Replacement Dwelling at 77 Avenue Road, Camden

Energy Statement and Sustainability Appraisal Report

For Mr Lipton

July 2009

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1 EXECUTIVE SUMMARY

Brooks Devlin were appointed by Coupedeville Architects to provide an Energy Statement and Sustainability Appraisal for the proposed dwelling at Avenue Road, Richmond. The scope of this report is to provide a preliminary energy statement and sustainability assessment of the proposed. The report uses to a large extent the current version of the Code for Sustainable Homes as a guide in addressing these issues.

The scheme is for a new replacement dwelling with an approximate internal floor area of 1432m2 of which approximately 1037m2 is residential living space.

This report details the various issues that should be addressed when considering the environmental sustainability of a building project and proposes standards and strategies to mitigate the issues where considered practical and cost effective.

The overall scheme should, if the strategies are adopted, provide an exemplar of modern sustainable design with a considerably lower environmental impact than a conventional dwelling built to Building Regulations minimum standards.

Although a score under the Code for Sustainable Homes has not been required by any policy, it is very likely that this dwelling if the strategies are adopted in full would achieve at least a Level 3 rating.

Compliance with the Planning Policy requirement for a 20% CO2 reduction from renewable energy is also addressed in this report via the use of Photovoltaics.

This report should not be seen as providing any mechanical or electrical specification advice, for which a suitably qualified mechanical and Electrical Engineer should be approached.

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2 INTRODUCTION

This report has been produced utilising the Code for Sustainable Homes as a guide. The issue headings are the same as the Code and can be effectively be read in conjunction with the Technical Guidance available online at i*www.planningportal.gov.uk/uploads/**code_for_sustainable_homes**_techguide.pdf* -

The Code for Sustainable Homes is an environmental assessment system for new housing in England which:

- Presents a range of environmental standards, which have been researched as being reasonable and achievable
- Assesses the environmental performance using objective criteria and verification methods
- Provides a formal certificate showing performance

The 'Code for Sustainable Homes: A Step-change in Sustainable Home Building Practice' (Department for Communities and Local Government 2006) defined a set of sustainable design principles for new housing covering performance in nine key areas, known as 'Categories' listed below:

- Energy and CO_2
- Water
- Materials
- Surface Water Run-Off
- Waste
- Pollution
- Health & Wellbeing
- Management
- Ecology

Within these nine categories, performance criteria are defined for the individual issues which are described in detail, together with the requirements for verification, in Section Two of the Code Technical Guidance.

The Assessment system assigns to each issue a simple integer number of CREDITS (One, two three). The credits allocated for each issue are then summed to give a total number of credits per Category.

Each category is allocated a total maximum score in terms of Percentage points out of 100. The weighting system is designed to reflect the importance of that environmental category in the view of a cross section of stake holders. The methodology for arriving at these weightings is discussed in detail in sections in 5 & 6 of the Technical Guidance. As a result, the value of weightings in different sections are not identical, meaning that a credit in one category may have a greater overall impact on the final score than another.

Code assessments must be completed by a qualified and registered Code assessor and are registered with the BRE.

Code assessments and certification is completed on a dwelling by dwelling basis, but there are a number of issues that are considered on a site wide basis. Table 3.1 in the Code Technical Guidance details which credits are site wide, assess shared facilities or are purely dwelling based. In certain instances, it is possible to assess Code 'Dwelling Types' rather than all individual units within a scheme. However, it should be acknowledge that a Code Dwelling Type requires all units within that type to be near to if not identical.

Code Assessments are carried out in two stages. The first part of the assessment is carried out at the design stage (called the Design Stage Assessment) and each 'Code Dwelling Type' is given an 'Interim' Code certificate at this stage. The second part is carried out after construction (called the Post Construction Review) – and each 'Dwelling' is given a 'Final' Code certificate at this stage. Further details regarding the process involved in each stage can be found in the technical guidance.

3 ENERGY

3.1 Carbon Dioxide Emissions

Aim
To minimise emissions of carbon dioxide (CO_2) to the atmosphere arising from the operation of the home and its services.

Suggested strategy
Under the Code it requires a percentage performance improvement of the Dwelling Emission Rate (DER) compared to the Target Emission Rate (TER). Both these items are produced in the SAP 2005 calculations.

Importantly, the Code defines mandatory minimum improvement standards that must be attained to achieve particular Code levels. For example, a 25% improvement of the DER/TER is required to achieve a Code Level 3. and a 44% improvement to achieve Code Level 4.

The DER is improved via a number of measures and should be approached in a hierarchical manner. Firstly the fabric of the building should be improved to provide reduced heat losses and the design of the building such that incidental solar gains are optimised. Secondly the use of energy efficient, heating and hot water systems, energy efficient lighting, appliances and white goods should be incorporated. Thirdly and lastly, the use of renewable energy devices and systems should be considered.

For the purposes of this report it will be assumed that the DER performance of the building will be 25% better than the Building Regulations as in our experience this is relatively easy and not costly to achieve. This would also be in line with all Government funded housing which now has to be built to a 25% improved level since April 2008 and which has helped the supply chain reduce costs via increased demand.

