June 2006

Quality Design - West Berkshire
Supplementary Planning Document

Part 4
Sustainable Design Techniques

Local Development Framework

West Berkshire Council

PART 4

Contents

Sustainable Design Techniques

1.1 Introduction

1.1.1 This document comprises the fourth of several publications which form the West Berkshire Council (WBC) design guide series "Quality Design - West Berkshire". Together the series forms a Supplementary Planning Document (SPD) which supports policies in the Berkshire Structure Plan 2001 – 2016 and West Berkshire District Local Plan 1991 - 2006. **As such, it is a 'material consideration' in determining planning applications and if not followed, may lead to the refusal of planning permission.** It is intended that in the future this SPD series will also support relevant policies in WBC's Development Plan Documents. It also complements other existing Supplementary Planning Guidance (SPGs) and SPDs, including any site specific development briefs which may be produced in the future.

1.1.2 This section "Sustainable Design Techniques" provides a range of methods, techniques and technologies as examples of solutions to sustainable building design for all developments which should be incorporated into new build. Its purpose is to assist in maximising the opportunity for developments to be energy and resource efficient.

1.2 Renewable Energy and Energy Conservation Overview

1.2.1 The continual production of greenhouse gases, in particular carbon dioxide, is recognised to contribute to the increasing rate of climate change. Under the Kyoto Protocol, the UK has committed to a 12.5% reduction in greenhouse gas emissions below 1990 levels by 2012. At the national level the Energy White Paper sets a target of generating 20% of UK energy by renewable technologies by 2020.

1.2.2 PPS22: Renewable Energy, 2004 sets out the Government's national policies for the use of renewable energy within development proposals. Local planning authorities and developers should consider the opportunity for incorporating renewable energy into all new developments and the emerging South East Plan, the Structure Plan policy EN8 and Local Plan policies OVS.9 and 10 promote these principles.

The guidance seeks to promote sustainable design within new development

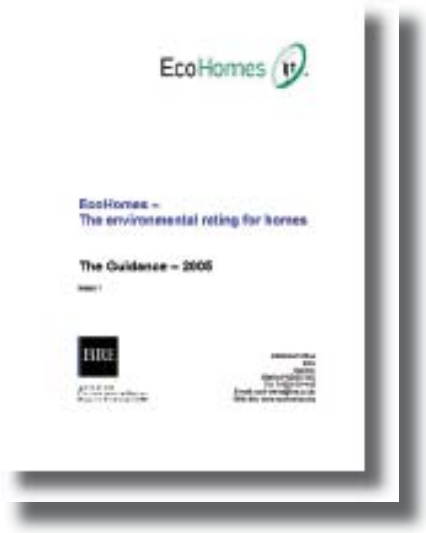
Energy efficiency is at the forefront of Government policy and many flagship developments incorporate sustainable design principles...

The challenge now, is to incorporate these principles into every day building design

Courtyard development, incorporating landscaping can assist energy efficiency

Design features such as large windows contribute to solar gain

Holistic energy efficient construction, Primary School, Millennium Community



BREEAM's EcoHomes Guidance 2005

1.2.3 PPS22 states that "Renewable energy covers those energy flows that occur naturally and repeatedly in the environment – from the wind, the fall of water, the movement of the oceans, from the sun and also from biomass". To successfully introduce renewable technologies, PPS22 recognises that this will involve the "installation of different kinds of schemes in different contexts, from rural areas to densely populated areas, market towns and suburban streets".

1.2.4 The Draft South East Plan encourages the use of SPD's to promote development design for energy efficiency and renewable energy. Policy EN1 encourages the provision of at least 10% of the development's energy demand from renewable sources, and for all new developments, where appropriate, to achieve high energy efficiency ratings through the use of best practice schemes such as BREEAM.

1.2.5 Structure Plan policy EN8 promotes energy efficiency and conservation in the design, layout and orientation of new development. Energy generation from renewable resources, such as electricity and heat, should be considered and implemented where feasible, providing that adverse impacts on landscape, biodiversity and local amenity are avoided.

1.2.6 Policy EN8 states that "1. All forms of development will maximise the opportunity to incorporate current best practice in energy efficiency and energy conservation into their design, layout and orientation. 2. Generation of energy from renewable resources should be considered, and implemented wherever feasible, in all development proposals, provided that adverse impacts on the landscape, biodiversity and local amenity are avoided. 3. Development proposals for the generation of electricity and heat from renewable sources will be encouraged, provided that adverse impacts on landscape, biodiversity and local amenity are avoided."

1.2.7 All proposals should satisfy Structure Plan policy EN8, which this SPD and the West Berkshire Planning Strategy support, and failure to do so may lead to the refusal of planning permission.

1.2.8 Local Plan policy OVS9 permits proposals for renewable energy schemes, as long as landscaping, open countryside and sites of nature conservation interest are protected, there is no environmental nuisance or pollution, and that access, road safety, public footpaths / rights of way and residential amenity are respected.

