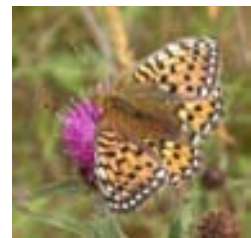


## *Ecology and biodiversity*

*Biodiversity is the 'variety of life', including species and their habitats. Understanding the relationships between biodiversity and the wider environment (the science of ecology) is essential when planning new developments and other land use changes or management.*

The government recognises that maintaining or enhancing biodiversity is critical in achieving the goals of sustainable development. Legislation, regulation and policy all drive developers, land managers and regulators to devise development proposals, management measures or policy solutions that adequately address the needs of biodiversity.



## *Capability statement*

# Entec

*Entec is one of the UK's largest environmental and engineering consultancies. Our technical and business skills are dedicated to delivering strategic, technical and engineering solutions which bring commercial benefit to customers at home and overseas. This know-how is based on over 60 years' consulting experience in the public and private sectors.*



Entec operates a Quality Management System in accordance with the latest requirements of the international standard BS EN ISO 9001 and an Environmental Management System compliant with BS EN ISO 14001. Both are audited by BSI Management Systems.





## Why is biodiversity important to your business?

Many plant and animal species together with an increasing number of sites are recognised as being of nature conservation value or have some form of legal protection (see Box 1). The presence of these sites, habitats or species on a development site or, in some cases, nearby (see Box 2), can result in consent for development being refused. Even where consent is granted (or there are permitted development rights), the presence of legally protected species can result in serious delays to development or, if the species' presence is ignored, prosecution (see Box 3). The fines for an offence are not always large, but the adverse impact on businesses' public image can be substantial.

As well as meeting legal requirements, new developments should reflect the requirements of planning policies relating to the conservation and enhancement of biodiversity. These policies typically build upon the biodiversity priorities defined in national planning policy guidance and national, regional and local biodiversity action plans.

### Box 1: Key regulations and legislation relating to biodiversity in the UK

Habitats Regulations (e.g. *The Conservation (Natural Habitats, & c.) Regulations 1994* (as amended) and *The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995*).

*Wildlife and Countryside Act 1981* (as amended).

*Natural Environment and Rural Communities Act 2006*.

*Nature Conservation (Scotland) Act 2004*.

*Wildlife (Northern Ireland) Order 1985*.

*Nature Conservation and Amenity Lands (Northern Ireland) Order 1985*.

*Environment (Northern Ireland) Order 2002*.

*The Water Framework Directive (Directive 2000/60/EC)*.

Environmental Impact Assessment (EIA) Regulations (e.g. *Town and Country Planning [Environmental Impact Assessment] Regulations 1999*).

### Box 2: Examples of where protected species and sites can be affected

The risk of new developments affecting legally protected species occurring on development sites is widely recognised, although this is often associated only with species that breed or roost on the site. What is less well known is that development can affect species that breed off-site (e.g. badgers can be affected by the loss of feeding areas some distance from setts) and that many other activities have the potential to contravene the law relating to biodiversity (e.g. the demolition of derelict buildings, roof repairs, clearance of overgrown brownfield as well as greenfield land and work in the vicinity of watercourses).

Also notable is that protected sites that may be some distance from a development site can sometimes be affected, for example by construction noise and dust, or hydrological changes.



## Ecology and biodiversity

The need to consider sites, habitats and species of nature conservation importance also extends beyond the development planning process. For example, applications for abstraction licences, Pollution Prevention and Control (PPC) permits, marine licences and consents, and waste management licences all have to include an assessment of potential effects on biodiversity.

Whatever the purpose, early consideration of ecological issues can help to avoid the need to delay the project programme until seasonally-constrained surveys can be carried out. It may also help to develop a scheme that conforms to planning and other policies as well as legal requirements (see Box 4). This can minimise the cost and inconvenience that may be caused if there is a need for expensive redesign work late in the planning process.



### Box 3: Examples of prosecutions

**A Midlands-based construction firm was fined for damaging a great crested newt breeding pond and surrounding habitat.** (18 January 2007). Source: Partnership for Action Against Wildlife Crime (PAW) – Prosecutions – Defra.

**Fined for cleaning up pond supporting great crested newts.** Source: Newcastle Journal, 19 March 2005.

**Cornish landowner fined for causing damage to an internationally important wildlife site.** (July 2004). Source: Partnership for action Against Wildlife Crime (PAW) – Prosecutions – Defra.

