SPORT ENGLAND

Design
Guidance Note

Creating an active nation through sport

Environmental Sustainability

Promoting sustainable design for Sport

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Sport England and Environmentally Sustainable Development

Introduction

This publication is intended to provide practical information to assist the design and management of sports, recreation and leisure facilities to promote the UK's commitments to delivering environmentally sustainable development. The information is aimed at those commissioning, designing, constructing and managing sports and recreation facilities of all types.

Sustainable development

The UK Government launched a new strategy for sustainable development, '***Securing the Future***', in March 2005. The strategy highlights the renewed international concern over sustainable development and sets out five guiding principles underpinning sustainable development:

> ***We want to live within environmental limits and achieve a just society, and we will do so by means of sustainable economy, good governance, and sound science***.

All UK Government Departments share responsibility for making environmentally sustainable development a reality. The remit of the Department for Culture, Media and Sport (DCMS) is to improve the quality of life for all through cultural and sporting activities, to support the pursuit of excellence and to champion the tourism, creative and leisure industries. DCMS is committed to supporting and promoting sustainable development in all aspects of its work.

In March 2006, DCMS published its '*Sustainable Development Action Plan*'. In turn, Sport England have prepared a Sustainable Development Strategy which reviews the contribution of Sport England in meeting the Government's national sustainable development goals. The Strategy commits Sport England to actively promote environmental objectives and strengthen environmental advice in it's published design guidance. This guide is one of the ways in which Sport England is meeting the challenge to promote and support sustainable development.

Aims of this guide

The aim of this guide is to encourage clients, designers, contractors and facilities managers to embrace the environmental sustainability agenda from the inception of a project, and to treat sustainability as an integral concern throughout rather than as a technological fix that can be bolted on at the end. This guide covers every phase of a project from the development of a vision for sustainability shared between client and design team, through to good practice in the day to day operation of the completed facility.

The guidance itself is intended to highlight environmental sustainability issues, to act as a starting point for clients and designers, and to provide a range of ideas for consideration. While some principles, like energy conservation, are fundamental, there are many emerging technologies that are undergoing rapid development. For these, it is impossible to provide definitive recommendations. Many of the issues therefore are posed in the form of questions, challenging the delivery team to assess feasibility in the context of a specific project.

Facilities for sport, recreation and leisure vary widely from swimming pools to running tracks. The nature of the environmental impacts from these different facilities is very different and this guide indicates the relevance of each issue to each facility type.

In addition to current advice on sustainability contained within Sport England's series of Design Guidance Documents, this publication draws on a wide range of sources from which more detailed advice can be obtained. References and web links are given at the end of this publication.