1.2.9 Local Plan policy OVS10 seeks for new development to maximise solar (or natural) heating, lighting and ventilation through siting, form, orientation and layout; use soft landscaping to increase shading and reduce heat loss in winter; and use energy efficient technology for heating, power and lighting.

Sedum roof on house in Harlow

1.2.10 In order to comply with the requirements of the above policies, developers will be expected to demonstrate how the development has regard for energy and resource efficiency with reference to the guidance set out below. Any new major development should be accompanied by an Energy and Resource Impact Statement, explaining these principles. For smaller proposals aspects of this statement should be addressed in the supporting statement submitted with the planning application.

1.2.11 The form, location and density of homes, businesses and communities play a major role in determining the energy demand of the development and their uses. It is important to consider these aspects of development at the design stage in relation to energy demand. Both large and small scale projects can provide valuable contribution to overall outputs of renewable energy and to meet energy needs both locally and nationally. Technology such as solar panels, biomass heating, small scale wind turbines, photovoltaic cells and combined heat and power should be incorporated into developments.

Green Roof on house at BedZed

BREEAM/EcoHomes rating (or equivalent) of at least **"Excellent"** should be achieved on all sites (1).

1.3 Sustainable Urban Drainage Systems (SUDS)

1.3.1 New development should consider SUDS as an element of drainage infrastructure as well as for leisure, visual amenity and wildlife benefits, to manage surface water runoff. There are numerous benefits to the development and environment from the inclusion of SUDS and proposals will be expected to incorporate these. SUDS should be used to mimic the natural pattern of drainage and can be designed into most urban and rural settings, ranging from hard-surfaced areas to soft landscaped features. They are used in conjunction with good management of the site, to prevent flooding and pollution. The management of drainage water incorporates a hierarchy of techniques which should be used in SUDS selection, these are:

Landscaped verges incorporating SUDS

(1) In some locations an "excellent" rating may not be achievable due to remoteness from services. Developments involving extensions and conversions will not, at this time, be required to adhere to this standard

SUDS incorporated into new housing development

- **Source control** – to attenuate and remove pollutants from runoff close to the source. Simple measures which can be used in high density sites include directing roof, driveway and footpath runoff over grassed areas, or promoting sheet flow through grassed areas. Gravelled or porous car parking areas, roadside swales, filter strips, bio-retention devices and filter drains.

- **Site controls** – these are runoff and treatment controls that serve areas of approximately 2 to 5 hectares. The most common forms are swales, extended detention basins (some can take the form of sports pitches) which all have relatively low land take.

- **Regional control** – these serve multi-hectare drainage areas greater than 5 hectares and can be incorporated into public open space. These include extended basins, retention ponds and storm water wetlands. When source and site controls are used upstream, the size of the regional controls can be reduced, freeing additional land for other purposes.

1.3.2 A range of SUDS techniques is available:

- **Filter strips and swales** – these are landscape features that are vegetated with smooth surfaces and a gentle slope downhill so that water can drain off impermeable surfaces

- **Permeable surfaces and filter drains** – these are permeable surfaces which allow run-off and rainwater to infiltrate down into permeable material below ground which stores the water prior to discharge.

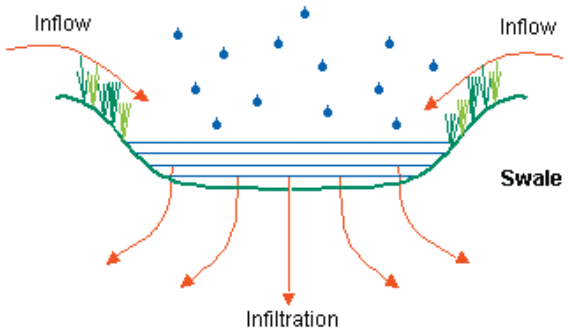
- **Infiltration devices** – these are surface structures of below-ground structures which drain water directly into the ground.

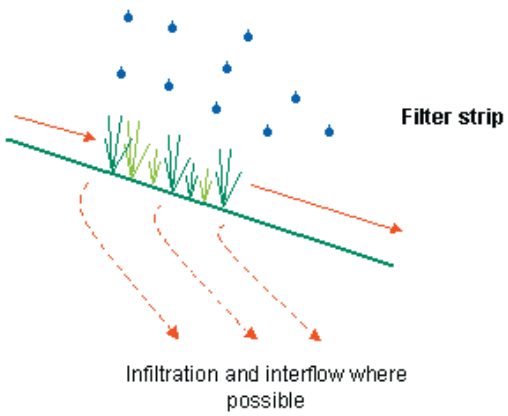
- **Basins and ponds** – these are structures which are designed to hold water when it rains. Ponds always contain water and have added capacity for rainwater. Basins are water free during dry weather. The design of basins and ponds should maximise the potential habitat creation for wildlife and to create an attractive landscape feature.

