

Camden Planning Guidance

Sustainability

London Borough of Camden

CPG 3



September 2013

CPG1 Sustainability

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1 Introduction

What is Camden Planning Guidance?

- 1.1 We have prepared this Camden Planning Guidance to support the policies in our Local Development Framework (LDF). This guidance is therefore consistent with the Core Strategy and the Development Policies, and forms a Supplementary Planning Document (SPD) which is an additional “material consideration” in planning decisions. This document was updated on 4 September 2013 following statutory consultation to clarify the guidance in Section 9 related to the Code for Sustainable Homes. The Camden Planning Guidance documents (CPG1 to CPG8) replace Camden Planning Guidance 2006.
- 1.2 The Camden Planning Guidance covers a range of topics as well as sustainability (such as design, housing, amenity and planning obligations) and so all of the sections should be read in conjunction, and within the context of Camden’s LDF.

What is this sustainability guidance for?

- 1.3 The Council is committed to reducing Camden’s carbon emissions. This will be achieved by implementing large scale projects such as installing decentralised energy networks alongside smaller scale measures, such as improving the insulation and energy performance of existing buildings.
- 1.4 This guidance provides information on ways to achieve carbon reductions and more sustainable developments. It also highlights the Council’s requirements and guidelines which support the relevant Local Development Framework (LDF) policies:
- CS13 - *Tackling climate change through promoting higher environmental standards*
 - DP22 - *Promoting sustainable design and construction*
 - DP23 - *Water*

What does the guidance cover?

- Energy statements
- The energy hierarchy
 - Energy efficiency – in new and existing buildings
 - Decentralised energy and combined heat and power (CHP)
 - Renewable energy
- Water efficiency
- Sustainable use of materials
- Sustainability assessment tools - Code for Sustainable Homes, BREEAM and EcoHomes
- Green roofs, brown roofs and green walls
- Flooding
- Climate change adaptation
- Biodiversity
- Urban food growing

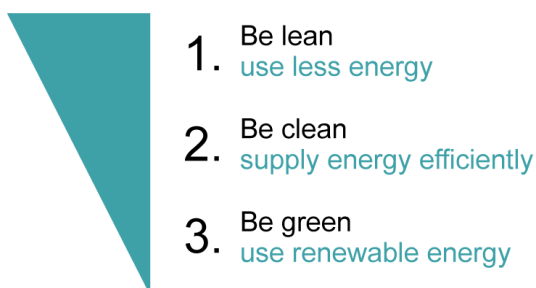
2 The energy hierarchy

KEY MESSAGES

- All developments are to be design to reduce carbon dioxide emissions
- Energy strategies are to be designed following the steps set out by the energy hierarchy

- 2.1 Buildings in Camden account for 88% of Camden's overall carbon dioxide emissions. These emissions result from the energy used within buildings. Therefore the Council encourages all buildings to be as energy efficient as possible. Our approach is to implement the energy hierarchy as set out in policy CS13 of the Core Strategy. The energy hierarchy is a sequence of steps that, if taken in order, will minimise the energy consumption in a building.
- 2.2 This section provides an overall introduction to the energy hierarchy and energy statements. This section sets out:
- The energy hierarchy
 - How to apply the energy hierarchy
 - When an energy statement is required
 - What to include in an energy statement
- 2.3 The next four sections provide more detailed guidance on each of the 3 steps in the hierarchy.

The 3 steps of the energy hierarchy are:



- 2.4 All developments are expected to reduce their carbon dioxide emissions by following the steps in the energy hierarchy to reduce energy consumption.
- 2.5 Developments involving 5 or more dwellings and/or 500sq m (gross internal) floorspace or more are required to submit an energy statement which demonstrates how carbon dioxide emissions will be reduced in line with the energy hierarchy (see below for more details on what to include in an energy statement).

Gross internal area

The area within the perimeter of the outside walls of a building as measured from the inside surface of the exterior walls, with no deduction for hallways, stairs, closets, thickness of walls, columns, or other interior features.

What to include in an energy statement?

- 2.6
- An energy statement is to set out how a development has been designed to follow the steps in the energy hierarchy. It should demonstrate how the proposed measures are appropriate and viable to the context of the development.

Baseline energy demand and carbon dioxide emissions

Calculate the baseline energy demand of the development and the corresponding carbon dioxide emissions arising from the development. You should clearly show the methodology used. See below for more guidance on how to calculate the baseline demand and carbon dioxide emissions.

Reduce the demand for energy

Describe the design measures which are proposed to maximise the energy efficiency of the development. See sections 2 and 3 for guidance on how to ensure your development is as energy efficient as possible.

Supply energy efficiently

Describe how your development has considered further reducing carbon dioxide emissions by sourcing energy efficiently e.g. through the use of decentralised energy, such as combined heat and power systems. See section 4 for guidance on decentralised energy network and combined heat and power.

Calculate the energy use and the corresponding carbon emissions from the development having applied the first two stages of the energy hierarchy.

Use renewable energy

Describe how your development has considered using renewable energy technologies to further reduce carbon dioxide emissions. See section 5 for more guidance on renewable energy.

Calculate the remaining energy use and the corresponding carbon emissions from the development having applied all three stages of the energy hierarchy.

Conclusion

A concluding section should be provided outlining the contribution of each set of measures, technology or combination of technologies towards meeting the relevant targets set out in this guidance and providing recommendations as to which approach is most suitable for the site. Where it has not been possible to reach the targets, a clear explanation should be provided.

- 2.7
- An energy statement should present technical data while remaining easy to read and to understand. Clearly laid out tables should be used to present data for ease of reading and comparison. Plans should be used where possible, e.g. to indicate suitable roof areas for installing solar technologies or the location of a plant room. References should be used to explain where data has been obtained from.