### Box 4: The Cornwall Case

The, so-called, ‘Cornwall case’ (R v Cornwall County Council ex parte Jill Hardy [2001]) has emphasised the importance of supplying an appropriate level of ecological information with a planning application.

Planning permission was granted for a landfill facility for which the applicant prepared an Environmental Statement under the EIA Regulations. Although it was known that the site could support bats and that the project was likely to have a negative effect on any bats that were present, the applicant did not investigate their presence. The planning authority, advised by English Nature (now Natural England), attached a condition to the planning permission requiring the applicant to carry out a survey to establish whether bats were present prior to commencing development. However the court held that the presence of bats could result in there being a significant effect under the EIA Regulations, and that information about the effects on bats (assessed using bat survey data) should have been included in the ES. The planning permission was therefore quashed because of the failure to investigate a potentially significant effect.



## *Why work with Entec?*

Conducting a biological survey does not, in itself, normally solve a client's problem or address an issue that they face. Entec's approach to biodiversity work is therefore focused on the problems and issues, with a view to addressing the client's needs in the most cost-effective way. This involves using our in-depth understanding of legislation and regulations, policies and the science of ecology, only undertaking the survey work that is really necessary and a pragmatic approach to finding the best design and management solutions.

*At Entec we are first and foremost problem solvers.*



## *The service*

Our inputs are tailored to meet the requirements of each client, promptly feeding back findings and advice to assist project planning, design, management and delivery.

Our work often involves:

- identifying the key ecological issues at an early stage – typically based on a desk study and preliminary survey work;
- defining and agreeing a programme of ecological works with clients and regulators;
- undertaking the agreed survey and follow-up analysis and assessment;
- advising on the implications for the project and recommending ways to overcome potential constraints and address opportunities – this involves working with the design team to incorporate appropriate mitigation and enhancement proposals into the scheme design;
- consulting with nature conservation bodies and other stakeholders – early consultation is the best way of ensuring that the concerns of regulators and others are addressed, thereby minimising adverse reaction upon submission of project proposals;
- preparing reports setting out the findings of ecological impact assessments - whether standalone, as part of Environmental Statements or to support Appropriate Assessments;
- acting as expert witnesses at public inquiries – although it should be noted that our approach to biodiversity work is often successful in securing consent without the need for inquiries, thereby avoiding the associated costs and risks;
- often as a requirement of local authority planning conditions, devising ecological mitigation plans/method statements/habitat management plans;
- obtaining any licences that may be required to disturb legally protected species (where unavoidable);
- implementing mitigation measures (e.g. newt or reptile exclusion fencing) and providing ecological expertise during construction works (e.g. through an ecological clerk of works);
- carrying out longer-term monitoring of protected species, habitats or invasive species (e.g. Japanese knotweed, zebra mussel) to demonstrate compliance with legislation, planning conditions and/or licence requirements.



## Ecology and biodiversity

To deliver these services, Entec employs a team of some 40 ecologists with a range of expertise covering avian, terrestrial, wetland, freshwater, coastal and offshore marine environments (see Box 5). In addition, members of our team hold protected species survey and mitigation licences including, for example, for great crested newt, dormouse, bats, white-clawed crayfish and badger.

Our team has experience of working on a wide variety of projects across a diverse range of sectors and services (see Box 6). This work often involves close liaison with other technical specialists, either drawn from Entec's in-house multidisciplinary resources, or with specialists from other practices.

### Box 5: Survey and data analysis skills

Phase 1 Habitat Survey, surveys using the National Vegetation Classification (NVC), tree and hedgerow surveys

Non-native species surveys (e.g. Japanese knotweed, Himalayan balsam, New Zealand pigmyweed etc.)

Surveys of badger, otter, water vole, bats, red squirrel, dormouse and other small and large mammals

Wintering, breeding and migrating bird surveys, using species-specific (e.g. black grouse and red-throated diver) or generic methodologies (e.g. territory mapping and moorland bird surveys)

Collision risk analysis relating to birds and wind farms

Reptile and amphibian surveys (including great-crested newts)

River Corridor and River Habitat Surveys, and the use of Mean Trophic Rank, PHABSIM, Habscore, BMWP, ASPT, LIFE and RIVPACS methodologies

Freshwater, marine and terrestrial invertebrate surveys

Analysis of fisheries survey data

Analysis of biological data using statistical packages (e.g. Primer)

Abiotic habitat assessments, including soil quality, geomorphology, hydraulics and water quality

### Box 6: Example project types and sectors

Obtaining planning permission for a wide range of schemes, many of which are screened as EIA development, including:

- residential, commercial and industrial development on greenfield and brownfield sites;
- regeneration projects;
- windpower and other energy projects, including nuclear decommissioning;
- water and waste water infrastructure (e.g. pipelines, reservoirs, waste/water treatment plants);
- airports and other transport projects;
- minerals and waste projects;
- marine aggregates extraction.