1.3.3 For housing developments examples of SUDS include specifying porous paving for all hard surfaces or the adoption of soakaways or other systems (including green roofs – which broadly speaking is a roof with plants growing on its surface) that reduce peak run-off loads. Porous paving should be installed as this will allow water to soak through the paving into natural water tables rather than direct collected rainwater into public sewers and watercourses. Care needs to be taken to ensure that the local conditions will permit these measures.

1.3.4 Run-off from roofs should be collected as part of a rainwater harvesting system into a local soakaway or other holding facility such as tanks, ponds, swales etc. Green roofs can also assist in this process. Rainwater run-off should also be stored for re-use as irrigation water or grey-water recycling (such as toilet flushing) – see section 1.5 for further information.
(Ref: www.ciria.org.uk/suds) (Ref: BRE EcoHomes – The environmental rating for homes, 2005; Pol 3 Reduction of Surface Runoff. Available to view at www.ecohomes.org)

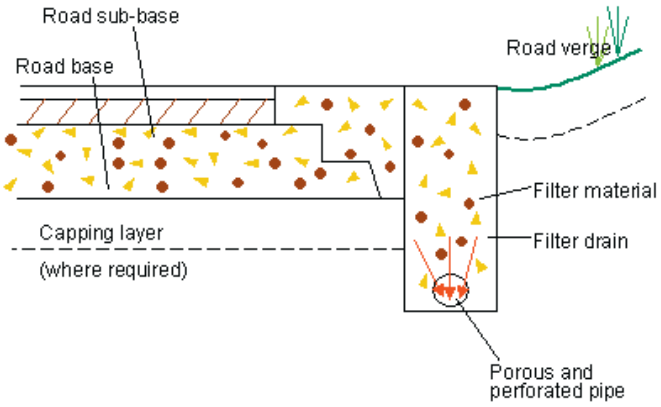
1.3.5 The Council recommends that the advice of the Environment Agency is sought on SUDS. Further information is available from their website: www.environment-agency.gov.uk. Information on the current Indicative Floodplain Map for West Berkshire can also be viewed here.



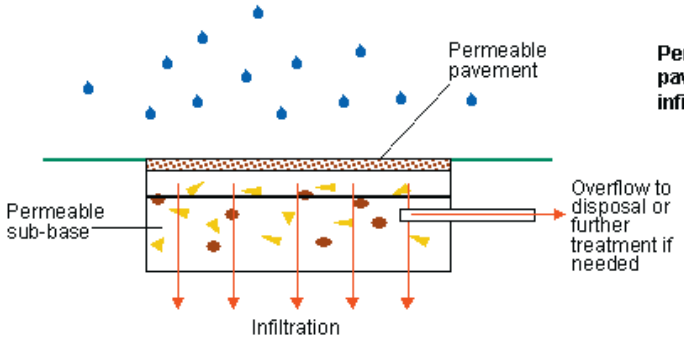


Filter strips and swales are vegetated surface features that drain water evenly off impermeable areas. Swales are long shallow channels whilst filter strips are gently sloping areas of ground

Source:
www.ciria.org.uk/suds/suds_techniques.htm



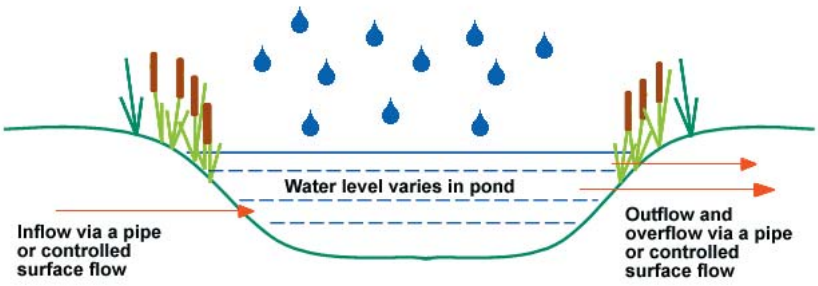
Cross-section through a filter drain



Permeable pavement used for infiltration

Filter drains and permeable surfaces are devices that have a volume of permeable material below ground to store surface water. Runoff flows to this storage area via a permeable surface. This can include:

Grass (if the area will not be trafficked)
Reinforced grass
Gravelled areas
Solid paving blocks with large vertical holes filled with soil or gravel
Solid paving blocks with gaps between the individual units
Porous paving blocks with a system of voids within the unit
Continuous surfaces with an inherent system of voids



Basins are areas for storage of surface runoff that are free from water under dry weather flow conditions. These structures include:

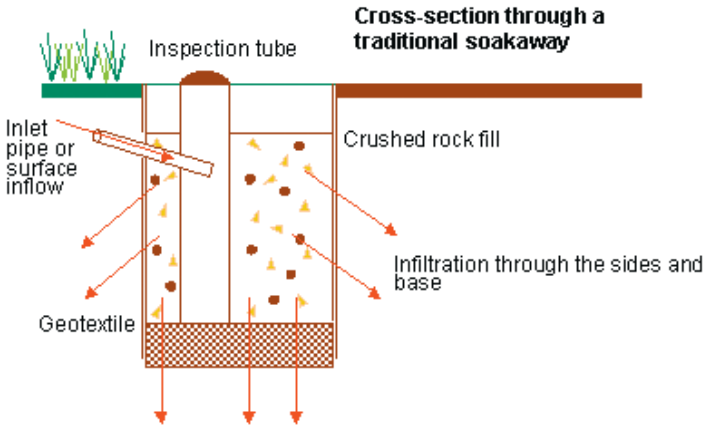
Flood plains
Detention basins
Extended detention basins

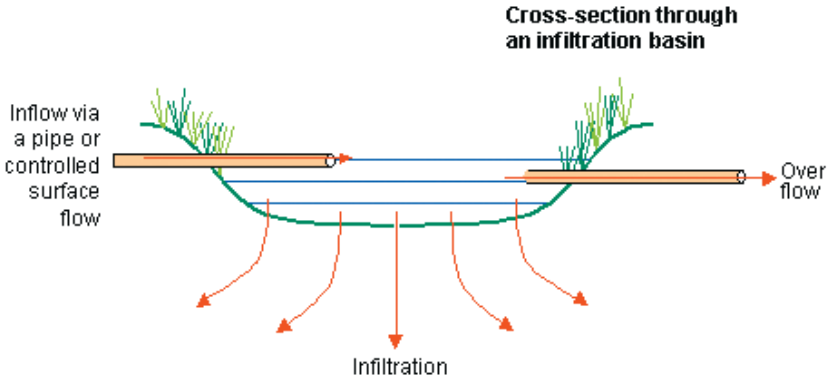
Ponds contain water in dry weather, and are designed to hold more when it rains. They include:

Balancing and attenuation ponds
Flood storage reservoirs
Lagoons
Retention ponds
Wetlands

The structures can even be mixed, including both a permanently wet area for wildlife or treatment of the runoff and an area that is usually dry to cater for flood attenuation. Basins and ponds tend to be found towards the end of the surface water management train, so are used if source control cannot be fully implemented, if extended treatment of the runoff is required or if they are required for wildlife or landscape reasons.

Source:
www.ciria.org.uk/suds/suds_techniques.htm





Source:
www.ciria.org.uk/suds/suds_techniques.htm

Infiltration devices drain water directly into the ground. They may be used at source or the runoff can be conveyed in a pipe or swale to the infiltration area. They include soakaways, infiltration trenches and infiltration basins as well as swales, filter drains and ponds. Infiltration devices can be integrated into and form part of the landscaped areas.

Soakaways and infiltration trenches are completely below ground, and water should not appear on the surface. Infiltration basins and swales for infiltration store water on the ground surface, but are dry except in periods of heavy rainfall.

Gardens can be designed to include opportunities for water recycling, rain water collection etc

Water can be a valuable resource for biodiversity, as well as recreation

Opportunities for biodiversity planned into urban development

Dual footpath / cycleway can assist in the movement of wildlife and act as green corridors

1.4 Biodiversity, Landscaping and Planting

1.4.1 The reuse of existing sites will help to slow down or stop the destruction of natural habitats and the wildlife they support, as well as preventing loss of greenfield land. However brownfield land can also have an important ecological value to the environment. New developments will be expected to demonstrate minimal damage to existing local ecology and where possible, to enhance it. Measures include;

- Ensuring that water courses are retained and enhanced;
- Minimise the loss of trees, hedgerows and landscaping. If removal is necessary then ensure that these features are replaced elsewhere. The use of native species encourages wildlife and can lead to cost savings through reduced maintenance;
- Ensuring that green corridors are retained, and where possible enhanced, or created;
- Ensuring that wildlife is encouraged (e.g. provision of trees or places for bird and bat boxes);
- Retention and creation of "wild" areas;
- Creating green roofs;
- The incorporation of Sustainable Urban Drainage Systems (see section 1.3) can create a good opportunity to increase biodiversity with habitat creation.
  (Ref: BRE EcoHomes – The environmental rating for homes, 2005; Eco 1 Ecological Value of Site and Eco 3 Protection of Ecological Features)

1.4.2 West Berkshire Council aims to encourage developers to make decisions on their developments which can be positive towards improving the local environment. A useful information booklet titled "Development Control – Biodiversity Planning Advice" has been produced to assist planning applicants on how the issues of biodiversity can be addressed in their planning application. (Available from the Council offices and on www.westberks.gov.uk)

1.4.3 Planting is a good way of increasing the year round usability of outdoor spaces such as gardens and terraces by providing wind breaks. However, care should be taken to ensure that planting does not obscure sunlight and shade potential solar collection areas.

1.4.4 The use of dual footpaths and cycleways passing through green spaces should be considered, linking wildlife corridors to hedgerows and waterways.

