

Guide to sustainable development

Practical guidance for developers on achieving high quality design and construction

This guidance document complements the Southampton sustainability checklist to provide background information on the key sustainability issues to be addressed in planning applications



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<http://www.southampton.gov.uk/environment/development-control/planning-application-forms>

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1. User Guide



1.1 Context

Global environmental issues are a product of human activities at a local scale. The nature in which we consume our natural resources is not only depleting their finite supply at an unsustainable rate, but also contributing to wider social, economic, and environmental impacts. Southampton aspires to maintain economic growth and employment but development must be sustainable in order to ensure effective protection of the environment, prudent use of natural resources, and social progress that recognises the needs of everyone. Achieving more sustainable patterns of development therefore requires an integrated approach with active commitment from many sectors. The development design process must consider a wide range of topics. Ideally, all new buildings should be designed to take account of their impact on the environment, locally and globally, respect the natural environment, and use only sustainable natural resources.

1.2 Purpose of this Guide

The purpose of this document is to help developers to deliver sustainable design by supplying information on the issues that need consideration and the methods and techniques they can employ. Minimum standards are required through building regulations, but sustainable construction must exceed such standards in order to make significant changes in the way we use resources.

1.3 Format

The guide is structured into main sections covering issues of energy efficiency and zero or low carbon sources, water efficiency, sustainable construction, building design and layout, waste and recycling, biodiversity, and transport. These topics all relate to policies contained in the City of Southampton Local Plan. The document can be read as a whole to obtain a comprehensive overview of what can and should be done in development. Alternatively, each section is designed to work on its own as an advice sheet on particular aspects of Sustainable Design.

Each section contains:

- **An Introduction** - explaining the issue, its environmental consequences, and the need for action.
- **A Policy Framework section** - listing the relevant policies and legislation from local to national level.
- **Descriptions of sustainable design features and processes** - these sections also outline the context, in which different design features should be considered, and in which they are feasible.
- **Best Practice Examples** - the majority of which are taken from the city of Southampton itself, that illustrate the potential to realise sustainable design and the benefits that flow from it for residents, developers and society as a whole.
- **Further Information** - each advice sheet concludes with a list of sources that provide further information on sustainability and details on technical aspects of the sustainable design.

2. Assessing Sustainability



2.1 Introduction

Measuring levels of sustainability is a complicated issue. However, standards of good practice and achievable targets have been set through existing policy. In terms of building design there are several widely accepted methods of assessment that can be used to determine relative levels of sustainability in relation to social, economic, and environmental aspects.

2.2 Environmental Assessment Tools

Eco-Footprinting

An Ecological Footprint is a quantitative calculation of resource consumption and production. The methodological output gives a reflection of the area of land that would be required to support the current resource flows, which can then be compared to a theoretical benchmark land area that reflects a sustainable level of raw material use. This is generally a useful tool for policy-makers to assess the impact of large-scale development proposals.

Eco-Homes & BREEAM

The BREEAM standard is based on a range of qualitative ratings used for new and existing office buildings. An equivalent standard (Eco-Homes) has also been devised for use on residential buildings. The standard is being increasingly used in regional and local planning policy for housing development as a reference for the minimum requirements (such as the 'good', 'very good' or 'excellent' rating) for all new buildings.

South East England Development Agency (SEEDA) Sustainability Checklist

SEEDA has produced a checklist that relates regional policy on creating sustainable communities to practical objectives that can guide the process of development design.

Whole Life Costing

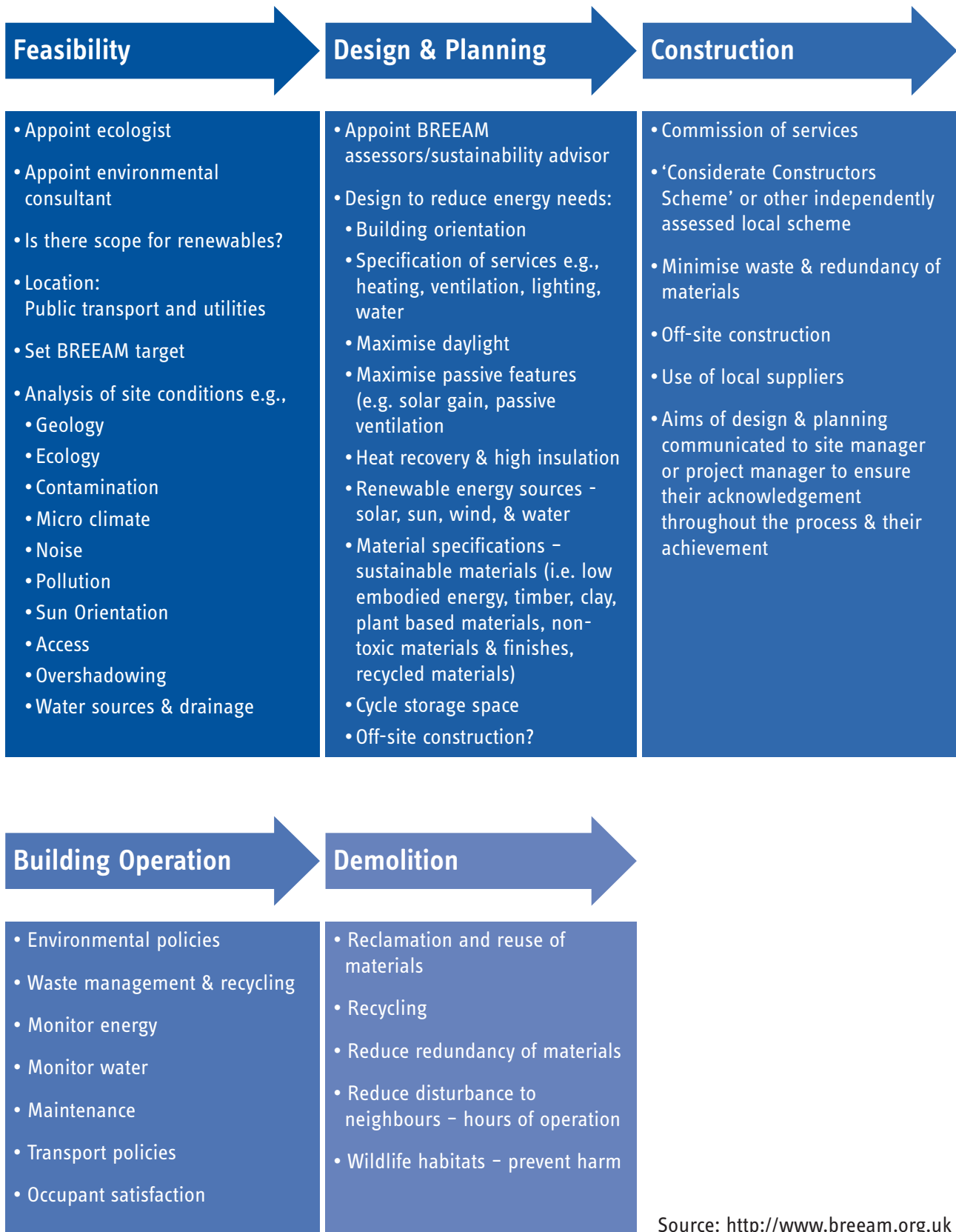
The whole-life costs of a facility (often referred to as through-life costs) are the costs of acquiring it (including consultancy, design and construction costs, and equipment), the costs of operating it, and the costs of maintaining it over its whole life through to its disposal - that is, the total ownership costs.

These costs include internal resources and departmental overheads, where relevant; they also include risk allowances as required; flexibility (predicted alterations for known change in business requirements, for example), refurbishment costs and the costs relating to sustainability, and health and safety aspects. Some approaches only consider the financial cost in use/operation which are usually more tangible, easier to quantify, and are perceived as of most relevance to owners and tenants. Others aim to consider the wider financial, social, and environmental costs. These are harder to quantify but provide a truer reflection of the real costs of a development.

2.3 Further Information

- BREEAM & EcoHomes
www.breem.org
- SEEDA checklist
www.seeda.co.uk
- Whole Life Costs
www.leicesterbetterbuildings.org.uk

3. The Sustainable Development Process



Source: <http://www.breeam.org.uk>

4. The Business Case for Sustainable Design



4.1 Introduction

Research carried out by CABI, the WWF, and the Halifax in July 2004 found that 84% of people surveyed would be willing to pay an average of 2% extra on the purchase price of their home if it was environmentally sound. The same research found that 87% of buyers want to know if their homes are environmentally friendly.

4.2 The Benefits for Developer of Sustainable Urban Design:

- Reducing the overhead costs of development through measures such as resource efficiency
- Raising the profile and increasing the ability to sell or let the development
- Meeting the consumer demands of a growing 'green' market
- Ensuring smoother and speedier progress through the planning system
- Increasing land and property values
- Developing a strong marketable image for the area
- Providing a high quality and healthy environment that attracts more residents, businesses, customers, and tourists
- Providing high quality working environments that help attract and retain employees
- Minimising any potential litigation insurance risk

(Source: www.leicesterbetterbuildings.org.uk)

5. Energy Efficiency & Low and Zero Carbon Energy Sources



5.1 Introduction

The use of fuels that release greenhouse gases (including water vapour, carbon dioxide, methane, and nitrous oxide, and aerosols) has significant effects and impacts on the environment and society, particularly due to their contribution to climate change. Climate change is widely recognised as the most serious environmental threat to our planet. Left unchecked, it will have a profound effect on weather patterns globally. It is likely that the UK will experience more severe weather events and increased rainfall, storms, floods, and gales.

In the UK, 27% of the total carbon emissions are generated from homes. Efficiency savings are crucial to meet national targets for reducing greenhouse gas emissions and to decrease EU dependence on imported energy sources. The largest proportion of energy demand in a building arises during its operational activities. In a typical house, 40% of heat loss is through the walls and loft. However, buildings can be designed and built to reduce energy usage and energy loss. Energy efficient measures that reduce heating, hot water, and lighting loads, can be installed that also maximise cost effectiveness.

5.2 Policy Framework

- Planning Policy Statement 22 'Renewable Energy'
- Climate Change and Sustainable Energy Bill
- Draft South East Plan 2006 – Policy EN1 'Development Design for Energy Efficiency and Renewable Energy'
- City of Southampton adopted Local Plan 2006 – Policies: SDP 13 'Resource Conservation', SDP 14 'Renewable Energy'

5.3 Energy Efficiency

Measures that help to save and efficiently use energy within developments include:

- Controlled use of heat and ventilation systems.
- Double glazed windows.
- Draught proofing (airtight construction).

- Greywater systems
- Insulation – cavity wall, floors, roof, tank & pipe, & loft.
- Sensible use of machinery and appliances.
- Use of energy efficient lighting i.e. light fittings, light bulbs, light switches and controls (timed, and movement or light detecting shut-off devices such as Passive Infra Red sensors (PIR)), and low energy bulbs (e.g. low energy compact florescent lamps (CFLs) use one fifth of the energy of conventional tungsten filament bulbs.
- Use of energy efficient appliances, for example, use of 'A*' or 'A++' EU rated domestic appliances, or high efficiency condensing boiler with the correct heating controls.
- Design buildings designed to optimise their passive energy gain.
- Design buildings to optimise natural lighting, for example using light wells.
- Use of zoning & metering, for example, Zoned Heating Controls can be used in industrial and commercial operations, and sub metering of gas and electricity allows managers and tenants to establish major users of energy and where possible alter operational procedures to minimise consumption.
- Energy generated by renewable & low- or zero-carbon emitting resources.