Calculating the baseline energy demand and carbon dioxide emissions

- 2.8 You should produce a single energy statement for the entire development. The baseline energy demand should include an assessment of all the energy consumed in the operation of the development, including where there will be more than one occupier, use or building. This should include regulated energy or 'fixed' consumption (covered by building regulations) e.g. fixed lighting, heating and hot water systems, ventilation/cooling etc and non-regulated energy sources from 'plug-in' sources (not covered by building regulations) e.g. cooking, electrical appliances, centralised IT (server room) systems, communications equipment. Major developments should use modelling SAP/SBEM (Standard Assessment Procedure/Simplified Building Energy Model) to calculate this data. Benchmark data is only acceptable for minor developments.
- 2.9 The energy statement should clearly identify the total baseline energy demand and the carbon dioxide emissions of the development prior to the inclusion of any measures to reduce carbon dioxide emissions beyond the minimum requirements of current Building Regulations. The statement should clearly demonstrate the energy demand and carbon dioxide emissions of the development regulated by the Building Regulations as well as the additional energy demand and resulting carbon dioxide emissions. Reductions in each type of energy use should be demonstrated and the resulting total energy demand and carbon dioxide emissions.
- 2.10 Baseline carbon dioxide emissions should be calculated for energy use using Part L of the Building Regulations for domestic and non-domestic developments. Total development emissions should take into account all emissions sources.

Further information

Camden Core Strategy	Policy CS13 - <i>Tackling climate change through promoting higher environmental standards</i> – sets out Camden's overarching approach to environmental sustainability.
Camden Development Policies	Policy DP22 - <i>Promoting sustainable design and construction</i> – sets out Camden's detailed requirements for developments to comply with.
Mayor of London	The London Plan Supplementary Planning Guidance, Sustainable Design and Construction: – sets out the Mayor's requirements for environmental sustainability.
GLA Energy Team Guidance on Planning Energy Assessments October 2010	Sets out how the GLA want Energy Assessments accompanying planning applications to be set out and what information is to be provided www.london.gov.uk/sites/default/files/guidance-energy-assessments-28-sep-10.pdf
Building Regulations	Approved Documents Part L - Conservation of Fuel and Power. This section of the Building Regulations deals specifically with the energy efficiency of buildings. The latest version of the Regulations can be found on the Planning Portal website www.planningportal.gov.uk

4 Energy efficiency: existing buildings

KEY MESSAGES

As a guide, at least 10% of the project cost should be spent on environmental improvements

Potential measures are bespoke to each property

Sensitive improvements can be made to historic buildings to reduce carbon dioxide emissions

- 4.1 Many of the sections in this guidance focus on reducing the environmental impact of new buildings, however Camden's existing buildings account for almost 80% of the borough's carbon emissions. Therefore it is essential that these buildings make a contribution towards the borough's reduction in carbon dioxide emissions.
- 4.2 This section provides more information on how existing buildings can be more energy efficient. It builds on the previous section, which covered Stage 1 of the energy hierarchy and improving energy efficiency in new buildings.
- 4.3 Camden Core Strategy Policy CS13, paragraph 13.9 expects development or alterations to existing buildings to include proportionate measures to be taken to improve their environmental sustainability, where possible.

WHAT DOES THE COUNCIL EXPECT?

- All buildings, whether being updated or refurbished, are expected to reduce their carbon emissions by making improvements to the existing building. Work involving a change of use or an extension to an existing property is included. As a guide, at least 10% of the project cost should be spent on the improvements.
- Where retro-fitting measures are not identified at application stage we will most likely secure the implementation of environmental improvements by way of condition. Appendix 1 sets out a checklist of retro fit improvements for applicants.
- Development involving a change of use or a conversion of 5 or more dwellings or 500sq m of any floorspace, will be expected to achieve 60% of the un-weighted credits in the Energy category in their EcoHomes or BREEAM assessment, whichever is applicable. (See the section on Sustainability assessment tools for more details).
- Special consideration will be given to buildings that are protected e.g. listed buildings to ensure that their historic and architectural features are preserved.

How can I make an existing building more energy efficient?

- 4.4 There are many opportunities for reducing the energy we use in our homes. The design and the materials used can make a significant

contribution. Simple measures, such as closing curtains at dusk, can help stop heat loss. Installing condensing boilers, heating controls and energy saving light bulbs and appliances reduce energy use and carbon dioxide emissions significantly. Reduced energy use also means lower energy bills.

- 4.5 When dealing with historic buildings a sensitive approach needs to be taken. Guidance on this is provided later within this section.

Draught proofing

- 4.6 There is a range of effective draft proofing measures you can use to help insulate your home:

- Fix brush seals to exterior doors and letterboxes, and tape to ill-fitting doors;
- Put reflector panels behind radiators to reflect heat into the room; and
- Use shutters for windows and/or thicker curtains that do not drape over radiators.

Energy efficient lighting

- 4.7 In most homes lighting accounts for 20% of the electricity bill. It is easy to cut waste by simply turning off lights and adjusting blinds and curtains to let in more natural light. When lighting a room, always use energy saving light bulbs.

Windows

- 4.8 Windows let light and heat into your home, but they can also let a lot of heat out when temperatures are colder outside than inside. If you are replacing windows or building an extension, thermally efficient glazed windows will provide more effective insulation than older windows. Double glazed panels can now be fitted into some original wooden frames, without the need to replace the whole frame. This helps preserve the historic character of the building.

- 4.9 The use of PVCu windows is not considered to be acceptable in historic buildings, conservation areas and listed buildings as this material detracts from their historic significance and the architectural qualities of historic buildings and places. See below for more information on listed buildings and conservation areas.



- 4.10 There is a range of simple measures which can improve the energy efficiency of windows. These include:

- General repair and maintenance – which can substantially improve the energy efficiency of windows, as much of the heat lost through windows is through leaks and cracks.

- Installation of draught seals – which can help to further eliminate cold draughts and leaks.
- Secondary glazing – adding a second sheet of glass or plastic to a window frame can improve sound-proofing as well as energy efficiency. If carefully designed it can be unobtrusive and appropriate in a listed property or one within a conservation area.
- Secondary protection - e.g. shutters or heavy curtains, although these are predominantly a night-time option.