1.4.5 An ecological assessment will be expected for all major development proposals. Smaller proposals should address ecology in the statement submitted with the application. See part 1 for further information.

1.5 Greywater Re-use, Water Collection and Storage

1.5.1 Approximately 20% of domestic water is used for drinking and the preparation of food, with a third of water used for toilet flushing. Water use in the garden has been on the increase and this is likely to continue. Water is becoming an increasingly scarce resource as demand continues to increase dramatically and it is essential that groundwater quality and levels are protected when proposing new development. Developments should therefore demonstrate the inclusion of water conservation within the proposal. By integrating water conservation measures, rainwater harvesting and greywater re-use, a significant reduction in mains water consumption can be made.

Low flush toilets are one measure that can easily be incorporated into new housing development

1.5.2 **Water conservation measures** - There are many actions that can be taken to minimise water consumption and all should be considered when installing WCs, showers, taps, baths and white goods within new developments;

- Dual-flush and low-water-use WCs, water-saver showers, spray taps, low volume baths and low-water-use appliances;
- Wastewater recycling and rainwater harvesting for toilet flushing, washing machines, garden watering etc. (e.g. the installation of water butts is a simple and cheap rainwater harvesting measure);
- Avoidance of large water-using features (e.g. pools, hot tubs, etc), fed by mains water;
- Rainwater collector systems for watering gardens and landscaped areas. Rainwater downpipes should be located to enable the installation and use of water butts.

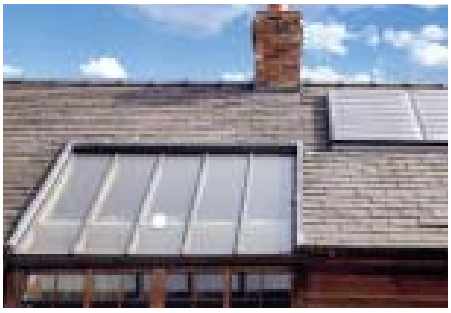
(Ref: BRE EcoHomes – The environmental rating for homes, 2005; Wat 1 Internal Water Use and Wat 2 – External Water Use)

Water recycling within commercial development

1.5.3 **Rainwater harvesting** – the simplest form of rainwater harvesting is the collection of rainwater in a water butt to be re-used for outdoor use. More advanced systems can provide water for several uses within the building such as toilet flushing and for the washing machine. Rainwater re-used for personal washing would require purification. The facilities for collection and re-use of rainwater can be incorporated into a new building relatively easily. Space for a storage tank would be required in the roof space or underground with appropriately located downpipes. Back-up from the mains supply should be provided.

Water conservation should be made easy around homes - integral water butt

Gardens can be designed to include opportunities for water recycling, rain water collection etc



Use of glass, courtyards and atria can assist PSD

Southerly facing windows and balconies promote solar gain

1.5.4 **Greywater re-use** – Greywater is the waste water from baths, showers and hand basins. Systems collect, clean and re-use greywater and can be incorporated within a single dwelling up to the scale of a whole development. The water is filtered, and with simple cleaning is usually clean enough for toilet flushing.

1.6 Passive Solar Design (PSD)

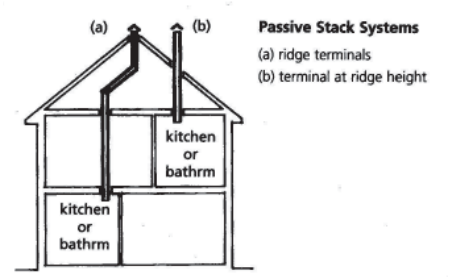
1.6.1 Natural climatic and environmental conditions should be considered holistically when planning new development. The main climatic influences on comfort are solar heat and air flow, which can influence the ability to maximise natural ventilation, lighting and heating. PPS22 includes "passive solar" as a renewable energy technology. Passive solar design uses the sun's heat to reduce the need for heating and sunlight to reduce the need for artificial lighting within a building. Large energy savings can therefore be made through the orientation, location of entrances, windows (and opening designs), use of open spaces, landscaping, height, depth, size and aspect of rooms. PSD is an opportunity to save energy for the whole lifetime of a building and can only really be considered at the design stage, generally at no extra cost. The primary objective for housing is to encapsulate the light and heat from the sun, whilst for commercial buildings where light is similarly important, the main purpose for PSD is to remove excess heat from periods of high solar gain to avoid the use of air conditioning.