Sport England, June 2007

Issue	Sports Buildings		Sports Pitches and Tracks		Outdoor Pursuits	
	'Dry': Sports Halls, Fitness Centres, Pavilions etc.	Wet': Swimming Pools, Ice Rinks, Combined Leisure Centres	Natural Turf: Pitches, Cricket Squares, Bowling Greens, Golf Courses	Synthetic Surfaces: Artificial Pitches, Tracks, Courts, Multi-Use areas	Land Based: Cycling, Climbing, Skateboarding etc.	Water Based: Sailing, Canoeing, Rowing etc
Client And Design Team Vision						
Client awareness. Is the client aware of the importance of sustainability and environmental protection? This should include: protecting or enhancing biodiversity; designing to make best use of the natural features of the site including sun, wind and landscape; and the choice of intrinsically efficient and controllable engineering systems for heating, lighting and ventilation. Materials should be from renewable sources, with low environmental impact and requiring minimum maintenance.	✓	✓	✓	✓	✓	✓
Client sustainability champion. Is there a sustainability champion on the client side?	✓	✓	✓	✓	✓	✓
Design team awareness. Is the design team aware of the importance of environmental sustainability, and does it have the experience and access to the necessary expertise to deliver a sustainable project?	✓	✓	✓	✓	✓	✓
Development of a shared vision. Has a shared vision for environmental sustainability been agreed between the client and the design team? Have challenging but realistic objectives been established?	✓	✓	✓	✓	✓	✓
Setting and meeting sustainability targets. Have challenging but achievable targets been set for annual energy use and annual water use? Have review and audit points been agreed to ensure standards targets continue to be met throughout the construction programme and, crucially, during operation?	✓	✓				
Community Consultation. Have local communities (or neighbours') been consulted and their concerns or aspirations regarding sustainable development been established, considered and taken into account prior to finalising the design and submission of a planning application?	✓	✓	✓	✓	✓	✓
Transport						
Travel plan. Transport to sports facilities may be a major source of environmental impact. Has a travel plan been prepared to encourage more sustainable forms of transport? Will information be provided to staff and users about bus routes and other sustainable forms of transport? Will financial incentives be used to encourage staff to cycle to work?	✓	✓	✓	✓	✓	✓
Cycle paths and safe routes. Is the facility accessible by safe cycle paths? And/or are quiet streets that give access to the facility adequately signposted, and are there road markings and cycle-friendly road layouts to encourage users to cycle to the facility?	✓	✓	✓	✓	✓	✓
Measures to encourage cycling. Will simple measures to encourage cycling to the facility by staff be provided, such as covered cycle parking and the provision of one or more staff showers?	✓	✓	✓	✓	✓	✓

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Site Appraisal And Renewable Energy						
Site features and potential. Has the site been assessed for its ecological value and its microclimate, to ensure the shape and planning of the building make best use of daylight, solar gains, wind, and landscaping to enhance building performance, reduce reliance on mechanical services for heating, lighting and ventilation, and provide sheltered entrances?	✓	✓	✓	✓	✓	✓
Exploiting neighbouring opportunities. Are there opportunities to connect to a local district heating scheme or share the outputs from a combined heat and power plant with other adjacent buildings?	✓	✓	✓	✓	✓	✓
Combined heat and power. Has the potential for combined heat and power been examined, particularly in buildings with large demands for hot water in summer such as swimming pools?	✓	✓				
Wind power. Has the feasibility of using wind power to generate electricity been examined?	✓	✓				
Photo-voltaic panels. Has the potential of photo-voltaic (PV) panels been examined?	✓	✓				
Solar-thermal panels. Have solar thermal panels for pre-heating hot water been studied for their feasibility?	✓	✓				
Ground source heat pumps. Has the feasibility of using heat pump to extract heat from the ground been examined?	✓	✓				
Rainwater harvesting and use of grey water. Has the feasibility of rainwater harvesting been investigated? Can grey water be filtered, treated and recycled?	✓	✓	✓	✓	✓	✓
Conserving water run-off. Have surface water run-offs been designed in ways which help to conserve water and follow best practice for sustainable urban drainage systems – for example by channeling water from paving (including car parks), roofs, and pitches to soakaways, balancing ponds or existing water courses?	✓	✓	✓	✓	✓	✓
Protecting And Enhancing Biodiversity						
Assessing plants and wildlife. Have statutory and non-statutory nature conservation organisations been consulted? Have specific surveys of plants and wildlife been undertaken by an appropriately qualified ecologist and at different times of the year, to assess the likely impact of the proposed development on species, habitats and/or site features that have biodiversity value?	✓	✓	✓	✓	✓	✓
Avoiding harm to existing biodiversity. Have all precautions been taken to reduce harm to existing flora and fauna on the site? If harm cannot be avoided to existing biodiversity, have specific features been added to compensate for unavoidable	✓	✓	✓	✓	✓	✓