Obtaining consents relating to the water environment, including:

- abstraction licences;
- drought permits/orders;
- review of Consents under the Habitats Regulations;
- marine licences and consents.

Obtaining Pollution Prevention and Control (PPC) permits in relation to waste schemes.

Obtaining Transport and Works Act Orders.

Undertaking marine habitat mapping for wildlife conservation purposes.

Supporting site investigations relating to contaminated land.

Informing landscape design proposals (e.g. developing planting schedules and contributing to habitat creation schemes).

Providing information to meet the requirements of the Habitats Regulations in relation to assessing the effects of land use plans (as well as projects) on European sites.



## Case studies

*The following pages demonstrate Entec's capabilities in the area of ecology and biodiversity, using case study examples.* ►



## Walpole to West Burton Overhead Line Refurbishment National Grid

*Comprehensive  
ecological support for a  
range of protected  
species*



National Grid is a leading international energy infrastructure business – the largest utility in the UK. Through National Grid Electricity Transmission, the company operates the high-voltage electricity transmission network across Great Britain and owns the network in England and Wales. National Grid has a statutory duty under the Electricity Act 1989 to “...maintain an efficient, co-ordinated and economical system of electricity transmission...”. In order to help fulfil this duty, National Grid undertook a programme of refurbishment work along the 4ZM Walpole – West Burton overhead line (OHL), to update and replace certain components and to strengthen the foundations of a number of towers. This OHL is approximately 104km long, comprises ~300 towers and passes through Nottinghamshire, Lincolnshire, Cambridgeshire and Norfolk. National Grid is committed to integrating environmental considerations into all of its activities and commissioned Entec to provide the ecological input to the project.

Entec provided a small team of ecologists to carry out the survey work and to be on hand to advise National Grid as necessary. The ecology team built a close working relationship with National Grid and its engineering contractors (Balfour Beatty) by attending regular progress meetings and providing day to day advice on ecological issues as they occurred.

With the construction work due to start in early 2005, Entec ensured the first two phases of the project, comprising a desk

study and an extended phase one habitat survey, were completed by December 2004, to ensure National Grid was aware of any potential ecological constraints and had time to incorporate them into its programme.

As a result of phases one and two, further ecological survey work for protected species, including great crested newt, badger, otter, water vole and bats, was identified as being required for phase three of the project. All the surveys were conducted within the timescale of National Grid’s refurbishment programme, and appropriate mitigation was suggested and supervised where required.

The desk study highlighted the use of the electricity towers by hobby, a highly protected bird of prey that uses old crows’ nests for breeding and for which a licence is required to move or disturb a nest. To avoid delays to the construction programme while a licence application was submitted, it was important to minimise the

risk of hobby breeding on the towers by identifying and removing, outside the breeding season, any crows’ nests that could be used. This was successfully achieved through identifying towers that were most at risk through examination of existing bird records and an intensive programme of bird surveys.

Entec also advised National Grid regarding the consequences of great crested newts being present along the OHL and, in response, National Grid was able to programme this potential risk into its works plan. Hence, when great crested newts were confirmed at a number of locations, Entec was able to apply to Defra for licences to undertake mitigation to ensure the potential impacts on newts were minimal and there was no delay to the project.

The project was completed within budget and agreed timescales, and to the satisfaction of Nation Grid, who have since employed Entec on several similar projects.



## **Army Training Estate Salisbury Plain Defence Estates (MoD)**

Headquarters Army Training Estate (ATE) and Defence Estates (DE) are responsible for the development and use of ATE Salisbury Plain in a manner that maximises its use for military training (to brigade level) while maintaining the substantial cultural heritage and nature conservation interests of the plain. ATE Salisbury Plain abuts the Stonehenge World Heritage Site, contains a very large number of Scheduled Monuments and other sites of archeological interest and has a number of nature conservation designations including Special Area of Conservation, Special Protection Area and Site of Special Scientific Interest

The MoD is committed to the preparation of an Environmental Appraisal (EA) and to fulfill the requirements of the Habitats Regulations 1994 in line with statements made in the Higher Level Environmental Assessment (HLEA) and Strategic Environmental Appraisal (SEA) of the Strategic Defence Review (SDR) .