1.6.2 There are many advantages for maximising natural daylight and sunlight into a building. Both make interiors look more attractive and interesting, provide light and are beneficial to health. Access to them also helps to make a building energy efficient through solar gain, reduces the need for electricity and can assist with heating systems. Passive solar gain is the maximising of heat generated by the sun into a building. The incorporation of passive solar design can result in an innovative building design. New development will be expected to consider the following;

- Living and working areas with larger windows facing south (or within 30 degrees of south), where the solar gain is greatest and rooms with increased width rather than depth to maximise solar gain. Locating rooms such as bathrooms, storage and stairs to the north side of a building;
- Locating taller buildings to the north of a site to maximise solar access and minimise overshadowing;
- Living areas with unobstructed lines of sunlight and daylight (e.g. ensuring that garages / fencing / trees / other buildings do not obstruct windows);
- Deciduous trees to block the high summer sun and reduce the chance of overheating, whilst in the winter the low sun will be able to provide solar gain through the branches;
- Maximising the use of double glazed glass as a building material (e.g. conservatories, atriums, glass porches, skylights, light wells, glass brick walls);
- Construction of a suitably pitched roof facing south for incorporation of solar panels or sky lights;
- Designing with nature such as shelter belts, shaded outdoor areas, high reflectivity external surfaces and maximising absorptive surfaces.
  (Ref: BRE EcoHomes – The environmental rating for homes, 2005; Hea 1 Daylighting)

Energy saving through building orientation

1.6.3 Outdoor space should also be considered in the orientation of buildings. Private outdoor space can be attractive, with benefits for health and well being, allowing occupants to sit outside, dry clothes and store garden equipment and should be located where an element of privacy is achieved. For houses and flats, outdoor space should be accessible only by occupants of designated units. Balconies and roof gardens / terraces should be considered where garden space is limited, although they should provide privacy and not restrict daylight into the building.
(Ref: BRE EcoHomes – The environmental rating for homes, 2005; Hea 3 Private Space)



Source: Environment Agency

Private gardens or secure, communal areas within apartment blocks allow for drying

Solar panelling on house roofs in Berkshire

1.7 Natural Ventilation

1.7.1 Ensuring that maximum use is made of natural ventilation can complement PSD and can be preferable to mechanical ventilation and air conditioning systems. Natural ventilation allows cool air to be drawn in at low levels, encouraging air to move upwards through the building and be ejected at a high level. Techniques include the installation of solar siphons, opening windows, roof or wall vents. Shaded balconies can also complement natural ventilation and provide access to the outside. The features can be used as positive architectural features.
(Ref: Sustainable Design and Construction: The London Plan (Spatial Development Strategy for Greater London) Supplementary Planning Guidance May 2006 – www.london.gov.uk)

1.7.2 Adequate space for drying should also be provided, either in a garden, balcony, or in an adequately ventilated room (such as a utility room), which can either be communal or private, within the development. If within the building, it should not be supplied with additional heating solely for the purposes of drying clothes.
(Ref: BRE EcoHomes – The environmental rating for homes, 2005; ENE 3 Drying Space)

1.8 Solar Electric (photovoltaics)

1.8.1 Photovoltaics (PV's) convert the sun's heat directly into electricity using a semi-conductor device. They are silent and can be mounted on the roof or in a free-standing modular form, or integrated into the roof or facades of buildings. Large buildings and public buildings are well suited to PV arrays as the buildings are occupied to capacity during sunlight hours where the energy output is greatest, and similarly with buildings that require air conditioning.

1.8.2 Whilst PV cells (and solar water heating cells) do not require direct sunlight for energy output, care must be taken to avoid overshadowing of the cells as this will reduce the amount of energy produced. The orientation and angle of the array affects the energy output, with the optimum output being achieved when the angle of the array matches the angle of the sun. For a fixed position array this would be south orientation with an angle of 20-40 degrees (depending on the altitude). Care needs to be given to visual impact and in built up areas the potential for nearby buildings to overshadow for large parts of the day. Consideration must be given to the potential impact of proposals on the character or appearance of the area, particularly those involving a listed building, conservation area or in the AONB. Consideration will also need to be given to the load capacity of the roof or structure of the building that the array is proposed to be mounted upon.

Photovoltaics

1.9 Solar Water Heating (solar thermal)

1.9.1 Solar water heating technology works in a similar way to photovoltaics, the difference being that PV produces electricity whereas solar water heating produces hot water. Solar water heating uses the sun's heat to heat water that can be used for either space heating or more commonly for hot water heating. Such systems are most commonly employed for domestic use, light industrial and agricultural use and for the heating of swimming pools. A good system should provide 50-60% of annual domestic hot water requirements, with most energy generated between May and September.

1.9.2 There are two main types of solar collectors. These are flat plate collectors and evacuated tube collectors. Both technologies work by an absorber collecting the radiation from the sun, which is then transferred as heat to a fluid. This fluid would either be water or a special liquid that boils when heated and condenses to transfer heat energy to water.

1.9.3 For guidance on siting, orientation and considerations please refer to section 1.8.

Biomass production

1.10 Biomass and Combined Heat and Power (CHP)

1.10.1 **Biomass** is the use of organic matter to produce energy. The fuels can be categorised as either wet or dry, in the form of crop residue, coppiced wood or animal waste and are virtually carbon-neutral. Such fuels are currently being produced from a range of plant types such as short rotation coppice willow, clean wood waste from industry (e.g. pallets), produce from forestry operations (e.g. branches, lop and top), as well as from used cooking oil.