Insulation

- Loft insulation - Your home may already have some loft insulation, but if the material is thin it will not be saving as much energy and money as it could. Fitting proper loft insulation is the most cost-effective way of saving energy. As a guide, your loft insulation should be around 250mm thick to be effective.
- Floor insulation - If you have any gaps between your floorboards and skirting boards, you can reduce heat loss by sealing them with a regular tube sealant, like the silicon sealant used around the bath. It is also very useful to insulate underneath the floorboards at ground floor level.
- Cavity wall insulation involves filling the gap between the bricks with insulating material. It can reduce heat loss by up to 60%. Most homes built after 1930 will have a cavity that could be insulated
- Solid wall insulation (internal or external) – buildings constructed before 1930 almost always have solid wall construction. The only way to insulate solid walls is to add insulation to the inside or outside of the wall. External insulation involves adding a decorative weather-proof insulating treatment to the outside of your wall while internal insulation involves attaching insulating plaster board laminates or wooden battens in-filled with insulation to the inside of the wall. Generally 100mm of insulation is required to be effective. Solid wall insulation, whether internal or external, will require relocation of the services attached to the wall e.g. radiators, electrical sockets, drainpipes.

Heating and hot water

- New boiler - Replacing an old boiler (more than 10 years old) with a high efficiency condensing boiler and heating controls to provide heating and hot water could significantly cut energy consumption.
- New/upgraded central heating – If you install a new boiler the rest of your central heating system may need upgrading, for example large, old radiators could be replaced with smaller, more efficient radiators that are better suited to the new boiler
- Upgrading heating controls - You can install heating controls that allow you to control the temperature in different parts of your building. These can be included as an electronic timer control for your boiler, room thermostats for your main living area and thermostatic valves on all your radiators.

- Insulating hot water pipes and your hot water tank will retain hot water for longer, and save money on heating it.

- 4.11 See the Council's website for further information for householders on various retro-fitting measures and whether permission is required.

Generating your own energy

- 4.12 Buildings can also reduce their energy consumption by generating their own energy in the form of heat or electricity using low carbon and renewable technologies which use little or no energy. See section 6 of this guidance on renewable energy for more advice on the technologies that are available and appropriate in Camden.

CASE STUDY

Renovated Victorian Eco-home: A semi-detached Victorian house in one of Camden's conservation areas was transformed in 2007, reducing its carbon footprint by 60%. Works undertaken to improve energy efficiency included:

- internal solid wall insulation;
- a new fully insulated roof;
- underfloor insulation;
- double glazing; and
- draught proofing.

Heat is provided by an efficient condensing boiler complemented by solar hot water panels on the rear extension; power to the panels' water pumps is provided by solar panels. Other improvements include an upgraded ventilation system with heat recovery, water saving features (e.g. rainwater harvesting for garden irrigation, dual flush toilets), low energy lighting and energy monitoring.

For further information on this property and improvements to other properties of a similar age see www.sd-commission.org.uk



What if my building is historic, Listed or in a conservation area?

- 4.13 Historic buildings have special features that need to be conserved and therefore need to be treated sensitively. This section explains how energy efficiency improvements can be achieved without causing harm to the historic environment.
- 4.14 Reflecting the special qualities of historic buildings, additional consents may be required for statutorily designated buildings (listed buildings, or those in conservation areas). The Council's website has more detailed guidance on what types of permission are required. The Council will aim to balance the conservation of fuel and power against the need to conserve the fabric of the building.

- 4.15 Historic buildings can perform well in terms of energy efficiency. When looking to install high energy efficiency measures, however, it is essential to ensure that works do not compromise the character and significance of the building or area.
- 4.16 In order to identify the most appropriate measures, we recommend taking the following approach, which takes into account measures best suited to individual buildings and households (i.e. taking human behaviour into consideration as well as the building envelope and services):
- Assess the heritage values of the building;
 - Assess the condition of the building fabric and building services;
 - Assess the effectiveness and value for money of measures to improve energy performance;
 - Assess their impact on heritage values; and
 - Assess the technical risks.
- 4.17 A range of thermal efficiency measures can then be implemented, which avoid harm to the historic environment. Ranked according to their impact on heritage and the technical risks, these include:
1. Ensure that the building is in a good state of repair
 2. Minor interventions - upgrade the easier and non-contentious elements:
 - insulate roof spaces and suspended floors;
 - provide flue dampers - (close in winter, open in summer);
 - use curtains, blinds and window shutters;
 - provide energy efficient lighting and appliances
 - draught-seal doors and windows;
 - provide hot water tank and pipe insulation.
 3. Moderate interventions - upgrade vulnerable elements:
 - install secondary (or double) glazing (if practicable);
 4. Upgrade building services and give advice to building users on managing them efficiently:
 - install high-efficiency boiler and heating controls;
 - install smart metering;
 - install solar panels, where not visible from the street or public spaces.
 5. Major interventions - upgrade more difficult and contentious elements (where impact on heritage values and level of technical risk shown to be acceptable)
 - provide solid wall insulation.
- 4.18 When considering refurbishment, it is the owner's responsibility to ensure that any work does not cause unlawful or unnecessary damage to the building.

- 4.19 The Energy Savings Trust and English Heritage have published detailed guidance on refurbishing and improving the efficiency of historic buildings. See the Further Information section below for details of where to find these guides.
- 4.20 Before carrying out any work, find out if your property is listed, in a conservation area or subject to any other planning restrictions such as an Article 4 Direction. Then check if any of the proposed works require consent – such as listed building consent, planning permission or conservation area consent. See CPG1 Design for more information on Camden's historic buildings. The Council's website also provides detailed information on these matters.

Article 4 Direction

Removes the permitted development rights awarded to properties by legislation and means a planning application has to be made for minor works that usually do not need permission.