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impact?						
Enhancing existing biodiversity. Where the site has limited biodiversity value, have opportunities been taken to create features that can enhance existing flora and fauna?	✓	✓	✓	✓	✓	✓
Ecological management plan. Has an 'ecological management plan' either independently or as part of the 'landscape plan' been prepared setting out good practice guidelines for the management and maintenance of biodiversity features?	✓	✓	✓	✓	✓	✓
Giving priority to native species. Has priority been given to specifying native tree and plant species, which usually offer better habitat opportunities for wildlife than introduced or exotic species?	✓	✓	✓	✓	✓	✓
Drought-resisting plants. To reduce the need for watering, have plants that are known to be drought-resistant been chosen?	✓	✓	✓	✓	✓	✓
Water-based or artificial turf pitches? Have the implications for grass pitches been weighed against the potential of artificial turf pitches, given the expected intensity of use and playing requirements?	✓	✓	✓	✓	✓	✓
Alternatives to grass on non-sport areas. Although grass is quite cheap to plant, regular mowing and maintenance costs are high: have low-maintenance alternatives, such as a wildflower meadow, been considered?	✓	✓	✓	✓	✓	✓
Retain topsoil. Have all possible efforts been made to retain and re-use existing topsoil on the site, rather than importing it from elsewhere? Poor quality topsoil can be improved by the addition of peat-free compost, or plants chosen that do not require high quality topsoil.	✓	✓	✓	✓	✓	✓
Use peat-free composts. Many composts are made from peat, which comes from sensitive ecological wetlands and whose removal is unsustainable: have peat-free composts been specified?	✓	✓	✓	✓	✓	✓
Local and/or on-site composting. Has locally-produced compost from the local authority's collection of green waste and organic rubbish been investigated? Has on-site composting using organic waste been considered?	✓	✓	✓	✓	✓	✓
Protecting landscape features during construction. Have precautionary measures been taken to ensure existing trees, hedgerows and all other significant landscape features are adequately protected during construction work? Tree felling should be done only when absolutely necessary and after ascertaining that no Tree Preservation Orders are in force.	✓	✓	✓	✓	✓	✓
Planting schedule. Has a landscape plan been prepared showing proposals for trees, shrubs and other plants, including the time of year when each is to be planted, and complete with a maintenance schedule?	✓	✓	✓	✓	✓	✓
Building Design						
Building shape and form. Has careful use been made of orientation, plan form and three-dimensional shape to	✓	✓				

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reduce heat losses, to exploit natural light and ventilation, and to reduce artificial lighting, heating, cooling and ventilation loads, while avoiding glare and overheating?						
Location of offices. Have offices been located on external walls to allow daylight and views over the approach to the building?	✓	✓				
Space planning. Have spaces requiring intensive servicing been located adjacent to plant rooms – to minimise ducting/pipework runs to minimise energy loss and increase the potential for heat recovery?	✓	✓				
Design for maintenance. Does the plant room layout allow adequate space for safe inspection, maintenance and upgrading or replacement of equipment and plant? Is there external access to ensure minimum disruption?	✓	✓				
Zoning. Have high temperature zones been grouped together with low temperature zones used as buffer spaces reducing heat losses to the exterior. Has the adjacency between spaces been considered to minimise unwanted transfer of heat or humidity?	✓	✓				
Plant location. Plant produces noise and pollute the environment. Have they been located carefully to reduce impact affecting health of occupants/users, including immediate environment, etc?	✓	✓				
Design for management - submetering. Have electricity, gas, oil and water sub-meters been provided to encourage effective monitoring and management, particularly for: areas of high energy intensity (swimming pools, health suites, and kitchens); and larger usage plant items (air handling units, humidifiers)? Ideally, sub-metering should be at plant item or motor control centre/panel level, and linked to a BEMS if installed. Heat metering should be considered on its merits.	✓	✓				
Existing and heritage buildings. Has the value of development on previously developed land (brown sites), the renovation of existing buildings and the need to protect heritage value been recognised?	✓	✓	✓	✓	✓	✓
Construction Elements						
Window design. Have windows and rooflights been positioned and sized to make best use of daylight while minimising unwanted solar gains, glare and unwanted reflections particularly in pool halls.	✓	✓				
Glazing and frame specification. Has double or triple-glazing been specified for windows and rooflights with window frames at least as well insulated as the glass?	✓	✓				
Fabric insulation. Have high or very high levels of fabric insulation been specified, and especially in pool halls?	✓	✓				