1.10.2 Biomass fuels can be used for space heating, for hot water and in Combined Heat and Power (CHP) units. Consideration needs to be given to the space required for storage and delivery of the fuel. Improved insulation to the building can reduce the amount of energy needed for heating and therefore the amount of space needed for storage of the fuel.

1.10.3 **Combined Heat and Power (CHP)** is the production of electricity and useful heat from a single plant. A CHP system generates electricity in the same way as conventional electricity but the by-product of heat which is generated by this process is retained and used for heating, hot water and cooling.

1.10.4 CHP units can be used on a variety of scales, from plants for large settlements (community heating) to schools, to individual buildings (micro-CHP). CHP can typically reduce carbon dioxide emissions by 60%. This increases when combined with thermal storage and absorption cooling.

1.11 Wind

1.11.1 Wind turbines use the wind to generate mechanical power for electricity generation. There are essentially two types of turbine – vertical axis machines with rotors that rotate about a vertical axis, and horizontal axis (the most common) with the rotating shaft aligned horizontally. Turbines can range in size from small domestic turbines to large offshore turbines. The wind is not a constant source of power, therefore a back up system would be needed which would usually be the National electricity grid.

1.11.2 Wind velocity is a major factor in the location of wind turbines. Consideration will need to be given to wind speed and turbulence, and especially for larger turbines constraints such as radar stations, landscape designations and proximity to special wildlife areas or bird migration corridors. Proposals for wind turbines within the North Wessex Downs Area of Outstanding Natural Beauty should be informed by the study of 'Landscape Sensitivities and Constraints to Wind Turbine Development' (2005) (available from www.northwessexdowns.org.uk).

1.11.3 Opportunities should be investigated to incorporate micro-turbines which can be integrated within both urban and rural areas and are suited for dwellings, commercial premises, community facilities and schools. A range of micro-wind turbines exist; one example being the 'Wind Save' domestic, three bladed micro-wind turbine, which can generate 700 watts from a rooftop location (www.windsave.com). Other suppliers include Proven Energy (www.provenenergy.com), Renewable Devices (www.renewabledevices.com) and Eclectic Energy (www.eclectic-energy.co.uk).

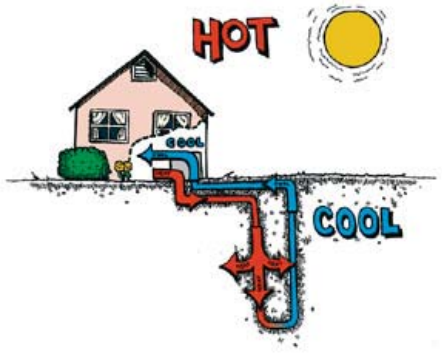
Wind energy turbines

1.11.4 For all proposed turbine development care should be taken to selecting the turbine type and location to take advantage of available wind, but also to avoid or minimise visual impact, particularly if the proposed turbine is to be located near a listed building or conservation area or other sensitive location. The views of the local community and planning authority should be sought at an early stage in the design process.

1.12 Ground Source Heat Pumps (GSHP)

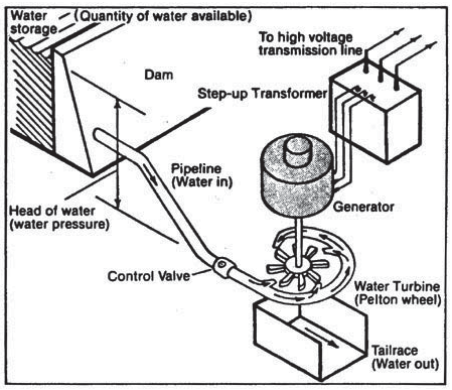
1.12.1 Ground source heat pumps harness the energy from the ground. Whilst air temperatures vary throughout the year, the temperature of the ground remains relatively stable. The technology can therefore be used for heating during the winter (the most efficient use being under floor heating) and cooling during the summer.

1.12.2 The system works in a similar way to a fridge. A heat exchanger (also known as 'ground loop' or 'ground coil') is laid in the ground, water passes around this system and 'absorbs' the heat from the ground, a heat pump then relays this heat into the building. The heat exchanger can either be a series of pipes driven deep into the ground, or pipes laid in a series of trenches at shallower depths. The heat pump converts the heat generated from the ground into a usable higher temperature for the building. Trench systems require a large area of ground, whilst borehole systems require access for drilling along with a geological survey and contact should be made with the Environment Agency to see whether a permit is required.



Ground source heat pump
Source: www.igshpa.okstate.edu

1.13 Micro/Small-scale Hydro



Micro hydro scheme
Source: Environment Agency

1.13.1 Hydroelectric technology captures the energy from flowing water. It works by using the flow of the water to turn a turbine which generates electricity. Small-scale hydro schemes commonly involve the construction of a dam and a reservoir, the controlled flow of the released water from the reservoir then turns the turbine. Micro-hydro harnesses the power from flowing water such as streams. Efficiencies are greatly reduced at head heights of less than three metres.