Further information

Energy efficiency in existing buildings:

The Energy Saving Trust	<p>A national agency promoting energy efficiency in the domestic sector. For information on home energy efficiency measures including grants, visit their website: www.energysavingtrust.org.uk</p> <p>The Energy Saving Trust also provides technical guidance on energy efficiency in the Publications and Case Studies section of their website.</p> <p>www.est.org.uk/housingbuildings/publications</p> <p>Recommended Best Practice in Housing technical guidance documents:</p> <ul style="list-style-type: none"> • CE120 - Energy Efficient Loft Extensions • CE122 - Energy Efficient Domestic Extensions
T-ZERO	<p>A free interactive web-based tool that allows you to identify the optimal low-carbon solutions for your home. Once you have inputted your home's details, such as type of house/flat, amount of insulation in roof/walls and whether or not you have double glazing, the system identifies a tailored list of optimal insulation, heating, and renewable energy options (and the costs of each).</p> <p>www.tzero.org.uk</p>
GreenSpec	<p>Provides details of products and how they can be used to improve the efficiency of your home or building</p> <p>www.greenspec.co.uk</p>
The Planning Portal	<p>Provides information on what alterations you can make to your home without requiring planning permission</p> <p>www.planningportal.gov.uk</p>

Energy efficiency in historic buildings:

English Heritage	<p>English Heritage, the UK government's adviser on the historic environment, has produced the following guidance:</p> <ul style="list-style-type: none"> • A Guide to Energy Conservation in Traditional Buildings, which looks at a range of improvements that can be made to reduce the heat lost through a building's walls, windows, floor and roof. This guide is one of a series looking at reducing energy consumption in traditionally constructed homes. http://www.english-heritage.org.uk/publications/energy-conservation-in-traditional-buildings/ • Meeting building regulations Part L in existing buildings. The purpose of the guidance is to help prevent conflicts between the requirements of the regulations and the conservation of historic and traditionally constructed buildings. http://www.english-heritage.org.uk/publications/energy-efficiency-historic-buildings-partl/ • saving energy in historic buildings at www.climatechangeandyourhome.org.uk which includes very detailed information about a wide range of improvements, e.g. insulating solid walls.
The Energy Saving Trust	<p>Provides technical guidance on energy efficiency in the Publications and Case Studies section of their website. www.est.org.uk/housingbuildings/publications</p> <p>This includes their Recommended Best Practice in Housing technical guidance documents: CE138 - Energy Efficient Historic Homes</p>
The Victorian Society	<p>Has information on their website on greening Victorian homes - www.victoriansociety.org.uk/advice/greening</p>
Building Conservation	<p>Provides a directory of useful contacts, grant sources and websites www.buildingconservation.com</p>
The Sustainable Development Commission	<p>Provides case studies of existing homes that have improved their energy efficiency, including the example detailed in this section. www.sd-commission.org.uk</p>

Appendix 1: Checklist for retro-fitting measures

Applies to all:

- changes of use
- conversions
- extensions over 30sq m

Please note that not all the measures will be appropriate for all buildings and some measures will require planning permission e.g. alterations to the front of a property

Measure	Specification	Evidence
Draught proofing		
Reflective radiator panels		
Overhauling/upgrading windows		
New boiler		
LED lighting		
Meters, timers, sensors, controls on heating or lighting		
Mechanical Ventilation with Heat Recovery		
Insulation		
Hot water tank & pipes		
Roof		
Walls Internal		
Walls External		
Floor		
Renewable energy technology		
Solar PV panels		
Solar thermal (hot water) panels		
Ground source heat pumps		
Double glazed windows / Secondary glazing		
Combined heat and power unit		
Green or brown roof		
Rainwater harvesting		
Other measures		
Join the Camden Climate Change Alliance (commercial only)		
Off-setting contribution £3,000		

7 Water efficiency

KEY MESSAGES

At least 50% of water consumed in homes and workplaces does not need to be of drinkable quality re-using water

All developments are to be water efficient

Developments over 10 units or 1000sq m should include grey water recycling

- 7.1 Core Strategy Policy CS13 protects the borough's existing water infrastructure to ensure we have an adequate water supply as well as adequate water storage and foul water capacity. Development Policy DP23 expects all developments to be designed to be water efficient and to minimise the need for further water infrastructure.

- 7.2 This section outlines what measures the council will expect to ensure developments reduce the consumption of water and reduce the amount of water that is disposed of.

WHAT DOES THE COUNCIL EXPECT?

The Council expects all developments to be designed to be water efficient by minimising water use and maximising the re-use of water. This includes new and existing buildings.

Minimising water use

- 7.3 The simplest way of doing this is through installing efficient water fittings and plumbing, such as
- dual flush toilets;
 - low flow taps and shower heads; and
 - low water consuming washing machines and dishwashers.
- 7.4 Your development will need to use a range of these measures to reduce their water consumption. Specifications should be practical for the intended occupier to ensure that fittings are not simply replaced.
- 7.5 Your development should include meters which are visible to occupants, as this has been shown to result in reductions in water use.
- 7.6 We will assess the performance of water minimisation measures used against the water category in BREEAM, EcoHomes or the Code for Sustainable Homes assessments (see section 8 on sustainability assessments for more information).

Maximising the re-use of water

- 7.7 At least 50% of water consumed in homes and workplaces does not need to be of drinkable quality. For example, rain water can be water

used for flushing toilets, washing laundry and watering plants and gardens.

Collecting rain water

- 7.8 This involves collecting rainwater from a building's roof, as well as its surroundings, and storing it in a tank. Once filtered of leaves and larger objects, the water can be re-used for toilet flushing, laundry and watering plants. If used outside, the rain water harvesting system can take the form of a simple water butt. If used within the building it will need to be supplied through pipes and taps that are separate from the standard mains water supply.



WHAT WILL THE COUNCIL EXPECT?

The Council will require buildings with gardens or landscaped areas that require regular maintenance to be fitted with water butts.

