

London Borough of Barking and Dagenham

Sustainable Design and Construction

Planning Advice Note 5

For consultation and advice on any scheme, please contact:

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Chapter 1 — Introduction

1.1 The aim of this planning advice note (PAN)

1.1.1 The aim of this advice note is to provide guidance to planners, developers, architects and facility managers on how to achieve the Council's requirements in the areas of sustainable design and construction. This PAN will help us achieve policies set out in our Unitary Development Plan (UDP) and the London Plan, and will be used when considering new Local Development Plan (LDF) policies (see paragraph 2.6.2)

1.2 Do I have to follow the advice in this planning advice note?

1.2.1 Although you do not have to follow the advice in this PAN to get planning permission, it provides important guidance about how to meet certain UDP policies. When we are deciding whether to approve planning applications, we will consider whether you have followed the advice in this PAN. All the advice on this PAN is backed by policies in the London Plan, particularly Policy 4B.6 (see chapter 2).

1.3 Why is the Council promoting sustainable design and construction?

1.3.1 'Sustainable design and construction' is an all-encompassing phrase for a large number of design elements including designing buildings to maximise solar gain, using reused or recycled materials in the construction phase and installing water saving devices.

1.3.2 The reason why these measures are important to the Council is because, when applied in a development project, they deliver buildings that not only provide a high quality environment for their occupants but minimise the negative environmental impact any new building has on the planet.

1.3.3 Sustainable design and construction is underpinned by a number of principles such as efficiency, longevity, health, local responsibility and sensitivity to place to list a few. Many of these principles are echoed in the Council's social, economic and environmental policies that in turn are underpinned by our communities' priorities. This places sustainable construction and design at the core of the Council's vision for delivering sustainable communities in the years to come.

1.4 Where has the specific guidance in this PAN come from?

1.4.1 The guidance in this PAN is based on national, regional and local policy relating to sustainable design and construction (see chapter 2). This PAN highlights requirements that are of particular importance to Barking and Dagenham Council given the local circumstances in our borough. Such local circumstance is Barking Town Centre's designation as an Energy Action Area by the Mayor of London. This means that all developments within Barking Town Centre are expected to significantly reduce carbon dioxide emissions beyond Building Regulations L and incorporate community heating or Combined Heat and Power (CHP).

- 1.4.2 While efforts have been made to include further sources of information for each topic covered, the Council's Spatial Planning and Environmental Sustainability Group will be able to provide further advice. Developers are encouraged to contact the Council at the earliest opportunity to discuss sustainable design and construction.

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Chapter 2 — Relevant policies

National Policy

2.1 National Planning Policy

2.1.1 Planning Policy Statements (PPSs)

These statements provide the planning policy context for sustainable development and impact on many design and construction issues.

Planning Policy Statement 1: Delivering Sustainable Development (2005). PPS 1 outlines the Government's objectives for the planning system. It states that 'regional planning authorities and local authorities should promote resource and energy efficient buildings; community heating schemes, the use of combined heat and power, small scale renewable and low carbon energy schemes in developments; the sustainable use of water resources; and the use of sustainable drainage systems in the management of run-off.'

Planning Policy Statement 9: Biodiversity and Geological Conservation (2005). PPS 9 states that 'development policies should promote opportunities for the incorporation of beneficial biodiversity and geological features within the design of development'

Planning Policy Statement 10: Planning for Sustainable Waste Management (2005). PPS10 states that 'planning authorities should ensure that new development makes sufficient provision for waste management and promote designs and layouts that secure the integration of waste management facilities without adverse impact on the street scene' or, in less developed areas, the local landscape.' Furthermore 'proposed new development should be supported by site waste management plans.'

Planning Policy Statement 22: Renewable Energy (2004) PPS 22 states that 'local planning authorities may include policies in local development documents that require a percentage of the energy to be used in new residential, commercial or industrial developments to come from on-site renewable energy developments.'

Planning Policy Guidance 25: Development and Flood Risk PPG25 explains how flood risks should be considered at all stages of the planning and development process in order to reduce future damage to property and loss of life. It states that 'flood risk and other environmental damage can be managed by minimising changes in the volume and rate of surface runoff from development sites through the use of sustainable drainage systems'. The ODPM is at the time of publication consulting on *Planning Policy Statement 25 (PPS 25)* which will provide further clarity on these issues.

Further information:

Office of the Deputy Prime Minister (ODPM)

<http://www.odpm.gov.uk/index.asp?id=1143803>
Planning Policy Statements

ODPM
<http://www.odpm.gov.uk/index.asp?id=1144113>
Planning Policy Guidance: Development and Flood Risk

ODPM
<http://www.odpm.gov.uk/index.asp?id=1162059>
Consultation on Planning Policy Statement 25: Development and Flood Risk

2.2 Building Regulations

2.2.1 **ODPM, Building Regulations Approved Documents and Associated Guidance, Part F (Ventilation), Part H (Drainage and Waste Disposal) and Part L (Conservation of Fuel and Power) (2002)**

Part F and L relate to ventilation and conservation of fuel and power respectively which combined set standards for energy efficiency of new buildings. Part H regulates the provision of refuse (and recyclables) storage in new developments.

2.2.2 **Building Regulations 2006 (Parts F&L)**

These revised Building Regulation energy efficiency standards improve the minimum level of energy efficiency by 40% since the introduction of 1995 Part L Building Regulations. Part L 2006 require calculations based on the potential performance of the building based on standardised occupation and behaviour in relation to space heating, hot water heating and lighting. Compliance with Part L 2006 requires calculation of the home's carbon dioxide emission rate (DER) in accordance with the procedures set out in SAP 2005. This emission rate must not be greater than the target carbon dioxide emission rate (TER) derived according to the procedure published in Approved Document L1A 2006.

Further information

Office of the Deputy Prime Minister (ODPM)
<http://www.odpm.gov.uk/index.asp?id=1130478>
Building Regulations and Approved Documents

2.3 National strategies

2.3.1 **Sustainable Communities: Building for the future (2003)**

Also known as the Sustainable Communities Plan, this document sets out a long-term programme of action for delivering sustainable communities in both urban and rural areas. It aims to tackle housing supply issues in the South East, bring all social housing up to the Decent Homes standard by 2010, protect the countryside and improve the quality of our public spaces. The Plan spells out a new approach to how we build and what we build.

2.3.2 **National energy, waste and biodiversity strategies**

Our Energy Future – Creating a Low Carbon Economy (2003)

The national energy strategy outlines the Government's objective to radically reduce the consumption of fossil fuels over the next fifty years as a means of reducing greenhouse gas emissions and delivering long term energy security. It highlights the key solutions to improving energy efficiency and increasing our exploitation of renewable energy. This energy policy builds upon the approach outlined in Climate Change Strategy (1999) which outlined a strategy to reduce the UK's CO2 emissions by 20% by 2010. The UK Climate Change Strategy is currently being reviewed.

Working with the Grain of Nature (2002)

This national biodiversity strategy strongly encourages development that supports and improves wildlife habitats. It highlights how nature conservation is essential in creating successful urban communities in the built environment.

Waste Strategy 2000

The national waste strategy sets a framework for reducing the amount of waste produced by municipalities, commerce and industry, recycling more of the waste that is produced and extracting energy from any residual waste before landfilling. The strategy sets targets for reducing the amount of municipal biodegradable waste landfilled and sets local authorities targets for recycling and composting household waste.

Further information:

Department of Trade and Industry (DTI)

<http://www.dti.gov.uk/energy/whitepaper/index.shtml>

'Our Energy Future — Creating a Low Carbon Economy' (2003)

Department of Food and Rural Affairs (Defra)

<http://www.defra.gov.uk/wildlife-countryside/biodiversity/biostrat/biostrategy1to4.pdf>

'Working with the Grain of Nature' (2002)

Defra

<http://www.defra.gov.uk/environment/waste/strategy/cm4693/pdf/wastvol1.pdf>

Waste Strategy 2000

Regional policy

2.4 Regional Planning Policy

2.4.1 The London Plan, 'Spatial Development Strategy for Greater London' (2004)

The London Plan has development plan status and includes a number of policies on the environment which developments must adhere to. The guidance in this PAN is intended to help developers implement these policies.

Policy 4A.9 Providing for renewable energy

'The Mayor will and boroughs should require major developments to show how the development would generate a proportion of the site's electricity or heat needs from renewables, wherever feasible.'

Policy 4A.7 Energy efficiency and renewable energy

'The Mayor will and boroughs should support the Mayor's Energy Strategy and its objectives of reducing carbon dioxide emissions, improving energy efficiency and increasing the proportion of energy used generated from renewable sources by:

-requiring the inclusion of energy efficient and renewable energy technology and design, including passive solar design, natural ventilation, borehole cooling, combined heat and power, community heating, photovoltaics, solar water heating, wind, fuel cells, biomass fuelled electricity and heat generating plant in new developments wherever feasible.'

Policy 4A.8 Energy assessment

'The Mayor will and boroughs should request an assessment of the energy demand of proposed major developments, which should also demonstrate the steps taken to apply the Mayor's energy hierarchy. The Mayor will expect all strategic referrals of commercial and residential schemes to demonstrate that the proposed heating and cooling systems have been selected in accordance with the following order of preference: passive design; solar water heating; combined heat and power, for heating and cooling, preferably fuelled by renewables; community heating for heating and cooling; heat pumps; gas condensing boilers and gas central heating. Boroughs should apply the same criteria to major developments.'

Policy 4B.6 Sustainable design and construction

'The Mayor will, and boroughs should, ensure future developments meet the highest standards of sustainable design and construction and reflect this principle in UDP policies. These will include measures to:

- Re-use land and buildings;
- Conserve energy, materials and other resources;
- Ensure designs make the most of natural systems both within, in and around the building;
- Reduce the impact of noise, pollution, flooding and micro-climatic effects;
- Ensure developments are comfortable and secure for users;
- Conserve and enhance the natural environment, particularly in relation to biodiversity;
- Promote sustainable waste behaviour in new and existing developments, including support for local integrated recycling schemes, CHP schemes and other treatment options;

Applications for strategic developments should include a statement showing how sustainability principles will be met in terms of demolition, construction and long-term management;

Boroughs should ensure that, where appropriate, the same sustainability principles are used to address planning applications.'

