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Wise use of resources

Good practice note 4

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The Environment Agency is the leading public body protecting and improving the environment in England and Wales.

It's our job to make sure that air, land and water are looked after by everyone in today's society, so that tomorrow's generations inherit a cleaner, healthier world.

Our work includes tackling flooding and pollution incidents; reducing industry's impacts on the environment; cleaning up rivers, coastal waters and contaminated land; and improving wildlife habitats.

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Wise use of resources

Society's demands on the earth's supply of resources, such as water, energy and minerals, are increasing: more houses are being built, the population is expanding and standards of living are rising. However, inefficient use of these resources also puts pressure on the environment, leading to problems of waste disposal, pollution and global warming to name but a few.

Incorporating principles of sustainability into quality design provides the opportunity to create better buildings. This is being encouraged by emerging changes in best practice. One example is the Code for Sustainable Buildings as recommended by the Sustainable Buildings Task Group report, May 2004.

Local planning authorities will seek a sustainable pattern of development. They will also encourage resource-efficient design and construction. New development must also comply with building regulations. These have a sustainable development requirement and set minimum standards for energy efficiency.

The wise use of resources needs to be considered in all elements of the design process including:

- site selection 3.1
- mix of uses 3.2
- siting and layout of development 3.3
- building design 3.4
- building materials 3.5
- building services 3.6

- building construction 3.7
- fixtures and fittings 3.8

To prompt developers to use resources wisely during design and construction. The Environment Agency has set out examples of good practice as a first step. We also provide details of other sources for information and advice.

Step 1 – Clarify the needs of the development.

Good practice

1. Consider whom the development will serve. For example:
 - where will people live, work?
 - what facilities and services will they need?
 - what standard of heating or ventilation will they need?
2. Consider the planning policy implications of the proposed development.
 - Refer to the relevant plan.
3. Consider the priorities of the developer.

Step 2 – Develop strategic objectives to reduce resource consumption.

For example:

- Maximise solar gain.
- Minimise heat loss.
- Reduce water and energy consumption.
- Reduce the distance over which resources will need to be transported.
- Maximise the use of renewable materials.
- Encourage future users of the development to lead sustainable lifestyles.

Step 3 – Consider options to meet the needs of development and to consume less resources.

Step 3.1 Site location:

Good practice

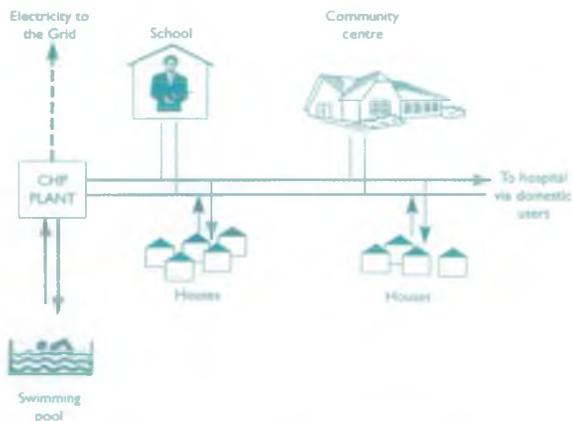
Locate the development to reduce the need to travel and to make use of the existing infrastructure.

- How far away are the facilities and services which meet the needs of the development?
- Is the site well served by public transport? Is it possible to link into existing cycling and pedestrian routes?
- Consult the infrastructure providers – the sewerage undertakers, water and energy companies, education and health authorities – about the capacity of nearby services.

Step 3.2 Mix of uses:

Good practice

Consider a mix of uses that will provide a balanced demand for heat and power during the day and the night. This increases the feasibility of combined heat and power.



