Environment Agency

building a better environment

A guide for developers

Practical advice on adding value to your site

We are the Environment Agency. It's our job to look after your environment and make it a better place – for you, and for future generations.

Your environment is the air you breathe, the water you drink and the ground you walk on. Working with business, Government and society as a whole, we are making your environment cleaner and healthier.

The Environment Agency. Out there, making your environment a better place.

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Building a better environment

We know that development doesn't have to harm the environment. We know that if it is well located, planned and designed, it can actually make improvements to the environment and provide a better place for people to live.

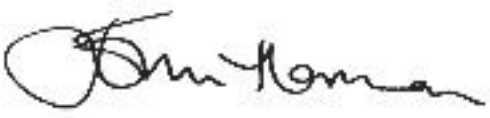
A guide for developers is an essential tool for you to use during every stage of your development. It provides advice on making sure your development contributes to the long-term environmental quality of our country. The increasing impacts of climate change mean this is more important now than ever before.

In this guide we give practical advice on each of the environmental issues that may affect your site. This ranges from how you can reduce flood risk through to creating quality green space in your development. We give pointers for building sustainable, cost-effective homes, helping create an environment in which people will really want to live. We've also provided examples of sites where this good practice has already been applied.

We've included a checklist for you to use to put our advice into action. You'll also find details of the consents and permissions you will need from us so that your project can move forward.

Our team of experts can help you get the most out of your development – for you, the people who will live and work there and for the environment.

We look forward to hearing from you.



Sir John Harman
Chairman, Environment Agency

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In **Part 2** we provide practical advice on each of the **environmental issues** that may affect your site. This section includes **case studies** that brings this advice to life.

Part 3 details the **permissions** you will need from us so your project can move forward. It also presents the practical advice from Part 2 in an environmental **checklist** for your development.

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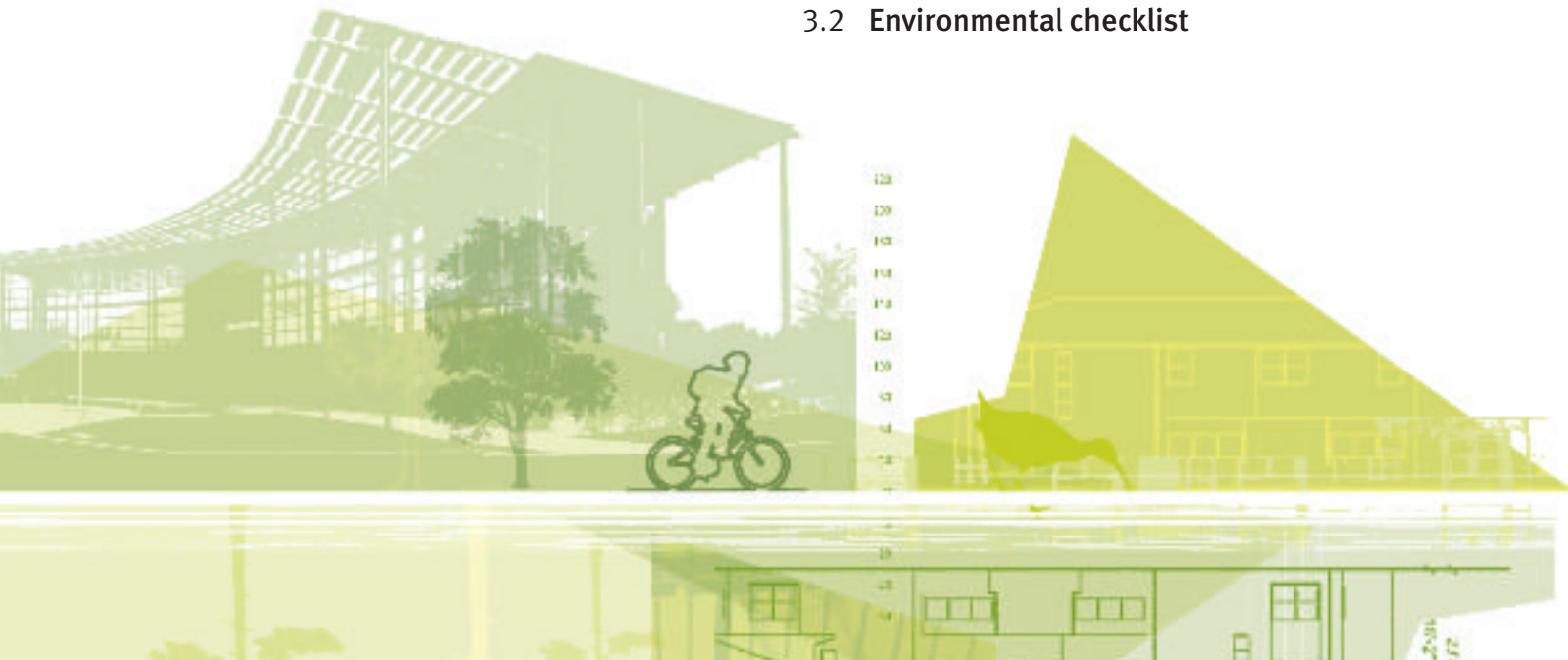

Part 1
working with us

This section provides an overview of how you should use this guide. It includes details about the Environment Agency in terms of how we are structured and the way we work. It outlines why it is so important to work with us from the very start of your development.