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Infiltration. Has unwanted air infiltration been minimised by attention to detailing, specification and site quality control, particularly at junctions between components?	✓	✓				
Draughts. Have revolving doors or draught lobbies been specified to reduce unwanted draughts and heat losses?	✓	✓				
Low Environmental Impact Materials And Components						
Considering environmental profiles. Materials and components need different energy inputs during their winning, their transport to be processed, their manufacture, and their eventual transport to site. Have materials and components been selected after comparing their environmental profiles?	✓	✓	✓	✓	✓	✓
Local materials. Have locally produced materials been used wherever possible, reducing road-miles and helping the local economy?	✓	✓	✓	✓	✓	✓
Avoiding hazardous materials. Have hazardous materials been avoided wherever possible – such as paints, adhesives and coverings that release volatile organic compounds (VOCs) or semi-volatile organic compounds (SVOCs) into the atmosphere during construction and in use?	✓	✓	✓	✓	✓	✓
Green alternatives. Have 'green' materials (such as those made from recycled and/or recyclable materials, from solid timber rather than composites) been properly evaluated and selected wherever possible?	✓	✓	✓	✓	✓	✓
Natural Materials. Have building products made from natural materials been identified and considered?	✓	✓				
Using recycled materials or components. Have opportunities for using recycled materials or components been taken wherever possible (subject to avoiding re-use of hazardous materials)?	✓	✓	✓	✓	✓	✓
Specifying materials suitable for recycling. For components needing replacement over the lifetime of the facility, have these been chosen on the basis that their materials can be re-cycled at the end of their useful life – reducing waste going to landfill?	✓	✓	✓	✓	✓	✓
Sustainable timber. Has timber been specified that comes from sustainable and legal sources and where suppliers provide independent certification?	✓	✓	✓	✓	✓	✓
Robustness and low maintenance. Have materials been chosen that are robust and durable in use, decreasing the need for costly maintenance and replacement? And are vulnerable components adequately protected?	✓	✓	✓	✓	✓	✓
Low ODP refrigerants. If there is air-conditioning or refrigeration, is the refrigerant used of 'zero ozone depletion potential' ('zero ODP')?	✓	✓				

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Lighting						
Exploiting daylight. Have all opportunities for using daylight been exploited, including light wells, light pipes, rooflights, and general design of windows?	✓	✓				
Light interior finishes. Have light coloured finishes been chosen internally to improve internal reflections – subject to compatibility with the needs of games such as badminton that require contrast between shuttlecocks and adjacent walls?	✓	✓				
Quantity and quality of lighting. Have appropriate standards for illumination levels been selected that provide the required quantity and quality of light consistent with the minimum energy demand? Over-lighting should be avoided, and areas of special need should be met locally.	✓	✓				
Efficient lamps and fittings. Have intrinsically efficient lamps together with reflectors and fittings been selected that make maximum use of the light output, including in overlooked areas like corridors and WCs?	✓	✓				
Responsive lighting controls. Have occupancy sensing controls, daylight-linked controls, and/or time switch controls been considered for all areas where lights may otherwise be left on – both internally and externally?	✓	✓				
Positioning and labelling of light switches. Are switches in accessible locations where it is obvious which lamps they operate? Are lamps switched in banks to encourage those not required to be switched off? Are switches labelled clearly?	✓	✓				
Key-operated light switches. Are fish-tail switches used that can be operated only by staff using a key to prevent unwanted tampering?	✓	✓				
Efficient and controlled exterior lighting. Have efficient exterior lights been selected? Do they direct light to where it is needed for circulation and security, and reduce stray light into the sky? Are they switched by daylight-linked controls that ensure they are not left on during daytime? Have self-contained solar-powered lamps been considered to reduce the need for mains connections?	✓	✓	✓	✓	✓	✓
Access for cleaning and lamp replacement. Has consideration been given to access to allow light fittings to be cleaned and maintained and lamps changed?	✓	✓	✓	✓	✓	✓
Power factor correction. Power factor is the ratio of kW to kVA in AC electrical circuits relating useful power to reactive power. Values below unity may attract a financial penalty from the electrical supply company. Power factor correction can save money, although it does not reduce electricity use.	✓	✓				