Combined heat and power (CHP)

Step 3.3 Siting and layout of development:

Good practice

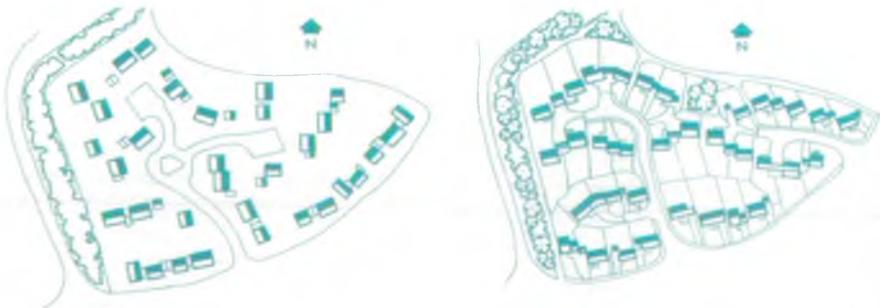
Routes and pathways

Provide safe cycling and pedestrian routes that also create amenity space and enhance natural features.



Maximise solar heating access

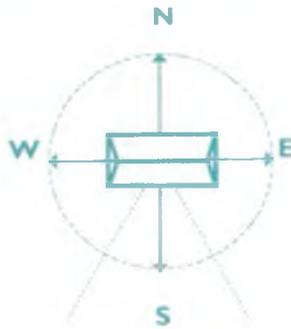
Residential roads should ideally run east-west to facilitate south-facing front or rear housing layouts.



Left – conventional layout Right – Passive solar layout

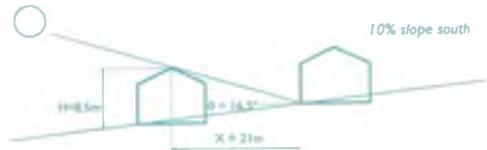
Orientation

Site building with one elevation to face within $\pm 30^\circ$ of due south.

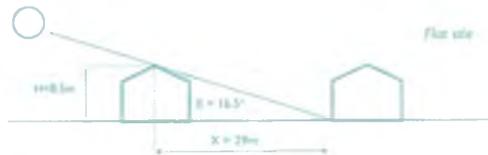


Overshadowing

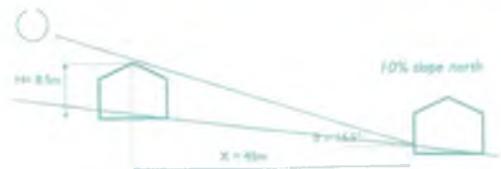
- Minimum spaces between buildings can be calculated to reduce the negative effect of overshadowing.



- New planting can be carefully selected to reduce the negative effect of overshadowing from trees.



- South-facing slopes will allow for tighter spacing, without reducing the level of solar access.



Minimise heat loss

Building groupings

Arrange buildings to provide protection from cold winter winds, for example by:

- avoiding long, uninterrupted passages and short gaps between dwellings;
- by ensuring buildings are uniform heights.

Density

Higher densities may act as a constraint on solar access. However the milder urban climate is a form of compensation.

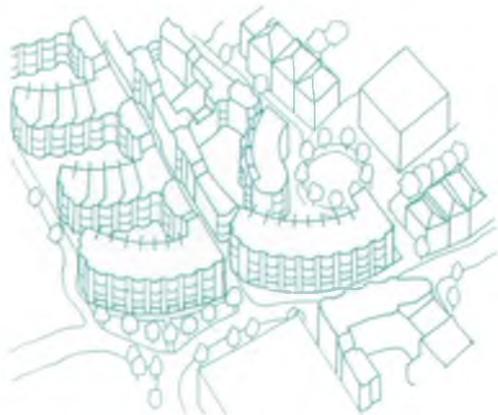


Illustration of high density

Shelter belts

- Wind protection over a northerly arc is advisable against cold winds.
- Sheltering is desirable at corners to reduce the impact of the wind.

3.4 Building design:

Good practice

Compactness

Terraced houses and low-rise flats are more energy efficient than detached or semi-detached buildings.

Conservatories

- Conservatories can provide thermal buffering to a poorly insulated house.
- South-facing conservatories can also increase solar gain.

Glazing

- South-facing double-glazed windows provide a form of solar heating.
- Reduce the size and number of north-facing windows.

Internal layout

Locate rooms that require a higher temperature, such as living rooms, on the southerly side of the dwelling.