5.4 Low or Zero Carbon Energy Sources (LZC energy source)

LZC energy sources are increasingly being installed in buildings. The use of these sources helps to achieve target carbon emissions for different building types. LZC energy sources can deliver carbon emissions reduction in the range of 10-20% and several can deliver much larger reductions. A variety of these sources are outlined below.

Absorption cooling

Absorption cooling is most likely to be applicable to large buildings and highly serviced spaces requiring full air-conditioning.

5. Energy Efficiency & Low and Zero Carbon Energy Sources

Combined Heat and Power (CHP)

CHP is the simultaneous generation of power and useful heat in a single efficient process, which secures environmental benefits and thereby contributes to sustainability. In a conventional power station only part of the input energy is converted to electricity, the rest is wasted as heat that is lost to the surroundings. In CHP systems, the waste heat is recovered to supply heat or hot water to nearby buildings. Therefore, it is particularly applicable to community heating networks and the overall efficiency is much higher than in conventional power stations.

There is a wide range of sizes, fuels, and technologies, which may be used. Typical large fossil-fuelled CHP schemes achieve a thermal efficiency of greater than 75%. CHP can improve the sustainability benefits of power generation schemes based on renewable and waste energy sources such as geothermal or biomass. CHP is suitable for heating and hot water for an individual dwelling or larger scale, non-domestic or mixed use applications.

Southampton has a CHP district heating and chilling scheme, which serves more than 20 major commercial and residential consumers in the city centre. Although currently the Southampton scheme is fuelled by natural gas there is opportunity to use geothermal. Southampton City Council and Utilicom are looking at alternative sources of energy to increase the proportion of renewable input. A new CHP station is proposed for Millbrook, which will provide heat and hot water to approximately 3,450 homes and businesses in the Millbrook and Maybush areas.

It is a requirement of SDP13 of the City of Southampton Local Plan, that the use of CHP or District Heating and Chilling schemes are incorporated into new developments, where possible. It is crucial that the use of CHP is considered at an early stage in the development process to ensure that the scheme is designed to enable the success of the technology.

Community heating is best suited to high-density housing because the cost of mains installation per unit decreases as density increases. High-density developments that are close to existing community heating networks will be even more cost effective. Whilst the capital costs associated with CHP tend to be higher than the installation of individual systems, long-term financial benefits come from reduced Whole Life Cycle Costing. Decisions should be made based on whole life costs as opposed to the cheapest capital costs.

Best Practice Example 1: Park View, Southampton (Barratt Homes)

Barratt Homes Park View apartments were the first new private housing development of its type in the UK to use community heating by connecting to the Southampton District Energy Scheme. The development comprises of 108 apartments in a building, which ranges from 6 to 8 storeys in height.

Barratt Homes worked in partnership with the Southampton Geothermal Heating Company (SGHC), which is the company that developed, manages, and operates the Southampton scheme. SGHC was set up and is owned by the energy management company Utilicom. SGHC works in partnership with Southampton City Council.

The benefits of using the scheme were as follows:

- Using community heating in the Park View development reduced capital costs and allowed better use of space.
- Barratt estimate that using community heating saved them £300 per dwelling. The savings came from avoiding the costs of installing individual boilers, avoiding the costs of gas mains connection, and not having to install brickwork to conceal gas risers.
- The absence of a boiler or storage tank freed up space, allowing the installation of additional kitchen units and cupboards.

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- There were no flues or pipe work to detract from the aesthetic appearance of the development.
- The dwellings are more energy efficient leading to higher SAP ratings.
- The improved environmental performance is good for the image of the company amongst customers and the community.
- The Park View development is used in company publicity.

(Source: <http://www.est.org.uk/bestpractice/uploads/publications/pdfs/gpcs400.pdf>)

CHP (Micro CHP)

The capacity to deliver emission reductions will vary with CHP technology. Small Stirling engine units will typically produce around 10-20% of their output as electricity (usually 1-1.5kW). When such units are applied in a single dwelling they can deliver a carbon emissions reduction of 11% in new build and 11-12% in retrofit applications. Internal combustion engines produce higher electrical output but are usually larger in size and unlikely to be applicable to new build single dwellings. When applied to groups of dwellings or small non-domestic applications internal combustion units can deliver a carbon emissions reduction of around 16%.

Ground Source Cooling

Ground source cooling uses the relatively constant ground temperature to provide summertime cooling through ground heat exchangers (air-to-ground or water-to-ground). It is most likely to be applicable to large buildings and highly serviced spaces requiring full air-conditioning.

Ground Source Heat Pumps

Ground source heat pumps make use of energy stored in the Earth's crust coming mainly from solar radiation. Essentially, heat pumps take heat at certain temperature and release it at a higher temperature. This is achieved by means of ground collectors (coils), in which heat exchange fluid circulates and transfers heat via a heat exchanger to the heat pump.

Solar Water Heating

Solar water heating or solar thermal/hot water systems are a well-established renewable energy system in many countries. It is appropriate for residential and non-residential applications. For a single typical house, a suitable system would occupy 2.5 - 4m² of roof space. It uses the energy from the sun to heat water. In the UK this it is most commonly used for hot water needs. The systems use a heat collector in which a fluid is heated by the sun. This fluid is used to heat up water that is stored in a separate hot water cylinder inside the building.

The collectors can be bolted onto a roof and look similar to roof lights. Ideally, they should be mounted on a south-facing roof, although south-east or south-west will also function successfully. The system works in difficult light conditions.

Wind turbines

(building mounted wind energy generators)

A wind turbine installation can be sized to generate carbon zero electricity to a level equivalent to any percentage of the total carbon emissions of an associated building subject to there being a suitable location for a turbine of the appropriate size. To deliver a 10% carbon emissions reduction in a new build dwelling would require a turbine in the range 0.1-0.3 kW and 20% would require double this size. To deliver a 10% carbon emissions reduction in a 3,000m² office would require an installation in 6-32 kW range for a new build. The location of a turbine in these size ranges would require careful consideration.

Photovoltaics (PV) (solar electric) or Solar Technology

PV or Solar Technology are arrays of cells consisting of one or two layers of a semi-conducting material, which convert daylight and direct sunlight into electricity. A PV installation can be sized to generate carbon zero electricity to a level equivalent to any percentage of the total carbon emissions of the building subject to there being sufficient suitable surface area to mount the required area of PV. To deliver a 10% carbon emissions reduction in a new build dwelling would require an installation in 0.3-

5. Energy Efficiency & Low and Zero Carbon Energy Sources

0.5 kW peak range occupying no more than 5m² of suitable orientated roof and 20% would require double this size area.

PV's should be located facing towards the south, although systems can still produce 82% of their optimum output when facing east or west. PV systems should not be over-shadowed.

A main consideration of PV's is their visual impact. However, they come in a variety of forms and colours, which means that they can be fully integrated into the building fabric. The visual impact will also be dependent on the size of the array and this will be determined by the energy requirements of the user.

Best Practice Example 2: Chapel Road, Southampton (Persimmon Homes)

The development consists of 174 dwellings constructed on a 1.99 hectare brownfield site. In order to try to achieve an EcoHomes rating of "Very Good" it was decided to use solar panels as an alternative source of energy.

Support for the scheme was obtained from SEEDA and applications were made to the Energy Saving Trust and the Department for Trade and Industry.

The c.£300,000 solar scheme is currently being implemented in the first phase of the development. The system will serve all 174 dwellings in terms of lighting all communal areas and undercroft parking. Some communal heaters will also be powered by the system. The range for units on-site covers 80kw, 123kw, 125kw, and 165kw. Excess power generated will be sold to the national grid, with the value being offset against service charges.

Swaythling Housing Society has also included a factor in their service charges to cover longer-term repair or replacement of the system, which is a crucial aspect to ensure the successful implementation of the scheme.

Energy Management Plans

An energy management plan is the means by which energy efficiency can be maximised from new or existing developments. The first step to energy management is to conduct an energy audit in order to develop a detailed understanding of energy usage throughout the buildings and to assess energy performance and then to identify further energy efficiency and saving opportunities by implementing the measures outlined above and educating people to change their behaviour in terms of energy use.

Benefits

The running costs of developments can be greatly reduced by the implementation of energy saving measures. The installation of devices need not be more expensive (see Appendix 1: Costing.) Developments with comprehensive Energy Management Plans can attract prospective tenants by reducing operating costs, and the ability to fulfil corporate and social responsibilities.

Best Practice Example 3: Portswood SUN Centre, Southampton (Hyde Housing Association and Southampton City Council)

The development of five new affordable homes plus a visitor centre, has not only created an attractive place to live for people who were in housing need, but has helped to increase energy efficiency locally, and promote the importance of sustainability across the city. Energy efficient measures included solar panels, increased efficiency double-glazing, additional loft insulation, energy efficient light fittings, and 'White' goods with 'A' rating for energy efficiency.

Occupant behaviour has a significant impact on energy use. The residents of the two timber frame units (although living in identical houses) had different energy costs. As a result residents are now advised of the cost implications of heating their homes above a 'standard level'.

5. Energy Efficiency & Low and Zero Carbon Energy Sources

5.5 Further Information

Building with vision:

- Low Carbon Building Design Advice Services from the Carbon Trust – Offer free or subsidised consultancy advice for projects > 2,500 m² or for multiple projects.
0800 085 2005
www.thecarbontrust.co.uk/buildingdesign

Energy Saving:

- ‘General Information Leaflet 72’ of the Housing Energy Efficiency Best Practice Programme has a “Best Practice” insulation standard for new homes.
- www.est.org.uk

Renewable technologies & energy:

- www.enthuse.info
- www.dti.gov.uk/renewable/index.html
- www.nef.org.uk/greenenergy/index.htm
- ‘Energy and Waste in an Age of Excess: A Future Laboratory Report for the Energy Saving Trust’ (October 2005)

Combined Heat and Power:

- www.chpa.co.uk/

6. Water Efficiency



6.1 Introduction

The UK population has remained relatively stable since the 1960s, yet in the 2000s we use 70 per cent more water per person. Forecasts indicate that this upward trend will continue. This is mainly due to the use of water-intensive appliances such as washing machines, dishwashers and power showers. Water resources face growing pressure from increasing demand arising from existing and new development, exacerbated by changes to the climate and rainfall patterns. Southampton relies entirely on the River Test and River Itchen (designated Sites of Special Scientific Interest/Special Area of Conservation) for water supply so efficient use of water is vital. Ensuring that new development has adequate supply and is water efficient is therefore a key challenge for the city. There are many ways to reduce our demand on mains water:

- **Reducing water usage** through the installation of water efficient appliances, low-flow taps, low-volume capacity baths and dual-flush toilets
- **Using alternative sources** of water such as rainwater
- **Recycling** water that is used in homes

The problem with the traditional system of drainage is the rapid transmission of rainfall runoff into surface watercourses. This contributes to urban flooding and damages the natural ecosystem as the surface water drains and takes pollutants directly to a watercourse.