As a result of this commitment, DE appointed Entec as the lead consultant to manage the preparation of an EA and Appropriate Assessment (AA) of the effects of the change in training activities on ATE Salisbury Plain resulting from the implementation of the SDR.



The project involved the management of four UK and one US sub contractors as well as significant technical contribution to the delivery of the EA. The project, began in September 2001 and the EA and AA were completed in December 2002. The project comprised a number of sub tasks which include the preparation of the project scope, baseline surveys on invertebrates, soil types in pilot areas, development of historic landscape, the quantification of training activities in the pre and post SDR years (represented by 1999 and 2001), analysis of aerial photographs (AP) over the training area in the pre and post SDR years, drafting of text for the analysis of ground conditions based on the AP analysis, cultural heritage and nature conservation chapters of the EA and the development of a “proof of principle” Sustainable Training Model. The EA was compiled jointly by Entec and DE. The development of the Sustainable Training Model is an ambitious project in its own right which covers four elements; training demand, management, estate constraints and monitoring. This model will assist the decision-making processes for the management of training on the Plain and its development, while maintaining the ecological and archaeological resources of the training estate. Entec also assisted DE in the drafting and compilation of the AA. As a separate, but related piece of work Entec

prepared a landscape character assessment of the Plain.

In addition Entec formed part of the core project management team with the Army and DE and served on the External Working Group which comprised the core project team, Statutory Bodies and Planning Authorities. The forum was developed to promote a pro-active consultation process with interested parties so that it was possible to discuss and agree key stages, methodology and draft reports. This forum also provided a mechanism to develop recommendations in the form of undertakings that would safeguard the cultural heritage and nature conservation interests of the Plain while delivering sustainable training resource.

The EA and AA reports have been widely circulated and are available electronically on CD.



*Environmental appraisal and appropriate assessment of the change in training activities resulting from the implementation of the Strategic Defence Review*



## Hydrological Impact to Ecological Effect for Fens & Wet Grasslands Environment Agency (Anglian Region)

*Meeting the  
requirements of the  
Habitats Directive*



The Habitats Directive, and associated legislation, requires the Environment Agency (the Agency) to review the effects of consents, for which it is the competent authority, on European designated nature conservation sites. The Agency is using a four stage approach to this process; stage three being Appropriate Assessment.

At this stage, the Agency has to assess whether the consents that it grants result in an adverse effect on the habitats and species for which the sites have been designated. For the Agency's water resources function, this involves determining whether the impacts predicted on water levels and water flows cause an ecological effect.

Hydrological impact assessments (HIA) had been undertaken for all the Agency's high priority sites in the Anglian region during 2003, in preparation for completion of the Appropriate Assessments on these sites by March 2004. Eco-hydrological guidelines, focused on the eco-hydrological requirements of some important wetland communities found in the Agency's Anglian region, had also been prepared by

a team of recognised academic experts, with support from the Agency, Entec and English Nature.

To bridge the gap between the HIAs and the Eco-hydrological guidelines, the Agency wanted to develop guidance for their area staff in translating the predicted hydrological impact to an ecological effect, particularly for fen and wet grassland sites.

In 2003 Entec was commissioned to develop the required guidance. The objective was to establish a practical step-by-step procedure for completing the Appropriate Assessment and to test this approach on case study sites in the Anglian region.

The output was a technical note that presented a step-by-step procedure for completing the Appropriate Assessment and, in the process, provided guidance on the types of information that should be reviewed, the types of field data that should be sought, ecological target setting, evaluation of consents and completion of the Appendix 21 documentation, which forms the Agency's Appropriate Assessment.

The approach developed was tested by applying it to four case study sites. The Agency's Area teams were involved in reviewing the approach during its development.

Although the guidance was prepared for Anglian region, it is expected to have wider applicability nationally for sites with similar habitats.



## **Darwell – Hazards Green – Ecological Clerk of Works** South East Water



*Delivering on ecological challenges  
during water transfer scheme construction*

Entec was employed by South East Water to provide an ecological Clerk of Works (CoW) for the period of construction works on South East Water's Darwell to Hazards Green water transfer scheme. In doing this we oversaw the implementation of the environmental management plan, which was produced as part of the Environmental Impact Assessment for the development, which had also been undertaken by Entec.