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Heating, And Ventilation Systems						
Heating system and pattern of use. Is the heating system including the heat source, the type of emitters and the control system, well matched to the pattern of use – for example, to cope with intermittent use efficiently?	✓	✓				
Zoning of building services. Have the services been zoned according to the patterns of use and the heating and ventilation requirements of particular spaces?	✓	✓				
Intrinsically efficient plant. Has intrinsically efficient plant been specified? For example, condensing boilers that extract latent heat from flue gases, or modular boilers that reduce inefficiencies associated with frequent on-off switching.	✓	✓				
Feasibility of CHP. Has the feasibility of using combined heat and power (CHP) been assessed, particularly for swimming pools with their year round demand for heat?	✓	✓				
Heat recovery systems. Have heat recovery systems – particularly for swimming pools – been considered, such as dehumidification systems, ventilation heat recovery and heat recovery from swimming pool water?		✓				
Decentralised plant. Where loads are small, have separate local systems been considered – for example independent water heaters with time controls, in preference to long pipe runs from central plant?	✓	✓				
Variable speed fans. Have variable speed fans and a humidistat controller been considered for pool hall ventilation to minimise the quantity of ventilation air consistent with adequate supply of fresh air and removal of contaminated air?		✓				
Localised heating. Have gas fired radiant tube heaters been considered for multi-purpose halls; compared with warm-air convective systems, air temperature can be kept lower for the same comfort level – so less energy is used?	✓	✓				
Pool cover. Has a pool cover been specified: used at night this helps to reduce both heat and water loss and also allows night ventilation rates to be lowered? Pool cover materials should be carefully selected to avoid emissions of SVOCs.		✓				
Effective controls. Have central, zone and room controls been designed to ensure that heating and ventilation are provided to occupants only when, where and to the extent needed, and to protect the building fabric from degradation through condensation and mould growth? Are controls readily accessible and appropriate to the skills of site staff and maintenance contractors?	✓	✓				
Status indicators. Have status indicators been specified to indicate the status of plant so that checks can be made that it is operating in compliance with design intentions, for example, that heating and ventilation are not in conflict.	✓	✓				
Saunas and steam rooms. Is the heating to these rooms controllable so it can be switched off when they are not in use?	✓	✓				