3.2 Building Fabric Performance

Aim
To future proof the energy efficiency of dwellings over their whole life, and to minimise operational Carbon Dioxide emissions via good fabric performance and low heat losses.

Suggested strategy
The Code assesses the defined Heat Loss Parameter (HLP, determined in SAP 2005 calculations) for each dwelling and rewards performance standards greater than 1.3 and 1.1W/m2. The HLP defines the total heat losses (in watts), from the house as a function of the net internal floor area.

For the purposes of this report it will be assumed that the HLP will be in the region of 1.3W/m2 mainly due to the high levels of glazing and it is recommended that the following performance targets are adopted:

U values

Walls – 0.20
Roof – 0.10
Floor - 0.10
Windows – 1.4
Doors – 1

Air permeability - 5m3/m2@50Pa

3.3 Internal Lighting

Aim
To encourage the provision of energy efficient internal lighting, thus reducing the operational CO_2 emissions from the dwelling.

Suggested strategy
Under the Building Regulations Part L minimum standards, 30% of light fittings have to be dedicated low energy types. Further use of fittings such as compact fluorescent (CFL) for space lighting and LEDs for decorative purposes can reduce operational energy consumption and thus lower emissions.

For the purposes of this report and based upon experience it is feasible to achieve a minimum of 75% low energy lighting within the dwelling and this is therefore recommended.

3.4 Drying Space

Aim
To minimise the amount of energy used to dry clothes and thus reduce operational CO_2 emissions.

Suggested strategy
Provide appropriate external and internal drying facilities to avoid the use of tumble driers. The private garden can be supplied with an external drying line and the bathroom(s) provided with a "tidy-dry" overbath drying line

3.5 Energy Labeled White Goods

Aim
To encourage the provision or purchase of energy efficient white goods, thus reducing operational CO_2 emissions from the dwelling.

Suggested strategy
White goods provided within the dwelling should be A+ rated in the case of fridges/freezers, A rated for washing machines/dishwashers.

3.6 External Lighting

Aim
To encourage the provision of energy efficient external lighting.

Suggested strategy
All external lighting could be provided via dedicated low-energy fittings. In addition to this, all security lighting should meet the following criteria: Burglar detection lighting is to be a maximum of 150W complete with PIR and daylight cut-off devices. Any other security lighting should incorporate dedicated low-energy fittings and be fitted with dawn to dusk sensors or timers.

3.7 Low or Zero Carbon (LZC) Energy Technologies

Aim
To reduce atmospheric pollution by encouraging locally generated renewable and low emission energy to supply a significant proportion of the dwelling's energy demand.

Suggested strategy
As the Code rewards schemes that specifically includes low or zero carbon technologies where they create a reduction in total dwelling CO_2 of either 10% or 15% this is an area that has been considered by the design team already and is required under Planning Policy to be 20%. The section below sets out the CO2 model for the building as modelled in SAP and the strategy being adopted to maximise energy efficiency of the building and meet the 20% RE requirement:

3.7.1 CO^2 Model

The proposed dwelling has been modelled in SAP software to produce indicative CO2 and kWh figures for domestic hot water, space heating and electrical demand for lighting, pumps and fans. The Total floor area is less the non residential elements in the basements.

BASE CASE ASSESSMENT	Housetypes				
	A	B	C	D	E
TFA	1037				
TER	15.37				
DER	13.95				
DER/TER % IMPROVEMENT	9%				
SPACE HEATING kWh	46518				
DHW kWh	6668				
HEATING TYPE	GAS				
CO2 FOR HEATING & DHW	**10105**				
NO. OF UNITS PER TYPE	1				
TOTAL PREDICTED KgCO2/YR HEATING AND DHW ONLY					**10105**
AVERAGE DER/TER % IMPROVEMENT					**9.2%**

NOTES:				
Thermal Performance Standards:	Walls		0.20	w/m².K
	Roof		0.1	w/m².K
	Ground Floor		0.1	w/m².K
	Glazing		1.2	w/m².K
	Airtightness @ 50Pa		5	m³/m²
Unit based condensing gas boiler @			90.2%	
Standard intermittant extraction to Kitchen, bathrooms, WC				

This model also shows the proposed U values, efficiency of the gas boiler and target air permeability rate all of which should give a 9.2% improvement on the base case to meet Building Regulations.

The electricity demand for lighting, pumps and fans and appliance use is calculated below and is based upon 50% of the lighting being low energy.

BASE CASE 50% LOW ENERGY LIGHTING	Housetypes				
	A				
TFA	1037				
ELEC FOR PUMPS & FANS (SAP)	175				
ELEC FOR LIGHTING (SAP)	7622				
ELEC FOR APPLIANCES & COOKING	2591				
TOTAL ELECTRICITY USE	10388				
KgCO2 EMISSIONS FROM ELEC	**4384**				

All the CO2 emission figures are then totalled to give the base case for establishing the 20% RE requirement.

TOTAL CO2 BASE CASE	Housetypes				
	A	B	C	D	E
TFA	1037				
CO2 FOR HEATING & DHW	10105				
CO2 FOR ELECTRICITY	4384				
DWELLING TOTAL KgCO2/YR	**14489**				
NO. OF DWELLINGS	1				
TOTAL PREDICTED CO2 EMISSIONS					**14489**

Based upon a 14,684kgCO2/pa total figure the 20% RE offset requirement will be 2,937kgCO2/pa.