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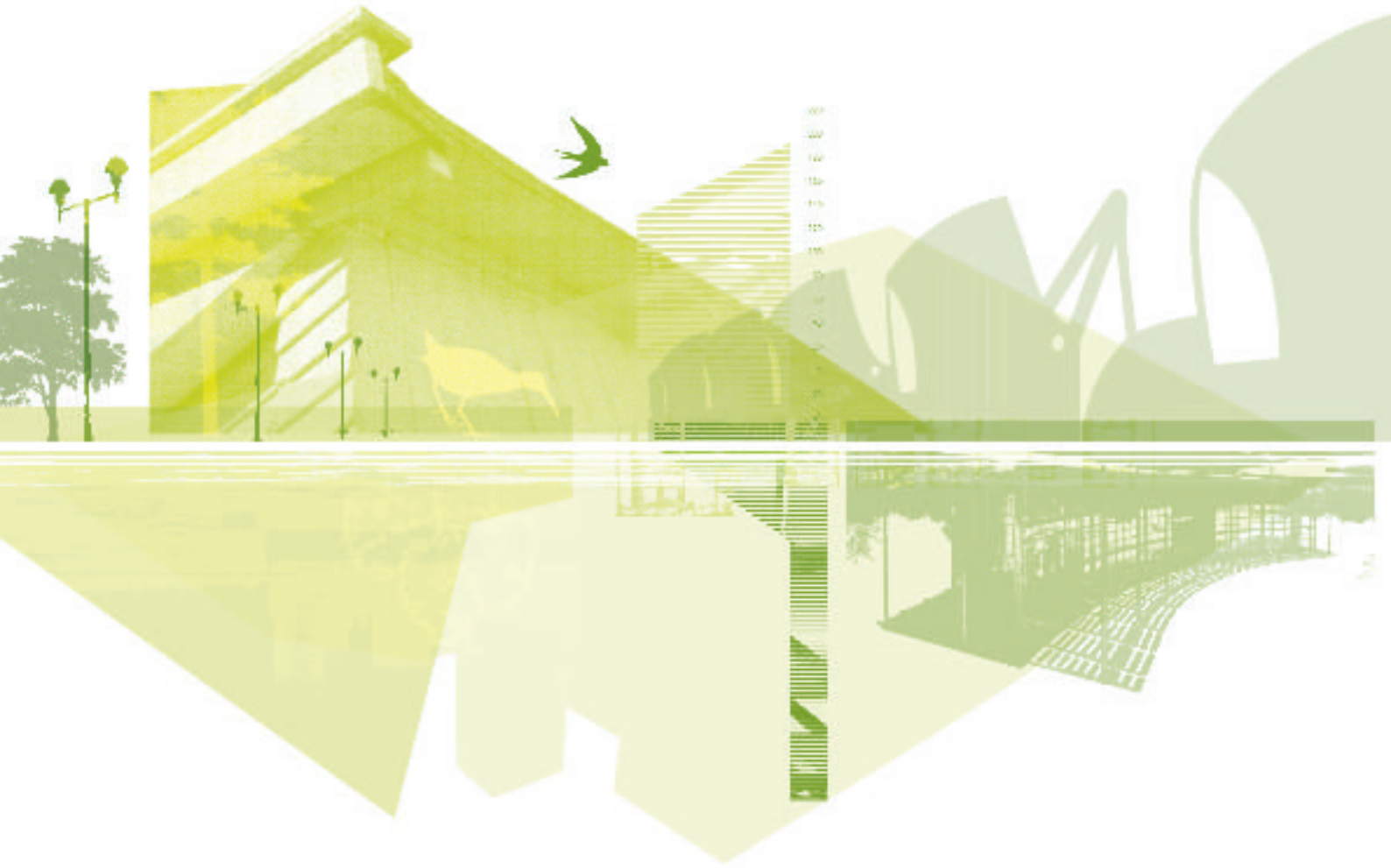
1.1 How this guide can help you

This guide is an important tool for you to refer to during each stage of your development. It provides practical advice on making your development better for people and the environment. You and your team should use it as a starting point for managing the environmental issues affecting your site.



→ **also see**

1.5 Contact us

An organisation as large as the Environment Agency can seem complicated. By reading this guide you will have a much better idea of when and why you need to talk to us. Speaking with us as early as possible in the development process will mean you can get a better outcome for the environment. It can save you valuable time and money.

We have provided general advice on what permissions you will need from us for your development to go ahead. These permissions or consents are legally required. Without them we can take enforcement action, leading to fines or imprisonment. We want to avoid this and would prefer to work with you to create better developments.

→ All of the information in this pack is also provided on our website: **www.environment agency.gov.uk/developers**

This provides our most up-to-date advice and guidance, together with links to other useful sites.

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1. Creating green spaces will add value to your development. They can encourage people to take-up outdoor activities such as walking or cycling that will increase their enjoyment of the site.

2. Research shows that homeowners are willing to pay extra for a home with a good eco-rating.

This guide provides you with:

- an **overview** of the development process and when you should contact us;
- practical **advice** on managing flood risk, sustainable construction and protecting and improving the environment;
- **case studies** on good-practice sites;
- a list of the **permissions** you will need from us;
- an environmental **checklist** for your development.

When necessary we may send you updates for you to add to this pack or further technical information you may need.

1.2 Our new initiative

This guide is part of a new initiative for developers. This is to improve our service to you during the whole planning process, from providing pre-application advice on your development through to advice on completion.

By working with us from the start we can provide you with advice and guidance to help you gain the permissions you need from us and from the relevant planning authority.

If your development is large or complex, you should have your own team of environmental experts. You should also have one main point of contact or a project manager to liaise with us.

Whatever the size of the project, it is vital to make sure there is a proper hand over within your team between each stage of the development. This will avoid losing the information or experience you have gained with us as the development proceeds.

1. Avoid valuable information being lost by arranging a hand over between each stage of your development.

2. We can provide you with information to help you recognise the opportunities through sustainable construction, making your development better for the environment.

1.3 About the Environment Agency

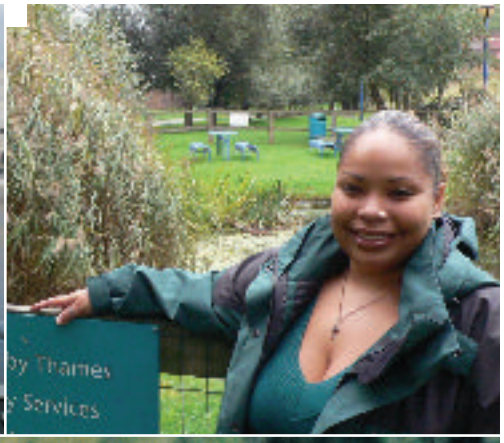
We are the biggest organisation protecting and improving the environment in England and Wales. We have around 12,000 members of staff and a budget of almost £900 million. We were set up under the Environment Act 1995 and given certain duties and powers.

We regulate the following:

- activities and processes that could cause pollution to **air, land** or **water;**
- abstracting and storing **water;**
- construction works that are in, on, over or close to watercourses, or affect **land drainage;**
- constructing and maintaining **flood defences;**
- the exploitation of **freshwater fisheries;**
- navigation on some **rivers;**
- **waste** and some land affected by contamination.

The issues we can advise you on are:

- managing the **risk of flooding;**
- making sure your activities do not **pollute** the environment;
- safely developing on **brownfield land;**
- managing your construction and demolition **waste** efficiently;
- using **sustainable drainage systems** and **managing water wisely;**
- providing **open and green spaces** for communities to enjoy;
- protecting **wildlife** and creating habitats for wildlife to flourish.



1. We regulate industry through permits, authorisations and consents.

2. We have a responsibility to protect wildlife and create habitats for wildlife to flourish.

3. Our experts can advise you on protecting and enhancing riverside habitats.

We are a public body – around 60 per cent of our funding comes from Government. Most of the rest comes from various charging schemes. We are independent, but we work closely with Government to get the best possible results for the environment.