In the main our role was to ensure that the legislation relating to protected species was not contravened by any part of the construction process. The species that occurred included great crested newt, dormouse, nesting birds, reptiles and badger. Our works therefore comprised a wide variety of tasks such as:

- Overseeing the sensitive removal of hedgerows including moving any reptiles or dormice found to safe areas away from construction activities;
- Surveying areas of vegetation for nesting birds before such areas were to be removed;
- Trapping great crested newts using both drift/exclusion fencing and pitfall traps, and moving them to safe areas away from construction activities.
- Minimising the disturbance of construction activities to active badger setts; and
- Monitoring the restoration process.

Often the works were undertaken under the conditions of an appropriate Defra or English Nature licence.

Because of the dynamic nature of the construction process on this scheme the CoW, and the Entec project manager, were required to work quickly to resolve any issues that may have arisen. For this we always had to be one step ahead of the construction team, constantly considering the sorts of issues that might arise in the near future. A measure of our success was that the project timetable was met successfully.



## **Telford Millennium Community (Ecology)** English Partnerships and Taylor Woodrow Developments

*Committed to habitat  
preservation and  
translocation  
throughout the  
TMC site*



In accordance with one of the primary objectives of the Millennium Communities Programme, to achieve truly sustainable development, ecological issues are central to the design, and approach to the development, of the Telford Millennium Community (TMC).

The history of the TMC site is reflected in the species and habitats it supports, some of which are of nature conservation importance. The 36 hectare site is characterised by a series of spoil mounds, relics of historic colliery workings that have been colonised by plant communities typical of thin, nutrient-poor, acidic soils. These plant communities include lowland heath and acid grassland, both of which are local Biodiversity Action Plan (BAP) priority habitats.

The site supports a population of great crested newts (*Triturus cristatus*), a threatened amphibian species protected under European legislation, and is one of only four sites in the Telford area known to be inhabited by common lizards (*Lacerta vivipara*). Bats, badgers and a range of bird, plant and invertebrate species also occur on the site.

In recognition of the nature conservation value of the site, Entec Ecologists were engaged throughout the iterative, master-planning process and the site layout reflects the design team's commitment to retaining features of importance for wildlife. These features include core areas of habitat for great crested newts and common lizards, areas of mature broad-leaved woodland, which provide habitats for birds, bats and badgers, and locally uncommon plant communities, which in turn support diverse

invertebrate assemblages. Retaining the connectivity of these features was also prioritised during the design phase.

Prior to reclamation works and land-forming at the TMC site, Entec designed, and implemented, an integrated ecological mitigation scheme, to ensure wildlife continues to flourish alongside the new community.

Areas of lowland heath, acid grassland and gorse scrub, that would otherwise be lost to development, have been translocated to a receptor area inside the TMC boundary. Entec also undertook heathland creation to augment these habitats. This will conserve these habitats within the site whilst enhancing the nature conservation value of a former landfill. Central to the successful re-establishment of these habitats was the creation of suitable ground conditions at the receptor site. This has been achieved by transferring over 30,000m<sup>3</sup> of site-derived colliery spoil to the former landfill, in advance of habitat translocation, to provide the required undulating surface topography and a suitable base substrate.

A large-scale programme of great crested newt translocation, under a DEFRA licence held by Entec, and common lizard translocation, has also been implemented. Both these species were relocated to a four-hectare area of the site, which was within their current range and has been set

aside specifically for this purpose. This receptor area has been enhanced through creation of terrestrial and aquatic habitats to safeguard the conservation status of these species.

Entec has continued to monitor the use of the site by bats and badgers and implemented measures required to mitigate the effects of development on these species.

Entec provided constant support to and liaised with the contractors during the reclamation phase. The success of the mitigation scheme will be monitored throughout the construction phases of the development, by an Entec Ecologist appointed in a supervisory, Clerk of Works, role.

In the interests of securing the longer-term success of the mitigation scheme, Entec has prepared a Habitat Management Plan, a ten-year programme of nature conservation actions and monitoring intended to ensure the favourable conservation status of the site's flora and fauna is maintained. Mechanisms for independent arbitration, including the engagement of statutory nature conservation organisations, have been built into the plan. This Habitat Management Plan will form the basis of an agreement governing the long-term stewardship of the site.