This can be achieved via PV arrays mounted on the roof as per the model below:

Dwelling Type	*A*	*B*	*C*	*D*	*0*
Dwelling Type	House	House	House	House	House
Dwelling Floor Area	*1037.0*	*0.0*	*0.0*	*0.0*	*0.0*
Number of Dwellings in Type	*1*	*0*	*0*	*0*	*0*
Dwelling TER	*15.37*	*0*	*0*	*0.00*	*0*
Dwelling DER	*13.95*				*0*
Current DER Improvement	*-6.7%*				
DER Target KgCO2/m²	11.07	0.00	0.00	0.00	0.00
DER Reduction from PV KgCO2/m²	2.88	0.00	0.00	0.00	0.00
Equivalent KgCO2/yr Reduction required	2990.3	0.0	0.0	0.0	0.0
Orientation	South	South	South	South	South
Angle	30°	45°	45°	45°	30°
Shading	None	None	None	None	None

Kwp Required for DER Target	6.32	0.00	0.00	0.00	0.00
KWp for Individual Systems	**6.32**	**0.00**	**0.00**	**0.00**	**0.00**
Communal PV Requirement	**6.32**	KWp			
Communal Installation Type	Flat Roof	Roof Area Required m²			**126.31**
Emissions Reduction from PV KgCO2/yr	**2990**	As % of Development Total			**20.64%**

Maximum Available Roof Area, m²	**118**	Maximum Potential Array KWp	**5.9**
Emissions Reduction from PV KgCO2/yr	**2794**	As % of Development Total	**19.3%**
DER Reduction with maximum PV array	**26.8%**		

Onsite Renewables Target of	20.00%	Requires array equal to	**6.23**	**KWp**
Installation Type	Flat Roof	Roof Area Required m²		**125**
DER Reduction with 20% onsite renewables	**27.4%**			

The PV array required to meet the 20% RE requirement would be approximately 6.32kWp in output requiring 126m2 of roof space, this is however not fully available with only approximately 118m2 available, this slightly reduces the % contribution to 19.3% which it is hoped would be near enough to be acceptable.

The approximate cost for a 6.32kWp PV array would be between £25,000 and £28,000 and a partial grant may be available depending on timing from the Low Carbon Buildings Programme. However, the Government "Feed In" tariff should be in place in April 2010 which will replace the grant regimes via an enhanced payment for the RE generated and sold to the grid.

OPTION	COLLECTOR AREA m²	ESTIMATED COST	ESTIMATED LIFESPAN Yrs	£/KgCO2 SAVED LIFESPAN
PV Array	118	£25000 - £28000	20	£0.45 - £0.5

Photovoltaic Panels explained

Photovoltaic panels convert solar radiation into direct current electricity. In principle, they are an ideal source of renewable energy as they harness the most abundant source of energy on the Earth, the sun, and they produce electricity which is the most useful form of energy.

PV's are silent in operation, have no moving parts and have a long life with low maintenance levels. PV systems can be connected to the grid or battery arrays in remote locations. Grid connected systems consist of PV arrays connected to the grid through a charge controller and an inverter.

PV cells are more efficient at lower temperatures so good ventilation should be allowed around the PV modules where possible. Overshadowing and self-shading reduce energy production and in order to maximise energy output, the modules must face due south at an angle of approximately 35 degrees. Output is measured in kWp (kilowatts peak) which is the maximum output a module will have under standard test conditions.

At present typical costs start in the region of £4500-6500 per KWp for small arrays. Bulk ordering for large (greater than 10KWp) arrays could reduce this further to between £3500-4500 per KWp. The cost varies between systems to reflect the overall efficiency of the modules. Higher efficiency modules cost more but require less space for installation.

The current UK Government has a grant programme Low Carbon Buildings Programme Phase 2, that has created framework supply agreements with various companies via a competitive tender process, this has resulted in certain minimum array sizes being available due the grant scheme criteria.

Figure 1: A roof mounted PV array

The embodied energy in the manufacture of PV cells and framing systems varies depending on the manufacturer, location of fabrication, distance travelled to site and insolation (solar radiation) levels for site. There are currently no officially UK recognised figures for the embodied energy within PV systems. However, there are a number of papers on the subject and it is an area under even greater consideration. As a guide, the more comprehensive papers on the subject estimate that the carbon payback for PV systems is in the region of 4-6 years. Systems have a typical expected life expectancy of 30 years.

The UK Government is also introducing a "feed-in" tariff (an enhanced payment per kWh produced) for electricity generated via renewables at a domestic scale in April 2010 and this will significantly improve the economics of PV with some estimates of 7 year financial paybacks potentially being feasible (http://www.r-e-a.net/document-library/policy/policy-briefings/RET_Report1-1.pdf)

3.7.2 Solar Thermal Panels

Solar thermal panels collect solar radiation to heat water that can then be used for either space heating or domestic hot water. There are two types of competing solar thermal technologies; flat-plate and evacuated tube. In summary, evacuated tube collectors are more efficient and therefore require less active collector array than the equivalent output of a flat plate system. However, in general, capital costs for the two technologies are comparable.