We work across England and Wales, and have regional offices working closely with other regional bodies to develop the right solutions for their environment. We also have area offices working with local authorities and others to tackle the immediate environmental issues in your area.

We also regulate a number of activities through consents, authorisations, permits and other requirements. You may need our permission to carry out certain activities for your development to proceed, so make sure you speak to the local office about your obligations.

also see

1.5 Contact us

3.1 Environment Agency permissions

Our experts work on a variety of issues:

Our **development control** teams regulate development near watercourses and works that affect flood defences. They advise on the site's risk of flooding, whether it is acceptable to build there, what you should include in any flood risk assessment and the potential for using sustainable drainage systems.

The **environmental management** teams are responsible for preventing pollution to air, land and water. A wide range of activities are authorised through permits and licences, such as discharges to rivers or groundwater, land remediation, the storage of materials and the movement of wastes.

Our **water management** teams manage water resources and regulate its abstraction. They will explain your responsibilities and can tell you which water companies you will need to work with. They also advise on water efficiency measures.

The **fisheries, biodiversity** and **recreation** teams will help you create quality environments for wildlife and people, protecting and enhancing riverside habitats and making use of 'water space'. Recreational opportunities can increase the desirability of your development.

The advice from these teams will be co-ordinated by our **planning liaison** team.

Our experts can also provide you with some of the information that you will need to complete your environmental assessments. We may charge for this. For details visit our website.

1. Removable flood defence barriers. Around 5 million people in 2 million properties live in areas at risk of flooding in England and Wales. We have an important role in warning people about flood risk and reducing the likelihood of flooding from rivers and the sea.

2. We encourage making space for water in your development. This can reduce the risk of flooding and improve the landscape. Case study 2.2.2 shows how this approach was adopted at Ravenswood in Ipswich.

1.4 Our role in planning

We are a consultee in the planning process, in the preparation of plans as well as for individual planning applications. We play an active role in this process to help achieve development that protects and enhances the environment.

Influencing spatial development

We work with national, regional and local government to influence strategic plans and policies on key environmental issues.

Regional spatial strategies determine the scale and distribution of new development and set the principles for how development should be carried out on a regional basis. Local development frameworks are prepared by local planning authorities. They set out the key policies for an area and determine the allocation of land use. Major development sites should be included in these frameworks.

Getting the go-ahead

A local planning authority will consult various organisations to decide whether a development can go ahead. They will contact our planning team for advice on a whole range of environmental issues. If a development is likely to have a significant impact on the environment, an environmental impact assessment may also need to be submitted.

1. Our planning team is consulted for advice on a wealth of environmental issues by the local planning authority.

2. We can help you get the most out of your development. This will be good for you and the community. This popular green space in Lewisham was created as part of a scheme to reduce the risk of flooding. For more details see case study 2.2.9.

We encourage you to make **pre-planning** enquiries by completing the **pro-forma** on our website **www.environment-agency.gov.uk/developers**

As part of the Government's e-planning initiative, you may be able to make your planning application online. We are developing our own web-based systems so that in the future you can also make online applications for our permissions.

Pre-planning application enquiries

In the meantime, we encourage you to make pre-planning application enquiries by completing the pro-forma on our website. This will allow us to give you a properly considered response.

We will usually respond to pre-planning application enquiries and planning consultations within 21 days, unless another timescale has been agreed. However, this depends on whether you have given us the information we need to determine your application.

Our response to your pre-application enquiry will advise:

- if we need more information;
- what information we have to help you;
- if we are likely to recommend to the local planning authority that the application be refused;
- if we are likely to ask the local planning authority for conditions to be included in a planning permission;
- what permissions you will need from us and how to obtain them.

Contacting us before you make your planning application will help you include all of the information necessary from the very start. It will save you time and money, and make sure your development is better for the environment.

Planning applications

Local planning authorities consult with us on a variety of planning applications. This could be a site at risk of flooding or that may have some other impact on the environment.

We commonly find that not enough information is included in these planning applications. This means that we cannot determine what impact the development will have on the environment. Missing information could be environmental capacity or infrastructure studies, flood risk assessments, ecological appraisals or site investigations on land contamination. Without these, the developer has not demonstrated to us how they will address our environmental concerns. This means that we have to object because of missing information. This can cause many delays. It can mean that planning permission is refused.