Green/brown roofs and collecting rain water

- 7.9 Green/brown roofs can be designed to include rain water collection. However, more consideration needs to be given to the materials and pipe work that will go underneath the green/brown roof structure. Green/brown roofs with rainwater harvesting may also need to use extra filters to ensure the water can be re-used. See section 10 for more information on green/brown roofs.

Re-using water

- 7.10 'Grey water' (water that has already been used in hand basins, baths and showers) can be stored, filtered and disinfected, and then reused, for toilet flushing, garden watering or laundry. It is also possible to recycle 'black water' (water used for toilet flushing and washing up) although this is more resource intensive. Both 'grey water' and 'black water' systems will require regular maintenance to ensure their ongoing quality and effectiveness. A separate standard mains supply will also always be needed in addition to provide drinking water.

The Council will require developments over 10 units or 1000sq m and/or intense water use developments, such as hotels, hostels, student housing etc to include a grey water harvesting system, unless the applicant demonstrates to the Council's satisfaction that this is not feasible.

- 7.11 When considering the feasibility of grey water systems applicants should consider
- The cost of the system;
 - Cost savings for owner/occupier over a 10 year period;

- Projected grey water generation;
- Projected demand for use of grey water; and
- Water savings as a result of the grey water system.

Further information

The Environment Agency produces a range of guidance about how to conserve and reduce water consumption.

- Conserving Water in Buildings: Fact Sheets, Environment Agency,
- Greywater: An information guide, Environment Agency, 2008
- Harvesting rainwater for domestic uses, Environment Agency, 2008

They are all available on the EA website:

www.environmentagency.gov.uk

8 Sustainable use of materials

KEY MESSAGES

Reduce waste by firstly re-using your building, where this is not possible you should implement the waste hierarchy

The waste hierarchy prioritises the reduction, re-use and recycling of materials

Source your materials responsibly and ensure they are safe to health.

- 8.1 This guidance relates to Core Strategy policy CS13 - *Tackling climate change through promoting higher environmental standards* in design and construction. It encourages developments to be sustainable: through the choice of appropriate materials which will assist in minimising energy needs both during construction and occupation periods and by making efficient use of resources.
- 8.2 It also relates to Development Policy DP22 - *Promoting sustainable design and construction* which encourages developments to conserve energy and resources through the use of recycled and renewable buildings materials.
- 8.3 This guidance shows how you can minimise the use of resources through your choice of materials to limit the environmental impact of developments. You can achieve this by focusing on the sustainable (re)use of existing materials as far as possible before considering introducing new materials. There are 5 key measures:
1. Managing existing resources;
 2. Specifying materials using the Building Research Establishment's Green Guide to Specification;
 3. Ensuring that materials are responsibly sourced;
 4. Minimising the harmful effects of some materials on human health; and
 5. Ensuring that specified materials are robust and sensitive to the building type and age.

Managing existing resources

- 8.4 Most development sites have existing materials which can be re-used, recycled or obtained from nearby development sites. You should always look for options to sensitively re-use, refurbish, repair and convert buildings, rather than wholesale demolition (see Camden Development Policies paragraph 22.4). This will reduce the amount of resources used and will help reduce construction waste.
- 8.5 Where the retention of a building or part of a building is not possible, you should aim to tackle the quantity of waste produced - from the demolition phase through to the construction phase – through the use of the waste hierarchy.

WHAT WILL THE COUNCIL EXPECT?

All developments should aim for at least 10% of the total value of materials used to be derived from recycled and reused sources. This should relate to the WRAP Quick Wins assessments or equivalent as (highlighted in the waste hierarchy information section below). Special consideration will be given to heritage buildings and features to ensure that their historic and architectural features are preserved.

Major developments are anticipated to be able to achieve 15-20% of the total value of materials used to be derived from recycled and reused sources.

The Waste Hierarchy

8.6 The 'waste hierarchy' ranks the different ways in which waste can be treated so that it limits the amount of resources used and waste generated. You are to justify the use of (existing) resources and materials in your development through the implementation of the waste hierarchy below to minimise waste generated during the demolition and construction process.

Figure 8. The waste hierarchy



8.7 In line with the waste hierarchy, during the construction phase, our preferred approach is:

- 1. the use of reclaimed materials;
- 2. the use of materials with higher levels of recycled content; and
- 3. the use of new materials.

8.8 Similarly, in demolition you should:

- 1. prioritise the on site reuse of demolition materials;
- 2. recycle materials on site recycling, then off site recycling; and
- 3. the least preferred option - disposal to landfill.

Reduce

8.9 Reducing waste is the preferred option and at the top of the waste hierarchy – this means the Council prefers you prevent waste being produced in the first place rather than recycle or dispose waste that is

produced. You should focus on opportunities for waste reduction from the outset, at the earliest stages of design, as well as through better methods of purchasing and ways of working, for example by ordering the right amount of materials for the job.

8.10 Where demolition is necessary, you and your contractors are encouraged to:

- safely remove the most valuable or more contaminating materials and fittings for later re-use or processing before work commences.
- optimise the reuse and recycling of demolition materials - the Council strongly encourages the use of the Demolition Protocol where substantial demolition is proposed (over 1000 square meters). In general the protocol is a 'demolition waste audit' - a process that describes the percentage of the materials present on a site which can be reused/recycled (either in the development site or one nearby). For further detailed guidance on the Demolition Protocol (2003), refer to: Institute of Civil Engineers (ICE) and London Remade: www.londonremade.com
- You are to demonstrate that the most significant opportunities to increase the value of materials derived from recycled and reused content have been considered. A good way of achieving this aim at no additional construction cost is to use the Waste and Resources Action Programme (WRAP) by selecting the top ten WRAP Quick Wins or equivalent, and implement the good practice guidance highlighted: www.wrap.org.uk/construction/tools_and_guidance/index
- Building contractors are legally required to produce Site Waste Management Plans (SWMP) for all projects with an estimated construction cost of over £300,000. A Site Waste Management Plan provides a framework for managing waste in line with the hierarchy by identifying types and quantities of materials for re-use/recycling to reduce the amount of waste produced by construction projects. For further guidance see the WRAP NetWaste tool which has a site waste management plan function: www.wrap.org.uk/construction/tools_and_guidance/net_waste_tool
- The WRAP Quick Wins assessment can form part of a development's Site Waste Management Plan.
- Designing for deconstruction (rather than demolition) is strongly encouraged. Deconstruction is the dismantling of a structure in the reverse order in which it was constructed, which means that the materials that were put on last are removed first.
- From the outset, new buildings should be designed with the prospect of future deconstruction being implementable. This process will facilitate the segregation and extraction of materials that could be carefully removed intact during redevelopment, and then re-used/recycled wherever possible.
- You are encouraged to incorporate a 'material salvage phase', in which construction and surplus materials are recovered from the site. Additionally, materials should be segregated into categories, e.g.