2.4.2 **Draft Supplementary Planning Guidance on Sustainable Design and Construction, the London Plan, 'Spatial Development Strategy for Greater London', (2005)**

This document offers further guidance on London Plan Policy 4B.6 and sets out the Mayor's essential and preferred standards on a whole array of issues related to sustainable design and construction. All major strategic developments that are referable to the Mayor are expected to meet all the essential standards and also to demonstrate how they have met, where feasible, the Mayor's preferred standards. Much of the advice in this PAN is geared to meeting these standards, henceforth referred to as the Mayor's essential or preferred standards.

2.5 Regional Strategies

2.5.1 Mayor of London's energy, biodiversity and waste strategies

The Mayor's Energy Strategy, Green Light to Clean Power (2004)

This document aims to reduce London's contribution to global climate change, tackles fuel poverty and promotes London's economic development through renewable and energy efficient technologies. The planning system will make a huge contribution to the Mayor's energy targets by ensuring developers incorporate energy efficiency measures and renewable energy technologies in their buildings.

The Mayor's Municipal Waste Strategy, 'Rethinking Rubbish in London' (2003)

This document outlines a series of policies and proposals for local authorities in London aimed at moving waste management up the waste hierarchy and exceeding national recycling and composting targets. Planning can contribute to this by ensuring new developments minimise waste generated during construction and provide adequate recycling infrastructure for occupants.

The Mayor's Biodiversity Strategy 'Connecting with London's Nature' (2002)

Proposal 5 says 'The Mayor will and boroughs should take account of the protection of wildlife habitats and biodiversity in the consideration of all planning applications.' Policy 5 says 'The Mayor will seek to ensure that opportunities are taken to green the built environment within development proposals and to use open spaces in ecologically sensitive ways.'

Further information

Greater London Assembly (GLA)

http://www.london.gov.uk/mayor/strategies/sds/london_plan/lon_plan_all.pdf
London Plan, the Mayor's Spatial Development Strategy (2004)

GLA

http://www.london.gov.uk/mayor/strategies/sds/sustainable_design.jsp
Sustainable Design and Construction: Draft Supplementary Planning Guidance (2005)

GLA

http://www.london.gov.uk/mayor/strategies/energy/docs/energy_strategy04.pdf

Mayor's Energy Strategy: Green Light to Clean Power (2003)

GLA

<http://www.london.gov.uk/mayor/strategies/waste/index.jsp>

Mayor's Municipal Waste Strategy 'Rethinking Rubbish in London' (2003)

GLA

<http://www.london.gov.uk/mayor/strategies/biodiversity/index.jsp>

Mayor's Biodiversity Strategy 'Connecting with London's Nature' (2002)

Local policy

2.6 Local Planning Policy

2.6.1 **Barking and Dagenham's Unitary Development Plan (1996)**

The borough's planning policy document includes a number of policies that promote sustainable design and construction. These include:

- Energy conservation: G40, DE9 and H20
- Micro climates: DE2
- Reuse and recycling of building materials: G53
- Water management and flooding: G34, G38, DE3 and SPG5;
- Habitats and nature conservations: strategic policy M, G42, G43, G46, G50, G54 and DE3
- Noise and Vibration: G36;
- New Developments and sustainability: G46 and DE10

2.6.2 **Local Development Framework**

The Council is in the process of replacing its Unitary Development Plan (UDP) with a new plan called a Local Development Framework (LDF). The LDF will be developed over the next three years and is expected to be adopted in 2008. It will address Sustainable Design and Construction issues in the Core Strategy. The review of the UDP is an excellent opportunity to provide comments in relation to how new development in Barking and Dagenham should incorporate sustainable design and construction features. This PAN indicates how the Core Strategy can be implemented and provides further information for developers, architects and facility managers on how to achieve the Council's requirements in the areas of sustainable design and construction.

2.6.3 **Barking Town Centre Interim Planning Guidance (IPG) (2004)**

The IPG provides policy guidance that bridges the 'Unitary Development Plan 1996 (UDP) and more recent, adopted national and regional policy. The IPG provides a framework for considering development proposals and highlights the main issues developers will have to consider, including sustainability issues, in any new development or redevelopment within the town centre. The IPG is a material consideration when deciding planning applications.

2.6.4 **Green Roofs Planning Advice Note (PAN) 1 (2005)**

This PAN provides developers and architects with guidance on building green roofs.

2.6.5 **Refuse and Recycling Facilities in New and Refurbished Residential Developments (2006)**

This PAN provides guidance on what refuse and recycling facilities new developments should incorporate into their designs and offers advice on location, design and on-going waste management issues.

2.7 Local Strategies

2.7.1 **The Barking and Dagenham Partnership's Community Strategy 'Building Communities Transforming Lives' (2004)**

The Community Strategy provides a framework for making the borough a better place to live, work and spend leisure time. Under the Local Government Act 2001, all plans and programmes prepared by the Council must conform to policies and priorities set out in the Community Strategy. Sustainable designed and constructed buildings meet the Community Priority of making the borough Cleaner, Greener and Safer.

2.7.2 **Delivering a low carbon borough: A sustainable energy strategy for Barking and Dagenham (2005)**

The Council's energy strategy sets eight strategic objectives with accompanying policies and actions for reducing the borough's carbon dioxide emissions.

2.7.3 **Barking and Dagenham's Local Biodiversity Action Plan (2005)**

The Action Plan sets out a framework for the protection and enhancement of the boroughs flora and fauna.

Further information

LBBB (London Borough of Barking and Dagenham)
<http://www.barkingdagenhampartnership.org.uk/2-comm.html>
Community Strategy 'Building Communities Transforming Lives' (2004)

LBBB
<http://www.barking-dagenham.gov.uk/8-leisure-envir/planning/plan-udp.html>
Unitary Development Plan (UDP) (1996)

LBBB
<http://www.barking-dagenham.gov.uk/5-work/regeneration/town-centre/towncentre-menu.html>
Barking Town Centre Interim Planning Guidance (2004)

LBBB
<http://www.barking-dagenham.gov.uk/6-living/envir-protect/pdf/energy-strategy-full.pdf>
Delivering a low carbon borough: A sustainable energy strategy for Barking and Dagenham (2005)

LBBB
<http://www.barking-dagenham.gov.uk/8-leisure-envir/planning/plan-online.html>
Green Roofs Planning Advice Note 1 (2005)

Chapter 3

Environmental assessment methods

3.1 In order to ensure developers consider and include a wide range of sustainability features in their building plans, they are strongly advised to follow a certified assessment method. The Council's preferred tool is BREEAM but there are other assessment methods developers can follow.

3.2 BREEAM

3.2.1 BREEAM stands for the Building Research Establishment Environmental Assessment Method. BREEAM is used to assess the performance of buildings in the following areas:

- management: overall management policy, commissioning site management and procedural issues;
- energy use: operational energy and carbon dioxide (CO₂) issues
- health and well-being: indoor and external issues affecting health and well-being;
- pollution: air and water pollution issues;
- transport: transport-related CO₂ and location-related factors;
- land use: greenfield and brownfield sites;
- ecology: ecological value conservation and enhancement of the site;
- materials: environmental implication of building materials, including life-cycle impacts;
- water: consumption and water efficiency

3.2.2 Credits are awarded in each area according to performance. A set of environmental weightings then enables the credits to be added together to produce a single overall score. The building is then rated on a scale of PASS, GOOD, VERY GOOD or EXCELLENT.

3.2.3 BREEAM covers a range of building types including:

- Offices;
- Homes (known as EcoHomes);
- Industrial units;
- Retail units;
- Schools;
- Hospitals/ health centres (Neat)

3.2.4 Developers in Barking and Dagenham are expected to achieve an **EXCELLENT BREEAM** score on all strategic developments and aim for this score on major developments (1,000 sq m + or 10 C3 units +). **VERY GOOD** will be accepted only in those cases where developers can present robust arguments why an EXCELLENT rating is not viable for their development.

Further information:

BREEAM
www.breeam.org

3.3 Code for Sustainable Homes

3.3.1 This is a voluntary sustainability code for homes championed by the ODPM. The Government intends that all new homes built by Registered Housing Landlords will comply with at least level 3 of the Code and will encourage local authorities to apply it to private homes. The code is expected to be finalised in 2006.

3.3.2 The Code sets minimum standards for six essential elements of sustainable design and construction: energy efficiency; water efficiency; site waste management; household waste management; use of materials. All minimum standards as outlined in the table below must be achieved if a home is to meet Code standards.

Essential elements	Minimum standards
Energy Efficiency (conservation of fuel and power)	As Building Regulations Part L1A 2006
Water Efficiency (use of potable water)	No greater than 125 litres per head per day (46m ³ /bedspace/year).
Surface Water Management	Ensure that peak run-off rates and annual volumes of run-off will be no worse than the original conditions for the development site.
Site Waste Management (during construction)	Adopt and implement Site Waste Management Plans (including monitoring of waste)
Household Waste Management (during occupation and use)	At least 0.8m ³ storage for each home
Use of Materials	Inventory of materials/products used.

3.3.3 These minimum standards form the base level or Code Level 1. Four further levels exist that deliver all the minimum standards and additional levels of sustainability either by meeting higher standards in some of the essential elements or by offering some optional elements or a combination of both.

3.3.4 Compliance with the Code will be ensured by a team of assessors, along the lines of the team of assessors used to validate BREEAM standards. The Council will expect all housing developers to reach higher levels of the Code if not using BREEAM..

Further information

ODPM
<http://www.odpm.gov.uk/index.asp?id=1162094>
Code for Sustainable Development

Chapter 4

Sustainable materials in construction

4.1 Introduction

- 4.1.1 Each year in the UK, construction activity consumes around 420 million tonnes of material. The materials used in the construction and refurbishment of property affects the embodied energy of a building. Embodied energy is the energy consumed by all of the processes associated with the production of a building, from the acquisition of natural resources to product delivery.
- 4.1.2 This includes the mining and manufacturing of materials and equipment, the transport of the materials and the administrative functions. For example quarries can damage landscape, wood can come from unsustainable sources, metals use a lot of energy in production and PVC production produces atmospheric pollution.
- 4.1.3 The embodied energy of a building can be reduced by using:
- Local supplies to reduce the energy use of transport;
 - Materials that require low energy to manufacture;
 - Recovered materials (reclaimed and recycled).