The system consists of solar collectors that are often roof mounted. Water is passed through the solar collectors and then to a heat exchanger in a domestic hot water cylinder, which will also have a top-up heat source (gas, biomass, or electricity) to ensure reliability of supply.

Solar thermal collectors can still produce energy from diffuse sunlight and are therefore less susceptible to performance reductions from orientation and angle compared to PV.

A typical 3-4m^2 collector area system (area dependent on technology) is capable of providing 50% the annual domestic hot water demand for a typical 2-3 bed house. The proportion of hot water provided varies over the course of a year, with the system achieving 100% during the summer months and 5% during the winter. A typical system of this scale costs in the region of £2500-£3500 per dwelling.

The current UK Government has a grant programme Low Carbon Buildings Programme Phase 2, that has created framework supply agreements with various companies via a competitive tender process, this has resulted in certain minimum panel sizes being available due the grant scheme criteria.

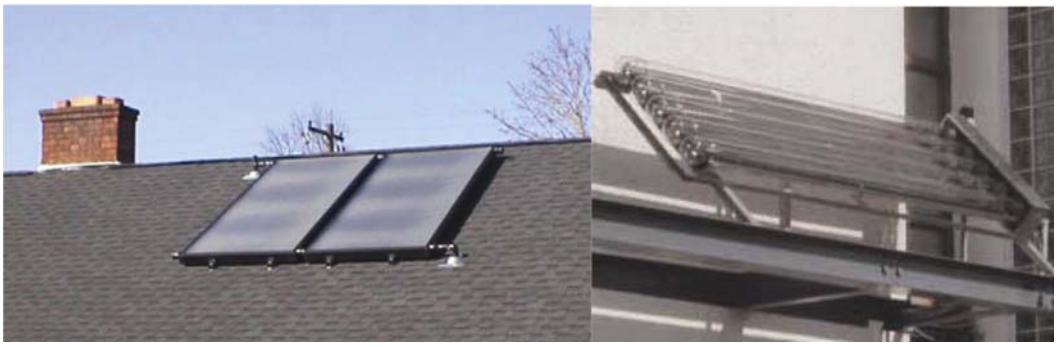


Figure 2: Roof mounted solar thermal systems; flat plate (left), evacuated tube (right)

Similar to PV, there is no authoritative data on the embodied energy and carbon associated with the production, transport and installation of solar thermal systems. However, research suggests that the carbon payback period for the systems is in the region of 1-2 years where offsetting mains electricity and 3-4 years where offsetting mains gas.

The UK Government also has plans to introduce a renewable heat payment tariff in April 2010, this will significantly improve the financial payback for Solar Thermal systems with some estimates quoting 7 years (http://www.r-e-a.net/document-library/policy/policy-briefings/RET_Report1-1.pdf).

3.7.3 Ground Source Heat Pumps

A ground source heat pump (GSHP) harnesses the energy from the ground and upgrades it for use within buildings. Whereas ambient air temperatures can have a large swing throughout the year the temperature of the ground a few metres below the surface stays relatively stable. This makes it possible to use the heat in the ground during the winter months to meet our heating needs. In the summer months it is also possible to cool buildings using ground temperatures that are lower than ambient air.

A typical system consists of a ground to water heat exchanger (often called the 'ground loop' or 'ground coil'), a heat pump and a distribution system. Water (or other solution) is passed round the system 'absorbing' heat from the ground and upgrading this heat via the heat pump into the building.

The heat exchanger can consist of either a vertical bore hole system, where long pipes are driven deep into the ground or a horizontal trench system, which operates at shallower depths. The performance of a GSHP is measured using a COP (coefficient of performance). This defines the amount of useful energy output from the heat pump compared to the energy input. Typical systems can achieve a COP in the region of 350-400%.

The COP is maximised where the flow temperature of the heating circuit is between 35-40^{o}C and therefore GSHP are ideally suited for connection to under-floor heating. The potential scale of GSHP is only limited by the availability of land for the ground loop and reasonable levels of energy abstraction. Typical costs for ground source heat pumps range from £800/kW for trench systems to £1500/kW for vertical borehole systems.

This scheme lends itself to a piling solution for the foundations and therefore the opportunity to investigate using the piles for GSHP via "energy piles" should be considered.

Figure 4: The preparation of GSHP heat exchanger loop in 'Energy Piles'

3.7.4 Biomass Heating

In the context of energy generation, the term "biomass" can refer to any organic substance that can be processed to produce energy, either solid matter or liquid biofuel. Biomass fuels are an alternative to conventional fossil fuels and are often considered to be near carbon neutral. This is because the growing plant or tree absorbs the same quantity of CO_2 in its lifetime as is released upon energy conversion.

Biomass is a renewable form of energy as it can be replaced over a short period of time. Biomass or biofuels are currently being produced from plantations of a variety of plant types, as well as from waste materials like cooking oil and waste wood. If waste wood is used, care must be taken to maintain fuel standards and exclude wood treatments such as preservatives and paint. Biomass heating is simple and proven technology, widely used in mainland Europe, and which compares well in running cost with mains gas. It can be implemented on a variety of scales from systems for small buildings up to systems of several MW capacities, with the capital cost of larger installations decreasing per unit of heat output.