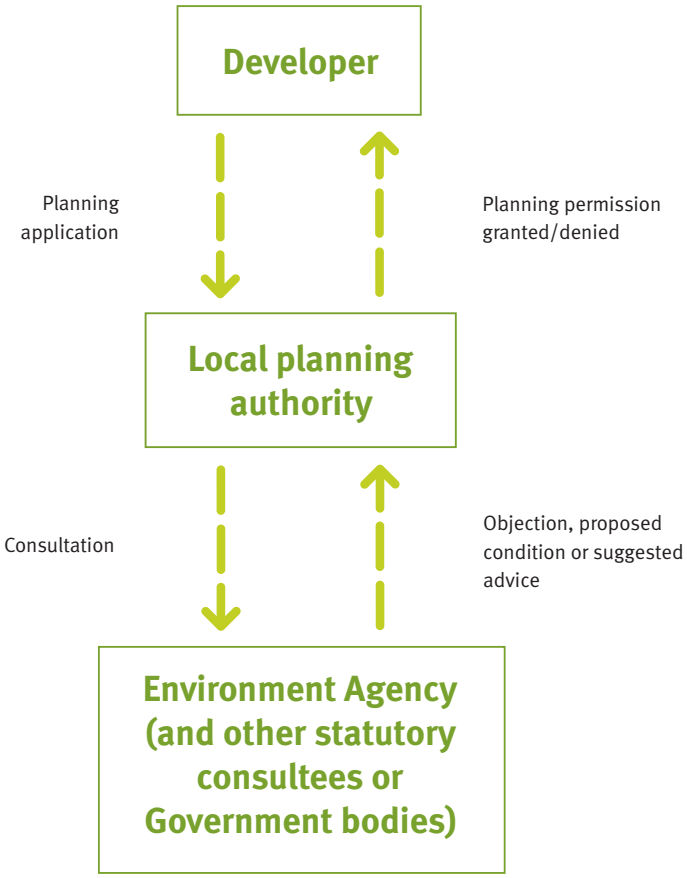


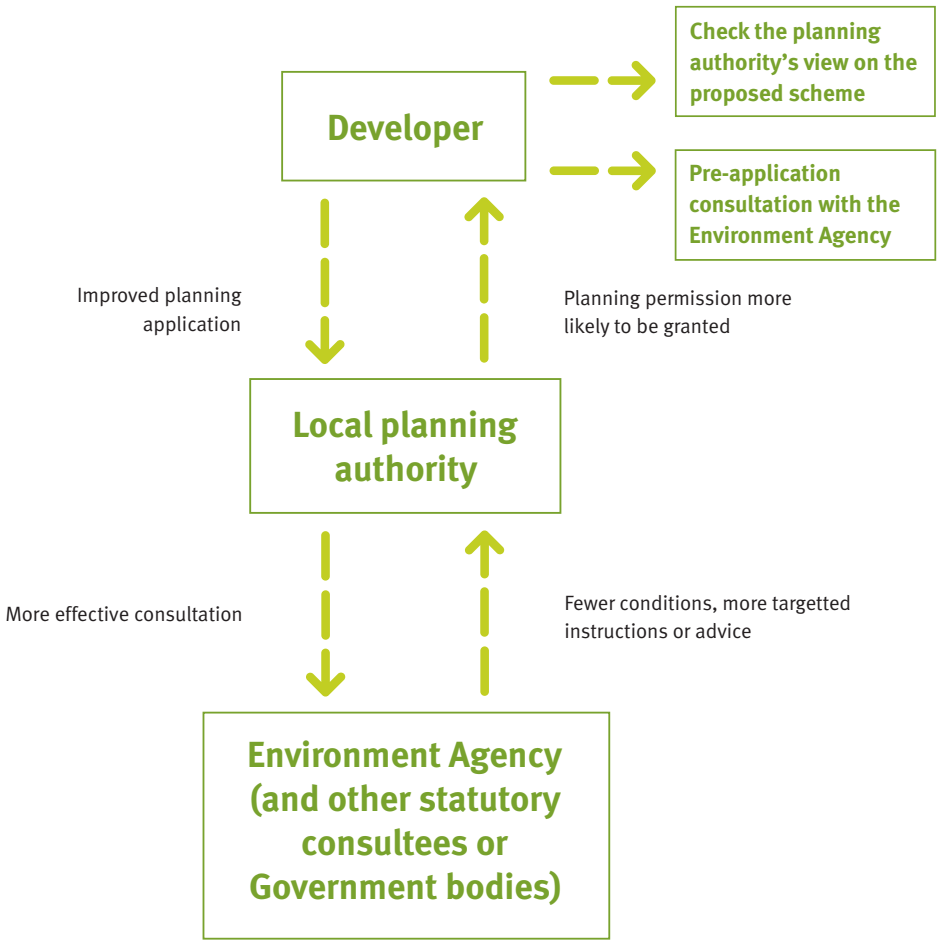
Chart 1. Where we fit into the planning process.

How to save time and money

The good news is that this can be overcome by approaching us before you submit your planning application. Using our pre-planning pro-forma, you can make sure you include all the information we need in order to comment fully on your proposals.

Furthermore, we can work together at the design stage to maximise the potential for environmental enhancements at the least cost to you. You can find our pre-planning pro-forma on our website.

Chart 2. You should start the planning process with us before you submit your planning application. Contact us early to save you time, money and to create a better development for the environment.



Environment Agency consents

Alongside being consulted on planning applications, we also have a regulatory role in issuing consents for various activities that may have an impact on the environment.

You will need these Environment Agency consents in order for your development to proceed. It is your responsibility to apply and secure them, even if you already have planning permission.

also see

3.1 Environment Agency permissions

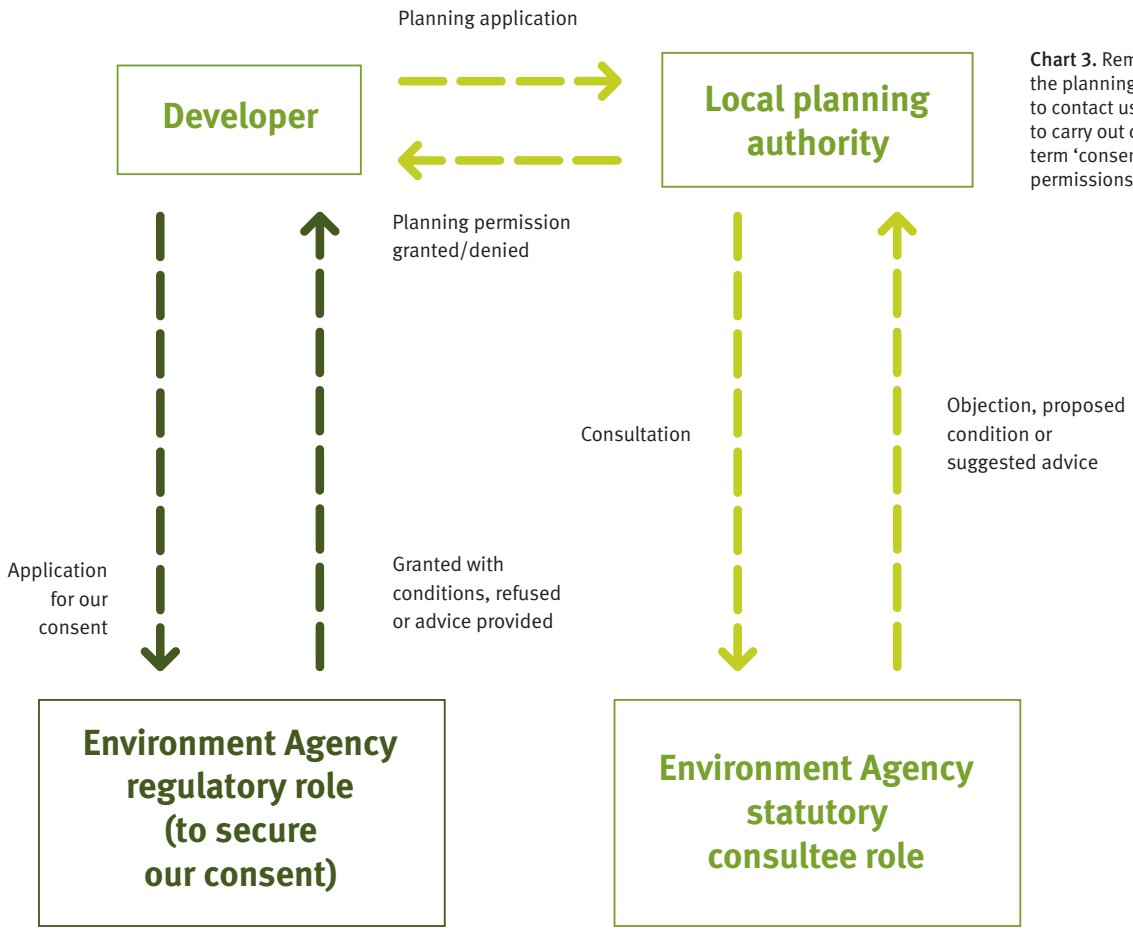


Chart 3. Remember, in addition to the planning process, you will need to contact us for our formal consent to carry out certain activities. The term 'consent' covers consents, permissions or licences.