4.2 Locally sourced materials

- 4.2.1 Developers should procure materials locally (wherever practical) and rationalise transportation of materials to a site. This should include plant and equipment to be used in the development wherever possible.
- 4.2.2 In accordance with the Mayor's essential standards, developers should source 50% of materials used in the development by value from within 35 miles of the site. The percentage of locally sourced materials required in new buildings in Barking and Dagenham as well as the radius that defines 'local' is being determined at the time of writing and developers are advised to contact the Spatial Planning and Environmental Sustainability Group or check the Sustainability Statement Template on our website for further details.

Further information

Barking and Dagenham Chamber of Commerce
'The Barking and Dagenham Directory' is a directory listing approximately half the businesses in the borough. Copies can be obtained from Dorchester Production on 02075311146.

Building East
<http://www.buildingeast.com/>
Local supplier hub set up to allow local businesses to take advantage of the construction projects generated in the area by the Thames Gateway development initiative.

4.3 Reclaimed and Recycled Materials

- 4.3.1 Reclaimed materials are recovered from the waste stream and put back into use with minimal or no reprocessing. Examples include bricks, which require removal of any adhering mortar and inspection for cracks before reincorporation in masonry walling, or timber doors, which may only require simple repairs.
- 4.3.2 Recycled materials require reprocessing before reuse, either as a primary material such as aluminium, or as a secondary material. An example of the latter is rubber floor tiling made from crumbed motor vehicle tyres.
- 4.3.3 Reclaimed and recycled materials can be used in many parts of the house building process, as well as for external site works such as roads and landscaping features.
- 4.3.4 The low impacts of reclaimed materials can be increased if they are transported very long distances compared with raw materials. The table below shows the maximum distance a reclaimed material can be transported by road before it will have a greater impact than a new material manufactured locally.

Table 1: Maximum transport distances for reclaimed materials (source: BRE's Green Guide to Housing Specification)

Materials	Distance (miles)
Reclaimed tiles	100
Reclaimed slate	300
Reclaimed bricks	250
Recycled aggregates	150
Reclaimed timber (eg. floor boards)	1000
Reclaimed steel products	2500
Reclaimed aluminium products	7500

- 4.3.5 WRAP (the Waste & Resources Action Programme) has established the validity of setting a requirement for recycled content in house building construction projects. They have demonstrated that 12.5% of the materials value of a construction project can derive from recycled content .¹
- 4.3.6 The 12.5% target is considered by WRAP to be good practice, meaning that the level of recycled content is better than standard and readily available, but not necessarily as high as current technology or market conditions would allow. A WRAP case study of a four-bedroom semi-detached masonry house shows that substituting products with best available recycled content in four elements of the house — external walls, internal walls, ground floor and foundation — increases the overall recycled input from 12.5% to 33% by value².

¹ The requirement is defined as a % of materials value, not total project value, i.e: it excludes labour and various other costs. The selected metric is value and not mass as this reflects the availability of cost data within standard construction practice — whereas a percentage by mass or volume would be expensive and impractical to implement. It also encouraged high-value application of recycled materials.

² WRAP — Opportunities to use Recycled Materials in House Building: Reference Guide

- 4.3.6 This target can be met through a number of common construction elements, particularly high value concrete products and high volume capping, subbase and fill materials 33% is considered by WRAP best practice.
- 4.3.7 WRAP has developed a number of reference guides to support the process of identifying which materials can be procured with the most significant levels of recycled material content (without additional cost to the project).

Further information:

WRAP

<http://www.wrap.org.uk/procurement>

WRAP

http://www.aggregain.org.uk/procurement/quick_wins/opportunities_to.html
Opportunities to use Recycled Materials in House Building: Reference Guide

WRAP

http://www.aggregain.org.uk/procurement/quick_wins/opportunities_3.html
Opportunities to use Recycled Materials in Preliminary Building Works and Civil Engineering: Quick Wins Guide

WRAP

http://www.aggregain.org.uk/procurement/quick_wins/opportunities_1.html
Opportunities to use Recycled Materials in Building: Reference Guide

- 4.3.8 Developers are also encouraged to use the Institution of Civil Engineers (ICE) Demolition Protocol to arrive at an ambition target for the use of reused or recycled materials in the new build. It should be noted that such targets are developed on the basis of recovered materials being available at the right quality, quantity and price i.e. they must be either cost neutral or lower in price.
- 4.3.9 The Protocol's methodology for new-build includes an assessment of the supply chain to provide cost effective recovered materials, sets a target for procurement and requires evidence of compliance with targets.

Further information:

ICE

<http://icextra.ice.org.uk/tlml/demolition>
Demolition Protocol

WRAP

http://www.aggregain.org.uk/demolition/the_ice_demolition_protocol
Targeted brochures on Demolition Protocol

Aggregain (WRAP)

<http://www.aggregain.org.uk/>
'One-stop' source of practical information on the use of recycled and secondary aggregates

The Recycled Product Guide (WRAP)
www.recycledproducts.org.uk
Comprehensive listing of recycled products available in the UK

Salvo
<http://www.salvo.co.uk/>
Market place for reclaimed construction materials/products

Ecoconstruction
<http://www.ecoconstruction.org/>
Details of "green" products for house-building

BioRegional Reclaimed
www.bioregional-reclaimed.com

Sustainable Homes
<http://www.sustainablehomes.co.uk/>
Advice on sustainable construction for Housing Associations, including:

<http://www.greenstreet.org.uk/>
Information on improving environmental performance in housing refurbishments

<http://www.sustainabilityworks.org.uk/sus.php>
Guidance on sustainable housing development

National Green Specification
<http://www.greenspec.co.uk/>
Technical specifications, design and product information for sustainable construction

4.4 Materials with a low environmental impact

- 4.4.1 The Green Guide to Housing Specification produced by the Building Research Establishment (BRE) assesses the relative environmental performance of over 150 materials and components over a 60-year life-cycle. A wide range of alternative specifications are provided for: walls, floor systems, floor finishes, roofs, windows, doors, ceilings, paints, insulation, landscaping.
- 4.4.2 The performance of each specification is measured against a range of environmental impacts including:
- climate change;
 - toxicity fossil fuel and ozone depletion;
 - levels of emissions and pollutants;
 - and mineral and water extraction.
- 4.4.3 Environmental performance is indicated by a simple-to-use A-B-C rating system. To further aid specifiers, guidance on capital costs, typical replacement intervals and information on recycling is also provided for each material and component.

- 4.4.4 Developers should refer to Chapter 9 for information on what percentage of basic building elements should achieve an A rating depending on development type. Basic building elements refer to walls –external and internal walls and partitions - , floors –upper and suspended ground floor - , roofs and ceilings (suspended ceilings and ceiling finishes).

Further information

BRE

<http://www.bre.co.uk/breeam/ecohomes.html>

Details of the Green Guide to Housing Specification and EcoHomes assessment scheme

4.5 Sustainable timber

- 4.5.1 By using sustainable timber, developers and the Council can contribute to the environmentally responsible, socially beneficial and economically viable management of the world's forests. Sustainable timber means that the harvest of timber and non-timber products maintains the forest's biodiversity, productivity and ecological processes. It ensures that forest operations are structured and managed so as to be sufficiently profitable, without endangering the forest's resources, the ecosystem or affected communities.
- 4.5.2 The Mayor's essential standards and Barking and Dagenham Council require that 50% of timber products come from a Forest Stewardship Council (FSC) source. The scheme links the finished timber product to an independently certified forest via timber mills and merchants who are also certified. By using a Chain of Custody (CoC) certification system for timber processors and merchants checked by regular inspection it prevents timber substitution and ensures an unbroken audit trail for the timber from user to forest.
- 4.5.3 While other forest certification schemes exist, the FSC is recognised by many Local Authorities, timber companies and environmental organisations as the best standard of sustainable forestry. It is also the only forest certification scheme recommended by the World Wildlife Trust (WWF) and Friends of the Earth.

Further information

Forest Stewardship Council (FSC)

<http://www.fsc-ouk.info/>

Information on sustainable timber and list of suppliers of timber sourced through the FSC scheme.

Pan European Forest Certification (PEFC)

<http://www.pefc.org/internet/html/index.htm>

Besides the FSC, the main European system is the PEFC (Pan European Forest Certification). This is an umbrella organisation of a number of national forestry schemes. Whilst some PEFC schemes, like the UK Certification Scheme are rigorous, others are less so. The Finnish Forest Certification Scheme, for example, has received serious criticism from the Finnish Nature League for

allowing logging in old growth forests and insufficient regard for indigenous people.

4.6 Peat or weathered limestone

4.6.1 In accordance with the Mayor's preferred standards, no peat or weathered limestone should be used in buildings or landscaping. Developers in Barking and Dagenham are encouraged to find alternatives.

4.6.2 Peat is made of incompletely decomposed plant remains, mainly sedges, grasses, reeds and mosses. Peatlands are important for four main reasons:

- They form a unique natural habitat that supports important biodiversity and species at risk;
- They are an important carbon sink, containing one third of the world's soil carbon. The removal of peat not only leads to the release of this carbon but also removes the carbon sink, exacerbating global warming and climate change;
- They contain vital geochemical and palaeological archives offering unique historical evidence on the area and its inhabitants;
- They play an important role in the global hydrological cycle helping maintain both water quantity and quality.

4.6.3 Limestone is a hard sedimentary rock formed under the sea in ancient times from the shells of small sea creatures. The removal of limestone pavement for the construction of garden features destroys a remarkable habitat, which cannot be replaced or recreated. The conditions that created limestone pavement and its associated plants and animals have produced over thousands of years a unique ecosystem and landscape feature.

4.6.4 A wide number of alternatives to peat exist such as bark wood waste, coir, green waste and biosolids. Similarly alternatives to weathered limestone exist such as sandstone, slate and granite supplied from reputable sources. Furthermore, limestone can also be obtained from legitimate quarrying.

Further information:

Royal Horticultural Society
http://www.rhs.org.uk/Learning/research/conservation_and_environment_peat.asp
'Peat and the Gardener' offers information on peat and peat alternative plus further sources of information.

Royal Horticultural Society
http://www.rhs.org.uk/Learning/research/documents/c_and_e_limestone.pdf
'The Use of Limestone in Horticulture' offer information on limestone and alternatives plus further sources of information.