timber waste, metal waste, concrete waste and general waste – to aid re-use or recycling.

- 8.11 Only once all the 'Reduce' options have been considered, should you consider the other waste options.

Re-use

- 8.12 Re-using materials (either onsite/off-site) is defined as putting resources/materials to an alternative use so that they are not wasted and disposed of. This can be done during the design, procurement and construction phases of a development by, for example:
- identifying and segregating materials already on site for re-use in the new development, such as:
 - bricks, concrete
 - internal features – historic fireplaces, timber floorboards, doors
 - metal frames, plastics, granite
 - sub-soil, top soil;
 - using the BRE Smart Waste www.smartwaste.co.uk management plan tool. This is an on line template contractors can use to input data on the amount and type of waste and have it sorted by the management tool;
 - making materials not reused on site available for reuse elsewhere. Consider the exchange/sale/donation of construction site materials to waste recovery businesses, such as: BRE Materials Information Exchange (www.bre.co.uk); Waste Alert North London's Waste Exchange service (www.wastewatch.org.uk), etc. These specialists can sort the waste materials into various types and then find businesses that can reuse/recycle them.

Recycling

- 8.13 Recycling materials (either onsite/off-site), is the preferable solution only when waste minimisation 'reduce' or reuse are not feasible. The recycling of materials enables them to be made into something new). Every opportunity should be taken to recycle materials, this can be done by, for example:
- identifying and segregating materials for recycling, such as:
 - metals and high value materials
 - timber, plasterboard, packaging
 - concrete crushed and re-used for concrete aggregate;
 - using the BRE Smart Waste www.smartwaste.co.uk, mentioned above
 - considering 'take-back' schemes with suppliers for materials and packaging. This where suppliers take back any materials not used as well as any packaging the materials are delivered in

- making materials not reused on site available for reuse elsewhere, as discussed above.

Disposal

8.14 Disposal is the least preferred waste management approach. Developers should only consider disposal of materials and waste after all of the above approaches have been carried out. Disposal generally involves burying the materials in a landfill or burning it at high temperatures in an incinerator. Where disposal is the only option for the materials developers should:

- identify materials that are contaminated and cannot be reused and arrange for their safe and legal disposal by the authorised waste management;
- remove all toxic and hazardous materials from a development site in accordance with any relevant legislation, unless they are integral to the structure or a feature to be retained, and any harm to environmental or public health should be mitigated;
- limit waste disposal to minimise the amount of land fill tax that needs to be paid.

Using the BRE Green Guide to Specification

- 8.15 You are encouraged to use the BRE Green Guide which provides guidance on how to make the best environmental choices when selecting construction materials and building components. The Green Guide ranks, materials and components on an A+ to E rating scale – where A+ represents the best environmental performance / least environmental impact, and E the worst environmental performance / most environmental impact.
- 8.16 In new-build and development projects with either - 500sq m of any floorspace or more or 5 dwellings or more - you should seek to achieve an area weighted average of A+ to B for the major building elements (roof, external walls, floor finishes, internal partitions and windows) in accordance with the BRE Green Guide to Specification. For further guidance see the sections on 'Code for Sustainable Homes, BREEAM and Ecohomes assessments' in section 9 of this guidance which sets out standards for developments to meet in the Materials category. For further guidance on BRE Green Guide to Specification: www.bre.co.uk

Responsible Sourcing

- 8.17 You should specify materials from suppliers who participate in responsible sourcing schemes such as the BRE BES 6001:2008 Responsible Sourcing Standard. All timber specified should be sourced from schemes supported by the Central Point of Expertise for Timber Procurement such as Forest Stewardship Council (FSC) accreditation (which ensures that the harvest of timber and non-timber products maintains the forest's ecology and its long-term viability). The use of

responsible sourcing can contribute towards attaining the BREEAM/Code credits but a clear audit trail will need to be provided to gain these credits. For further guidance on responsible sourcing of materials: <http://www.bre.co.uk/>

‘Healthy’ materials

- 8.18 The Council recommends the use of environmentally sensitive building (non-toxic) materials and avoiding the use of materials or products that produce VOC (volatile organic compounds and formaldehyde) which can affect human health. For current controls on VOC’s see the link below. The use of ‘healthy’ material options can contribute towards attaining the BREEAM/Code credits but a clear audit trail will need to be provided to gain these credits.

Historic materials

- 8.19 In projects that involve the refurbishment of heritage buildings (those built before 1919) or those in conservation areas, materials should be specified in line with the following hierarchy:
- Reclaimed materials should be matching and appropriate to the building type/area (original construction time/period) and sufficiently robust in their performance not to compromise building function;
 - Materials with a low environmental impact as determined by the BRE Green Guide to Specification subject to approval from Conservation Officers and provided those materials do not compromise the performance (thermal, structural or otherwise) of the existing building; and
 - When selecting insulation materials for older buildings, preference should be given to natural fibre based materials that prevent moisture retention in the building fabric.

How will the Council secure the sustainable use of materials?