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BEMS. Well designed electronic Building Energy Management Systems (BEMS) can be very powerful in large buildings or estates, as a means to good management. In smaller buildings, BEMS must not be too complicated for the level of management skills available.	✓	✓				
Water Conservation Measures						
Leak detection. Is water leak detection installed for all mains supplies?	✓	✓				
Water conservation measures. Have water conservation measures been adopted, such as: tap restrictors, spring-loaded taps, PIR sensors operating automatic taps, shower-regulators, push-button shower controls, urinal flush controls, and/or low-flow WCs?	✓	✓				
Water conservation and treatment in pools. In swimming pools, intrinsically efficient systems to encourage water conservation include planning to ensure bathers shower before entering the pool and carefully managing pool hall air temperature. To monitor pool water circulation, flow meters should be installed. Heat recovery systems should be installed to recover heat from waste water during regular backwashing. Water from automatic sampling should be returned to the pool. An agreed rate for fresh water dilution should be established. Have non-chlorine based systems for pool water treatment been assessed for their feasibility?		✓				
Controls on leisure facilities. Leisure facilities such as wave machines, flumes, Jacuzzis and similar energy intensive features should have indicators showing when they are in use, and be designed to be easily switched off when not required.	✓	✓				
Commissioning And Hand-Over						
Commissioning. Effective commissioning is vital to ensure services are operating efficiently and as designed, and are delivering the performance specified or required. Elements that need commissioning will include mechanical and, electrical systems, and the controls that govern them. Constructional elements such as opening windows and solar shading devices may also require commissioning.	✓	✓				
Building Log Book. The design team should assemble systematically all material relevant to a Building Log Book and the O&M manuals. The Log Book should give a summary overview of the facility and purpose of the building services, the zoning arrangements, the location and features of the relevant plant and equipment, and a schedule of the building's energy supply meters and sub-meters including their location, fuel type, and how to read them. The Log Book should also describe the operational and control strategies of the energy consuming services, and provide instructions on how to achieve the specified performance including the actions required daily, monthly, seasonally and annually. Information should also be provided on how to calculate the energy performance of the facility from the individual metered energy readings and	✓	✓				

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compare it with published good practice benchmarks.						
O&M Manuals. Operating & Maintenance Manuals will need to include: • makes and model numbers of all significant items of plant and equipment together with manufacturers' contact details; • manufacturers' instructions for all significant items of plant and equipment, with clear indications of the equipment actually installed in the building and all maintenance and servicing schedules and requirements; • schematic diagrams of the building services; • commissioning records, including demonstration of compliance with specified energy efficiency standards, for example, for specific fan power.	✓	✓				
'Sea trials' at hand-over. Is the design team committed to providing support including on-site training and advice to the facilities management team and occupants after hand-over – and to remain available to ensure the building is operating as planned? Most buildings have systems for lighting, security, heating, and ventilating that even after initial testing will need to be fine-tuned to give optimum performance in use.	✓	✓				
Management Practices Including Catering						
Appoint a person to be responsible. Has a person been given the responsibility to manage energy and water use, and other aspects of environmental sustainability?	✓	✓	✓	✓	✓	✓
Monitoring and targeting. Has a routine been established for reading meters regularly and analysing energy and water use in a spreadsheet? This will enable benchmarking against typical buildings of the same type, and the identification of unexpected changes in the pattern of consumption, together with their probable causes. Ideally, stringent but realistic targets for reducing consumption will be set.	✓	✓				
Good energy housekeeping practices. Have good housekeeping practices been identified that prevent unnecessary waste of energy and water? Have these been drawn together into a walk-round energy checklist and staff training material?	✓	✓				
Management on-site recycling and composting facilities. If services for recycling waste materials are provided, are they managed well? Yard trimmings and food residues constitute a huge percentage of solid waste stream. If on-site composting facilities are provided, are they used and managed appropriately?	✓	✓	✓	✓	✓	✓
Energy walk-round. Is a periodic tour undertaken of the premises at different times of day (and night) with the energy checklist to identify sources of energy waste, such as heating, lighting and ventilation operating when it is not required?	✓	✓				
Staff awareness and training. Are new staff introduced to good housekeeping practices? Are good housekeeping practices routinely promoted through staff awareness campaigns? Has a poster or similar competition been considered to promote energy saving practices and/or identify new opportunities?	✓	✓				

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Celebrating success. Are staff efforts recognised and celebrated when energy and water use targets are met?	✓	✓				
New technologies. Are periodic inspections undertaken to look for opportunities to improve efficiency through investment in energy saving technologies?	✓	✓				
Catering energy. Are kitchens provided with space heating to avoid catering equipment being used to keep staff warm? Is the size of equipment well matched to catering needs? Do white goods meet the highest efficiency standards of the EU Energy Labelling scheme? Are cooking appliances well-insulated? Do catering appliances have heat recovery where appropriate? Are the controls on catering equipment clearly visible and do they indicate when the equipment is switched on or running? Does equipment have an economy setting? Are electricity, gas and water supplies to catering facilities sub-metered, as this is essential for benchmarking and diagnosing usage?	✓	✓				