## **Limekiln Wind Farm Due Diligence Ornithology Study** E.ON UK

*Assessing  
ornithological issues  
for a potential  
wind farm site in  
Caithness, Scotland*



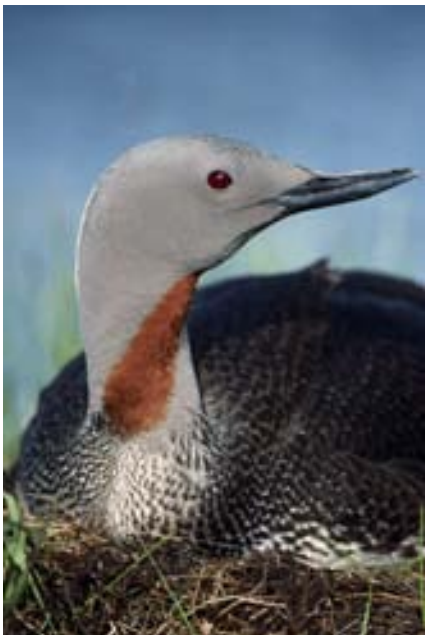
*Photograph courtesy of Laurie Campbell*

E.ON was invited to tender for wind farm development rights at a site in Caithness, subsequently being selected as the preferred developer. E.ON's offer was made subject to their undertaking due diligence works, the results of which would inform the final decision as to whether they would take up the option on the site. As the site is located adjacent to the Caithness and Sutherland Peatlands Special Protection Area, a site designated on the basis of supporting a wide range of birds of conservation concern, ornithological issues were identified as a potential 'showstopper' at an early stage.

Entec was appointed by E.ON to provide advice on ornithological issues and, on the basis of previous experience, to assess whether it would be possible to gain planning approval for the wind farm in light of these. Entec undertook a desk study to determine the ornithological issues that were likely to affect the site, reviewing the ornithological data available for the site itself and drawing on previous experience from undertaking wind farm environmental impact assessments at other sites. E.ON was also advised on the scope of works and associated costs that were likely to be

required to enable the completion of the ornithology chapter of an Environmental Statement that would adequately address concerns likely to be raised by consultees.

In light of the advice provided by Entec, E.ON concluded that some birds, possibly including SPA qualifying species, could potentially be adversely affected by developing this wind farm. As well as identifying that this is a site with significant planning risk that would require a significant investment in ornithological surveys, progressing Limekiln would have gone against E.ON's core value of developing wind farms in suitable locations from an environmental perspective. As a result, E.ON declined to take up the option on Limekilns, allowing resources to be targeted at less sensitive sites.



*Photograph courtesy of Laurie Campbell*



## *Sample client list*

***Contractors e.g.***

Allenbuild  
Morgan Est  
Miller Civil Engineering  
Morrison, Brown and Root  
Nicholas O'Dwyer

***Energy industry e.g.***

EDF Energy  
Eon  
Force 9  
Magnox  
National Grid  
Nuon Renewables

***Governmental organisations e.g.***

Countryside Council for Wales  
Defence Estates  
Department for Environment, Food and Rural Affairs (Defra)  
English Partnerships  
Environment Agency  
Natural England (formerly English Nature)  
North West Development Agency  
Scottish Natural Heritage

***Developers e.g.***

Bellway Homes  
Cathedral Group  
Gladedale Holdings plc  
Persimmon  
Reland (Leeds) Ltd  
Taylor Woodrow

***Local authorities e.g.***

Cornwall County Council  
Dudley Metropolitan Borough Council  
Greater London Authority  
Staffordshire County Council  
West Berkshire District Council

***Manufacturing and chemical industry e.g.***

Shotton Paper  
Acordis UK  
Sunderland Paper Mill  
ACS Dobfar Ltd  
Mineral industry e.g.  
Aggregate Industries  
Banks  
Hanson  
Lafarge  
RMC  
Scottish Coal  
United Marine Dredging

***Transport e.g.***

BAA  
Bristol Airport

***Water industry e.g.***

Essex and Suffolk Water  
Northumbrian Water  
Portsmouth Water  
South East Water  
Southern Water  
Thames Water  
United Utilities

***Waste industry e.g.***

Sita  
Cory Environmental



# **Entec**

*For further details on  
Entec's full range of environmental and engineering services:*

***Telephone***

0800 371733 (UK)

+44 (0) 191 272 6100 (Overseas)

***Fax***

0191 272 6592 (UK)

+44 (0) 191 272 6592 (Overseas)

***E-mail***

info@entecuk.co.uk

***Web site***

www.entecuk.com