Spaces

Encourage sustainable lifestyles by providing:

- living and work space;
- cycle storage;
- recycling facilities.



Step 3.5 Building materials:

Good practice

Reuse on-site resources

- Reuse or refurbish any existing buildings or building materials.
- Reuse topsoil and subsoil rather than buying them in.

Use local materials

- Identify and use local building materials. Consult the local planning authority for advice.

Use renewable materials

For example, use timber from sustainably managed forests.

Use materials with a good standard of insulation.

For example, use low-emissive glazing.

Step 3.6 Building services:

Good practice

Energy

- Investigate Government advisory and assistance schemes for Renewable Energy and Combined Heat and Power
- Locate power and heat source close to recipients of heating

Water

- Consider collecting and re-using rainwater and grey water onsite
- Consider adopting water efficiency measures.



Step 3.7 Building Construction:

Good practice

Procurement

Order materials carefully to minimise amount of wastage.

Waste

- Plan demolition methods to keep reusable materials in good condition for reuse or recycling.
- Crush hardcore on site to reduce transportation.
- Shred timber waste and use for mulching.

Labour

Use local labour to reduce travelling distances.

Step 3.8 Fixtures and fittings:

Good practice

Energy

Fit energy-efficient appliances e.g. A-rated domestic appliances.

Water

Fit water-efficient fittings e.g. flow restrictor taps.



Step 5 – Develop detailed design solutions to reduce resource consumption.

Good practice

1. Seek further advice from the sources of information and advice listed in this leaflet.
2. Discuss development objectives with the local planning authority.
3. Ensure the design team have the relevant skills and experience to deliver the strategic objectives.

Where to find out more

Further guidance and advice

Building Research Establishment Environmental Assessment Method (BREEAM). Tel: 01923 664462
www.BREEAM.org

By Design: Urban Design in the Planning System, (DLTR) and (CABE), 2000. Available from
www.planning.odpm.gov.uk

A sustainable checklist for developments
www.sustainability-checklist.co.uk

Places, Streets and Movement: A companion guide to Design, Bulletin 32 DTLR, 1998.

A Guide to Green Networks, English Nature.

The Urban Design Compendium, Llewlyn-Davies for English Partnerships and the Housing Corporation, 2000.

For travel planning advice, contact local planning authorities.

For measures to encourage cycling see Sustrans at www.sustrans.org.uk

Energy-efficient design

Energy Efficiency Best Practice Programme, The Enquiries Bureau, BRESCU. Tel: 0845 1207799. Email: DesignAdvice@bre.co.uk

Energy Saving Trust
www.est.org.uk

National Building Specification
www.thenbs.co.uk

Environment and Energy Helpline
Tel: 0800 585794.

Association for Environment Conscious Building.
Tel: 01559 370908
www.aecb.net

Construction and waste

The Green Guide to Housing Specification, Anderson J and Howard N, BRE, 2000.

Green Construction:
www.greenconstruction.co.uk

Advice on using waste materials in construction: www.bre.co.uk

Advice on minimising waste, pollution and recycling:
www.ciria.org.uk

Waste Minimisation and Recycling Directory, Environment Agency. A free guide to companies that offer recycling services. Contact the helpline on 08708 506 506.

Waste Minimisation and Recycling in Construction Guides, CIRIA. Tel: 0207 5493 300.
www.ciria.org.uk/environment
www.ciria.org.uk/publications

Water efficiency

Water Demand Management
Centre of the Environment Agency:
www.environment-agency.gov.uk/savewater
Tel: 01903 832275.
Email: Helen.Parrish@environment-agency.gov.uk

Other Good Practice Notes in this series

Flooding

Practical advice on how to ensure new development is at minimal risk of flooding and does not increase the risk of flooding elsewhere.

Drainage

Practical advice for designing drainage schemes to avoid pollution and help return water to the environment naturally.

Watercourses

Practical advice on restoring and enhancing watercourses, to benefit wildlife and the community.

Wise use of resources

Practical advice for resource-efficient design and construction, to conserve natural resources and reduce operational costs.

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