1.5 Contact us

You will need to contact us if you are developing proposals for a site with environmental issues.

Call 08708 506 506 (Mon–Fri 8–6).

Ask to be put through to the **local planning liaison team** for your site. We can then provide you with one main point of contact for the development.

Other Environment Agency numbers

Report a **pollution** incident – **0800 80 70 60** (24 hours a day, 7 days a week).

Call free to report:

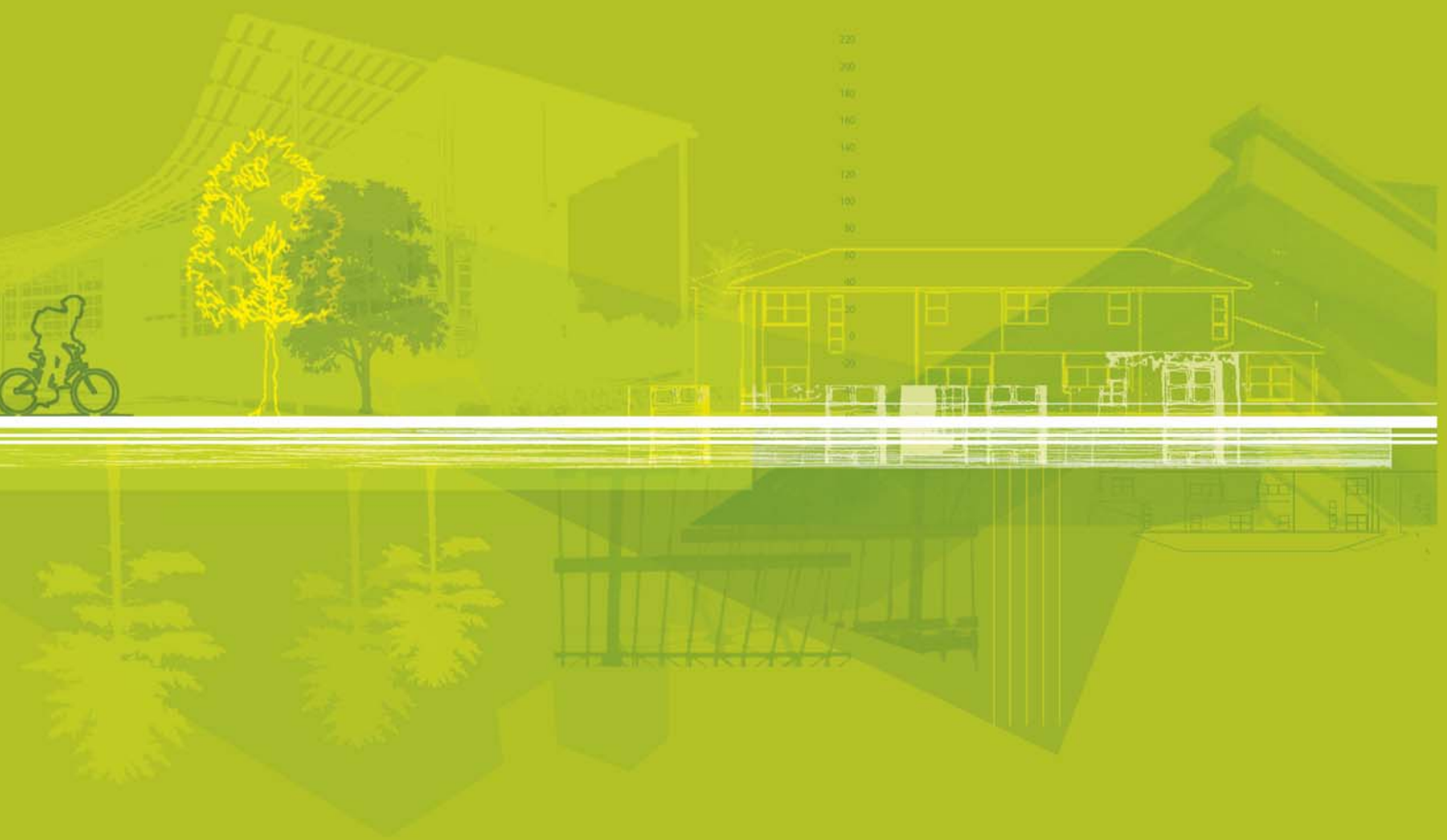
- damage or danger to the natural environment;
- pollution;
- poaching;
- risks to wildlife;
- fish in distress;
- illegal dumping of hazardous waste;
- flood incidents (for reporting flooding only).

Floodline – **0845 988 1188** (24 hours a day, 7 days a week).

Calls charged at local rate. Call to find out:

- the current flood warnings in force;
- advice to the public on preparing for a flood.

Hazardous waste registration – **08708 502 858**



Part 2
the environmental issues

In this part of the guide we'll help you identify the environmental issues to consider at each stage in the development process. For each major environmental issue we explain the potential problems and solutions, our expectations of you, and give examples of good practice and guidance.
An illustration of a hypothetical development brings these issues together in section 2.1.

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2.1 Introducing the issues

Whether you are working on a large or small development, you will need to consider the impact it will have on the environment during construction and in the future.

However, rather than constraining your work, the environment can be a big opportunity. High environmental standards can bring value to your development and boost your green credentials. You can also add value to your development by creating green space for the local community.

Climate change is set to have various impacts on the built environment. These include increased flood risk, subsidence, storm damage and higher day-time/night-time temperatures. We need to act now to reduce the impact of these risks.

This work doesn't have to cost the earth. The case studies in this guide illustrate how planning ahead and using more innovative techniques and designs have saved developers money.

This all leads to getting the most out of your development and creating a better place for the communities that will live and work there.