6.2 Policy Framework

- Planning Policy Guidance 25 ‘Development & Flood Risk’
- Planning Policy Guidance 20 ‘Coastal Planning’
- Draft South East Plan 2006 – Policies: NRM1 ‘Sustainable Water Resources Groundwater and River Water Quality Management’ and NRM3 ‘Sustainable Flood Risk Management’
- City of Southampton Local Plan 2006 – Policies: SDP 13 ‘Resource Conservation’ and ‘SDP 20 Flood Risk and Coastal Protection’

6.3 Measures to Improve Water Efficiency

Water Management Plans

Water management plans are an undertaking that run with a development site to implement water saving measures, and to ensure that those measures are implemented and operated effectively. A water management plan can enable businesses to reduce water consumption by up to 80 per cent. To produce an effective water management plan it is necessary to:

- Identify the true costs of water
- Identify water-use, re-assess water-use
- Identify and evaluate water efficiency measures
- Implement your plan and report results

By comparing the net annual savings with the capital costs (one-off purchase and installation costs), the simple payback period can be identified. Frequent meter reading is essential not only to quantify consumption, but also to understand seasonal variations and identify leaks. In large organisations with major water-using departments, the installation of sub-meters should be considered to identify how much of the total water use each department is responsible for. This can be extremely useful in encouraging staff to achieve greater water efficiency as costs are passed on.

Water Efficiency Devices

There are many zero or low cost actions that can substantially reduce water consumption and use water more efficiently:

- Push taps
- Flow regulators and restrictors
- Cistern displacement devices such as Hippo and Save-a-Flush reduce the volume of water required to fill a toilet cistern by up to 3 litres per flush (they are often available free of charge from water companies.)
- Spray nozzles
- Low flush toilets

6. Water Efficiency

- Dual flush toilets
- Sensor urinal flushing controls
- Insulate all pipework to protect against frost damage
- Fit spray taps to outdoor hoses
- Collect rainwater

Developers should investigate opportunities for re-using water and consider alternative water sources e.g., rainwater harvesting and greywater recycling such as closed-loop recycling or counter-current rinsing. Their suitability depends on many factors including building type, budget and payback periods required. Consideration should be given to the use of:

- **Low and dual-flush** toilets if replacing existing units. The maximum cistern volume of new toilets is 6 litres, compared with 9 litres for older models.
- **Supply restrictor valves** are easily fitted to supply pipes and keep the water flow constant, regardless of fluctuations in water pressure.
- **Tap controls** are an easy and cheap way of reducing water consumption and are available in both new and retrofit versions. Different types include infra-red, battery operated, simple push-top & and spray taps.
- **Urinal controls** can be retrofitted to existing urinals, ensuring that the cistern only flushes during office hours, or after use, rather than continuously
- **Waterless urinals** use either a symphonic trap or an outlet in the urinal containing a pad impregnated with a deodorising agent.
- **Washroom control systems** not only limit hot and cold water supply, but also control lighting and ventilation, therefore providing additional energy savings

Rainwater Harvesting

- Rainwater harvesting systems can be fitted into new or existing buildings in order that rainwater can be collected from the roofs of building or the run-off from hard standings and used in purposes such as irrigation or the flushing of WC's/
- Collecting rainwater in water butts can reduce the need for mains supply water when watering

external plants and washing down vehicles.

- Savings achieved by rainwater harvesting will be greater in larger buildings such as industrial units or education establishments since these typically have larger roof areas and a greater water demand.
- Methods of collection can range from a simple water butt, to the use of a complete system, which includes treatment, storage, and pumping of water to appliances.
- Details can be found on the following link:
<http://www.rainharvesting.co.uk/index.htm>

(source:harvestingwater.com)

Greywater Recycling

Grey water systems reduce the need to use fresh water and therefore reduce household water bills and pressure on public water supply. Grey water recycling allows the wastewater from showers, baths and washbasins to be collected at a household scale and reused for laundry, toilet flushing and the irrigation of plants. The filtration of, or another suitable treatment method for, the grey water is necessary to remove particles of soap, dirt and other contaminants from grey water.

Grey water systems in business premises can provide low running costs. This can have an effect on the ability to sell a property since reducing overheads is a much easier way of maintaining or improving net profit than increasing company productivity.

Best Practice Example 4: Portswood SUN Centre, Hyde Housing Association and Southampton City Council

The sustainable and 'green' features included solar panels, and rainwater harvesting. The rainwater recycling system was successful in significantly reducing water use. The use of rainwater recycling led to water savings of between 25% and 45% in four out of the five units. As a result, Hyde are now considering rainwater recycling in all new developments where feasible.

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6.4 Drainage

When designing drainage systems for developments the following must be considered:

- The need to avoid runoff if possible (allowing to infiltrate the ground).
- Slow the runoff process (which includes the provision of additional storage).
- Manage runoff as close as possible to the point of origin (that is, keep things small and local).

Sustainable Drainage Systems (SDS)

Sustainable Drainage Systems use a range of techniques to manage surface water as close to its source as possible. By moderating flows and filtering run-off, Sustainable Drainage Systems can deliver reductions in impacts on our water resources, and improve the quality of our built environment.

SDS are designed to:

- Control the quantity of run-off from a development
- Improve the quality of the run-off
- Enhance the nature conservation, landscape and amenity value of the site and its surroundings.

SDS can be implemented on a range of developments from small-scale residential, major residential and commercial or industrial. They can also be successfully retrofitted to existing developments. The inclusion of SDS needs to be considered early in the site evaluation and planning process, as well as at the detailed design stage. It is crucial to consider in the early stages of design, the arrangements for adoption and future maintenance of the system. This is likely to influence the design just as much as the technical considerations. It is important that developers establish the soil conditions and hydrology of their site at an early stage in the planning process. The results of such investigations should be provided to the planning authority with the proposals for a drainage system included with the planning application.

There are various different types of sustainable drainage systems:

- Permeable Pavements
- Swales & basins
- Infiltration trenches and filter drains
- Ponds & wetlands

Most of the rain that falls on cities lands on impervious surfaces, such as roads, where it absorbs pollutants before it finally drains away. The incorporation of permeable surface materials on roads and driveways will reduce the amount of surface run off within an area. This will benefit the local water supply, through the limiting of pollutants in water collected from surface run off, and enhance the local water table. Gardens significantly reduced the concentration of fertilisers, oil and particulates reaching storm drains and reduce localised flooding by absorbing rain water from heavy downpours. This reduces the risk of drains becoming overloaded. A shallow depression in a garden containing bark mulch and shrubs can remove up to 99% of toxins. It is important that developments allow for appropriate filtering of rain water through the maintenance of a garden or the appropriate use of pervious surfaces.

Metering and Sub-metering

Wasted water costs many companies as much as 1% of turnover as they pay for its purchase, heating, treatment and disposal. So waste can quite literally be money down the drain! Metering and sub metering of water allows managers and tenants to establish major users of energy and where possible alter operational procedures to minimise consumption. Having a meter installed means that in addition to the fixed charge you only pay for the water you use. This can help save businesses and tenants money and reduce the use of local water supplies. Provided it is not impracticable or uneconomic for the company to do all meter installations are now free. The Government made this law in April 2000. This extends to household tenants who do not need to seek their landlord's permission as long as they have tenancy agreements of more than 6 months. To find out how you can install a water meter contact your local water company. (Source: www.southernwater.co.uk & www.ofwat.gov.uk).

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6.5 Further Information

- The Water Framework Directive (2000/60/EC)
- <http://www.dti.gov.uk/construction/sustain/dos.pdf>
- www.environment-agency.gov.uk
- Information on Sustainable Drainage Systems from CIRIA:
 - <http://www.ciria.org.uk/suds/>
 - <http://www.sepa.org.uk/publications/leaflets/suds/index.htm>
- Information on water efficient technologies is available from the Environment Agency:
 - <http://www.environment-agency.gov.uk/>
- An example of good practice from the National Energy Foundation:
 - <http://www.natenergy.org.uk/phase2.htm#other>
- Information on water conservation and rainwater harvesting systems:
 - <http://www.rainharvesting.co.uk/index.htm>
- www.ciria.org
- www.southernwater.co.uk
- www.ofwat.gov.uk

7. Sustainable Construction



7.1 Introduction

The construction process generates a considerable volume of waste and due to the increasing pressures for the construction of new homes and the proposals for the growth areas outlined in the Sustainable Communities and South East Plan's; there is more need than ever for Sustainable Construction. This means that materials, construction techniques and the management of building projects must ensure that they minimise resource consumption.

Sustainable construction is the focus for all future development to minimise resource consumption both during development and throughout the buildings life cycle. The term 'sustainable construction' relates to the issue of sustainable buildings i.e. energy efficient homes and businesses, sustainable operational considerations and the sustainable sourcing, recycling and disposal of all construction materials and waste. Construction waste accounts for approximately 50% of UK CO₂ emissions; this contributes to climate change, the consumption of non-renewable resources and adds to pollution. It is important that all developments are built as a sustainable development to halt the negative effects of the construction industry on the environment.

Current government legislation requires all developers to dispose of construction waste in a sustainable manner. Where possible developers are required to source sustainable materials i.e. locally sourced materials and/or sustainable grown materials. Building regulations require developers to meet standards that will result in improved energy efficiency in all new build properties. In addition, there are measures in place to encourage developers to realise the benefits sustainable development can offer to the developer and the tenant of the building. BREEAM and Ecohomes standards assess the environmental efficiency of a development and give that building a rating. These ratings allow the buyer or tenant of the property to identify the environmental rating of the building and are becoming popular in the marketing of new developments. For further information on BREEAM and Ecohomes assessments visit www.bre.co.uk.

7.2 Policy Framework

- National building regulations
- Draft South East Plan 2006 - Policy: CC4 'Sustainable Construction'
- City of Southampton Local Plan 2006 - Policy: SDP 13 'Resource Conservation'

7.3 Construction Materials

The acquisition of materials and the associated transportation of these materials can have far-reaching effects. The use of non-local labour will also impact upon energy use and transport patterns. Materials causing pollution in manufacture will place an ecological burden on the locality and potentially to the wider area. Embodied energy is the total amount of energy used in the production, transportation and the eventual disposal of the raw materials of a building. The following criteria can be followed to reduce the embodied energy requirements of a building:

- The raw materials to be used in building should be natural, non-toxic raw materials, from renewable resources and extracted or harvested by environmentally sound methods - insulated with cellulose (recycled newspaper).
- Recycled materials should be used where possible.
- Where possible materials should be sourced locally (less than 25 miles).
- The manufacturing process should be non-polluting and safe for the workforce.
- Safe non-toxic use of the building after construction.
- Safe, non-toxic installation or application of the product.
- Lowest possible energy requirement for running the completed building.
- High level of internal comfort in the completed building.
- Re-usability, recyclability or safe disposal at the end of the building's or component's lifetime.

(Source: <http://www.sustainable-architecture.org.uk/>)

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& <http://www.greenstreet.org.uk/index.php>)

In sourcing materials, it is important to obtain the manufacturer's technical specifications for the specific product to ensure they reveal the full environmental credentials. The following link provides a directory of suppliers and products_ <http://greenstreet.wiredesign.net/index.php?ct=20&filters=f1>

In addition, the green guide to housing specification & green guide to specification provide a simple method of comparing the lifestyle impacts of different construction materials and methods of construction.

Construction Techniques

There are various construction methods that can ensure a more environmental form of construction. Lean construction, for example, describes the process of minimising waste in the construction process. Minimising waste through design means avoiding the over-specification of materials and services in favour of simplicity (buildability), bearing in mind operation and maintenance (maintainability), and considering flexibility and future re-use (adaptability), so as to minimise construction costs. A number of techniques are described below.