Design and Access Statement

- 8.20 As part of the Design and Access Statement for your development, you will be expected to describe how the development has considered materials and resources. This statement should provide an explanation of the opportunities for the selection and sourcing of sustainable materials that have been considered in the proposal, and the reasons for the sourcing choices made. Your statement should also detail which existing materials on the site are to be re-used as part of your development or made available for re-use elsewhere.

Construction Management Plan (CMP)

- 8.21 A Construction Management Plan will be required to support many developments and will help manage on site impact arising from demolition and construction processes. The types of schemes where a CMP will usually be appropriate include:

- major developments;
- basement developments;
- developments involving listed buildings or adjacent to listed buildings; and
- For a full list see Development Policy DP26 - *Managing the impact of development on occupiers and neighbours*, paragraph 26.10 and the section on Construction management plans in CPG6 Amenity.

Site Waste Management Plan (SWMP)

- 8.22 Where a 'site waste management plan' (SWMP) is required (in projects with an estimated construction cost of over £300,000) it should include a pre-demolition audit of materials completed by a qualified professional and submitted with an application, in accordance with the Demolition Protocol. The audit must show what materials can and will be reused. If a full audit cannot be provided with the application, it should be submitted to and approved by the Council prior to commencement of works on site. Therefore the Construction Management Plan (where required) will have to reflect that space will be required to sort, store and perhaps crush/recycle materials as part of the SWMP. This link into the WRAP NetWaste tool has a site waste management plan function: www.wrap.org.uk/construction/tools_and_guidance/net_waste_tool

Planning obligations and Section 106

- 8.23 Meeting the requirements for sustainable design and construction is often achieved in the detailed design or construction phases. Normally, requirements for environmental design will be dealt with using conditions, but in some circumstances a Section 106 agreement may be required to secure an environmental assessment of the proposed development carried out by an impartial assessment body or a sustainability plan to provide and maintain the highest environmental standards of development.
- 8.24 If a proposal generates a requirement for a management plan such as a SWMP or CMP (as discussed above) but cannot be implemented through the approved design or satisfactorily secured through conditions, they may be secured as part of a Section 106 Agreement. The requirements will be relevant, proportionate and related to the specific nature and potential impacts of the development proposed.

Further information

Sustainable Design and Construction	The London Plan Supplementary Planning Guidance, Mayor of London www.london.gov.uk
BREEAM	(BRE Environmental Assessment Method) and The Code for Sustainable Homes www.breeam.org
BRE Smart Waste	An on-line site waste management plan tool. It's a template contractors can use to input data. www.smartwaste.co.uk
Materials	<p>For Materials Information Exchange and Architectural salvage and surplus building materials:</p> <ul style="list-style-type: none"> • Architrader - www.architrader.com • SALVO - www.salvomie.co.uk/ • Waste Exchange - www.wasteexchange.net <p>To find out how you can use more recycled and reclaimed products and building materials see www.ecoconstruction.org. There is a searchable database of available products on this website with information about the manufacturing processes of the products and their compositions, as well as contact details of suppliers.</p> <p>Design for deconstruction – principles of design to facilitate reuse and recycling, B Addis (2003) CIRIA Best Practice Guidance C607.</p>
Volatile Organic Compounds	<p>For current controls on avoiding VOCs and using healthy materials, see:</p> <p>British Standard (BS) regulates UFFI quality, limits the product's use and limits ingress of formaldehyde vapour into buildings (BS: 5617, 5618 (1985)).</p> <p>A BS Institution standard (BS 5669 part I (1989), BS 1142 (1989)) regulates the formaldehyde content, together with test methods that must be used to assess formaldehyde levels in particle boards and fibreboards.</p>

10 Brown roofs, green roofs and green walls

KEY MESSAGES

All developments should incorporate green and brown roofs

The appropriate roof or wall will depend on the development, the location and other specific factors

Specific information needs to be submitted with applications for green/brown roofs and walls

- 10.1 As development densities increase, brown roofs, green roofs and green walls can provide valuable amenity space, create habitats and store or slow down the rate of rain water run-off, helping to reduce the risk of flooding.
- 10.2 Green and brown roofs can help to reduce temperatures in urban environments. This is particularly valuable in Camden where we suffer from increased temperatures in Central London (known as the urban heat island effect).
- 10.3 Development Policy DP22 states that schemes must incorporate green or brown roofs and green walls wherever suitable. Due to the number of environmental benefits provided by green and brown roofs and green walls, where they have not be designed into a development the Council will require developers to justify why the provision of a green or brown roof or green wall is not possible or suitable.

WHAT WILL THE COUNCIL EXPECT?

The Council will expect all developments to incorporate brown roofs, green roofs and green walls unless it is demonstrated this is not possible or appropriate. This includes new and existing buildings. Special consideration will be given to historic buildings to ensure historic and architectural features are preserved.

What are green and brown roofs?

- 10.4 Green and brown roofs are roofs that are specially designed and constructed to be waterproof and covered with material to encourage wildlife and to help plants grow. They can be left without planting - 'brown' or planted with a range of vegetation - 'green' depending on the depth or the soil or substrate.

Substrate

Substrate is a layer of material which supports the roots and sustains the growth of vegetation.

There are three main types of green and brown roof:

1. Intensive roofs

- 2. Semi intensive roofs
- 3. Extensive roofs.

The general features of these roofs are shown below:

	Extensive	Semi Intensive	Intensive
Use	Ecological Landscape	Garden/Ecological Landscape	Garden/Park
Type of vegetation	Mosses, Herbs, Grasses	Grasses-Herbs-Shrubs	Lawn, Perennials, Shrubs & Trees
Depth of Substrate	60-200mm	120-250mm	140-400mm
Weight	60-150 kg/m2	120-200 kg/m2	180-500 kg/m2
Maintenance requirement	Low	Periodic	High

Intensive roofs

- 10.5
- Intensive roofs provide the widest range of uses such as for accessible amenity space or to create ecological habitats. They are known as ‘intensive’ due to the high level of design, soil or substrate depth and maintenance that they require. They can also be used to manage water by including systems that process wastewater or store surplus rain water. They can also be designed specifically for food production.