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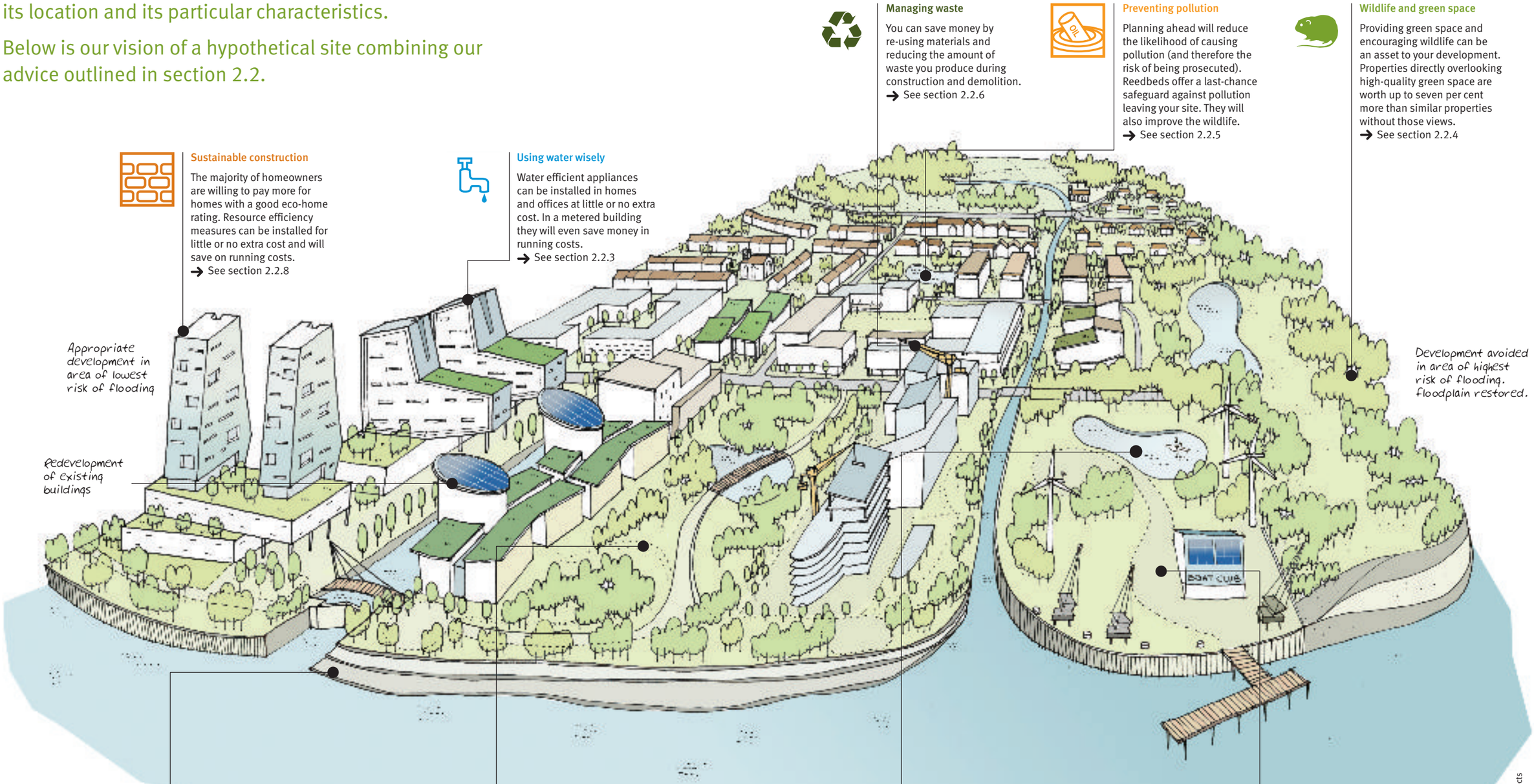
1. By retreating the flood defences at the Greenwich Peninsula, valuable habitat was created for the tidal wildlife. See case study 2.2.1.

2. Features such as solar panels will save homeowners money in energy costs. They will be viewed positively by the local authority and us.

2.1.1 An example of sustainable development

Development is subject to a variety of opportunities and constraints. This depends on the proposed use of the site, its location and its particular characteristics.

Below is our vision of a hypothetical site combining our advice outlined in section 2.2.



Sustainable construction

The majority of homeowners are willing to pay more for homes with a good eco-home rating. Resource efficiency measures can be installed for little or no extra cost and will save on running costs.
→ See section 2.2.8

Using water wisely

Water efficient appliances can be installed in homes and offices at little or no extra cost. In a metered building they will even save money in running costs.
→ See section 2.2.3

Managing waste

You can save money by re-using materials and reducing the amount of waste you produce during construction and demolition.
→ See section 2.2.6

Preventing pollution

Planning ahead will reduce the likelihood of causing pollution (and therefore the risk of being prosecuted). Reedbeds offer a last-chance safeguard against pollution leaving your site. They will also improve the wildlife.
→ See section 2.2.5

Wildlife and green space

Providing green space and encouraging wildlife can be an asset to your development. Properties directly overlooking high-quality green space are worth up to seven per cent more than similar properties without those views.
→ See section 2.2.4

Managing flood risk

Your development must be safe from flooding and must not increase the risk of flooding elsewhere. Making space for water can provide valuable green space, adding value to your development.
→ See section 2.2.1

Managing surface water

Using sustainable drainage options on your site can reduce pollution and reduce the risk of flooding. They can save you money compared with the more traditional drainage techniques.
→ See section 2.2.2

Recreation, society and health

Floodplains provide areas of open space and bring significant health and recreational benefits to local communities. They are likely to increase the value of the site.
→ See section 2.2.9

Land affected by contamination

Contaminated soils can be treated on site, saving you money on lorry movements and disposal costs.
→ See section 2.2.7

KCA Architects

This hypothetical site is for illustrative purposes only.
For more detailed information see **2.2 The environmental issues.**

2.1.2 The stages of your development

→ **also see**

1.4 Our role in planning

Site selection and location

We want to ensure that homes and other buildings are built in the right and safe locations where there is already sufficient environmental infrastructure, or in places where this can be provided with minimal environmental impact. You should check with the local planning authority that your development is compatible with their development plan or local development framework.

We have a statutory duty for strategic water resources planning, and a role in the planning, management and delivery of infrastructure to reduce flood risk. So we advise on where development and supporting infrastructure should be located to reduce environmental impacts and flood risk.

A good starting point to find out about the environment around your site is to look at 'What's in your backyard?' on our website. By entering the site's postcode you can view maps on the flood risk and the quality of the nearby rivers.

For a small charge we can provide you with further information you will need for your environmental assessments.

Masterplanning

This stage is crucial to create a development or area that is safe, attractive and prosperous. Multi-functional planning and design will help you integrate the aesthetic, social, economic and environmental needs.

You should check with us what information you will need to carry out an environmental appraisal on your site.

You can make much more of your site if you see the environment as an asset – work with it and with us.