References

The following reference documents include web links to the sources referred to:

- A Dos And Don'ts Guide For Planning And Designing Sustainable Urban Drainage Systems
  http://www.sepa.org.uk/pdf/publications/wfd/suds_leaflet.pdf
- BRE Green Guide to Specification (2002)
  http://www.bre.co.uk/greenguide/section.jsp?sid=435
- Building Log Books – A User's Guide. Good Practice Guide GPG 348, 2003
  http://www.carbontrust.co.uk/Publications/publicationdetail.htm?productid=GPG348&metaNoCache=1
- Building Log Books - An Authors Guide & Standard Template for Non Domestic Buildings, CIBSE Technical Memorandum TM31: 2006
  http://www.cibse.org/index.cfm?go=publications.view&PubID=227&S1=y&L1=0&L2=0
- Car Par and Landscape Design. Design Guidance Note. Sport England
  http://www.sportengland.org/carparking.pdf
- Design for Bio-Diversity, London Development Agency.
  http://www.lda.gov.uk/upload/pdf/Design_for__Biodiversity.pdf
- Drawing A Winner, Energy Efficiency Design of Sports Centres, Good Practice Guide 211: 1997.
  http://www.carbontrust.co.uk/Publications/publicationdetail.htm?productid=GPG211&metaNoCache=1
- Energy Efficiency in Buildings, CIBSE Guide F: 2004
  http://www.cibse.org/index.cfm?go=publications.view&PubID=6&S1=y&L1=0&L2=0
- Sports and Leisure - Introducing Energy Saving Opportunities for Business, Carbon Trust Sector Overview. CTV006. 2006
  http://www.carbontrust.co.uk/publications/publicationdetail.htm?productid=CTV006
- Energy Efficient Mechanical Ventilations Systems. Good Practice Guide GPG 257: 1999.
  http://www.carbontrust.co.uk/Publications/publicationdetail.htm?productid=GPG257&metaNoCache=1
- Energy Use in Sports & Recreation Buildings. Energy Consumption Guide 78. 2001.
  http://www.carbontrust.co.uk/Publications/publicationdetail.htm?productid=ECG078&metaNoCache=1
- Interim Code of Practice for Sustainable Drainage Systems. CIRIA, 2004.
  http://www.ciria.org/suds/pdf/nswg_icop_for_suds_0704.pdf
- Natural Turf for Sport. Design Guidance Note. Sport England. 2000.
  http://www.sportengland.org/naturalturf.pdf
- New Building Energy Management System (BEMS) Reduces Energy Consumption Carbon Trust Case Study CTS004. 2006.
  http://www.carbontrust.co.uk/Publications/publicationdetail.htm?productid=CTS004&metaNoCache=1
- Pavilions & Clubhouses. Design Guidance Note. Sport England. 1999.
  http://www.sportengland.org/pavilions.pdf

Useful Links

• BRE Environmental Assessment Method (BREEAM)	http://www.breeam.org/
• Building Research Establishment (BRE)	http://www.bre.co.uk/
• Carbon Trust	http://www.carbontrust.co.uk
• Chartered Institution of Building Services Engineers. (CIBSE)	http://www.cibse.org/
• Construction Industry Research and Information Association (CIRIA)	http://www.ciria.org.uk/
• Commission for Architecture and the Built Environment (CABE)	http://www.cabe.org.uk/
• Green Register of Building Professionals	http://www.greenregister.org/
• London Development Agency (LDA)	http://www.lda.gov.uk/
• Sport England	http://www.sportengland.org/

SPORT ENGLAND

Creating an active nation through sport

Information prepared by:

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