Chapter 5 — Sustainable waste management during construction and occupancy of development

5.1 Introduction

- 5.1.1 At present in the UK, landfill is the most utilised method of waste disposal. It is also the most unsustainable. Not only do landfill sites contribute to global climate change by generating large quantities of methane, a dangerous greenhouse gas, by landfilling waste, the resources and energy that went into making once useful goods are lost forever. The vast majority of resources used in manufacturing products and providing services are finite. Unless the UK manages resources more efficiently and deals with its waste better, future generations will suffer the consequences.
- 5.1.2 A more sustainable approach to waste management is being driven by the European Union (EU) Landfill Directive. The UK has a national target to reduce the amount of biodegradable waste going to landfill to 35% of 1995 levels by 2020. It also has a national target to recycle or compost at least 33 percent of household waste by 2010 and recover value (recycle, compost or extract energy) from 67 percent of municipal waste 2015. Meanwhile, escalating landfill taxes are making landfilling equally unattractive for businesses and industry.
- 5.1.3 For these reasons, minimising and recycling waste on construction sites as well as designing facilities that encourage recycling in new developments are crucial steps in driving waste management up the waste hierarchy of reduce, reuse, recycle and compost, energy extraction and finally landfill.

5.2 Site Waste Management Plans (SWMPs)

- 5.2.1 The purpose of SWMPs is to ensure that developers comply with their legislative duties related to waste. They are also intended to minimise waste at source on construction sites through the accurate assessment of the use of materials and the potential for their re-use and recycling both on and off site.
- 5.2.2 Medium to large developers should have an effective SWMP and are recommended to follow the methodologies in the Department of Trade and Industry (DTI) 'Voluntary Code of Practice – Guidance for Construction Contractors and Clients on 'Site Waste Management Plans'. This document sets out the nine steps to producing a successful SWMP, including reporting mechanisms.
- 5.2.3 It is intended for use by medium to large companies engaged in projects of £200,000 or more in value. Smaller companies may gain operational improvements by introducing SWMPs on their projects. The DTI are considering the introduction of mandatory SWMPs as part of the Clean Neighbourhoods & Environment Act 2005.
- 5.2.4 The ICE Demolition Protocol (see section 5.4 for details), provides good practice methodologies to be incorporated for projects involving demolition or refurbishment.

Further information

Department of Trade and Industry (DTI)
http://www.dti.gov.uk/construction/sustain/site_waste_management.pdf
A voluntary code of practice on site waste management plans for construction contractors and clients.

5.3 Prefabricated construction

- 5.3.1 In accordance with the Mayor's Preferred Standards, developers should use prefabricated and standardised modulation components to minimise waste. If this is not feasible, low waste fabrication should be used.

5.4 Material Resource Efficiency: The ICE Demolition Protocol

- 5.4.1 Before demolition developers should conduct an appraisal of the materials that can be recovered from the building by using the Institute of Civil Engineers (ICE) Demolition Protocol. Application of the Protocol to a demolition project involves the following:
- A pre-demolition audit is carried out to identify potential for material recovery;
 - A material segregation / recovery methodology is drawn up;
 - A materials recovery target is set based on good practice;
 - Evidence is provided of compliance with target.

Further information:

ICE
<http://icextra.ice.org.uk/tlml/demolition>
Demolition

WRAP
http://www.aggregain.org.uk/demolition/the_ice_demolition_protocol/index.html
Targeted audience brochures on Demolition Protocol

BRE
<http://www.smartwaste.co.uk/>
SMARTWaste (Site Methodology to Audit, Reduce and Target Waste) can be used to record, categorise and track wastes by source, amount, cause and costs;

5.5 Internal and external recycling facilities

- 5.5.1 Developers and architects should follow the guidance provided in the Council's Planning Advice Note (PAN): Refuse and Recycling Facilities in New and Refurbished Residential Developments.

- 5.5.2 This PAN — adopted by the Council in 2006 — sets out the amount of space developers should set aside for storing refuse and recyclable materials as well as the type of facilities developers are expected to provide. The PAN also sets out location, design and management considerations that developers must have regard to when planning for waste storage in new developments.

Further information

LBBB

Copies of this PAN can be obtained from the Council's Physical Regeneration Division on 0208 227 3812.

5.6 Dealing with waste over the lifetime of the development on site

- 5.6.1 On strategic developments, developers should provide reuse centres, recycling or composting plants on site that can deal with a portion of the waste generated by that development over its lifespan.

Further information:

ICE

http://www.ice.org.uk/knowledge/document_details.asp?Docu_id=982&intPage=1&faculty=17

"Planning for Resource Sustainable Communities" introduces the steps and infrastructure that should be considered for sustainable waste management in a community. The document provides a guide on the roles of those involved with a development and sets out 10 Sustainable Design Principles for consideration.

Chapter 6 — Energy efficient design and renewable energy

6.1 Introduction

- 6.1.1 Temperatures throughout the world have risen by 0.6°C over the last 100 years due to human activity releasing polluting gases in the atmosphere, especially carbon dioxide. This is predicted to rise by a further 5°C during the next 100 years. Unless we reduce the CO₂ and other 'greenhouse gases', climate change will have a huge effect on the world's economy, society and wildlife.
- 6.1.2 The Council has responded to this challenge by producing its own Energy Strategy for Barking and Dagenham with the target of improving the energy efficiency of existing housing and reducing the impact of new buildings. This is in line with the Mayor's essential standards which require that most developments maximise the use of energy efficiency design techniques as well as generate at least 10% of the building's energy needs from on-site generation of renewable energy.
- 6.1.3 Existing homes in Barking and Dagenham are responsible for approximately 31% of total greenhouse gas emissions across the borough. The majority of this energy consumption is for space heating and electrical appliances.
- 6.1.4 Although the Council is working to improving the energy performance of existing homes, energy efficient features are much easier and cost-effective to introduce at the design phase rather than post-occupancy. For this reason, developers are strongly encouraged to consider energy efficient building design, community heating and Combined Heat and Power (CHP) as well as renewable energy generation, from the outset of their plans.

6.2 Site Layout and Passive Solar Design (PSD)

- 6.2.1 During the initial survey of a site developers should consider the most energy efficient layout for the planned development. This is the most inexpensive way of reducing the energy demand of a development and paves the way for further savings if passive solar design elements are incorporated into buildings. A passive solar estate with all its houses designed for solar gain produces energy savings of up to 10% at no extra cost when compared to a non-solar estate with non-solar houses.³
- 6.2.2 The key elements of a site layout that maximizes solar gains are:
- Orientation of as many dwellings as possible within 30° of south;
 - Minimising overshadowing of south facing elevations by positioning taller buildings to the north;
 - Using deciduous vegetation to block the high summer sun to reduce the chance of overheating and use of air-conditioning.

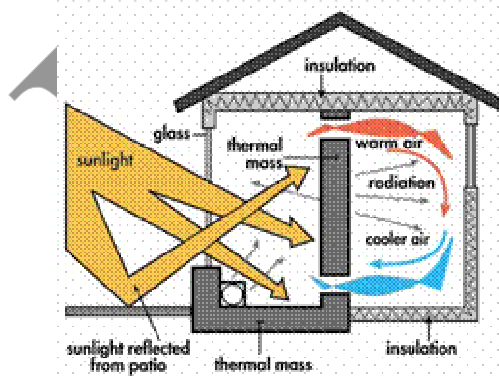
³ The Energy Saving Trust 'Passive solar estate layout' (GIR27)

- 6.2.3 If the site layout is favourable, other design features such as the use of space, the glazed areas within the buildings and the materials used in the structure will further increase the energy efficiency of a building. For example, a fundamental characteristic of passive solar houses is that the most heated and frequently used rooms are placed on the south side of the dwelling.

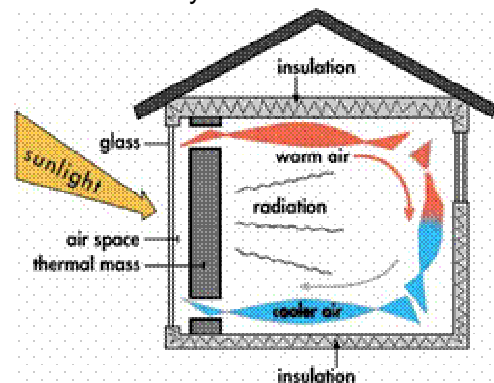
Heating

- 6.2.4 Passive solar heating techniques generally fall into one of three categories: direct gain systems; indirect gain systems; and isolated gain. For all three systems, the main rooms, with maximum occupancy, should be south facing.
- 6.2.5 *Direct gain systems* allow the sun's rays to directly penetrate the house through glazed areas (eg, windows) and store the heat in the living space's thermal mass. Thermal mass refers to materials that are particularly good at absorbing heat and releasing it slowly as the temperature drops. These materials include concrete, masonry, wallboard and even water.
- 6.3.6 *Indirect gain systems* collect, store and distribute solar radiation using some thermal storage material. For example, the sun's heat can be collected and trapped in a narrow space between the window and a thick masonry wall after it passes through the windows. This heats the air, which rises and spills into the room through vents at the top of the wall. Cooled air then moves to take its place from vents at bottom of the wall. The heated air circulates throughout the room by convection.
- 6.3.7 *Isolated gain systems* (e.g., sunspace) collect solar radiation in an area that can be selectively closed off or opened to the rest of the house, for example a conservatory.

Direct Gain Systems



Indirect Gain Systems



4

Further information:

Carbon Trust

⁴ Diagram taken from Renewables in Scotland website: http://www.esru.strath.ac.uk/EandE/Web_sites/01-02/RE_info/passive_solar.htm

http://www.thecarbontrust.co.uk/energy/pages/search_results.asp
Planning for Passive Solar Design

The Energy Saving Trust

- 1) Passive solar estate layout (GIR27)
- 2) Passive solar house designs — the Farrans study (GIL25)
- 3) Reducing overheating – a designers guide (CE129)

All Energy Saving Trust documents can be downloaded free of charge from www.est.org.uk/housingbuildings/ or alternatively ordered by telephoning 0845 120 77 99

Town and Country Planning Association (TCPA)

http://www.tcpa.org.uk/downloads/TCPA_SustEnergy.pdf
'Sustainable Energy by Design'

Renewables in Scotland

http://www.esru.strath.ac.uk/EandE/Web_sites/01-02/RE_info/index.htm
Information on Passive Solar Design

Natural Lighting

- 6.3.8 Natural lighting refers to reliance on sunlight for daytime interior lighting. Glazing characteristics include high-VT⁵ glazing on the east, west, and north facades combined with large, south-facing window areas. Windows should be large enough to provide adequate day lighting — a general guidance is to size the glazing so that it is between 15 to 25 percent of a room's floor area.
- 6.3.9 Sunpipes can also be used to provide natural lighting in places where daylighting cannot easily reach. Sunpipes capture light via a tube from the roof, using mirrors and other reflective devices.
- 6.3.10 Low-emissivity (low-E) coatings can help minimize glare while offering appropriate improved climatic heat gain or loss characteristics. Sloped or horizontal glass (e.g., skylights) admit light but are often problematic because of unwanted seasonal overheating.

