and 100 yr return events. Where there is a post-development flow rate, ensure that the limiting discharge is <5l/s at a discharge point 2) Volume of Run-off - A. Ensure that the additional predicted volume of run-off for the 100 year event of 6 hour event is prevented from leaving the site using infiltration or other SUDS techniques (see definitions) B. If A cannot be satisfied (full justification provided), then reduce the post development peak run off rate to the limiting discharge (equivalent to the 1-year peak flow rate, mean annual flood flow rate 2l/s/ha, whichever is highest. Other details apply, see guidance 3) Demonstrate that the flooding of property would not occur in the event of local drainage system failure (caused by extreme rainfall or lack of maintenance)				All levels					
		Note: If there is no increase in the man-made impermeable area as a result of the new development, then the above criteria do now apply.									
		One credit available by ensuring there is no discharge from the developed site for the rainfall depths up to 5mm (see calculation procedures)	1			-	-	-	-	-	-
		One credit available by ensuring that the run-off from all hard surfaces shall receive an appropriate level of treatment in accordance with the SUDS Manual to minimise the risk of pollution.	1								
Sur 2	Flood Risk	**EITHER:**									
		Two credits available for developments situated in Zone 1 - low annual probability of flooding (as defined in PPS25) and where the site specific Flood Risk Assessment (FRA) indicates that there is low risk of flooding from all sources **OR**	2		2	-	-	-	-	-	-
		One credit is available for developments situated in Zones 2 and 3a and the finished ground floor level of all habitable parts of dwellings and access routes to the ground level and the site, are placed at least 600 mm above the design flood level of the flood zone.	1								
		Total Credits	4	0.0	2.0						
		Category Score		0%	50%						
		Weighted Points	0.55 per credit	0.0	1.1						

Waste

6.4%

Credit Ref	Title	Credit Criteria	Available credits	Confirmed credits - evidence received	Expected credits - subject to evidence	Mandatory Credits Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Was 1	Storage of non-recyclable waste and recyclable household waste	**Mandatory** requirements: Space allocated for waste storage to be sized to accommodate containers with the largest of the two following volumes: 1) the minimum volume recommended by BS5906(2005) based on a max collection frequency of once per week: 100 ls volume for a single bed dwelling with further 70 ls for each additional bedroom. 2) the total volume of external waste containers provided by the Local Authority. In either case, the storage space must provide inclusive access and usability (checklist IDP) and containers must not be stacked.				All levels					
		Up to four credits available:									
		Two credits available where internal recyclable storage is provided, where there is no (or insufficient) dedicated external recyclable storage, no Local Authority collection scheme, and the following are met: At least 3 internal bins; located in adequate internal space (requirements apply); minimum total capacity of 60ls	2			-	-	-	-	-	-
		Four credits for providing both internal and external recyclable storage space. Combination of adequate internal storage with either: 1) a Local Authority collection scheme, or 2) no Local Authority collection scheme but adequate external storage capacity. For 1) collection at least fortnightly, recyclables sorted after collection, single bin of at least 30ls provided internally; recyclables sorted before collection, 3 bins provided internally, total capacity 30ls, no bin <7ls; an automated waste collection system for at least 3 types of recyclable waste. For 2) at least 3 internal recyclable bins total capacity 30ls, no bin <7ls AND externally 3 bins total capacity 180ls, no bin <40ls OR (for flats), externally 3 bins, private recycling scheme operator to collect waste regularly and maintain bins, bins sized according to frequency of collection	4		4						
Was 2	Construction Site Waste Management	**One credit** available: where there is a compliant Site Waste Management Plan (SWMP) (see guidance)	1			-	-	-	-	-	-
		Where there is a compliant SWMP including procedures and commitments to sort and divert waste from landfill, through either; a. Re-use on site (in situ or for new applications) b. Re-use on other sites c. Salvage/reclaim for re-use d. Return to the supplier via a 'take-back' scheme e. Recovery and recycling using an approved waste management contractor f. Compost **AND** One of the following has been achieved: **Two credits:** where at least 50% by weight or by volume of non-hazardous construction waste generated by the project has been diverted from landfill.	2								
		Three credits: where at least 85% by weight or by volume of non-hazardous construction waste generated by the project has been diverted from landfill.	3		3						
Was 3	Composting	**One credit** available: Individual home composting facilities **OR** Local communal or community composting service **OR** Local Authority green/kitchen waste collection system. All facilities must: be in a dedicated position; provide inclusive access and usability (Checklist IDP); have an information leaflet provided to each dwelling	1			-	-	-	-	-	-
		Total Credits	8	0	7						
		Category Score		0%	88%						
		Weighted Points	0.80 per credit	0.0	5.6						