One major drawback is the need for substantial storage space allocation for the fuel stock. Although not impossible, the storage requirement and the need for regular fuel deliveries can create significant complications in the development of large scale urban biomass heating systems

Biomass boilers can achieve similar efficiencies as good quality gas boilers, providing a significantly more efficient fuel burn than open fires or wood burning stoves. Large scale biomass boilers are particularly suitable for rural use such as farms or warehousing where space constraints are less onerous.

The capital costs of biomass boilers are greater than their gas equivalents. For example the purchase price of a 50KW log boiler alone is in the region of £4-£5,000 and there is a requirement for additional 'buffer' storage compared to conventional gas systems. It is also not uncommon for clients to require a standard gas boiler to provide back-up. Good practice for a 50KW log boiler would be to provide 3000 litres hot water buffer storage. The additional capital cost for biomass over gas is minimal when considered in the terms of the whole project value for new buildings, but the transportation and storage of fuel requires detailed consideration from the outset of any project.

Overall the energy load for the building will be higher than normal and it is therefore wholly appropriate to offset this demand with energy efficiency measures and renewables energy devices.

3.8 Cycle Storage

Aim

To encourage the wider use of bicycles as transport, and thus reduce the need for short car journeys, by providing adequate and secure cycle storage facilities.

Suggested Strategy
The Code has particular standards for the storage space required for cycle storage. The space requirements are as follows:

- 1 credit: 1, bed – 0.5 space, 2 & 3 bed – 1 space, 4 beds and above – 2 cycle spaces.
- 2 credits: 1 bed – 1 space, 2 & 3 bed – 2 spaces, 4+ beds – 4 spaces.

The current proposals allow for the addition of cycle storage

3.9 Home Office

Aim
To reduce the need to commute to work by providing residents with the necessary space and services to be able to work from home.

Suggested Strategy
The dwelling includes a study on the ground floor although specific details such as the location of power and phone points will not be addressed until detailed design stage.

4 WATER USE

4.1 Internal Potable Water Use

Aim
To reduce consumption of potable water in the home.

Suggested Strategy
Internal water consumption performance under the Code includes mandatory standards. In order to achieve a Code Level 3 rating for example, the water appliances will need to be designed to ensure that the maximum consumption as calculated in accordance with the CSH methodology is limited to 105l/person/day, the average consumption in the UK is approximately 130 l/person/day. Normally, a proposed strategy using a 6/4l flush WC, 140l – 150l bath, shower limited to 6l/min, all taps to 1.7l/m and standard washing machine will achieve this. However, due to the high water usage envisaged within the dwelling it will be wholly appropriate to collect as much rainwater as possible for re-use within the building. This could be achieved via below ground holding tanks with a pumped system.

4.2 External Potable Water Use

Aim
To encourage the recycling of rainwater, and reduce the amount of water taken from the mains, for use in landscape/garden watering.

Suggested Strategy
The Code requirements are for the following rainwater collector systems to be provided to dwellings where they have private external space:

- 3+ bed = 200 litres min

However, as it has been proposed that a rainwater storage system is appropriate for re-use of water within the dwelling then water butts are irrelevant, therefore it would be sensible for the rainwater tank to have an external connection for irrigation purposes within the garden.

5 ENVIRONMENTAL IMPACT OF MATERIALS

5.1 Environmental Impact of Materials

Aim
To encourage the use of materials that have less impact on the environment, taking account of the full life-cycle impacts.

Suggested Strategy
Under the Code credits are achieved by matching the proposed construction element type to their environmental rating as detailed in the 2008 edition of the BRE Green Guide to Housing Specification www.thegreenguide.org.uk.
The following elements are assessed: Roof, External Walls, Internal Walls, Ground and intermediate Floors and windows. The ratings go from A+ (best) to E (worst).

The current proposals should be aligned to ensure that as many of the construction elements get a high rating under the Green Guide, i.e., a specification that states A+ materials are used wherever possible and practical and the following suggestions may act as examples:

- Roof – A+ rated – Structural steel trusses, galvanised steel purlins and deck, vapour control layer, insulation, EPDM single ply roofing membrane
- External Walls – A+ rated – Cement rendered medium dense solid block wall (blocks laid flat), insulation, plaster, paint
- Internal Walls – 1) and 2) are A+ rated, 3) is A rated – 1) Timber stud, plasterboard, paint. 2) Glass blockwork 100mm thick 3) Aircrete blockwork with cement:lime mortar, plaster, paint
- Floors – Ground floor types - B rated – Powerfloated in situ concrete slab, over insulation on polyethylene dpm laid on blinded recycled aggregate sub-base. Upper floor type – A rated - OSB-2 decking on timber battens, grouted beam and medium dense solid block flooring
- Windows – A+ rated - Durable hardwood window, double glazed, solvent borne gloss paint (non-TWAS)

5.2 Responsible Sourcing of Materials: Basic Building Elements.

Aim
To recognise and encourage the specification of responsibly sourced materials for key building elements.

Suggested Strategy
Under the Code an assessment is made of all the key basic constructional elements used within the dwelling including: Frame, upper and ground floors, roof, external and internal walls, foundations, and staircase.