Prefabricated Construction

Using prefabrication in a project allows the time spent working on site to be reduced. Careful quality control of manufacturing processes enables waste to be controlled and minimised through appropriate design and recycling opportunities. In addition, the use of prefabricated components should cut the volume of site spoilage associated with current practices of over-ordering and poor site handling for the equivalent traditional processes.

One specific scheme being developed with EC funding has been quoted as having the following potential anticipated benefits:

- 50% reduction in the amount of water used for construction of a typical house;
- 50% reduction in the use of quarried materials used in the construction;
- At least 50% reduction in the energy consumption.

Best Practice Example 5: Mason Moor, Southampton

- This housing project in the west of the city consisted of 33 dwelling units design in a grid pattern layout, based on the Home Zone principles.
- The houses were constructed employing prefabricated construction techniques (using floor and wall cassettes) and with timber frames. The scheme succeeded in reducing the amount of construction waste by 20%, will cost no more than traditional construction and is within 110% of total cost indicator rates. The development received an: Echo-Homes: "Very Good" rating.

Timber frame Construction

One of the most environmentally acceptable materials used in modern construction is timber. It is natural, organic and non-toxic as well being recyclable, biodegradable and water efficient. It is also renewable; wood can substitute for items produced from non-renewable fossil. Wood is effectively a carbon-neutral material. The carbon is stored in the building; at the end of its life, the wood can be recycled or burned for energy as a substitute fossil fuel.

Timber has very low embodied energy content: converting timber into a usable building material generates far fewer greenhouse gases than any other mainstream alternative such as aluminium, steel or concrete. Once installed, wood is an excellent insulating material and it greatly reduces the 'energy footprint' of a building. Timber, framed houses are widely recognised as being top performers in thermal efficiency.

Thermal Mass Masonry

Building materials that are heavyweight store a lot of heat and are said to have high thermal mass. Materials that are lightweight do not store much heat and have a lower thermal mass. The use of heavyweight construction materials with high thermal mass (concrete slab on ground and insulated brick cavity walls) can reduce total heating

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and cooling energy requirements by up to 25% compared to a home built of lightweight construction materials with a low thermal mass (brick veneer with timber floor).

In hot weather, thermal mass has a lower initial temperature than the surrounding air and acts as a heat sink. By absorbing heat from the atmosphere the internal air temperature is lower during the day, with the result that comfort is improved without the need for supplementary cooling

Best Practice Example 6:

Portswood SUN Centre, Southampton (Hyde Housing Association and Southampton City Council)

Completed in 2002, the development included many different energy efficiency features as well as two different forms of construction (timber frame and high thermal mass masonry) to enable Hyde to research different building methods and materials.

The development consists of:

- 2 x 3 bed, 5 person houses (timber frame)
- 1 x 3 bed, 5 person house (high thermal mass masonry)
- 2 x studio flats (high thermal mass masonry units)
- 1 x visitor centre (brick build with a grass roof)

The development includes:

- Rainwater recycling
- Solar panels
- Increased thermal efficiency double glazing
- Additional loft insulations
- Minimized car parking (only tow spaces for visitors)
- Covered, secure cycle store
- Natural wood doors (from a sustainable source)
- Natural wood kitchens (from sustainable source)
- Energy efficient light fittings

- White goods (with highest rating for energy efficiency)
- Organic gardens
- A composter

The development has not only created an attractive place to live for people who were in housing need, but has helped to increase energy efficiency locally and promote the importance of sustainability across the city. Energy efficient measures included solar panels, increased efficiency double-glazing, additional loft insulation, energy efficient light fittings, and 'White' goods with 'A' rating for energy efficiency.

Occupant behaviour has a significant impact on energy use. The residents of the two timber frame units (although living in identical houses) had different energy costs. As a result residents are now advised of the cost implications of heating their homes above a 'standard level'.

The scheme has highlighted the importance of matching the type of construction and heating method to the pattern of occupation of the residents. E.g. for homes that are occupied for long periods (e.g. by older people) the preference is for high thermal mass with storage heating and timber frame with gas central heating is better in homes that are not occupied during the day and where a 'quick response' time is needed.

8. Waste and Recycling

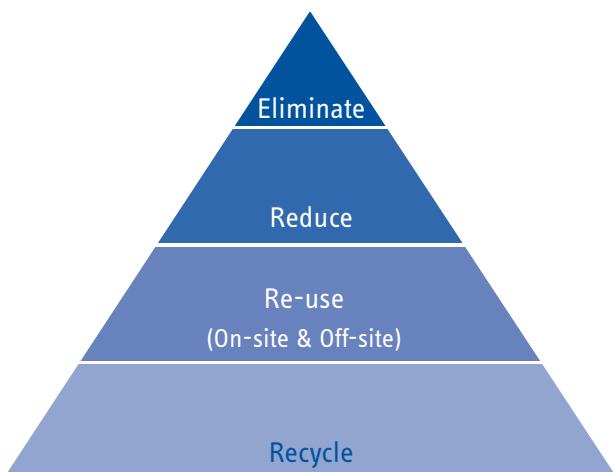


8.1 Introduction

Every year in the UK approximately 400 million tonnes of waste is produced; a quarter of this comes from households, commerce and industry with the remainder resulting from construction and demolition industry, mining and agricultural wastes, sewage sludge and dredged spoils. Currently the greater portion of this ends up as landfill. Approximately 35% of industrial land and commercial waste and 12% of household waste is being recycled or composted.

It is a requirement of the Landfill Directive that the amount of material being sent to landfill is reduced and recycling and composting increased for more sustainable management of waste streams. Waste is a potential resource and increased levels of reuse, recycling, and energy recovery will contribute to achieving more sustainable lifestyles.

The Government's white paper "Making Waste Work" ranked the different waste management options in a waste hierarchy to give an idea of the relative sustainability of each option. The recovery category is the broadest and incorporates the recycling of materials, composting and the recovery of energy from waste. The Government aims to follow the waste hierarchy, which in descending order of preference is eliminate, reduce, reuse and recycle.



8.2 Policy Framework

- Planning Policy Statement 10: Planning for Sustainable Waste Management
- Government's Waste Strategy 2000
- Landfill Directive
- Hampshire Minerals and Waste Development Framework Strategy 2006
- City of Southampton Local Plan 2006 - Policy: SDP 13 'Resource Conservation'

8.3 Waste and Recycling

Construction Waste

The construction process itself generates significant quantities of waste. Approximately 40% of the total amount of waste produced in the UK is generated by the construction industry. The construction industry is under pressure to find ways to conserve and make the best use of natural materials. The best way to do this is to reuse, reclaim or recycle materials. Over 70 million tonnes of construction waste is generated each year, but 60-80% of builders' on-site materials are reusable, including:

- Wood, metals, aggregates, glass, plastics, slate, tiles, cardboard
- Fixtures and fittings
- Windows, doors, fixed furniture items
- Other common reusable items, such as site hoarding materials.

Over 80% of construction materials use natural resources that can be recycled, reused or originally come from a sustainable source.

(Source: RICS website)

Project Management

Waste arising from construction includes off-cuts, packaging, and other legitimate wastes but also includes material which has simply been spilled, dropped or run over before ever being used. Waste is generated at every stage in a normal construction project, from initial extraction of resources such as

8. Waste and Recycling

aggregates, to processing, packaging, transport, use on site, repair, and disposal.

One way of addressing these issues is to consider the construction project in exactly the same way as any other manufacturing or production process and to apply the principles of waste minimisation on this basis. A typical waste minimisation project of this sort would consider the inputs, processes, and outputs of the production process as well as any utility inputs such as energy and water.

Waste and inefficiency can be limited and increased amounts of materials recycled during construction by:

- Recycling of demolition materials and waste arising from construction.
- Re-using on-site materials, and monitoring of material use and packaging.
- The materials and products used in a development should be extremely durable and expected to perform well over an extended lifetime.
- Refurbishment of a building is the preferable option to demolition, but where refurbishment is no longer a viable option then buildings need to be deconstructed, creating a minimum amount of waste. The new building should recycle as much of the materials from the previous building as possible. Better use should be made of unavoidable waste - recycled and secondary aggregates, and waste by-products offer a range of high-grade and low-grade applications in construction.
- Lean construction techniques increase efficiencies in using all resources such as time, energy, and materials. Waste should be designed out of a building through methods such as modular design with regard to suppliers' unit/sheet size, which will reduce un-usable off-cuts.
- Reducing Energy Consumption during construction can result in lower direct costs for the developer, thus helping profitability.

8.4 The Provision for Recycling within new development

Whilst there are statutory requirements with regards to provision for waste and recycling, there are additional measures that can be taken to ensure that the development has a negligible impact on the environment. Provision for the storage, collection and recycling of waste needs to be an integral part of any design for a new development since it is fundamental to its operation. Inadequate provision can lead to a plethora of problems for residents, neighbours, and refuse disposal crews.

Details of the facilities for waste and recycling should accompany the planning application.

The design, size, and appearance of waste storage containers, and how they fit into the development are important factors to consider in order to encourage the most effective use of the provision. The following factors need to be considered:

- Storage capacity and method of storage - building users need a number of containers to store at least a week's worth of waste both internally and externally
- Possibility of on-site treatment
- Location of waste storage and treatment areas - the bins should be clearly labeled and in an appropriate location in the development (30 metres from the dwelling & 25 metres of the waste collection point. 10 metres).
- Means of access for waste collection staff and vehicles.

On-site Facilities

Providing easily accessible recycling facilities on-site will encourage building users to sort their waste into separate streams. Provision of local facilities encourages uptake in recycling and reduces the need to drive to a central facility. In residential developments, the provision of containers integrated into the layout of the kitchen (under the sink, or other storage unit) will encourage the householder to recycle waste without the need for untidy boxes on the floor.

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Where possible developments should make provision for local shared recycling facilities for new residential or mixed-use development e.g. paper, glass, plastics, cans and clothing and the provision of a composting facility in properties with gardens or landscaped space.

Site Waste Management Plans

It is important that during the design process an effective waste recycling strategy is adopted and that there is a convenient solution to allow building users to dispose of a sufficient number of segregated waste streams.

The site waste management plan should take the form of a scheme of works to be submitted for council approval, outlining the method of storage and waste collection of refuse from the land, to include details that take into account the location of waste storage containers, the process for pre and post collection and also measures for recycling.

The benefits of a site waste management plan include:

- Better control of risks relating to the materials and waste on your site
- A tool to help you deal with queries from, for example the environmental regulators, regarding the wastes arising from your site
- A mechanism to demonstrate to clients how you manage your waste and minimize costs and risks to them
- Compliance with likely future contractual requirements from public and private sector clients
- A system help you and your workforce make cost savings by better managing your materials supply, materials storage and handling and better managing your waste for recovery and disposal.
- There is a variety of examples of best practice in the preparation of site waste management plans.

These are included in the websites of the various organisations listed - please see the links below:

- www.smartwaste.co.uk, www.ciria.org,

www.constructingexcellence.org

- www.envirowise.gov.uk, www.greenwich-village.co.uk, www.bre.co.uk, www.carillionplc.co.uk,
- www.defra.gov.uk/environment, www.dti.gov.uk, www.netregs.gov.uk

Waste into Energy Schemes

It is important to consider the wider implications of major development proposals on local waste management. In the case of major housing development, the feasibility of community heating schemes, which utilise waste products generated, would bring benefits such as a reduction in traffic carrying wastes, as well as a more efficient energy supply. The scope for the incorporation of access to biological waste treatment facilities to provide a renewable energy source for CCHP, CHP or district heating schemes (e.g. anaerobic digestion producing methane) needs to be explored. For example, Nottingham's Eastcroft incinerator supplies steam for community heating and generates electricity for the local area.