CUNDALL

Credit Ref	Title	Credit Criteria	Available credits	Confirmed credits - evidence received	Expected credits - subject to evidence	Mandatory Credits Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Health & Wellbeing			**14.0%**								
Hea 1	Daylighting	**Three credits** available:									
		Kitchens must achieve a min. average daylight factor of at least 2%	1		0						
		All living rooms, dining rooms and studies (include any room designated as home office under Ene 9) must achieve a minimum average daylight factor of at least 1.5%	1		1	-	-	-	-	-	-
		80% of the working plane in each kitchen, living room, dining room and study (include any home office room under Ene9) must receive direct light from the sky	1		0						
Hea 2	Sound Insulation	**Four credits** available, regarding sound insulation. All three can be demonstrated through **EITHER** A programme of pre-completion testing based on the Normal programme of testing described in Approved Document E, for every group or sub-group of houses or flats, demonstrating that the above standard or standards are achieved **OR** Use of constructions for all relevant building elements that have been assessed and approved as Robust Details by Robust Details Limited (RDL) and found to achieve the performance standards stated above. All relevant dwellings must be registered with RDL.									
		• airborne sound insulation values are at least 3dB higher • airborne sound insulation values are at least 3dB higher than the performance standards of Building Regulations Approved Document E(2003, with amendments 2004)	1			-	-	-	-	-	-
		• airborne sound insulation values are at least 5dB higher • airborne sound insulation values are at least 5dB higher than the performance standards of Building Regulations Approved Document E(2003, with amendments 2004)	3								
		• airborne sound insulation values are at least 8dB higher • airborne sound insulation values are at least 8dB higher than the performance standards of Building Regulations Approved Document E(2003, with amendments 2004)	4		4						
		Default cases: Detached dwellings (4 credits). Attached dwellings where separating walls or floors only occur between non habitable rooms (3 credits).									
Hea 3	Private Space	**One credit** available, for providing outdoors space (private or semi-private) that is: of minimum size that allows all occupants to use the space; provided with inclusive access and usability (checklist IDP); accessible only to occupants of designated dwellings	1		1	-	-	-	-	-	-
Hea 4	Lifetime Homes	**Four credits** are available where all the principles of Lifetime Homes have been complied with - **Mandatory for Code Level 6** (**OR** where an exemption from Lifetime Homes criteria 2 and/or 3 is applied to selected pathways subject to a steeply sloping plot gradient, but all other principles of Lifetime Homes, applicable to the dwelling being assessed, have been complied with - 3 credits)	4			-	-	-	-	-	4
		Total Credits	12	0.0	6.0						
		Category Score		0%	50%						
		Weighted Points	1.17 per credit	0.0	7.0						

Credit Ref	Title	Credit Criteria	Available credits	Confirmed credits - evidence received	Expected credits - subject to evidence	Mandatory Credits Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Ecology			**12.0%**								
Eco 1	Ecological value of site	**One credit** where the development site is confirmed as land of low ecological value EITHER by meeting the criteria of Checklist Eco1 OR by being confirmed by a suitably qualified Ecologist OR confirmed by an independent ecological report prepared by a suitably qualified ecologist AND any land of ecological value outside the construction zone but within the development site will remain undisturbed by the construction works.	1		0	-	-	-	-	-	-
Eco 2	Ecological Enhancement	**One credit** available where a "Suitably Qualified Ecologist" has been appointed to recommend appropriate ecological features that will positively enhance the ecology of the site AND where the developer adopts all key recommendations AND 30% of additional recommendations	1		1	-	-	-	-	-	-
Eco 3	Protection of Ecological Features	**One credit** available where all existing features of ecological value on the development site potentially affected by the works are maintained and adequately protected during site clearance, preparation and construction works.	1		1						
		Default cases: Credit awarded by default if the site was classified as having low ecological value in Eco1 AND no features of ecological value have been identified. If a suitably qualified ecologist has confirmed a feature can be removed because of its insignificant ecological value or where an arboriculturalist has confirmed a feature can be removed owing to poor health/condition, the credit can be achieved provided all other features are adequately protected in accordance with the ecologist's recommendations.				-	-	-	-	-	-
Eco 4	Change in Ecological Value of Site	**Four credits** available, depending on the net change in ecological value of the site before and after development. The ecological value before and after development is measured, and the overall change in species per hectare is:									
		Minor negative change: between -9 and less than or equal to -3	1								
		Neutral: greater than -3 and less than or equal to +3	2		2	-	-	-	-	-	-
		Minor enhancement: greater than 3 and less than or equal to 9	3								
		Major enhancement: greater than +9	4								
Eco 5	Building Footprint	**Two credits** available depending on the ratio of floor area to building footprint (see details of definitions in the guidance).									
		For houses, where the Net Internal Floor Area: Net Internal Ground Floor Area ratio is greater than or equal to 2.5:1 **OR** For blocks of flats, where the Net Internal Floor Area: Net Internal Ground Floor Area ratio is greater or equal to 3:1 **OR** For a combination of houses and flats, a ratio of Total Net Internal Floor Area: Net Internal Ground Floor Area of all houses and flats is greater than the area weighted average of the two target ratios above (see calc.procedures)	1			-	-	-	-	-	-
		For houses, where the Net Internal Floor Area: Net Internal Ground Floor Area ratio is greater than or equal to 3:1 **OR** For blocks of flats, where the Net Internal Floor Area: Net Internal Ground Floor Area ratio is greater or equal to 4:1 **OR** For a combination of houses and flats, a ratio of Total Net Internal Floor Area: Net Internal Ground Floor Area of all houses and flats is greater than the area weighted average of the two target ratios above (see calc.procedures)	2		2						
		Total Credits	9	0	6						
		Category Score		0%	67%						
		Weighted Points	1.33 per credit	0.0	8.0						