This credit is assessed by determining the extent and validity of any third-party environmental management auditing system used in the assessment of a particular construction element. The higher the standard of Environmental Management System (EMS) certification, the greater the potential to improve upon the predicted score. Points are awarded for each constructional element based on its performance, and the points for each element totalled. This is then converted to a credits score.

Simple clauses within the specification documentation requiring all timber to be either FSC or PEFC certified and all aggregates and aggregate based materials to be sourced from ISO 14001 accredited suppliers will provide an excellent basis for credits.

5.3 Responsible Sourcing of Materials: Finishing Elements

Aim
To recognise and encourage the specification of responsibly sourced materials for secondary building and finishing elements.

Suggested Strategy
As per 3.9.2 an assessment is also made of the finishing elements:

Stair (including handrails, balustrades, banisters, other guarding/rails, excluding staircase)

Window (including sub-frames, boards, sills)

External & internal door (including sub-frames, frames, linings, door)

Skirting (including architrave, skirting board and rails)

Panelling (including any other trim)

Furniture (including fitted kitchen, bedroom and bathroom units)

Fascias (soffit boards, bargeboards, gutter boards, others)

Simple clauses within the specification documentation requiring all timber to be either FSC or PEFC certified and all materials to be sourced from ISO 14001 accredited suppliers will provide an excellent basis for credits.

6 SURFACE WATER RUN-OFF

6.1 Reduction of Surface Water Run-Off

Aim
To reduce and delay water run-off from the hard surfaces and roofs of a housing development to public sewers and watercourses, thus reducing the risk of localised flooding, pollution and other environmental damage.

Suggested Strategy
Under the Code the mandatory requirements for this category are that the proposed development solution will ensure that run-off rates and annual run-off volume will be no greater than the current situation.

It is unlikely that the existing situation will be made any worse by the proposed development, however to ensure that this is definitely the case the design includes green roofing elements and other recognised Sustainable Urban Drainage systems such as rainwater harvesting. It would be appropriate to also consider the long term management of the green roofing elements and to seek an appropriate specialist to prepare a management plan.

6.2 Flood Risk

Aim
To encourage developments in areas with low risk of flooding or if developments are to be situated in areas with a medium risk of flooding, that appropriate measures are taken to reduce the impact in an eventual case of flooding.

Suggested Strategy
A review of the Environment Agency Floodmap, http://maps.environment-agency.gov.uk, indicates that the site is located in an area defined as having a low probability of flooding and as such is not at risk.

7 WASTE

7.1 Household Waste and Recycling Facilities

Aim

To encourage recycling and to provide homeowners with the opportunity and facilities to recycle household waste.

Suggested Strategy

Under the Code to achieve full credits in this category, (which is recommended as they are relatively low cost credits) where there is a Local Authority collection scheme, each dwelling must provide adequate internal separated waste storage and sufficient external storage space to meet the credit requirements. The definition of adequate internal and external storage space is dependent on whether there is a local authority collection scheme and whether that scheme is of the type that provides a single 30 litre collection bin.

Camden Council operate a doorstep collection scheme and collect: paper, glass, cans, cardboard and plastic bottles. It is therefore appropriate to dedicate an area for the storage of recyclables within the dwelling.

7.2 Construction Site Waste Management

Aim

To recognise the importance a Site Waste Management Plan has on the efficient use of resources during construction and demolition, and to promote the reduction and effective management of site waste.

Suggested Strategy

Under the Code the mandatory standards for the category require the provision of a Site Waste Management Plan being produced and implemented. This requires a commitment to monitor and reduce the demolition and construction waste generated on site and a commitment and clear details of the procedures to be implemented to sort construction waste on-site to facilitate off-site recycling. This can be achieved, for example, via a registered waste management company.

7.3 Composting

Aim

To encourage developers to provide the facilities to compost household waste, reducing the amount of household waste sent to landfill.

Suggested Strategy

Composting facilities should be provided within the garden.

8 POLLUTION

8.1 Insulant GWP

Aim

To reduce the potential global warming from substances used in the manufacture or composition of insulating materials.

Suggested Strategy

It is anticipated that the scheme will only incorporate materials with an ozone depleting potential of zero, and global warming potential of less than 5. It is worth noting at this point that some plastic based insulation materials, such as polyurethane or extruded polystyrene can be manufactured in a manner sympathetic to this aim. Therefore it is essential that the exact specification of all items, including any pipe insulation is confirmed.

Typical insulants that inherently have a GWP of less than 5 (and a zero ODP) will include insulation materials (if not blown) such as:

- mineral fibre
- glass fibre
- cork wool
- nitrile rubber
- cellulose insulation
- wood fibre board
- cellular glass flax
- recycled newspaper and jute

It is therefore anticipated that the proposed specification will include this specification item.

8.2 NOx Emissions

Aim
To reduce the nitrous oxides (NOx) emitted into the atmosphere.

Suggested Strategy
The specification of the energy efficient gas boiler should ensure that the NOx emissions are limited to below 40mg/kWh in accordance with Best Practice. Worcester Bosch Greenstar CDi models meet this requirement as do many other manufacturers.