1.13.2 Consideration must be given to any adverse impact on wildlife, visual impacts and any land that could be flooded. Early discussions with the planning authority, the Environment Agency and other statutory consultees such as English Nature are essential.

1.14 Noise

1.14.1 The mitigation of noise, particularly in residential development needs to be carefully designed into new development. Soft landscaping has limited effect. However the appropriate use of measures such as noise insulation techniques, bunds and noise barriers can mitigate disturbance from noise. This will be particularly relevant where new development is located near to busy roads, railway lines or other noise generating infrastructure.

1.15 Materials Selection and Sustainable Construction Methods

1.15.1 Opportunities to construct new development using renewable and low impact resources should be taken. This should include the use of locally sourced materials and labour where possible. The reuse of excavated soils and construction waste within new development (e.g. for landscaped areas) should be considered and developers may be required to submit a Site Waste Management Plan alongside planning applications for larger proposals.

1.15.2 There are several sustainable building methods that can be used in new development, for instance;

- High levels of insulation to reduce winter heat loss and therefore energy demand and to help keep buildings cool in the summer;
- Specifying insulating materials, that avoid the use of ozone depleting substances and have a global warming potential (GWP) of less than 5, for roofs,

Sustainably sourced materials
Copyright Forestry Stewardship Council (www.fsc.org)

Locally resourced timber

walls, floors, hot water cylinders, pipe insulation and other thermal storage. (Ref: BRE EcoHomes – The environmental rating for homes, 2005; Pol 1 Insulant ODP and GWP);

- Renewable energy technologies such as solar photovoltaics, active solar thermals, wind turbines, micro-hydro, biomass heating, ground source heat pumps (provided they run on electricity generated from a renewable source), thermal moderation by ground or water sources, heat and /or electricity from a local community heating / CHP network (Ref: BRE EcoHomes – The environmental rating for homes, 2005; Pol 4 Zero Emission Energy Source);
- Encouraging timber products coming from responsibly managed forests, for timber frames, floor joists, roofs, walls, windows, doors etc (Ref: BRE EcoHomes – The environmental rating for homes, 2005; Mat 1 Timber: Basic Building Elements and Mat 2 Timber: Finishing Elements);
- The use of recycled building materials such as the crushing and re-use of concrete, use of clay or slate roof tiles, bricks and wooden structural beams. Materials from demolished buildings on the site that cannot be re-used should as far as possible be disposed of to a second hand building materials supplier for use elsewhere.

Sustainable construction

Use of natural materials

1.16 Working from Home

1.16.1 The number of self-employed people is increasing, as is the number of people who work from home. The benefits of working from home include reductions in transport movements, increased time available for the home worker and greater opportunity to participate within community activities. Working from home for most people requires either an office or a flexible space within living areas that can be used as an office. Usually a telephone line and connection to the internet is necessary. In order to encourage working at home, spaces for home offices should include;

- Windows or adequate ventilation;
- Space to allow for desk, filing cabinet, bookshelf, with space to move around and open the door

1.16.2 For dwellings with two or more bedrooms, the space should be in a room other than the kitchen, living room, master bedroom or bathroom.
(Ref: BRE EcoHomes – The environmental rating for homes, 2005; TRA4 Home Office)

Recycling collection basket

1.17 Recycling

1.17.1 Developments should provide dedicated space for internal and / or external storage bins (external storage areas to be accessible by Local Authority collection lorries if necessary). Gardens should also provide accessible spaces for home composting.
(Ref: BRE EcoHomes – The environmental rating for homes, 2005; Mat 3 Recycling Facilities and Mat 4 Environmental Impact of Materials)

Safe and secure bicycle storage

1.18 Promoting Cycling

1.18.1 To promote and increase cycling and to ensure that it is an easy and safe option for travel, developments will be expected to;

- Provide a secure place within the development, where appropriate, (whether residential or commercial) for residents, workers and visitors bicycles (communal storage will require individual locks);
- Provide garages with enough space to store both bicycles and cars;
(Ref: BRE EcoHomes – The environmental rating for homes, 2005; TRA2 Cycle Storage)

As stated in section 1.2, this SPD requires all new development to achieve BREEAM/EcoHomes rating (or equivalent) of at least **"Excellent"** (1).

References to BRE advice appear throughout this document.

This document, Part 4, provides a range of methods that can be used to help achieve this standard and is a real resource for improving the environmental footprint of developments.

For further information and guidance on the BRE requirement, please see the Development Control guidance note which is available to view on the Planning Advice page under the Development Control section of the Council's web site at www.westberks.gov.uk

(1) In some locations an "excellent" rating may not be achievable due to remoteness from services. Developments involving extensions and conversions will not, at this time, be required to adhere to this standard

Local Development Framework

West Berkshire Council

Halcrow

Prepared by Halcrow on behalf of West Berkshire Council