Further information:

Carbon Trust

<http://www.thecarbontrust.co.uk/carbontrust/>

Daylighting Design in Architecture — Making the Most of a Natural Resource

Ventilation & Cooling

- 6.3.11 Appropriate use of outdoor air often can cool a home without need for mechanical cooling, especially when effective shading, insulation, window selection, and other means already reduce the cooling load.

⁵ VT stands for Visible Transmission and refers to the percentage of light allowed through.

- 6.3.12 Cross-ventilation techniques capture cooling, flow-through breezes. Exhausting naturally rising warmer air through upper-level openings (stack effect; e.g., clerestory windows) or fans (e.g., whole-house fan) encourages lower-level openings to admit cooler, refreshing, replacement air.
- 6.3.13 Naturally ventilated buildings will incorporate openable windows or other means of outdoor air intakes including roof-mounted 'windcatchers' to induce vertical and horizontal airflow. If mechanical ventilation is needed it should use low wattage motors and incorporate heat recovery with a minimum efficiency of 80%.

Further information:

The Energy Saving Trust
'Energy-efficient ventilation in housing - A guide for specifiers on the requirements and options for ventilation' (GPG268)

All Energy Saving Trust documents can be downloaded free of charge from www.est.org.uk/housingbuildings/ or alternatively ordered by telephoning 0845 120 77 99

6.3 Low Carbon Buildings

- 6.3.1 The carbon emissions of new buildings can be lowered beyond current Building Regulation 2006 (Part L) specifications through a combination of energy efficiency measures — such as better insulation and glazing, improved heating systems, natural ventilation and installation of efficient lighting and appliances — and the use of renewable energy.
- 6.3.2 Developers in Barking and Dagenham are expected to achieve a further 20% reduction in carbon emissions beyond Building Regulations 2006 in new developments. 10% of this reduction has to be achieved through on-site generation of renewable energy. The remainder 10% can be achieved through energy efficiency or through further generation of renewable energy.

The Energy Saving Trust Energy Efficiency Standards

- 6.3.3 To achieve energy efficiency levels beyond current Building Regulations developers can refer to the Energy Saving Trust's performance standards. These are:
- Energy Efficiency Good Practice in Housing — achieves a further 10% reduction over Building Regulations Part L;
 - Energy Efficiency Best Practice in Housing — achieves a further 25% reduction;
 - Energy Efficiency Advanced Practice in housing — achieves a further 60% reduction.
- 6.3.4 The main difference between the three standards lies in the levels of insulation they require buildings to achieve. Improvements in insulation are primarily measured through the U-value and air tightness of a building. U-value is the measure of insulation and is the overall rate of heat transfer through a wall, door,

window or roof – the lower the U-value the better the thermal insulation. Air tightness refers to the extent to which uncontrolled movement of air, both into and out of the building through the cracks and gaps in the building envelope, is restricted. In this case, the higher the air tightness the better the thermal insulation.

- 6.3.5 Furthermore, to achieve the Best or Advanced Practice standards, electric heating will not be viable due to its inefficiency and high carbon emissions — current legislation already requires all heating systems to use highly efficient condensing gas boilers.

Further information:

The Energy Saving Trust

- 1) Energy efficiency in new housing (Summary specification for England, Wales and Scotland) (CE12);
- 2) Best Practice in New Housing – A Practical Guide (CE95);
- 3) Central Heating System Specifications 2005 (CHeSS) (CE51/GIL59)

All Energy Saving Trust documents can be downloaded free of charge from www.est.org.uk/housingbuildings/ or alternatively ordered by telephoning 0845 120 77 99

Lighting systems and efficient appliances

- 6.3.6 Developers should ensure that lighting systems must incorporate fluorescent lamps with high efficiency ballasts and include lighting controls (solar cells and occupancy sensors) in non-domestic buildings to maximise daylight use and avoid lighting unoccupied spaces.

- 6.3.7 To minimise energy use of lighting, the following aspects should be specified:

- Use the most energy- efficient light fittings available
- Design lighting to provide the correct levels; excess lighting levels can produce harmful glare as well as wasting energy;
- Ensure controls e.g. switches are easily understood and accessible, otherwise the temptation may be to leave lights on unnecessarily;
- Design wiring to allow smaller areas to be switched on or off instead of the whole room at the same time. This is useful where only part of an office is being used at night or tends to be darker than another part during the day;
- Use automatic switches such as movement sensors (PIR) or timers in areas where lights are not needed continuously such as toilets or security lighting.

- 6.3.8 'Energy Saving Recommended' appliances should be installed for all appliances in the development – the 'Energy Saving Recommended' logo endorses the most efficient products available.

Further information:

Energy Saving Trust

- 1) Energy efficient lighting (CE61)
- 2) Low energy domestic lighting – looking good for less (CE81), the Energy Saving Trust

All Energy Saving Trust documents can be downloaded free of charge from www.est.org.uk/housingbuildings/ or alternatively ordered by telephoning 0845 120 77 99

Energy Efficiency Recommended products are listed on the Energy Saving Trust website, www.est.org.uk/myhome/efficientproducts

Renewable Energy

6.3.9 According to the Mayor's essential standards developers should ensure that carbon emissions from the total energy needs (heat and power) of the development be reduced by at least 10% through on-site generation of renewable energy. In addition, because Barking Town Centre has been designated one of the four Energy Action Areas in London, developments in the town centre are expected to exceed the Mayor's 10% essential standards.

6.3.10 Developers have a choice of renewable energy technologies to choose from which includes solar, wind or biomass. 'Micro-renewables' are small-scale building integrated technologies that generate electricity or heat directly for the buildings own energy needs.

- **Solar Water heating** systems provide between 50 and 70% of a household's annual hot water requirement and are a fairly low cost technology;
- **Photovoltaic (PV) panels** convert solar radiation directly into electricity. Since the introduction of the Government's PV Major Demonstration Programme in 2002 PVs have been employed in many buildings across the UK. PV roof panels integrate into buildings extremely well and have a very low visibility impact - however, they are more expensive than the other renewable energy technologies listed;
- **Small-scale wind turbines** are a new technology that fix directly onto roofs or walls and generate electricity that is fed directly into the building;
- **Ground source heat pumps** are environmentally friendly heating technologies that use a small amount of electricity to generate heat. They require open space adjacent to the building so that a pipe network can 'capture' the ambient heat under the ground – or alternatively a more expensive borehole can be used beneath the building;
- **Biomass boilers** use a wood chip fuel instead of natural gas – specialist suppliers can regularly deliver the wood fuel in a similar way to coal deliveries in the past.

Further information:

GLA

www.london.gov.uk/mayor/environment/energy/london_renew.jsp

London Renewables: Integrating Renewable Energy into New Developments:
Toolkit for Planners, Developers and Consultants – Sept 2004

The Energy Saving Trust

- 1) Meeting the 10 per cent target for renewable energy in housing – a guide for developers and planners (CE190);
- 2) Renewable energy sources for homes in urban environment (CE69), the Energy Saving Trust

All Energy Saving Trust documents can be downloaded free of charge from www.est.org.uk/housingbuildings/ or alternatively ordered by telephoning 0845 120 77 99

REAL (Renewable Energy Action London)

0845 6780677, real@cen.org.uk

Free advice on incorporating renewable energy technologies within developments

Combined Heat & Power (CHP) and Community Heating

6.3.11 Developers are expected to undertake an assessment of the energy demand of their development and demonstrate the steps taken to apply the **Mayor's Heating Hierarchy**. The heating hierarchy is:

- Solar water heating;
- Combined heat and power for community heating and cooling (preferably fuelled by renewables);
- Community heating for heating and cooling;
- Heat pumps;
- Gas condensed boilers (individual boilers);
- Electric heating

6.3.12 This heating hierarchy is based on the carbon dioxide emissions associated with each heating system. The hierarchy illustrates that solar water heating and combined heat and power systems are better for the environment than the conventional approach to heating of individual gas boilers or electric heaters. Developers are required to consider combined heat and power (CHP) for their development and if CHP is not adopted then good reasons need to be provided.

6.3.13 The designation of Barking Town Centre as an Energy Action Area requires developers to utilise the energy efficient benefits of CHP unless there are particular reasons why this is not possible.

6.3.14 CHP systems are now available at a range of different scales from micro-CHP (for single dwellings) to neighbourhood heating systems, and many new

developments across London and the UK are incorporating CHP systems. CHP will be most cost-effective and environmentally-effective for larger mixed tenure developments as these have a balanced heating load with retail or office demand greatest in the day and residential demand greatest in the evening.

Further information:

The Energy Saving trust
Community heating – a guide (CE55)
All Energy Saving Trust documents can be downloaded free of charge from www.est.org.uk/housingbuildings/ or alternatively ordered by telephoning 0845 120 77 99

The Carbon Trust
<http://www.thecarbontrust.co.uk/energy/pages/home.asp>
Advice and help on CHP - 0800 585794

The CHP Club
<http://www.chpclub.com/>
Provides case studies and also a calculator on energy consumption and cost of CHP systems

The Combined Heat and Power Association
<http://www.chpa.co.uk>
Provides information on companies and consultancies that deliver CHP systems, 020 7828 4077.

6.4 Barking Town Centre Energy Action Area

- 6.4.1 In 2005 the Mayor of London designated Barking Town Centre as one of four energy action areas in London to showcase energy efficiency and renewable energy technologies. The Council has modeled the energy consumption of the regeneration plans for the town centre which has highlighted a number of options for ensuring that the growth in new homes and businesses does not lead to a significant increase in energy consumption.
- 6.4.2 The Council has produced an Implementation Plan for the Barking Town Centre Energy Action Area. This Energy Action Area Implementation Plan outlines all the steps for delivering a low carbon town centre. It contains an action plan for incorporating community heating and CHP in the town centre's regeneration which will require developers in the town centre to include community heating in all developments.
- 6.4.3 Due to this, developers in Barking Town Centre will be expected to achieve a 35% reduction in carbon emissions on top of Part L 2006 Building Regulations. The same principles will apply as for the 20% reduction asked for elsewhere — referring to the combination of renewable and energy efficiency measures — with the exception that in the Town Centre, further reductions will be possible through connection to community heating and CHP system.