9 HEALTH & WELLBEING

9.1 Daylighting

Aim
To improve the quality of life in homes through good daylighting, and to reduce the need for energy to artificially light a home.

Suggested Strategy
Under the Code this is a highly weighted credit and specifically requires certain rooms to achieve a minimum average daylight factor: 2% in kitchens, 1.5% in living rooms, dining rooms and study's and which should also provide a view of the sky for 80% of work-plane area for each of these rooms.

A review of the drawings suggests that the ADF and view of sky standards may be maintained but would need to be subject to window size and daylight modelling by a specialist.

9.2 Sound Insulation

Aim
To ensure the provision of sound insulation and reduce the likelihood of noise complaints.

Suggested Strategy
As the dwelling is detached occupant noise from or to neighbours is not an issue.

9.3 Private Space

Aim
To improve the occupiers' quality of life by providing an outdoor space for their use, which is at least partially private.

Suggested Strategy
A private garden is being maintained.

9.4 Lifetime Homes

Aim

To encourage the construction of homes that are accessible to everybody and where the layout can easily be adapted to fit the needs of future occupants.

Suggested Strategy

The design should consider the following Lifetime Homes principles:

Car Parking
1. Where car parking is adjacent to the home, it should be capable of enlargement to attain 3.3m width.

Access from Car Parking
2. The distance from the car parking space to the home should be kept to a minimum and should be level or gently sloping.

Approach
3. The approach to all entrances should be level or gently sloping.

External Entrances
4. All entrances should be illuminated, have level access over the threshold and have a covered main entrance.

Communal Stairs
5. Communal stairs should provide easy access and, where homes are reached by a lift, it should be fully accessible.

Doorways & Hallways
6. The width of internal doorways and hallways should conform to Part M, except that when the approach is not head on and the hallway width is 900mm, the clear opening width should be 900mm rather than 800mm. There should be 300mm nib or wall space to the side of the leading edge of the doors on entrance level.

Wheelchair Accessibility
7. There should be space for turning a wheelchair in dining areas and living rooms and adequate circulation space for wheelchairs elsewhere.

Living Room
8. The living room should be at entrance level.

Two or more storey requirements
9. In houses of two or more storeys, there should be space on the entrance level that could be used as a convenient bed space.

WC
10. In houses with three bedrooms or more there should be a wheelchair accessible toilet at entrance level with drainage provision enabling a shower to be fitted in the future. In houses with two bedrooms the downstairs toilet should conform at least to Part M.

Bathroom & WC Walls
11. Walls in the bathroom and WC should be capable of taking adaptations such as handrails.

Lift Capability
12. The design should incorporate provision for a future stair lift and a suitably identified space for a through the floor lift from the ground floor to the first floor, for example to a bedroom next to the bathroom.

Main Bedroom

13. The design and specification should provide a reasonable route for a potential hoist from a main bedroom to the bathroom.

Bathroom Layout
14. The bathroom should be designed for ease of access to the bath, WC & wash basin.

Window Specification
15. Living room window glazing should begin no higher than 800mm from the floor level and windows should be easy to open/operate.

Fixtures & Fittings
16. Switches, sockets, ventilation and service controls should be at a height usable by all (i.e. between 450 and
1200mm from the floor).

10 MANAGEMENT ISSUES

10.1 Home User Guide

Aim

To recognise and encourage the provision of guidance to enable home owners/occupiers to understand and operate their home efficiently, in line with current good practice and in the manner envisaged by the designer/developer, and to make best use of local facilities.

Suggested Strategy

This issue requires that the developer provides the occupants with a simple non-technical guide that covers information regarding the operation and performance of their home. In principle, the guide should provide information regarding the potential for energy and water efficient use of their home, including details of any relevant technologies that have been included in the scheme.

10.2 Considerate Constructors

Aim

To recognise and encourage construction sites managed in an environmentally and socially considerate and accountable manner.

Suggested Strategy

To ensure that the main contractor for the development registers the site under the Considerate Constructor scheme and commits to achieve a rating within the 24 – 31.5 range.

10.3 Construction Site Impacts

Aim

To recognise and encourage construction sites managed in an environmentally sound manner in terms of resource use, energy consumption, waste management and pollution. This requires the development and implementation of a strategy to operate site management procedures including:

1. Monitor, report and set targets for CO_2 production or energy use arising from site activities;
2. Monitor and report CO_2 or energy use arising from commercial transport to and from site;
3. Monitor, report and set targets for water consumption from site activities;
4. Adopt best practice policies in respect of air (dust) pollution arising from site activities;
5. Adopt best practice policies in respect of water (ground and surface) pollution occurring on the site;
6. 80% of site timber is reclaimed, reused or responsibly sourced.

Suggested Strategy

Encourage the constructor to adopt items 2, 3, 4 and 5.

10.4 Security

Aim

To encourage the design of developments where people feel safe and secure; where crime and disorder, or the fear of crime, does not undermine quality of life or community cohesion.

Suggested Strategy

The scheme could be discussed with the Architectural Liaison Officer or Crime Prevention Design Advisor at the local Police office with a view to obtaining a Secured by Design certificate and any recommendations made by them implemented within the scheme.