For further information on this scheme visit <http://www.wrg.co.uk/eastcroft/>

For more information on CHP, please refer to the Energy Efficiency and Renewables Advice sheet within this document.

8.5 Further Information

- Recycling and Waste pages from the DEFRA website: <http://www.defra.gov.uk/environment/waste/intro.htm>
- The Hampshire, Portsmouth and Southampton Minerals and Waste Local Plan: <http://www.hants.gov.uk/environment/mineralsandwastelocalplan/test/initial.html>
- For information on waste and recycling in the construction industry please refer to the Building Research Establishment web pages: <http://www.bre.co.uk/service.jsp?id=5>
- For more information on waste-to-energy from Cardiff University: <http://www.wasteresearch.co.uk/ade/Currentprojects.htm>

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- Information on sustainable waste management from the Environment Agency:
http://www.environment-agency.gov.uk/subjects/waste/?version=1&lang=_e
- For information on Nottingham's Eastcroft Incinerator from the Waste Recycling Group:
<http://www.wrg.co.uk/eastcroft/>
- The Chartered Institution of Wastes Management:
<http://www.iwm.co.uk/>
- The Waste and Resources Action Programme (WRAP), for information on markets for recycled resources:
<http://www.wrap.org.uk/index.html>

9. Site Layout and Building Design



9.1 Introduction

Sustainable Building Design is of vital importance due to the considerable pressures for the construction of new homes in the UK. This new development has the potential to generate substantial new emissions and place huge demands on energy resources. The scale of new urban housing required provides an opportunity to innovate and the form of new development must take into account all aspects of sustainability.

9.2 Policy Framework

- Planning policy Statement 1: Delivering Sustainable Development
- Planning Policy Statement 3: Housing
- Planning Policy Statement 22: Renewable Energy
- The City of Southampton Local Plan 2006 - SDP13 'Resource Conservation'
- Southampton Residential Design Guide 2006

9.3 Energy Efficient Design Techniques

Increased solar collection

- The sides of buildings which contain the most fenestration should be orientated facing south, or within 30° either side or south.
- In the case of loft conversions or household extensions, where possible use skylights or tall windows on the southerly facing sides.
- Habitable rooms (i.e. bedrooms or lounge) should be located to have a southerly aspect.
- Where larger developments are concerned, the layout of roads within a development can be a primary influence in determining the orientation of housing within a scheme. For optimum orientation of house plots, roads should preferably be aligned east-west.

For further information visit:

www.est.org.uk/bestpractoce/uploads/publications/pdfs/GIR053.pdf

www.est.org.uk/bestpractice/uploads/publications/pdfs/GI027.pdf

Prevention and minimisation of over-shadowing

- There should be no obstruction to south-facing fenestration within an altitude angle of 10° to ensure that they remain un-shaded in winter months, especially between the hours of 9.00am and 3.00pm.
- A distance of 21 metres between two storey elements can ensure minimal over-shadowing occurs.
- Taller buildings should be located to the north of the site, or to the south of areas that need less or no sun such as road intersections or car parking.
- Low-rise buildings should be located to the south of the site.
- If semi-detached and detached housing are positioned to the south of the site, then sunlight is able to penetrate between houses.
- On the south elevations of buildings, projecting features such as porches or garages should be avoided.
- Car parking and garages should be located to the north of housing.
- Low-pitched and hipped roofs can also minimise over-shadowing.

For further information visit:

www.est.org.uk/bestpractoce/uploads/publications/pdfs/GIR053.pdf

Reduction of heat loss

- The smaller the external surface area of a building then the less opportunity there is for heat to escape. Therefore, the exposure of a building to the external environment can be reduced by setting the building into the ground, or employing unheated intermediate spaces such as an extension, conservatory, garage, or lobby to act as thermal buffers for the main building.
- Heating demand can be reduced by ensuring that north, north-west and northeast elevations have a minimal amount of fenestration as possible, although they should however, be large enough to provide adequate daylight.

9. Site Layout and Building Design

- To reduce heat loss at night, windows on south-elevations should not be larger than usual. Similarly, where buildings do not incorporate thermal mass, which absorbs solar gains, then larger windows in southern elevations, can lead to excessive solar heat gain.

Ventilation

Buildings should maximise the use of natural ventilation in preference to mechanical ventilation and air conditioning systems. Passive ventilation is simple and maintenance free, it is also quiet and has no running costs, as it does not require the use of electricity to drive fans. Modern buildings increasingly apply the principles of natural ventilation by allowing cool air to be drawn in at low levels, and for normal convection currents to encourage the air to move upwards through the building and be ejected at high level.

Whole house passive stack ventilation systems are based on the 'stack effect'. This is the movement of planned air paths through the dwelling as a result of internal and external temperature differences and wind induced pressure differences. PSV systems ventilate the whole house by siting extracts in 'wet' rooms (e.g. kitchens and bathrooms, including en-suite), and ducting vertically to individual terminals sited on the roof. Wind induced pressure differences cause moist air in these areas to be drawn up the ducts to be replaced by fresh air through inlet vents situated in the walls or window frames of habitable rooms. A free flow of fresh air from 'dry' to 'wet' areas creates whole house ventilation. PSV systems are suitable for dwellings, commercial buildings and flats, up to 4 storeys high, that require three or less individual stacks. Each 'wet' room must be ventilated by an individual stack.

Mechanically assisted ventilation systems are suitable for dwellings, commercial buildings and flats, where, due to the room layout or the number or extract points required, PSV systems are impractical. They have the additional advantage that all extract ducts can be vented through a single roof terminal. (Source: www.ubbink.co.uk).

Cooling

Reliance on mechanical cooling systems should be minimised. Cities with warmer climates than

Southampton can deal with high solar gain without over-reliance on mechanical cooling systems.

Typical elements include:

- Light coloured heavy buildings with small shaded windows set around courtyards with fountains along tree lined avenues.
- In buildings where summer overheating may be problematic (e.g. commercial buildings where heat is generated by occupants, equipment and lighting)
- Devices such as louvres, external blinds and eaves, and well-placed deciduous trees can be specified to shade glazed areas. These shade high summer sun but allow the weaker winter and evening sun to increase the heat and light input to the building.

Where mechanical cooling is required, cooling techniques to be considered include district cooling or those powered by renewable energy technologies. 'Green roofs' and 'green walls' are vegetated building surfaces that can minimise solar gain and provide additional cooling.

Planting

- Housing can be protected from prevailing winds through the planting of shelterbelts. These should always be placed at least three or four times their mature height from south-facing elevations to minimise solar obstruction.
- Taller trees should be deciduous to enable penetration of low-level winter sun.
- Shelterbelts can also be used to protect housing from the coldest winds, which are usually from the northeast; evergreen trees are more suited for this purpose.
- Trees may be planted within public spaces and footpaths to further the year-round use of these spaces. Deciduous trees can provide shading in summer to limit solar gain and possible overheating, yet allow winter sunshine to filter through the bare branches.

For further information visit:

www.est.org.uk/bestpractice/uploads/publications/pdfs/GI027.pdf

9. Site Layout and Building Design

Landscaping

New build schemes offer the greatest scope for incorporating wildlife habitats within the framework of the buildings. Even the smallest gardens on balconies and terraces can provide a link with the natural world. Although such gardens cannot make up for a lack of open space in a neighbourhood, they are complimentary to an open space network. A tiny garden can provide features such as miniature pond and wildflowers. They can be installed almost anywhere, including the most densely urbanized areas.

Balconies

There is the potential in all houses and flats without ground-level gardens to provide built-in balconies and terraces for growing plants. These add character to a development, provide space for wildlife, and are excellent for brightening up a dreary façade. The benefits of balcony gardens greatly outweigh the space and cost needed to create them.

Green Walls

Green walls provide the opportunity to extend the natural environment into urban areas by encouraging plants to grow on and up walls. There are opportunities to establish plants in the joints between brick or fascia work or specially built ledges and terraces. Vegetation placed directly on the surfaces of buildings protects the building shell. Extra short term capital costs are usually more than cancelled by long term savings.

Green Roofs

A green roof consists of vegetation and soil, or a growing medium, planted over a waterproofing membrane. Additional layers, such as a root barrier and drainage and irrigation systems can also be included. Green roofs, whether extensive or intensive, provide wildlife habitats, reduce storm water runoff, absorb CO₂, air pollutants and dust, reduce the urban 'heat-island' effect.

Green roofs are an attractive roofing option that can reduce urban heat islands. They also:

- Reduce sewage system loads by assimilating large amounts of rainwater.

- Absorb air pollution, collect airborne particulates, and store carbon.
- Protect underlying roof material by eliminating exposure to the sun's ultraviolet (UV) radiation and extreme daily temperature fluctuations.
- Serve as living environments that provide habitats for birds and other small animals.
- Offer an attractive alternative to traditional roofs, addressing growing concerns about urban quality of life.
- Reduce noise transfer from the outdoors.
- Insulate a building from extreme temperatures, mainly by keeping the building interior cool in the summer.

Green roofs also have direct benefits for developers as they have lower maintenance costs than other roofing materials, are attractive to clients and owner of building facilities and may help to win approval for planning permission.

Flexible Structures

Changing economic, social or environmental demands, climate change, and the introduction of new technology can result in the original use of a building being no longer viable and its heating, lighting and ventilation systems requiring modernisation. If buildings are designed to be flexible in use then changes can be accommodated without the need for significant redevelopment. This can ensure that buildings have long and useful lives even if the purpose for which they were originally built changes and reduce the likelihood of it being demolished, replaced or refurbished.

Therefore, wherever practical new buildings should provide:

- Flexible space capable of multiple uses and facilities (Ground floors are particularly suited to changes of use).
- Provision should be made at the design stage for incorporating renewable energy sources and for combined heat and power wherever feasible.

9. Site Layout and Building Design

- Enable buildings by integrating sufficient access to IT services should be encouraged to support the knowledge based economy.

The internal design ensures that the building could be relatively easily adapted in future. It is important to make it practicable to change as many as possible of our internal layout decisions during the life of the building. Most buildings contain spaces, which house shared facilities such as staircases, lifts and vertical service ducts. Usually these spaces are 'hard': they are least likely to change their functions during the building's life. These hard zones must be positioned where they will not restrict the use of the remaining space.

All building uses need some links to the outside world. Therefore, the number of access points is a key factor governing how easily a building can adapt to a variety of uses.

Design attributes that contribute to achieving flexibility include:

- Use of a grid structure to provide a consistent and generic internal environment
- Use of non-load bearing partitions;
- Integration of additional service capacity and ceiling heights to facilitate changes of room use and servicing requirements.

Increasing the range of potential occupier through flexible Design Buildings with a flexible layout will attract a greater range of potential purchasers or tenants thereby ensuring the best sale or rental value and maximising the chances of prompt occupation. A flexible environment will also increase the selling-on or renting value of a building for similar reasons.

Reusing buildings

Existing buildings can represent a valuable resource that could be more expensive to replace than reuse, even if the original use for those buildings has disappeared. Conserving, recycling and restoring existing buildings is generally more environmentally efficient as it uses fewer new resources and less energy. Even when new buildings are designed to be more energy efficient, the non-renewable resources involved in demolition and

rebuilding are considerable. Older buildings can also provide a valuable link with the past, providing continuity for old and new residents.