Semi Intensive roofs

- 10.6
- Semi Intensive Roofs can provide a degree of access and the potential for the creation of habitat. Similar water management functions can be integrated into their design as outlined above.

Extensive roofs

- 10.7
- Extensive Roofs are generally light weight, with a thin layer of substrate and vegetations. They can be further sub divided into 3 types:

1. Sedum Roofs:

These either take the form of Sedum mats or plug planted Sedum into a porous crushed brick material. Sedum roofs are relatively light weight and demand low levels of maintenance. They can be more readily fitted on to existing roofs.

Sedum

Sedum is a type of vegetation. They are generally short plants with shallow roots and thick leaves.

2. Brown roofs for biodiversity:

Brown roofs should create habitats mimicking local brownfield sites by using materials such as crushed brick or concrete reclaimed from the site. However, these materials are very heavy and cannot hold water for irrigation. Therefore it is preferable to use materials of known quality and water holding capacity. The brown roof is then planted with an appropriate wild flower mix or left to colonise naturally with areas of dead wood or perches for birds.

3. Green roofs for biodiversity:

Green roofs are usually formed by planting a wild flower mix on an appropriate layer of material. There are various techniques for the creation of this type of roof.

What are green walls?

- 10.8 Green Walls are walls or structures attached to walls where plants have been planted. Plants can be planted directly into a material within the wall or can be planted in the ground or a pot and encouraged to climb up a structure so that the wall is covered with vegetation.

Green walls provide a number of benefits:

- They provide useful habitat for invertebrates which in themselves provide a food source for birds and bats. Dense foliage provides nesting sites for a number of birds such as robin, wren and blackbirds
- evergreen, climbing plants provide insulation and can reduce wind chill during winter months
- climbing plants provide shade which can help to cool a building in summer, particularly when grown on south and western facing walls.
- climbing plants can also be effective in trapping airborne pollutants
- provide visual interest adding colour and texture to the wall surface



Green wall can be split into 3 main types:

1. Self clinging climbers such as Ivy, Russian Vine and Virginia Creeper. These plants are able to grow directly onto the wall surface.
2. Climbers which need support e.g. Honeysuckle and Jasmine. Supports are usually provided by trellis structures, wires etc. Well designed trellis or cable structures can become design features in themselves.

3. Vertical Systems (also known as Living Walls, Vertical Gardens). These walls are called 'systems' as they are made up of modular panels designed to support plant growth and require a feeding and watering system. The modules themselves are supported on or within a steel framework. Watering systems and a plant nutrient supply is incorporated into these systems requiring ongoing maintenance. The planted panels can be designed with a variety of plants depending on the aesthetic and habitat requirements of a project.

What to consider when choosing green roof or brown roof or green wall

- 10.9 Selecting the appropriate type of green/brown roof or wall type will depend on a number of factors including:
- the type of building
 - cost
 - maintenance
 - weight of the roof or wall
 - provision of amenity space
 - provide visual interest to surrounding building occupants
 - habitat creation
 - reduction of rain water run off
 - reduction of heating and cooling energy usage of a building
 - water conservation and recycling
 - space for food production (see section 14 of this guidance on urban food production).

What will the Council consider when assessing applications?

- 10.10 All developments should aim to incorporate green or brown roofs and green walls. Careful consideration needs to be given to the design of the roofs and any blank walls to enable the incorporation of these features and the need to access these areas for maintenance.
- 10.11 The Council will expect green or brown roofs and green walls to be provided in areas with low levels of vegetation, such as town centres and Central London, which are both more likely to feel the effects of climate change and developments where occupiers will be susceptible to overheating such as schools and offices. (See Camden Core Strategy policy CS15 - *Protecting and improving our parks and open spaces and encouraging biodiversity*).
- 10.12 The assessment of planning applications incorporating green/brown roofs and green walls will be made based on appropriateness for the site, the degree to which the chosen design objectives are met by the proposal and sustainable maintenance. Where green roofs are to be accessible for amenity purposes potential overlooking and loss of

privacy to adjoining properties will also be assessed (See the Overlooking, privacy and outlook section of the CPG6 Amenity)

- 10.13 The most appropriate green or brown roof and green wall should be incorporated into a development. We will consider the following factors when determining the most appropriate form of roof and wall:

- the loss of any biodiversity habitat on the site and the surrounding area;
- the existing need for habitat on the site and surrounding area;
- whether the site is overlooked;
- whether the site is an area that has historically suffered from surface water flooding;
- the amount of external heat generated by the development;
- whether the roof is to be accessible;
- the location of mechanical plant;
- the inclusion of areas of blank wall;
- access to walls and roofs;
- where being retro-fitted, the weight of the new roof or wall; and
- the amount of irrigation and maintenance required.

WHAT INFORMATION WILL THE COUNCIL EXPECT?

- a statement of the design objectives for the green or brown roof or green wall
- details of its construction and the materials used, including a section at a scale of 1:20
- planting details, including details of the planting technique, plant varieties and planting sizes and densities.
- a management plan detailed how the structure and planting will be maintained

Further information

The Environment Agency	The EA has a green roof toolkit that can be used to help you determine what solution is best for your development www.environment-agency.gov.uk/business/sectors/91967.aspx
“Living Roofs: Promoting green roofs, roof terraces and roof gardens across London”	GLA document which highlights the significant role that the roof space on buildings have to play in providing amenity space, increased biodiversity and improved building performance in terms of energy conservation and SUDS.
LivingRoofs.org	Provides detailed information on all the types of green and brown roofs as well as case studies, articles and research. www.LivingRoofs.org
National Centre of Excellence for green roofs	This website has a wide range of information on green roofs, including best practice, guidance, research and case studies. www.greenroofcentre.co.uk