Site preparation and construction

Most avoidable environmental impacts occur during the construction stage and many result from unnecessary accidents. If you have planned ahead and followed the recommended guidance, you should avoid any problems.

Management and maintenance

If you have used best environmental practice in your development, make sure it continues to work well and look good – so that it remains a good advertisement for your company.

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1. Check with the local planning authority to make sure your development is compatible with their local development framework.

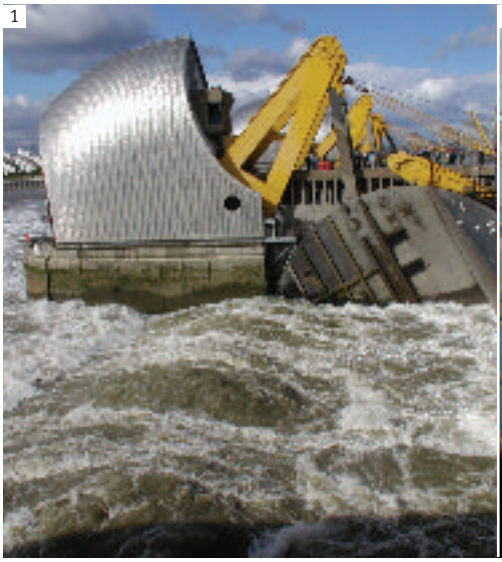
2. You can make the most out of the opportunities on your site by planning ahead and speaking to us as early as possible.

2.2 The environmental issues

The following sections outline the environmental issues that may affect your site. For each of them we have outlined our advice and guidance and details of when you need to contact us. Case studies illustrate how this advice has already been used at sites across the country.

2.2.1 Managing the risk of flooding

Contact us as early as possible to find out if your site is at risk from flooding. If it is, we can tell you whether development is likely to be acceptable, and then the steps you can take to manage the risk.



Climate change is causing sea levels to rise and we can expect more winter storms as well as more frequent and severe tidal flooding. Intense rainfall will also increase the risk of flash flooding from our rivers and overflowing drainage systems.

1. We are already seeing a difference in our climate. Since the Thames Barrier became operational in 1982 it has been raised 92 times to prevent flooding. More than half of these closures were in the last five years.

2. Flooding can have devastating effects.

Our job is to help you avoid or manage the risk of flooding. We work with other organisations and take action to avoid or reduce the likelihood and consequences of flooding.

Our advice

Managing flood risk is a major issue for any development, and we want you to consider some big questions at this stage to help you understand it. The location, layout and design of developments – in that order – are the most vital factors determining both the likelihood and consequences of flooding.

Built developments should be located in areas of lowest risk. This is in accordance with the Government's new **Planning Policy Statement 25 (PPS25): Development and flood risk**. You need to ensure the site land use and layout is appropriate to this risk. Housing and access roads are vulnerable to flooding, whereas open space and informal recreational areas are generally compatible and can help manage flood risk by making space for water. →

1. You can reduce the risk by building your development away from the river's edge. This was done at Woolwich Arsenal in London.

2. The flood maps on our website indicate the areas at risk of river and tidal flooding in England and Wales.

3. An example of a terraced riverbank. Terraced riverbanks can help manage the flood risk. They can provide valuable habitat for wildlife. As shown in this diagram, they provide a more attractive solution to traditional measures such as old sheet piling that can block views of the river.
Please note that this design is particularly suitable for the Thames Estuary, but not necessarily elsewhere.

Your development must be safe from flooding and must not increase the risk of flooding elsewhere. Both we and the local authority will want to see you demonstrate in your flood risk assessment (FRA) that you have considered all forms of flooding, its consequences and reduced the overall flood risk for the lifetime of the development. →

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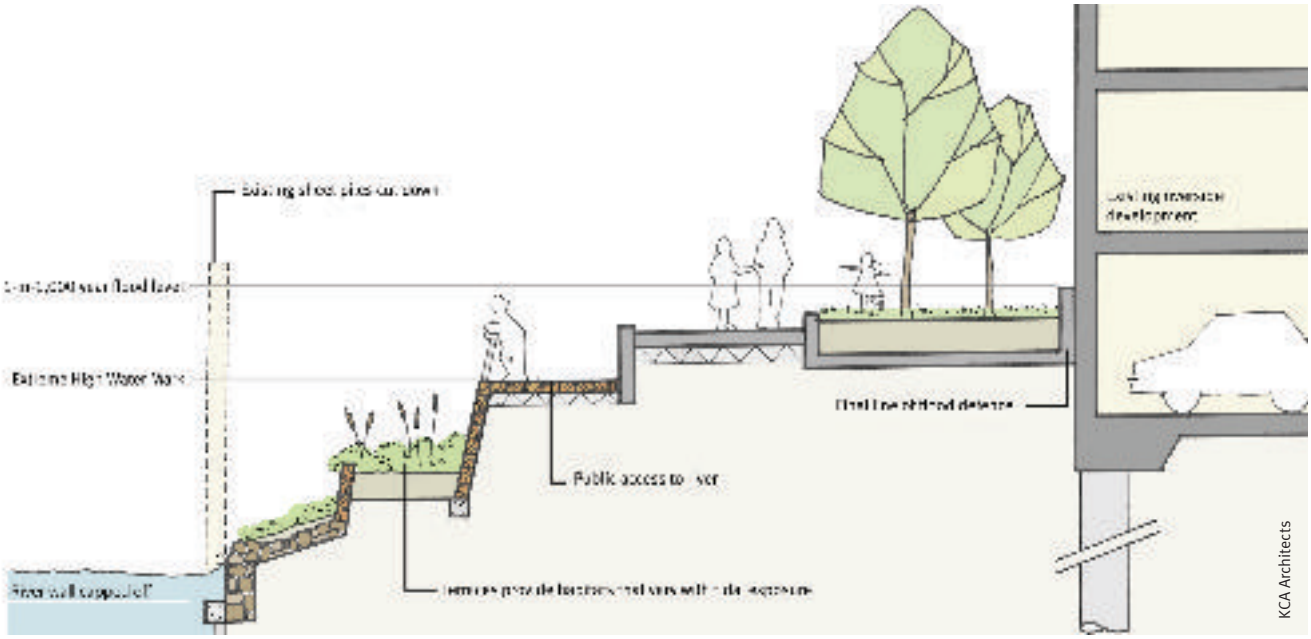

→ **also see**

2.2.2 Managing surface water

2.2.4 Wildlife and green space

3.1 Environment Agency permissions

Getting the go-ahead

We will object to developments that are likely to be at high risk of flooding or increase the risk to others.