Factors that we need to be considered include:

- the special historical or architectural interest of the building
- new uses for the buildings
- the location of the buildings
- how the building design and materials fit in with the local character

We may need a cost-benefit analysis to compare the cost of keeping and maintaining an existing building with the cost of replacing the building. This analysis should take into account energy performance. We should also consider how to improve the efficiency of the existing building, the materials to use in the building or redevelopment work and the cost of replacing the building.

It is also worth noting that, pound for pound, repairing and maintaining buildings creates more employment than building new ones. In new-build schemes, most of the cost comes from materials. For repair and maintenance, 70% of the cost comes from labour in addition, 30% from materials.

Best Practice Example 7: Buildings Reused in Southampton

1. Solent Business Centre: Warehouse - Small office units
2. South Western House: Hotel - Offices - Residential Apartments with ground floor bar
3. African Caribbean Centre: Church - Community Centre
4. BT House: Offices - Residential Apartments
5. Leisure World: Electricity Sub-Station - Cinema & nightclubs
6. Jo Da Flos: Church - Bar/Restaurant
7. Square Bar: Cinema - Bar

9. Site Layout and Building Design

9.3 Further Information

- BREEAM website:
http://projects.bre.co.uk/envdiv/sustainable_refurb/index.html
- The Energy Saving Trust Website:
www.est.org.uk
- The Green Energy Website from the National Energy Foundation:
<http://www.nef.org.uk/greenenergy/index.htm>
- The Sustainable Architecture Website:
<http://www.sustainable-architecture.org.uk>
- The Enthuse Website:
<http://www.enthuse.info/>
- The urban design compendium:
www.englishpartnerships.co.uk/urbandesign
- Sustainable Energy by Design:
www.tcpa.org.uk
- The National Green Specification (partnered with BRE):
www.greenspec.co.uk

10. Biodiversity



10.1 Introduction

Biodiversity means the great variety of natural life. It includes all plants and animals, their habitats and the complex ecosystems that sustain them. Continuing development throughout the city puts pressures on biodiversity, in particular on those species that are in decline. The protection of biodiversity and other key ecological features is a fundamental part of sustainable development. New development must minimise harm to existing biodiversity and aim to enhance habitats and wildlife. The City Council also has a role to play in responding to national and local duties and strategies to halt the loss of biodiversity.

10.2 Policy Framework

- Planning Policy Statement 9: Biodiversity and Geological Conservation
- Draft South East Plan 2006 - Policy: NRM4 'Conservation and Improvement of Biodiversity'
- City of Southampton Local Plan 2006 - Policy: SDP12 'Landscape and Biodiversity'
- Southampton Biodiversity Action Plan
- Southampton Residential Design Guide 2006

10.3 Statutory Nature Conservation Sites

Southampton has a number of areas designated as sites of international and national nature conservation importance. The City Council has statutory duties to protect such sites and their interest features and to enhance their conservation value.

The sites are identified on the Development Plan proposals map (3) and include:

- River Itchen Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI)
- Solent and Southampton Water Special Protection Area (SPA)
- Lee-on-the-Solent to Itchen Estuary Sites of Special Scientific Interest (SSSI)
- Southampton Common Sites of Special Scientific Interest (SSSI)

- Solent Maritime Special Areas of Conservation (SAC)

Site boundaries can also be found at www.natureonthemap.org.uk/

These sites receive high levels of protection, and there are specific legal requirements for assessing development impacts on certain sites (please refer to ODPM Circular 06/2005 'Biodiversity and Geological Conservation' and Circular 15/88 'Assessment of Environmental Effects'). The nature conservation interest associated with such sites is often mobile, and consideration must therefore be given to development impacts that may affect the interest even if it is outside the designated site boundary.

10.4 Local Nature Conservation Sites

PPS9 recognises that locally important wildlife sites have a fundamental role to play in meeting biodiversity targets and contributing to quality of life. Developments should avoid harm to local sites. Habitat protection and enhancement measures within developments can enhance their biodiversity and community value. Local Sites within Southampton designated as Sites of Interest for Nature Conservation (SINCs) are identified on the Development Plan proposals map and reasons for designation within the appendices to the plan. Policy NE3 of the revised Local Plan establishes the council's protection of local sites.

Protected Species

Protected species such as bats, badgers, great crested newt and slow worms are present within the city and can be encountered during development. As many species are mobile and have adapted their behaviour to the urban environment, their absence from areas of the city cannot be assumed based on geographical information alone. Such species can be found in gardens and predominantly built-up areas if habitat is suitable.

10.5 Biodiversity in the Development Process

It is imperative that biodiversity is considered from the beginning of the design process and is integrated into every stage thereafter.

10. Biodiversity

- **Professional ecological expertise** is desirable at an early stage within the development process: Biodiversity is a key urban design principle.
- **Surveys and scoping studies** may be valuable even when considering purchase of development land in order to identify ecological constraints, some of which may have unavoidable implications for the timing of development operations and environmental assessment. For information on time constraints please refer to <http://www.ciria.org/pdf/calendar.pdf>.
- **Ecological surveys**, particularly for protected species, are required prior to determination. Surveys for particular biological groups are seasonal and thus there can be considerable delays to obtaining consents unless biodiversity has been considered early in the development process. In certain cases, lack of information and incorrect considerations and process can allow legal challenges to planning consents.
- **Ecological information** should not be limited merely to survey for presence/absence but also include assessment of the impact of development on the biodiversity interest. **Details of mitigation and compensation measures should be proposed** along with **method statements for delivery mechanisms**, including monitoring and review of their efficacy. Ecological surveys and impact assessments should be compliant with Institute of Ecology and Environmental Management (IEEM) guidelines (<http://www.ieem.org.uk/ECIA.htm>).
- In their **design statements**, an applicants' Urban Designers and Landscape Architects should demonstrate how professional ecological advice has influenced design decisions.
- **Timing of site clearance and demolition** should be planned to avoid disturbance to breeding birds and migratory birds (protected by law) and other protected species such as bats.
- **Post-construction considerations** should be included in the design statement to account for minimisation of visual disturbance to migratory birds e.g. screening of waterside access.

10.6 Promoting Biodiversity in Development

Biodiversity Landscaping

Landscape schemes should be seen as an opportunity to retain, enhance or create wildlife habitats. Integrating new development into its landscape can reduce its impact on nature and reinforce local natural diversity as well as distinctiveness. Valuable wildlife habitats on development sites should be identified and protected from disturbance by appropriate measures. Existing landscape features such trees, hedgerows and walls and a range of habitats (e.g. scrub, woodland, grassland, ponds) should be incorporated into landscaping and green spaces on site.

The wider landscape setting of a site's topography, rivers, streams and green corridors should also be taken into account. It is important to keep features in context rather than as isolated fragments, hence wildlife corridors and linking habitats are encouraged. Habitats which provide ecological stepping stones to allow the dispersal of species associated with the interest of designated sites should be appropriately managed. For this reason a landscape plan should be provided at an early stage.

Where damage to existing habitat is unavoidable compensation will be sought. PPS9 states that planning decisions should aim to maintain and enhance, restore or add to biodiversity interests. Where development will result in unavoidable adverse impacts on biodiversity, planning permission should only be granted where adequate mitigation measures are put in place. A planning condition can be set out to require a mitigation strategy in line with any recommendations laid out in the Environmental Statement. The developer can enter into a planning agreement to recreate habitat.

First preference will always be for landscape/habitat creation schemes to be provided on-site as an integral part of the proposal. New ecologically functioning habitat can be created through soft landscaping. Two interesting examples are the Southern Park in Greenwich www.npaconsult.co.uk/documents/Greenwich_001.pdf and the Jubilee

10. Biodiversity

Campus, Nottingham University
<http://www.npaconsult.co.uk/nottingham.asp>.
The natural forms and landscape of Southampton mean that designing waterside access and sea walls to create opportunities for biodiversity is a particular issue.

If on-site habitat creation is not feasible, provision of appropriate off-site habitat is an alternative option. Open space contributions can be used to create natural habitats. Environmental features such as copses, ponds, ditches and dead wood piles can be created in parks and open spaces. Alternatively the developer may wish to make a financial contribution towards the management of nearby sites.

Planting

The Design Statement should demonstrate how the planting of areas would serve to foster nature conservation to satisfy Local Plan policy SDP12. The applicant should demonstrate that they have analysed the biodiversity character of the area, taken account of the Local Biodiversity Action Plan (which will identify priority species in need of attention and those such as non-native invasive species that should be avoided), and selected the appropriate species to plant in response to the assessment. Professional ecological advice is recommended.

Landscape Management Plans

Developers must also give consideration to the future uses of the site and the maintenance implications of their proposals. Professional ecological advice should be sought to inform landscaping proposals. Planning conditions require that an approved landscape scheme is maintained for a minimum period of 5 years with replacement of plants which fail to survive. Where appropriate, the Council will require details of management arrangements to ensure the long-term monitoring and maintenance of habitat creation schemes which may be secured via planning agreements. If the Council is to adopt any land a commuted sum will be required to assist in future maintenance and management.

Habitat within the framework of the building

Balconies, green walls and green roofs as well as features such as permanent raised planting beds, window boxes provide cover and resting places for

birds and food sources, either directly in the form of berries or indirectly as a result of encouraging invertebrates. In addition, artificial structures can be incorporated into developments, attracting wildlife for targeted biodiversity enhancement and/or compensation. These include:

- Bird nesting places: In many locations natural nest sites will be insufficient or non-existent, so if birds are to be attracted, artificial nest sites must be provided on or around the building. Nest boxes can be mounted on nearby walls.
- Bird feeders can be secured onto walls or hung on brackets.
- Bats need summer roosting sites and places to breed and to hibernate.

Best Practice Example 9: Weston Shore, Toilet Block

The toilets are planted with sedum to reduce the visual impact of the building and to create a new habitat for wildlife.

Best Practice Example 10: Orchards Homes, Regents Park

A survey revealed brown long-eared bats and pipistrelle bats use the site for foraging purposes. Thus significant trees, around which bats were seen to forage, were retained. Additional planting was introduced to create an alternative **foraging corridor**. Native species of tree, shrub and climbing plants were used to support the invertebrates bats feed on.

The building design incorporates vertical timber cladding, which has the potential to function as a bat roosting site, and overhanging soffits with the potential to attract to birds such as swift and house martins. **Five 'Sparrow Terraces or Flats'** were installed upon the new buildings to provide nesting units for a colony of 15 house sparrows. Modified bricks allow bat access to wall cavities

10. Biodiversity

as well as modified tiles to allow bat access to the roof space.

A total of **twelve nest boxes** will be provided amongst the retained vegetation for target species including blackbird, robin, wren, blue tit and great tit. Nest bundles were constructed and sited amongst the retained vegetation for song thrushes and long-tailed tits.

The bin store combined as a **bat sanctuary**. A purpose-designed building with has a pitched roof with a central ridge (to facilitate bat access to the roofspace), and tiled with overhanging eaves and soffit boxes. Native ivy and honeysuckle were planted near the bat sanctuary/bin store and encouraged to grow up the walls.

'Bat-friendly' building techniques were employed and the site was investigated thoroughly for the presence of fox earths.