6.4.4 The Energy Action Area Implementation Plan is available to all developers in the town centre so as to illustrate what is expected of new developments. The Energy Action Area is likely to require higher energy efficiency standards than the Building Regulations and the inclusion of renewable energy and CHP and community heating. In order to ensure complimentary between the community heating and the renewable energy systems, developers will need to install electricity generating renewable energy only. Solar hot water systems and heat pumps will not be appropriate as these generate hot water and heating – and this will already be provided by the community heating system.

DRAFT

Chapter 7 Water Resources

7.1 Introduction

- 7.1.1 Climate change projections predict a decrease in annual rainfall in the South East of up to 10%. Although significantly wetter winters are predicted, the increase in the frequency of exceptionally dry summers — with a predicted decrease in summer rainfall of 30 to 40% — will lead to an overall decrease in rainfall. Furthermore, the predicted drier summers may also lead to an increased risk in flash flooding when sudden storms cause very rapid run-off over dry, impermeable ground.
- 7.1.2 For these reasons, new development should provide appropriate Sustainable Drainage Systems (SDS) for the disposal of surface water. Water demand should be reduced as much as possible and water reuse systems, such as rainwater harvesting or greywater recycling, installed.

7.2 Sustainable Drainage Systems (SUDS)

- 7.2.1 SUDS mimic natural drainage patterns and can attenuate surface water run-off, encourage recharge of groundwater, provide significant amenity and wildlife enhancements and protect water quality by employing pollutant trapping and degradation processes.
- 7.2.2 There are a range of SUDS techniques available:

Preventive Measures

The best preventative measure is to minimise the amount of surface water runoff by reducing the area of impervious surfacing used on a site. Rainwater recycling systems, water butts and storage tanks can be utilised to further reduce the amount of water entering the storm water system.

Permeable Surfaces

These can comprise gravel surfacing, block paving with gaps between the blocks and porous paving that allow water to soak through. Filter drains can be employed along the edges of roads where permeable surfacing can not be used. These are source control systems, which are designed to allow the rainwater to infiltrate naturally into the ground.

Filter Strips and Swales

Filter strips can be utilized in areas of shallow slope where water is allowed to run along the ground passing over the filter strip. These can be areas of loosely compacted topsoil planted with grasses, shrubs or trees that allow water to naturally infiltrate into the ground. Swales operate on the same principle as filter strips but are also used as a method of conveying surface water away from the area being drained. Normally these features will be dry.

Infiltration Devices

Soakaways and infiltration trenches encourage the natural infiltration of run off into the ground but have added storage capacity to detain runoff when the rainfall rate is higher than the rate at which water soaks into the ground.

Basins and Ponds

Basins are temporarily wet water features that fill with water during and after periods of rain, whilst ponds are permanent water bodies. Both provide storage capacity during periods of heavy or prolonged rain and include balancing ponds, attenuation ponds and flood storage reservoirs that may allow water to naturally infiltrate into the ground.

- 7.2.3 Developers and their design teams are encouraged to:
- Carry out a site survey to determine which SUDS techniques will be appropriate for use on the site. For example, ground conditions will determine the suitability of infiltration systems. Consider rainwater harvesting, green roof systems and opportunities for permeable paving if soil permeability is low;
 - Ensure, in consultation with the Environment Agency, that the requirements of the Groundwater Regulations are complied with (please note that shallow, extensive infiltration systems will minimise risks to groundwater); demonstrate consideration is given to future maintenance requirements of SUDS including the need, where necessary, for the removal of silt which will be treated as a controlled waste, and that space requirements for this purpose are allowed for in the design;
 - Ensure that responsibility for maintaining SUDS is clear at the planning application stage;
 - Consider using permeable paving anywhere that loadings will not cause structural failure. In practice, all pavements, driveways, footpaths, car parking areas and access roads could have permeable surfaces; and
 - In developing the drainage plan for the site, ensure that the design standard takes account of climate change and that carriageways, paths and other features of the site are designed to convey this excess flow safely.

Further information:

Woking Borough Council
http://www.woking.gov.uk/council/planning/publications/climateneutral2/sustainable_drainage.pdf

Good Practice Guidance to Sustainable Drainage Systems

Bournemouth Borough Council
<http://www.bournemouth.gov.uk/Library/PDF/Living/Planning/Suds2%20Adopted.pdf>

Planning Guidance Note on Sustainable Urban Drainage Systems (SUDS)

Environment Agency
www.environment-agency.gov.uk/suds
Information on SUDs

CIRIA
Sustainable Urban Drainage Systems Design Manual for England and Wales

(C522, CIRIA 2000)
 Sustainable Urban Drainage Systems — best practice manual (C523, CIRIA 2001)

Sustainable Urban Drainage Solutions: An Introduction (Environment Agency/SEPA)

7.3 Water Conservation

7.3.1 London’s water supplies are under pressure. Supply is reducing whilst demand is increasing. It is essential that all new developments in Barking and Dagenham incorporate measures to avoid water wastage. Because of this pressure, water consumption targets are often set on new residential development. The table below sets out some of these targets.

Water consumption targets in residential development	
Mayor’s Essential Standards	Less than 40 m ² per bedspace per year
Mayor’s Preferred Standards	Less than 25 m ² per bedspace per year
Code for Sustainable Homes	46m ² per bedspace per year with extra points to be won the lower your consumption is
BRE’s EcoHomes	Top points scored if less than or equal to 30 m ² per bedspace per year is achieved

7.3.2 Developers should consider integrating water conservation into the design of a building’s plumbing, mechanical, fire-safety and landscaping systems. This is more cost-effective than measures taken post construction. As with energy, developers should firstly seek to reduce demand and then look for alternative, renewable sources.

Reducing Demand

- 7.3.3 A number of steps can be taken to reduce water consumption. Developers should ensure that water saving fixtures and appliances are used in all new developments. Some examples include:
- Spray taps which can save up to 80% of the water and energy used in filling baths;
 - Low-flow showerheads which create finer drops or aerate the water;
 - Tapered or peanut-shaped baths which provide more space for bathing with less water. Insulation of the bath reduces the need for regular topping up with hot water;
 - A or B eco labeled washing machines and dishwashers if these are provided in the development.
- 7.3.3 Furthermore, installing dual-flush and low-flush toilets can save more than half the water used for flushing toilets and cut household water use by up to 20%. Under the Water Regulations 1999 all new toilet fixtures must use no more than 6 litres per flush (previously 7.5-9 litres) or be dual-flush in a ratio no more than

6:4 litres (with a notice on or near cistern explaining its use). There are toilets currently available that only require 4 litres on full flush and 2 litres on half flush. Alternative approaches, such as waterless urinals

7.4 Reusing Water

- 7.4.1 Developers are encouraged to have a design strategy for water which creates multiple uses for each litre of water. For example, greywater or recaptured water from basins or kitchens can be used for toilet and urinal flushing, cooling tower or boiler makeup water, landscaping and on-site water storage for fire fighting. Such systems require dual piping to route the greywater and appropriate valves, filters and signage.

Rainwater collection

- 7.4.3 It is important that homes become increasingly self reliant in collecting their own rainwater for grey water recycling for non-potable domestic use. At the simplest level, rainwater can be collected in a water butt for garden use — subject to careful positioning of down pipes. More advanced rainwater harvesting systems can provide water supply for all non-potable consumption such as for WCs, washing machines, the garden and car washing. Rainwater harvesting can save around 50% on mains water consumption, depending on roof areas of dwellings and annual rainfall.
- 7.4.4 Space for storage tanks must be provided in the roof or underground, with down pipes located appropriately. Separate pipes are required to carry rainwater or greywater and mains water and a mains supply back-up should be provided. This means that when there is insufficient water in the storage tank the system automatically draws water from the mains so that from the point of view of the user no difference is apparent.

Greywater Recycling

- 7.4.6 Systems to collect, cleanse and re-use of greywater can operate on a single dwelling scale or a development – wide scale. Greywater from baths, showers and washbasins can be re-used for toilet flushing but requires basic disinfection or microbiological treatment. Filtering the water prior to disinfecting it prevents biological activity for long enough to allow the treated water to be stored until needed.

Further information

UK Rainwater Harvesting Association
<http://www.ukrha.org/>
For information on rainwater harvesting

Water Cycle Management for New Developments (WaND)
<http://www.wand.uk.net/>
WaND supports the delivery of integrated, sustainable water management for new developments by providing tools and guidelines for project design, implementation and management.

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Chapter 8

Nature Conservation and Biodiversity

8.1 Introduction

8.1.1 It is well documented that throughout the twentieth century, the increased modernisation of our lives has harmed biodiversity. The planned regeneration of Barking and Dagenham will see the number of homes in the borough increase by an additional 20,000 over the next 20 years. In order to prevent the detrimental effects of this regeneration, it is imperative that new developments factor-in nature conservation and biodiversity considerations into their master plans and building designs.

8.2 Nature Conservation Sites

8.2.1 The borough has five Local Nature Reserves and is home to 26 Sites of Importance for Nature Conservation (SINCs) as identified by the GLA. Details of the SINCs and a map of their location can be found in a document entitled 'Sites of Importance for Nature Conservation in Barking and Dagenham (2004)' referenced in the 'Further Information' box below. The borough is also home to a variety of species of conservation concern and priority. This includes the black poplar tree, the black redstart, the great nested newt, serotone bats and water vole.

8.2.2 A list of significant species known to be present in the borough — as identified by the London Species Audit commissioned by the GLA London Biodiversity Partnership — can be obtained from the London Biodiversity Partnership or the Council. The Council and the community have identified the following flagship species and habitats through the Biodiversity Action Plan:

Species	Habitats
- the common frog and amphibians;	- wastelands;
- bats;	- gardens and allotments;
- the house sparrow;	- river margins and reed beds;
- the native black poplar;	- acid grasslands; and
- the stage beetle; and	- woodland
- butterflies	

8.2.3 It is important that efforts are made to minimise the negative impact which new development can have on biodiversity in the borough. It is also important to remember that development and nature conservation need not always conflict with one another. There are ways in which they can in fact complement each other. With a few key steps, planning applicants can ensure that they comply with biodiversity legislation and achieve best practice. These steps are outlined in the rest of this chapter.