11 ECOLOGICAL ASSESSMENT

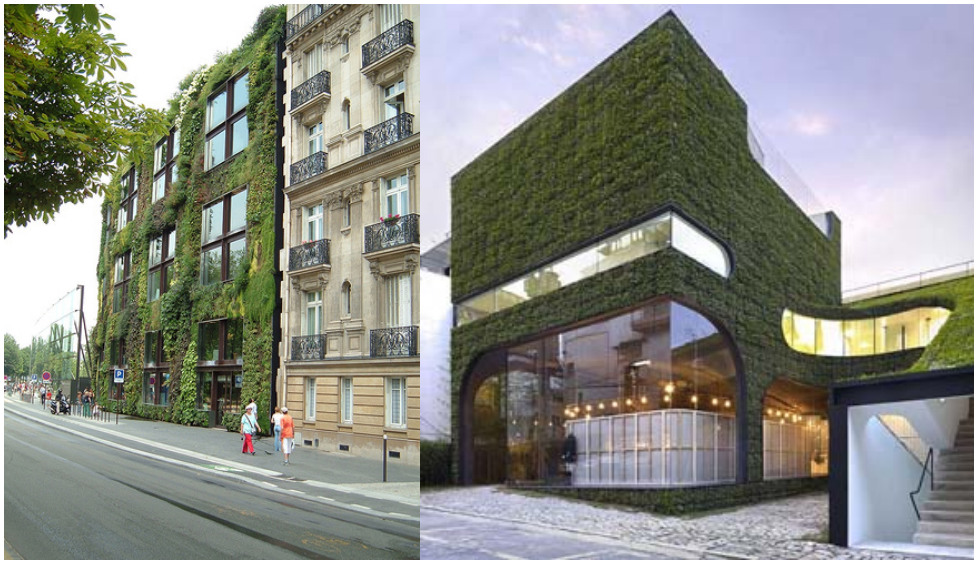
11.1 Ecological Value of Site

Aim

To encourage development on land that already has a limited value to wildlife and discourage the development of ecologically valuable sites.

Suggested Strategy

The scheme is a replacement dwelling and as such no ecological features are due to be lost during the development phase. However, the scheme is proposing a green wall strategy to the upper floor level (see photos below as example) as evidenced on drawing no. 787- PL09. If the scheme were to be registered for a Code Assessment a registered Ecologist would need to be appointed to verify any enhancement to the site. A registered Ecologist for the purposes of the Code would need to comply with the following criteria:



A *Suitably Qualified Ecologist* is defined as an individual that:

- Holds a degree or equivalent qualification (e.g. N/SVQ level 5) in ecology or a related subject.
- Is a practising ecologist, with a minimum of three years relevant experience (within the last five years). Such experience must clearly demonstrate a practical understanding of factors affecting ecology in relation to construction and the built environment; including acting in an advisory capacity to provide recommendations for ecological protection, enhancement and mitigation measures. Examples of relevant experience are: ecological impact assessments; Phase 1 and 2 habitat surveys; and habitat restoration.

- Is covered by a professional code of conduct and subject to peer review. Peer review is defined as the process employed by a professional body to demonstrate that potential or

current full members maintain a standard of knowledge and experience required to ensure compliance with a code of conduct and professional ethics.

Full members of the following organisations, who meet the above requirements are deemed to be *Suitably Qualified Ecologists*:

- Association of Wildlife Trust Consultancies (AWTC)
- Chartered Institution of Water and Environmental Management (CIWEM)
- Institute of Ecology and Environmental Management (IEEM)
- Institute of Environmental Management and Assessment (IEMA)
- Landscape Institute (LI)

11.2 Ecological Enhancement

Aim
To enhance the ecological value of a site.

Suggested Strategy
The replacement dwelling does incorporate green roofs and walls and allied to the minimal disturbance of the existing gardens will provide a small enhancement to the site in overall terms. It would however be of benefit to the scheme if a landscape plan with some additional planting was produced that the developer could commit to achieving.

11.3 Protection of Ecological Features

Aim
To protect existing ecological features from substantial damage during the clearing of the site and the completion of construction works

Suggested Strategy
This issue requires that where all existing features of ecological value on the development site potentially affected by the works, they are maintained and adequately protected during site clearance, preparation and construction works.

11.4 Change of Ecological Value of Site

Aim
To minimise reductions in ecological value and to encourage an improvement.

Suggested Strategy
Under the Code credits are awarded for changes to the ecological value of the site:

- Minor negative change – 1 credit
- Neutral Change – 2 credits
- Minor enhancement – 3 credits
- Major enhancement – 4 credits

The category levels are usually obtained via an accredited Ecologist who will make an assessment comparing the before and after. It should be noted that typical garden planting is not considered to have high inherent ecological value. The emphasis is on providing enhanced natural and native habitats that are sympathetic to the original site conditions and location.

11.5 Building Footprint

Aim

To promote the most efficient use of a building's footprint by ensuring that land and material use is optimised across the development

Suggested Strategy

Under the Code credits are awarded where the ratio of combined internal floor area to footprint (as measured by the total ground floor internal area) is greater than 3:1. A preliminary calculation indicates that the scheme will considerably better this with a ratio of over 4:1 which therefore is a very good use of the land.

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