10.7 Further Information

- The use of Green Roofs in Urban Areas from English Nature:
http://www.english-nature.org.uk/news/news_photo/Greenroofs.pdf
- For information of good mitigation techniques:
<http://www.blackredstarts.org.uk/index.html>
- Draft Circular: Biodiversity and Geological Conservation-Statutory obligations and their impact within the planning system from the ODPM website:
http://www.odpm.gov.uk/stellent/groups/odpm_planning/documents/page/odpm_plan_030967.pdf

Useful contacts

- English Nature: <http://www.english-nature.org.uk/>
- Environment Agency: <http://www.environment-agency.gov.uk/>
- Wildlife Trust: <http://www.hwt.org.uk/>

References:

- (0) Good Practice Guide from the RTPi "Planning for Biodiversity":
www.rtpi.org.uk/resources/publications/environment/biodiversity
- (1) The UK Biodiversity Action Plan website:
www.ukbap.org.uk
- (2) Planning Policy Contents Page from the ODPM website:
http://www.odpm.gov.uk/stellent/groups/odpm_control/documents/contentservertemplate/odpm_index.hcst?n=2258&l=1
- (3) The City of Southampton Local Plan Revised Deposit Version Proposals map from the Southampton City Council website:
http://www.southampton.gov.uk/images/proposals_map_tcm9-71582.pdf
(note that at present this only shows revisions & therefore some national designations are not represented. Cross reference with www.natureonthemap.org.uk/)
- (4) E.g. All nesting wild birds under the Wildlife and Countryside Act 1981, Bat species, dormouse, great crested newt are protected under the Conservation (Natural Habitats &c.) Regulations 1994. Badgers under the Protection of Badgers Act 1992.
- (5) List of habitats and species of principal importance for the conservation of biological diversity in England published by the Secretary of State for Environment, Food and Rural Affairs, in response to Section 74 (2) of the Countryside & Rights of Way Act 2000.
www.defra.gov.uk/wildlife-countryside/cl/habitats/index.htm
- (6) 'Biodiversity by design, A guide for sustainable communities' from the Town and Country Planning Association website:
www.tcpa.org.uk/content_files/TCPA%20biodiversity%20guide_lowres.pdf
- (7) Background to the distribution of important habitats and species of Southampton:- Southampton's Nature Conservation Strategy 1991 (Southampton City Council). Hard copy available from Ian.Barker@Southampton.gov.uk
- Hampshire Biodiversity Information Centre:
<http://www.hampshirebiodiversity.org.uk/infocentre.html>

11. Transport



11.1 Introduction

Cars, vans, and lorries contribute to 25% of all CO₂ emissions in Britain and account for 30% of UK total energy consumption. In addition to the implications for climate change there are also many health problems associated with traffic fumes and their impact on local air quality. Social problems also arise as a direct result of the existing transport system, such as community severance by busy roads and increased fear of road traffic accidents. Many of these issues act as a deterrent to pedestrians and cyclists and maintain the perception of UK cities as car dominated, polluted, and congested.

In new developments, there is a need to reduce travel by car and encourage the integration of access by walking, cycling, and public transport. Where car travel is necessary it is important to support new, more efficient transport technologies will little or no emissions.

11.2 Policy Framework

- Planning Policy Guidance 13: Transport
- Draft South East Plan 2006 - Policies: T7 'Parking' and T8 'Travel Plans and Advice'
- The City of Southampton Local Plan 2006 - Policies: SDP2 'Integrating Transport and Development' and SDP 4 'Development Access'

11.3 Sustainable Design Features & Processes

Development should be located as close as possible to public transport routes. Mixed-use developments can create a relatively self-contained community, which should also incorporate a comprehensive approach to sustainable travel with appropriate links to the existing transport infrastructure.

The layout of new developments should be designed to encourage pedestrians and cyclists and discourage the use of cars powered by fossil fuels. For example, footpaths should be:

- Well lit
- Suitable for all users (e.g. pushchairs, wheelchair users)
- Efficient (e.g. enable pedestrians to take the shortest possible routes)

Other design features that schemes should take account of include the following:

- In residential schemes, access to employment and retail areas needs to be integrated into the design. Similarly, when considering commercial schemes the spatial relationship of the site to local housing should also be considered.
- Building designs should incorporate lobby areas where information about public transport or car sharing can be made available.
- Lighting and landscaping of developments should contribute to pedestrian, cycle links and waiting areas being user-friendly.
- Designs of non-residential developments should make provision for shower and changing facilities at convenient locations.
- Cycle storage areas should be well designed and conveniently located.

<http://www.transportenergy.org.uk/downloads/GIR084.pdf>

Home Zones

The use of initiatives such as Home Zones can significantly contribute to encouraging pedestrians and cyclists by changing the way in which streets are used by ensuring that they are places for people, not just for traffic. Home Zones schemes are for existing or new residential streets where by changes to the road layout lead to a perception amongst motorists that they should give informal priority to other road users. The schemes typically contain:

- Modifications to street design, traffic calming and other speed reduction measures to support low speeds.
- Prescribed and/or approved signing.
- Amenity features, such as public spaces, play areas, rearrangements of street furniture and the introduction of trees, to support any new uses of streets in the community.
- Good design, both in the hard and soft elements.
- Restrictions on parking.

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Best Practice Example 11: Northam Home Zone, Southampton

This 'Home Zone' project took place in an area of approximately 4Ha and an estimated 375 residents. The aim was to shift the balance of control from the driver to the pedestrian by reducing accidents and diving speeds and introducing new uses and facilities for carriageway and adjacent public spaces.

A 20mh zone precedes the Home Zone entrance. All roads in the area have been remodeled to include raised planters with trees and shrubs and chevron parking to create horizontal deflection. Occasional areas of raised granite set paving to provide vertical deflection. Footways have been removed in Augustine Road and Personage Road to create shared surface streets. In addition, a car park was redeveloped to provide part of the land for the park.

Residents are pleased with the environmental improvements the Home Zone has brought such as the 'greening' of the area: the distinctive character of lighting and art features; reduced traffic speeds and new park. Children now play in the streets and new park and Children come in to play in the area from surrounding streets. A man with a young family living in the area said "You've saved me from having to move out of the area because of traffic speeds".

Cleaner Vehicles

Low-carbon vehicles and fuels offer opportunities to radically reduce the environmental impact of road transport – both locally in terms of reduced air pollution emissions and lower noise levels and globally in terms of climate change.

The use of cleaner vehicles and cleaner fuels for vehicles can be promoted through the planning system. For example, London Borough of Camden Council promotes the development of Liquefied Petroleum Gas (LPG) refuelling points in conjunction with the promotion of LPG vehicles.

Electric vehicles use a battery and electric motor to power the vehicle so they produce no emissions at the point of use and are also very quiet. These vehicles are well suited to city driving and new developments can incorporate re-charging facilities for such vehicles.

The following link to the Energy Saving Trust's Transport Energy website, indicates the location of refuelling stations for Liquid Petroleum Gas (LPG), Natural Gas, Biodiesel and Electricity:

Best Practice Example 12: St. Mary's Street, Southampton (Cindan Land Ltd)

The Cindan Land residential development in St Mary Street was designed to provide 63 residential units above a parade of existing shops. No car parking spaces were incorporated in this scheme but alternatively 63 bicycles were provided as well as 6 electric powered bicycles all for use of the occupiers of the development. Such a city centre location is well served by public transport and in close proximity to local amenities; consequently the need to travel is reduced. It is intended that this be established as pilot scheme to assess the long-term viability of electric powered bicycles. In addition to this the development also incorporated other sustainable building design features including a low-pitched roof with solar membrane that is designed to provide sufficient power to run communal lighting and power, within the development. As such the development has won plaudits from many "green" campaign groups, including Transport 2000.

Car Clubs

People like to enjoy 'mobility insurance' whereby they can be confident that should they need to use a car, there is an opportunity to do so. Car clubs provide a solution to this whilst reducing the need for parking and freeing up space that can be used elsewhere in the development.

11. Transport

Car clubs are neighbourhood based, short-term car rentals, which provide access to a car, eliminating the need to own one. Car clubs typically incorporate the following features:

- Cars can be hired 24 hours a day for periods of as little as an hour at a time.
- A car is booked through a central office using the telephone or Internet.
- They can be booked weeks in advance, or immediately prior to use.
- Cars are located at local reserved parking ‘stations’ within 10 minutes walk of the development. (Cycle stands are also located close to car club bays to enable cycling to pick up the car).
- Cars are often accessed by a smartcard, owned by the user.
- A range of vehicles enables members to choose one to meet their needs

Car clubs need to be established before a development is first occupied or bought into use. Their success is dependent on the number of parking spaces provided with a new development i.e. no more than one per unit. As use of a car is designed to be occasional, car clubs must also be integrated into a sustainable travel programme with good pedestrian and cycles links as well as access to a good public transport network.

Best Practice Example 13: Bedzed, Sutton

The development recognizes that people require “mobility insurance”. To cater for this need there is a “Zedcars” car club, which allows members of the development to pay for use of a communal car by the hour. By reducing car dependence in this manner the developers were able to negotiate a reduction in the number of parking spaces from 160 to 84 with the Local Authority, allowing the provision of additional housing.

The development also encourages the use of more sustainable vehicles. On-site integrated photovoltaic panels generate enough electricity to charge 40 electric vehicles and electric vehicle charging facilities are offered free of charge. Whilst an annual charge is levied on parking spaces, there are rebates for electric and LPG vehicles.

Travel Plans

Applications for major projects must be accompanied by a comprehensive Travel Plan, which is reviewed at regular intervals to ensure it remains effective. Travel plans are a means by which sustainable approaches to transport can be implemented in new developments. They should be designed to encourage the use of sustainable modes of transport such as car clubs, car sharing, public transport, walking or cycling. Partnerships with public transport operators and the Local Authority can be created, to identify opportunities for more convenient services to the development site and the possibility of negotiating travel pass schemes. Similarly, partnerships with local suppliers of bicycles or cleaner vehicles may also be possible. Employers could also offer their staff interest-free loans for bicycles or cleaner vehicles.

Further elements of a travel plan could include:

- Making public transport information widely available.
- Providing cycling facilities.
- Negotiating improved public transport services.
- Setting up car-sharing schemes.
- Offering flexible working practices.
- Signing up to and promoting the car club.
- Restricting and / or charging for car parking.

11. Transport

Best practice example 14: City College Travel Plan, Southampton

The college has drawn up a strategy for environmentally friendly transport. During the initial three-year period of the plan, the College set itself a series of quantitative targets to be met each year. These targets included: reducing the number of parking spaces, increasing the number of spaces available for scooters/motorcycles, increasing the number of spaces available for secure cycle parking, increasing the number of staff traveling by public transport, increasing the number of staff taking part in car sharing schemes, and increasing the number of staff cycling to work.