Further information:

LBBD

<http://www.barking-dagenham.gov.uk/8-leisure-envir/park-country/pdf/sincbardag.pdf>

'Sites of Importance for Nature Conservation in Barking and Dagenham' (2004)

LBBB

<http://www.barking-dagenham.gov.uk/8-leisure-envir/park-country/biodiversity/species-habitat/bio-habitat-species-action-main.html>
The Local Biodiversity Action Plan (LBAP) includes a local species and habitat action plan.

LBBB

<http://www.barking-dagenham.gov.uk/8-leisure-envir/park-country/pdf/parks-green-spaces-strategy.pdf>
Strategy for Parks and Green Spaces (2004)

London Biodiversity Partnerships

<http://www.lbp.org.uk/cgi-bin/lbp/audit/find-species.pl?borough=Barking-Dagenham&Go=Go+%3E%3E>
A comprehensive list of species in Barking and Dagenham from the Species Audit Database

8.3 Consultation and Scoping Studies

- 8.3.1 On strategic developments referable to the mayor, and on all development of any size within or adjacent to SINCS, we will expect developers to consult the Council as well as appropriate nature conservation organisations on the presence of important species and habitats on the proposed development site. For non strategic development proposals that are not adjacent to SINCS, developers are encouraged to submit a short statement detailing the presence of existing species and habitats present on the site.
- 8.3.2 Whatever the size of the development proposal, wherever a species is found which is protected under legislation such as Schedule 1 of the Wildlife & Countryside Act we will require developers to consult English Nature before any development proceeds.

Further information on nature conservation organisation

Defra

<http://www.defra.gov.uk/wildlife-countryside/>
Wildlife & Countryside Act (1981)

English Nature

<http://www.english-nature.org.uk/>
Information on legislation governing the protection of biodiversity

Greater London Authority Biodiversity Team

<http://www.london.gov.uk/>
City Hall, The Queen's Walk, London, SE1 2AA

London Biodiversity Partnership, c/o London Wildlife Trust,

<http://www.lbp.org.uk/>

Skyline House, 200 Union Street, London, SE1 0LW

Greenspace Information for Greater London, c/o London Wildlife Trust

http://www.wildlondon.org.uk/projects_10033.php

Aims to hold up-to-date information on open space, species, habitats, land cover, land use, soils, geomorphology and local geological sites

8.3 Detailed Surveys and Impact Assessments

- 8.3.1 Where it is found that the site does or could support important species and habitats, further survey work may be required. It is important that surveys are carried out during the optimum survey season (which varies depending on the species).
- 8.3.2 The potential impacts associated with a proposed development can be predicted once an appropriate level of baseline data has been collected.

8.4 Designing your development to incorporate biodiversity objectives

- 8.4.1 The nature conservation opportunities and constraints should be identified and designed into development proposals by the time a planning application is submitted.
- 8.4.2 Even where little biodiversity interest has been identified on a site, we will expect developers to aim to create features that will provide wildlife with opportunity to colonise. Paragraph 8.5.2 below lists a number of measures which can be used to create such nature conservation features. This is consistent with the Mayor's preferred standards which state that all developments should incorporate vegetation into the built structures eg. green roofs, green walls, balconies or terraces.
- 8.4.3 Further guidance on green roofs can be found in the Council's Green Roofs Planning Advice Note (PAN), December 2005.
- 8.4.4 This PAN provides guidance on the benefits of installing a green roof, the type of green roof is most appropriate for individual developments, cost and maintenance considerations as well as design issues. The PAN also provides references to further sources of information on installing a green roof.

Further information:

LBBB

<http://www.barking-dagenham.gov.uk/8-leisure-envir/planning/plan-online.html>

Green Roofs Planning Advice Note (2005)

Living Roofs

www.livingroofs.org.uk

An independent UK website to specifically promote green roofs

8.5 Enhancement, mitigation and compensation

8.5.1 When incorporating nature conservation measures into development proposals the Council will expect developers to follow the following hierarchy of objectives set out in the LDA's 'Design for Biodiversity':

- Retain, enhance or create features of nature conservation value and avoid harm;
- Mitigate the impacts to nature conservation where it has been impossible to avoid all adverse impacts;
- Where damage is unavoidable, compensate for the loss of features of nature conservation value.

8.5.2 There are a variety of measures through which the above objectives can be met. What the appropriate measures are will depend on each particular scheme but they include the following:

- appropriate siting of buildings
- creation of an ecological park and centre as part of the development scheme
- landscaping scheme designed to benefit local habitats including tree planting, planting of wildlife encouraging plants, wall climbers and green roofs
- planting of native wetland species around areas of existing water areas
- developing a habitat management plan for the construction and operation phase of the development
- developing a habitat management plan for the construction and operation phase of the development
- provision of roost sites for bats
- nesting boxes and/or swift bricks to encourage new populations of birds
- supplying feeding areas for birds and/or bats as part of the landscaping
- creating water features or containers that can capture rainwater which can benefit birds
- incorporating a green roof where your development leads to a loss of open land.
- Incorporating a green roof if located close to a water course or SINC
- Incorporating a green 'biodiverse' roof where your development replaces a derelict site with an established 'brownfield' habitat
- Incorporating a green roof to reduce storm water run-off

Further information:

London Development Agency (LDA)

http://www.lda.gov.uk/upload/pdf/Design_for__Biodiversity.pdf

The 'Design for Biodiversity' document includes the hierarchy of objectives described above.

Town and Country Planning Association

http://www.tcpa.org.uk/downloads/TCPA_biodiversity_guide_lowres.pdf

'Biodiversity by Design' — A guide for sustainable communities

GLA

http://www.london.gov.uk/mayor/strategies/biodiversity/docs/Building_Green_main_text.pdf

'Building Green' is a guide to using plants on roofs, walls and pavements

Species specific websites:

www.blackredstarts.org.uk

For advice on designing buildings to benefit black redstarts

www.londons-swifts.org.uk

For advice on designing buildings for swifts

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Chapter 9 Sustainable Design and Construction Checklist

Topic	Strategic Developments referable to the Mayor	Major Developments (1,000 sq m + or 10 C3 units +)	Developments within Barking Town Centre Energy Action Area	Minor developments (less than 1,000 sq m or less than 10 residential units) ⁶
Assessment methods (either BRE or Code for Sustainable Homes)				
BRE Assessment (ie. Ecohomes)	Excellent	Very Good – striving for Excellent		Very good
Code for Sustainable Homes	Code level 5	Code level 3-4		Code level 3
Building Materials				
Locally sourced materials	50% of materials should be sourced locally. ⁷			30% of materials should be sourced locally.
Reused and recycled materials	12.5% of materials by value should be recycled or reclaimed. Demolition Protocol to be used to reach ambitious target for reused & recycled materials			12.5% of materials by value should be recycled or reclaimed.
Materials with low embodied energy	80% of basic building elements by volume to be Green Guide A rated. Majority of the remaining basic building materials elements to be Green Guide B rated. ⁸	60% of basic building elements by volume to be Green Guide A rated. Majority of the remaining basic building materials elements to be Green Guide B rated.	80% of basic building elements by volume to be Green Guide A rated. Majority of the remaining basic building materials elements to be Green Guide B rated.	40% of basic building elements by volume to be Green Guide A rated by. Majority of the remaining basic building materials elements to be Green Guide B rated.
Sustainable timber	50% timber products from Forest Stewardship Council (FSC) source with chain of custody certification or			Endeavour to use timber products from FSC source.

⁶ This category does not apply to flat conversions or single house extensions.

⁷ For information on the radius from within which materials should be sourced, please contact the Environmental Sustainability Team (contact details on the front page).

⁸ For an explanation of what are basic building materials, please see page 18.

Topic	Strategic Developments referable to the Mayor	Major Developments (1,000 sq m + or 10 C3 units +)	Developments within Barking Town Centre Energy Action Area	Minor developments (less than 1,000 sq m or less than 10 residential units) ⁶
	equivalent scheme.			
Peat or weathered limestone	No peat or weathered limestone to be used in buildings or landscaping			No peat or weathered limestone to be used in buildings or landscaping
<i>Sustainable waste management during construction and occupancy of development</i>				
Site Waste Management Plans (SWMP)	Developers should have an effective SWMP and follow methodology prescribed by DTI			Not required for smaller developments although smaller companies may gain operational improvements by introducing SWMPS.
Demolition Protocol if project involves demolition	Apply Demolition Protocol. Set and reach ambitious target for recovering materials from demolition site for reuse/ recycling			None
Internal and external recycling facilities	Follow recommendations set out in Planning Advice Note on Refuse and Recycling Facilities in New and Refurbished Residential Developments			Follow recommendations set out in Planning Advice Note on Refuse and Recycling Facilities in New and Refurbished Residential Developments
Reuse centres, recycling / composting plants on site	Applicable	None		None
<i>Energy Efficiency and Renewable Energy</i>				
Site layout and Passive Solar Design	Consideration of site layout for solar gain and incorporation of passive solar design elements for heating, lighting and cooling.			Consideration of site layout for solar gain and incorporation of passive solar design elements for heating, lighting and cooling.