The college undertook a survey of both staff and students on their travel routes and methods of transport and formulated the following measures:

Provision for cyclists

- Secure cycle parking
- Shower and changing facilities
- Space for drying and storing wet towels

Car Park Management Plan

- Charging for a parking space
- Reserved spaces for those who car share

- A review of parking permits for staff living within the city Personalised journey planning service

Accessibility

- Campaigning for improvements to the accessibility of college sites for pedestrians, including pedestrianised areas and improved street lighting
- Involvement in planning for installation of CCTV in the area
- The College is also considering options for the future including some home working

Car sharing scheme

Provision of Information

- Staff bulletins and publications
- Student notice boards
- Student newsletters
- Induction material for new staff and students
- Events for new students
- Staff and student intranet
- College website
- Visitors issued with maps and information on the public transport services and information on cycle facilities on site

Annual Review & Monitoring

11.4 Further Information

- General Information on Transport and Climate Change from the ODPM “The Planning Response to Climate Change: Advice on Better Practice”
http://www.odpm.gov.uk/stellent/groups/odpm_planning/documents/page/odpm_plan_032088.pdf
- For more information on compiling travel plans from the Department of Transport’s Sustainable Travel pages:
http://www.dft.gov.uk/stellent/groups/dft_susttravel/documents/sectionhomepage/dft_susttravel_page.hcsp
- For more information on compiling Travel plans, The Benefits of Green Transport Plans from the DFT.
http://www.dft.gov.uk/stellent/groups/dft_susttravel/documents/source/dft_susttravel_source_027688.doc
- Further information on Travel Plans from the Energy Saving Trust Transport Energy Pages:
<http://www.transportenergy.org.uk/developtravelplan/>
- For more information on car clubs the Car Plus website:
<http://www.carclubs.org.uk/index.html>
- For more information on car sharing
www.hantscarshare.com
- For information on cleaner vehicles and fuels, the Transport Energy Pages from the Energy Saving Trust:
<http://www.transportenergy.org.uk/>
- General Information Report 84: Travel Plans, A guide for developers from the Energy Saving Trust’s, Transport Energy web pages:
<http://www.transportenergy.org.uk/downloads/GIR084.pdf>
- Sustainable approaches to transport at the Bedzed development:
 - <http://www.bedzed.org.uk/index.htm>
 - <http://www.est.org.uk/bestpractice/uploads/publications/pdfs/GIR053.pdf>
 - <http://www.transportenergy.org.uk/tools/refuellingmap/index.cfm>
 - <http://www.odpm.gov.uk/>

I. Glossary

- **BREEAM**
Building Research Establishment Environmental Assessment Method
- **CABE**
Commission for Architecture and Build Environment
- **EC funding**
European Commission funding
- **Eco homes**
BREEAM award given to sustainable residential developments
- **Landfill Directive**
Statutory Document which aims to reduce the amount of biodegradable municipal waste sent to landfill sites in the UK
- **Local Development Plans**
Set out local authorities long-term planning policies for the local authority
- **Building Regulations**
Set standards for the design and construction of buildings
- **Planning Policy Guidance**
Provides guidance to local authorities and others on planning policy and the operation of the planning system.
- **Planning Policy Statement**
Provides guidance to local authorities and others on planning policy and the operation of the planning system.
- **South East Plan**
Regional planning document
- **Sustainable Communities Plan**
A long-term programme of action for delivering sustainable communities in both urban and rural areas, launched by the Department for Communities and Local Government in 2003.

II. Appendix 1

Sustainable Design Features: Indicative Costs

Solar Panel Heaters

Flat plate collector solar panels are the most common type of solar panel; prices range from £2,000 - £3,000 per panel.

The evacuated tube system costs can range from £3,000 to over £4,000 for professionally installed systems.

Photovoltaic Cells

Costs of photovoltaic cells range from £4000 to £8000/kWp for a 1kWp (the peak output of the panel) roof mounted system. The lower prices will be obtainable for bulk orders or large systems.

Prices range from £10 - 15,000/kWp for façade or atrium systems.

Community Heating Schemes (With Combined Heat and Power Systems)

The cost of providing community heating with a CHP plant is estimated as: £2000/unit over the cost of standard central heating for a 50 unit urban development, £1320/unit for a 500 unit urban development.

An extra cost of £50,000 for CHP unit (over and above standard heating) has been estimated: for a typical factor unit (5000m² production 1000m² of office and for typical warehouse unit(13000m² production and 3340m² office). Costs would clearly be site specific and dependent on loads served.

On-Site Wind Power

Systems for households or businesses (1.5kW to 10kW can cost between £5,000-£25,000, including turbine, mast, inverters, storage (if required) and installation; depending on the size and type of the system installed.

Larger turbines serving whole communities will have higher costs with a 20KW turbine costing around £80,000.

Ground Sourced Heat Pumps

Ground source heat pumps tend to cost more than traditional gas heating system to install, and are therefore more suitable for areas with no gas supply, where there will be a significant running costs and CO₂ savings compared with electric systems.

The main additional cost in a ground sourced heat pump system is the installation of the pipes in the ground. Costs vary depending on the ground conditions and the length and depth that is required for installation. The additional costs per house is around £2000 - £3000

Energy Sub Metering

The assumed cost of sub metering is £2000 for both a typical factory unit (5000m² production, 1000m² of office) and for a typical warehouse unit (13,000m² production, 3340m² office).

II. Appendix 1

Sustainable Design Features: Indicative Costs

Water Efficient Appliances

Tap inserts to reduce the flow of water can cost as little as £2 while ready made water efficient taps can range from £20 - £90 depending on manufacturer and performance levels. Flow regulators for basins and shower flow restrictors can cost as little as £10.

The EU energy label gives efficiency information that retailers and manufacturer must display by law, on all new washing machines and dishwashers. Guidance ratings of A-G are applied to appliances with A being the most water efficient and G being the least.

Water efficient washing machines can range between £249 and £350, while water efficient dishwashers can range between £234 to £650. (Industrial & Commercial measures)

It has been estimated that fitting 20 4/6 litre flush toilets in factory or warehouse units would increase cost by £1200 per building. (A typical factory unit comprises 5000m² production, 1000m² of office and a typical warehouse unit comprises 13,000m² production, 3340m² office.)

For exact prices, please seek advice from an independent advisor.

Greywater and Rainwater Recycling

Costs for greywater systems vary according to suppliers. The fitting of a domestic sized system can cost around £3,000.

Rainwater wall mounted water butts made from recycled polythene can cost up to £100. A range of water butts are available with prices vary depending on materials, size and design.

Sustainable Drainage Systems (SDS)

A range of products is available and technical advice and methods of installation should be sought prior to the design of the development.

For further information please contact Southampton City Council Building Control on 023 8083 2896.

Airtight Construction

For further information on how to improve air tightness within buildings to meet the requirement set out in Part L of the Building Regulations please contact Southampton City Council Building Control on 023 8083 2896.

Reclaimed Construction Materials

For further information on how to use reclaimed materials and sourcing of such materials to meet the requirements set out in Part L of the Building regulations, please contact Southampton City Council Building Control on 023 8083 2896.

II. Appendix 1

Sustainable Design Features: Indicative Costs

Cycle storage/Cyclists facilities	<p>Floor and wall mounted bike parking racks costs vary £200-£600 depending on size.</p> <p>A basic stand to accommodate two cycles will cost between £60 - £100.</p> <p>A covered locker costs around £500 per cycle. A shelter for 20 cycles can range from £1,000 - £5,000 upwards.</p> <p>For exact prices, please seek advice from an independent advisor.</p>
Car Clubs	<p>Car clubs can be set up within large-scale developments as a compromise to the reduction of car parking spaces on site. A car club will also reduce the movement of traffic in and around the site as it will encourage residents to use a car as and when necessary.</p> <p>Independent car clubs are also available and can be found online. These could be promoted as part of a marketing scheme for the sale of developments.</p>
Cycle Lanes	<p>For further information the requirements of cycle lane requirements please contact Southampton City Council Transport Department on 023 8083 2366.</p>
Travel Plans	<p>For further information the requirements of travel plans please contact Southampton City Council Transport Department on 023 8083 3926.</p>
Commission a BREEAM Assessment or Ecohomes Assessment	<p>Design & Procurement Assessment: £2735 base fee plus £135 per 1000m2. BREEAM recommend that this is followed by a Post Construction Review at a cost of £1690 base fee plus £135 per 1000m2.</p>
Passive Stack Ventilation	<p>For further information on the requirements of passive stack ventilation and installation please contact Southampton City Council Building Control on 023 8083 2896.</p>
Whole Mechanical Ventilation systems with Heat Recovery	<p>For further information on the requirements of whole mechanical ventilation systems with Heat Recovery please contact Southampton City Council Building Control on 023 8083 2896.</p>
Recycling Facilities	<p>Variety of products are available and should be researched to find the most appropriate.</p>

II. Appendix 1

Sustainable Design Features: Indicative Costs

Green Roofs	The cost of growing materials is in the region of £10-£15/m ² . Green roofs have been shown to reduce heating and cooling costs of commercial buildings by up several thousand pounds a year, recovering costs of installation in a relatively short time. A green roof system protects the waterproofing membrane from climatic extremes and can almost double its life expectancy, lasting up to 60 years.
Improved Building Fabric Insulation	(Industrial & Commercial) A 15% improvement over Part L building regulation standards for U-values of exposed walls, roof and floors is estimated to cost £100,000 for a typical 6000m ² factory unit and £300,000 for a typical 16300m ² warehouse unit. A 15% improvement over Part L building regulation standards for U-values of glazing is estimated to cost £20000 for the factory unit and £60,000 for the warehouse unit.
Energy Efficient External Lighting and Controls	<p>A single CFL bulb usually costs between £4 and £12. Grants may be available under the Energy Efficiency Commitment Scheme for the installation of Low Energy Lighting.</p> <p>The control devices may cost £10-£20/unit.</p>
Efficient Domestic Appliances	Depending on the specific make, model and type of appliance an A rated product may be more expensive to purchase than lesser rated appliances although this differential is decreasing and in some cases there will be no differential.
Energy Zoned Heating Controls	Increased cost for installation of thermal zoning is estimated as £1000 for a typical factory unit (5000m ² production, 1000m ² of office) and £3000 for a typical warehouse unit (13,000m ² production, 3340m ² office).

Source: <http://www.hosted-fabermaunsell.com/sdc/>

III. Appendix 2




City of Southampton Local Plan Policies

- Sustainable Transport – SDP 2, SDP 4
- Landscaping and Biodiversity – SDP 12
- Land & Building Reuse – SDP 13 (i)
- Green Construction – SDP 13 (ii)
- Energy Minimisation, & Passive & Renewable Energy – SDP 13 (vi), SDP 14, & SDP 17
- Water Efficiency – SDP 13 (vii)
- Waste Management & Recycling (during construction & lifetime of development) – SDP 13 (viii)
- Air Quality: Air Quality Management Areas – SDP 15
- Combined Heat and Power (CHP) – SDP 13 (v)
- Use of Natural Heat & Light – SDP 13 (iii)
- Flood Risk – SDP 20
- Water Quality and Drainage – SDP 21

IV. Appendix 3 Policy Tools

Document		Issues for Sustainable Design
PPS1	Creating sustainable communities	Move to spatial planning – gives policy backing to evaluate wider environmental issues
PPG3	Housing	Recycling Brownfield land High density development
PPS6	Town centres	Sequential testing
PPS9	Nature conservation	Incorporation of biodiversity in new development
PPS12	Local development frameworks	Increased weight to SPDs over SPGs Sustainability appraisals Strategic environmental assessments
PPG13	Transport	Maximum parking standards Green travel plans Development in transport corridors
PPS22	Renewable energy	Requirement for policies to: ‘promote and encourage, rather than restrict’, the development of renewable energy resources
PPS23	Planning and pollution control	Precautionary principle
PPG25	Planning and flood risk	Precautionary principle
RPG9/Draft South East Plan 2006	Regional Guidance	Targets for renewable energy generation Energy assessments On-site renewables Waste self-sufficiency

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All written information is available, on request, in **larger** print, Braille  on audio tape  and on disk  . It is also available in other languages. Please contact 023 8083 4649.

www.southampton.gov.uk

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