Topic	Strategic Developments referable to the Mayor	Major Developments (1,000 sq m + or 10 C3 units +)	Developments within Barking Town Centre Energy Action Area	Minor developments (less than 1,000 sq m or less than 10 residential units) ⁶
Low Carbon Buildings	20% reduction in carbon emissions above Part L 2006 Building Regulations;		35% reduction in carbon emissions above Part L 2006 Building Regulations;	20% reduction in carbon emissions above Part L 2006 Building Regulations.
	10% to be met through on site generation of renewable energy. Remaining 10% to be met through either energy efficiency measures beyond Part L 2006 Building Regulations, further generation of renewable energy or community heating and CHP.		At least 10% of electricity needs to be met through on-site generation of renewable energy.	10% to be met through on site generation of renewable energy;
			Remaining 25% to be met through community heating and CHP which all developments will be expected to use further energy efficiency measures beyond Part L 2006 Building Regulations or further generation of renewable energy.	Remaining 10% to be met through either energy efficiency measures beyond Part L 2006 Building Regulations or further generation of renewable energy or community heating and CHP.
Lighting systems and efficient appliances	-High efficiency lighting and lighting controls -‘Energy Saving Recommended’ appliances to be installed in the development			Encouraged
Water Resources				
Sustainable Drainage Systems (SUDS)	Run-off after development should be equal to natural run-off as on an open space.			Paving for front and back gardens discouraged. Innovative alternatives such as porous pavements preferred.
Water demand	Less than 30 m ³ per bed space per year	Less than 35 m ³ per bed space per year		Less than 40 m ³ per bed space per year

Topic	Strategic Developments referable to the Mayor	Major Developments (1,000 sq m + or 10 C3 units +)	Developments within Barking Town Centre Energy Action Area	Minor developments (less than 1,000 sq m or less than 10 residential units)⁶
Water efficient devices	Water saving devices to be included in toilets, taps and showers.			Water saving devices to be included in toilets, taps and showers.
Design strategy for water conservation	Rainwater collection and/ or grey water recycling			Encouraged
<i>Nature conservation and biodiversity</i>				
Consultation and Scoping Studies	Consultation with Council and nature conservation organisations on the presence of important species and habitats on the site.	If site is within or adjacent to SINCs on we will expect developers to consult the Council and appropriate nature conservation organisations on the presence of important species and habitats on the proposed development site.		If site is within or adjacent to SINCs on we will expect developers to consult the Council and appropriate nature conservation organisations on the presence of important species and habitats on the proposed development site.
Detailed Surveys and Impact Assessments	Wherever a species is identified which is protected under legislation, detailed surveys and impact assessments are required as well as consultation with English Nature before development proceeds.			Wherever a species is identified which is protected under legislation, detailed surveys and impact assessments are required as well as consultation with English Nature before development proceeds.
Biodiversity hierarchy on new developments: 1. retain, enhance and create features of	Follow and implement hierarchy when planning developments. Even where little biodiversity interest has been identified on a site, developers should aim to create features that will provide opportunity to colonise. The appropriate measures will depend on each particular scheme but they include the following:			Create features that will encourage wildlife such as <ul style="list-style-type: none"> • tree planting • planting of wildlife encouraging plants

Topic	Strategic Developments referable to the Mayor	Major Developments (1,000 sq m + or 10 C3 units +)	Developments within Barking Town Centre Energy Action Area	Minor developments (less than 1,000 sq m or less than 10 residential units) ⁶
<p>nature conservation value and avoid harm</p> <p>2. mitigate the impacts to nature conservation where it has been impossible to avoid adverse impact</p> <p>3. Finally, where damage is unavoidable, compensate for loss of features of nature conservation value</p>	<ul style="list-style-type: none"> • creation of an ecological park and centre as part of the development scheme • landscaping scheme designed to benefit local habitats including tree planting, planting of wildlife encouraging plants, wall climbers and green roofs • planting of native wetland species around areas of existing water areas • developing a habitat management plan for the construction and operation phase of the development • provision of roost sites for bats • nesting boxes and/or swift bricks to encourage new populations of birds • supplying feeding areas for birds and/or bats as part of the landscaping • creating water features or containers that can capture rainwater which can benefit birds • incorporating a green roof where your development leads to a loss of open land. • Incorporating a green roof if located close to a water course or SINC • Incorporating a green 'biodiverse' roof where your development replaces a derelict site with an established 'brownfield' habitat • Incorporating a green roof to reduce storm water run-off. 			<ul style="list-style-type: none"> • provision of roost sites for bats • provision of nesting boxes and/or swift bricks to encourage new populations of birds • supplying feeding areas of birds and/or bats as part of the landscaping scheme • creating water features or containers that can capture rainwater for birds to feed from and to bathe • incorporating a green 'biodiverse' roof where your development replaces a derelict site with an established 'brownfield' habitat • incorporating a green roof where your development replaces open land • Incorporating a green roof if located close to a water course or SINC

Chapter 10
being met?

How to demonstrate the above standards are

Please submit a Sustainability Statement with your planning applications. The template for this statement can be downloaded from our website at:

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Chapter 11 Case Studies

The Millennium Centre, Eastbrookend Country Park

The building was a Millennium project designed to house the Council's ranger service and act as an educational tool on green issues for the schools of the borough. Sustainability features of the development include:



- **Foundations**
There are no conventional foundations under the Millennium Centre. There are a number of large helical screws that anchor the building to the ground. The anchors can be taken out leaving the earth unspoilt should the building be removed at any time in the future.
- **Passive Solar Design and Renewable Energy**
 - The roof is south facing to catch as much light & heat as possible. This is a clean & sustainable way of generating energy; in this case it generates electricity to power all the lighting in the building.
 - The windows are doubled or triple glazed to allow maximum heat retention. Underneath the paving slabs the floor is made of layers of sand and gravel, there is also a layer of foam glass made in part from recycled windscreens, which acts as further insulation. In the summer the slabs keep the centre cool and in the winter they store heat and help keep it warm.
- **Sustainable Materials**
 - The roof is made of recycled aluminium, including old drink cans. The roof of the Millennium Centre is supported by 'glu-lam (or laminated) beams. These are constructed by using wood cut from young trees (from sustainable forests), and 'pressure-glues' them together creating a much stronger material. This process means old mature woodlands are left intact and only young trees of lesser conservation value are cut down.
 - The walls are constructed using masonite wood fibre composite studs; external walls (& roof) are insulated with recycled newspaper or "cellulose blown fibre". This enables the walls to breathe eliminating condensation.

- Rainwater recycling
Rainwater from the roof is drawn into channels and collects in an underground reservoir to be recycled for watering the surrounding plants.

Further information:

Martin Page, Visitors Manger,
Millennium Centre The Chase, Rush Green, Romford, RM7 0SS
Tel: 020 8595 4155.
Email: martin.page@lbbd.gov.uk
Web Link:<http://www.barking-dagenham.gov.uk/8-leisure-envir/park-country/millennium/millen-c-menu.html>

Voltaics, Dagenham Dock

Voltaic is a 232,965 sq ft distribution/ warehouse building developed by Gazeley UK Limited. The building incorporates a number of sustainability features including:



- Energy
 - 16 kWp photovoltaic solar generator – reduced electricity bills and carbon savings of 7.5 tonnes CO2 per annum
 - Solar lighting for the cycle store – encouraging sustainable transport to work and saving 2 tonnes of CO2 per annum
 - 15% roof lighting for more natural light and reduced lighting costs and savings of 54 tonnes CO2 per annum
 - 80 kWth Ground Source Heat Pump – using "earth energy" to supply heating and cooling to reduce gas charges and saving 58 tonnes CO2 per annum
- Water
 - Efficient dual flush toilets and low flow taps to conserve water
 - rainwater collection and re-cycling to reduce storm run off and conserve water
- *Materials*
 - Sustainable timber used for windows and doors
 - Organic paint to provide a healthier working environment
 - Recycled yarn in the carpet tiles and natural marmoleum flooring to reduce the resources used
 - Low embodied energy solutions for plasterboard and roof tiles

For further information on Voltaics please contact:

James Behrens

Gazeley

+44 (0) 1908 838143

Ford Dagenham Plant Wind Turbines

Ford is one of the borough's largest employers and has been synonymous with Dagenham for decades. Ford has embraced sustainability as part of its development ethos and the two wind turbines on the Ford site at Dagenham have become a local landmark recognised from miles by residents and visitors alike.



The two 85m high wind turbines, with a combined capacity of 3.6MW, generate over 6.7million kWh of clean electricity every year, providing all the electricity needed to power Ford's new Dagenham Diesel Centre.

This is equivalent to enough electricity to power over 2,000 homes (nearly 7 million units per annum). This will mean that all Ford's diesel engines assembled at the plant will have been produced using wind power.

The wind turbines were built by Ecotricity, the UK's leading renewable energy company and the largest independent green electricity supplier in Europe. The turbines were built through the Merchant Wind Power scheme. Through this scheme Ecotricity own, operate and maintain wind turbines on site. Customers agree to purchase the electricity, typically over a 12 year period, and in return receive a supply of green energy, at a significantly reduced price.

Ford Dagenham Plant - Habitat Management Plan for Black Redstarts

As part of a planning consent in 2005, Fords are implementing a Habitat Management Plan for black redstarts and associated invertebrate life on site to protect and enhance habitats during operational activities including the construction of new buildings.

The aim of the plan is to enhance the current Ford Dagenham Plant for a number of key National and Local biodiversity action plan species and habitats, both at a national and regional [London] level. The plan recognises that Ford Dagenham is a working

environment and that incorporating or enhancing biodiversity within the area takes into account the operational constraints and commercial realities of a corporate business.

The Plan includes the following measures:

- Site surveys in March 2006 to establish potential of certain areas for seeding which can provide habitats for invertebrates.
- Creation of mounded areas using secondary aggregates and appropriate seed mix.
- Assessing the potential for top moss green roofs to be retro-fitted onto industrial shed roofs.
- Construction of sand walls and moss poles to provide nesting for rare invertebrates and foraging for black redstarts.
- Invertebrate and black redstart monitoring.

Jo Richardson School, Barking and Dagenham

The Jo Richardson Community School has been constructed with energy efficiency measures in place from the outset. For example, the building has a sophisticated building management system; there is a high level of insulation; and the high building mass and concrete concentration means that the building has efficient heat storage. It is anticipated therefore that the school will have low running costs and fuel usage.

Due to the proximity of the school to the A13 the building doesn't have windows which open, but instead has an air supply and extraction system which also contributes to localised heat exchange. The school also has soak-aways so that rainwater is used for ground-watering.

Charlecote Road

This is a new-build development of 65 timber-framed houses and flats in Charlecote Road, Dagenham, a brownfield site within the Thames Gateway area, which has been vacant for over five years. The development is of mixed tenure, providing affordable rented and shared ownership homes.

Environmental features include six PV systems on roof, eco-homes rating of 'very good', lifetime homes design criteria.

All Saints Catholic School and Technology College –completed 2003

Photovoltaic panels and solar water heating. The PV panels are also connected to small fountains in the College's pond – which allows pupils to see how the power output varies with sunlight intensity. The building is naturally ventilated through windcatchers on the roof and naturally lighted through sun-pipes.

St Mark's Church, Marks Gate – completed late 2005

Church extension with solar PV panels installed on mono pitch south facing roof – visible from across the pasture.