We can also refuse to give our own consent to works that we consider to be harmful to the environment, even if the scheme is sound from an engineering point of view. For example, we are generally opposed to culverting watercourses and to works on tidal rivers that encroach riverward of the flood defences. Our policy is to actively restore culverted channels to natural water courses.

We want you to design schemes that avoid flood risk or reduce the likelihood and consequence of flooding and also enhance the environment. Setting back riverside defences and designing green, floodable storage spaces and routes for water can create a safe, attractive and well-connected development for both people and wildlife.

Extreme floods will happen. It will never be possible to eliminate flood risk altogether. Even if the local planning authority accepts the flood risks associated with your development, you must include methods of reducing the risk and have appropriate flood resilience or resistance measures.

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1. The regeneration of this site on Ferry Lane in Brentford allowed the tidal flood storage area to be increased. The flood defence walls were repaired, creating new access to the riverside and also protecting important wildlife habitats.

2. To avoid serious risk to people on your site, you must design it according to the likelihood and consequences of flooding.

Emergency planning

A safe development will require good emergency planning procedures to be in place. This should be part of the flood risk assessment. Planning, building and maintaining development in flood risk areas will cost more, and is your responsibility.

→ see 3.2 for the full **environmental checklist**

Managing the risk of flooding
what we expect of you

- Establish if your development is at risk of **tidal or river flooding.** Check the flood maps on our **website**, and any strategic flood risk assessment.
- Make sure the location of your development meets the **Sequential Test (PPS25)**. Only where there is no other choice, it must meet the Exception Test.
- Speak to us for advice on flood risk and to ensure you understand **our flood risk management requirements**. Local byelaws may vary.
- Contact your planning authority to confirm whether a **flood risk assessment** is required. If so, find out what conditions apply and if they have any guidance or other information to help you target your flood risk assessment more effectively (for example, through a strategic flood risk assessment).
- Choose your site and design the **layout** so it is compatible with the flood risk. You must avoid causing flooding elsewhere.
- Assess and manage the risk from all possible **sources of flooding**. The risks may be from groundwater, river or coastal flooding (e.g. overtopping or breach of flood defences), surface water, overland flow, breached reservoirs or sewer flooding.
- Design your development so that it is safe for people to **occupy, access** and **leave** the site during a flood.
- Where development is acceptable, build-in **flood resilience and resistance**. This will reduce damage to your development should flooding occur, and make it more insurable.

→ see 3.1 for **permissions**

- Obtain all necessary **consents** to manage the risk of flooding before starting work. If work is carried out without our consent, we can inspect your site and require you to put things right. We could even reclaim the cost from you for removing or altering your work.
- Always leave adequate space for **maintenance and renewal** if you upgrade or build new flood defences. Consider setting them back from the riverside.

→ **more information**

Living on the Edge, Environment Agency. Contains details of the local land drainage byelaws.

Development and flood risk: Guidance for the construction industry (C624), CIRIA.

Planning Policy Statement 25 (PPS25): Development and flood risk, Department for Communities and Local Government (expected to be published by December 2006).

Flood resilient homes: What homeowners can do to reduce flood damage, Association of British Insurers.

Links to these documents plus other useful information are on our website: **www.environment-agency.gov.uk/developers**

Case study A millennium experience

Greenwich Peninsula, east London
Completed 1999

Developers:
British Gas
English Partnerships

Benefits:
Cheaper, more sustainable defences of a higher standard; contaminated and derelict site transformed; habitats provided for wildlife to flourish; improved access to the riverside.

Site background

In 2000, the site at the Greenwich Peninsular in east London hosted the Millennium Experience. This development brought a high-profile opportunity to demonstrate good practice in urban flood risk management.

As a former gas works, the site was contaminated and largely derelict. The aim was to clean-up the site and improve the standard of flood defence. A total of 2,200m of the site was next to the River Thames, and so there was also a huge opportunity for recreation facilities, landscaping and encouraging wildlife.

The scheme

We worked closely with British Gas and English Partnerships to replace 1,240m of the existing river frontage. We recommended cutting down the old sheet piling and bringing the new line of defence into the site. This created a new terraced habitat where wildlife could flourish.

Around 1,800m on the eastern side of the peninsula was pulled back by 7m to create habitat of varying tidal heights. At the northern side of the peninsula tip, 130m was retreated by 10m to create salt marsh. ➔

1. The scheme at Greenwich was designed to bring people closer to the river.

1. These terraced flood defences cost half of what it would have cost to replace the sheet piling in the same position.

2. Reeds provide valuable habitat for animals and fish in the tidal estuary.

The Greenwich Peninsular site is still one of the best illustrations of this approach to riverside design. Large-scale riverside developments can often conflict with the environment. But this development illustrates how they can complement the environment and be a commercial asset.

Elsewhere, the existing good-quality sheet piling was clad with timber fenders. This improved its appearance and also provided some habitat for animals and plants in the estuary. Across the site the landscape was thoughtfully planned to include an ecology park and riverside foot and cycle paths. Viewing points allow people to enjoy remarkable views of the River Thames and the river's edge.

The set-back and terraced flood defences cost less than half of what it would have cost to replace the sheet piling on the same line (however removing the contaminated soils made the final costs about equal). The land value of the site has improved as a result of all of the improvements to the ecology.

Further redevelopment

Further inter-tidal terraces are to be created during the next development phase of the peninsula. The proposals are for 10,000 more homes, community facilities and commercial development. The site will be remediated and major new green space and park areas are to be created.

Buildings will have green roofs and solar panels, and will be set back from the riverside to provide space for a new riverside walkway. There will also be recreational improvements to the old drawdock.

2.2.2 Managing surface water

A well-designed and managed surface water system can save you money and add to the visual attractiveness of the site.

The Government's planning policy on development in the floodplain highlights the important role that SUDS can play and introduces a general expectation for their use at all sites. Surface water disposal is a material planning consideration. Local authorities increasingly expect developers to submit proposals that incorporate the SUDS approach.

1. At Sanders Garden World, rainwater is infiltrated through the permeable paving to be re-used for watering plants.

2. SUDS can look attractive and natural.

Planning a site so that water is removed from it as quickly as possible can harm the environment. It can increase both water pollution and the risk of flooding to the site itself and elsewhere downstream. It can cause damage to wildlife and river habitats. In areas with combined drainage systems, surface water entering the system causes polluting storm discharges and overloads treatment plants.

Sustainable drainage systems

To make sure your site is not polluting the environment or increasing the risk of flooding, you should use the sustainable drainage systems approach to drainage, otherwise known as SUDS.

This approach provides a drainage solution that takes into account the:

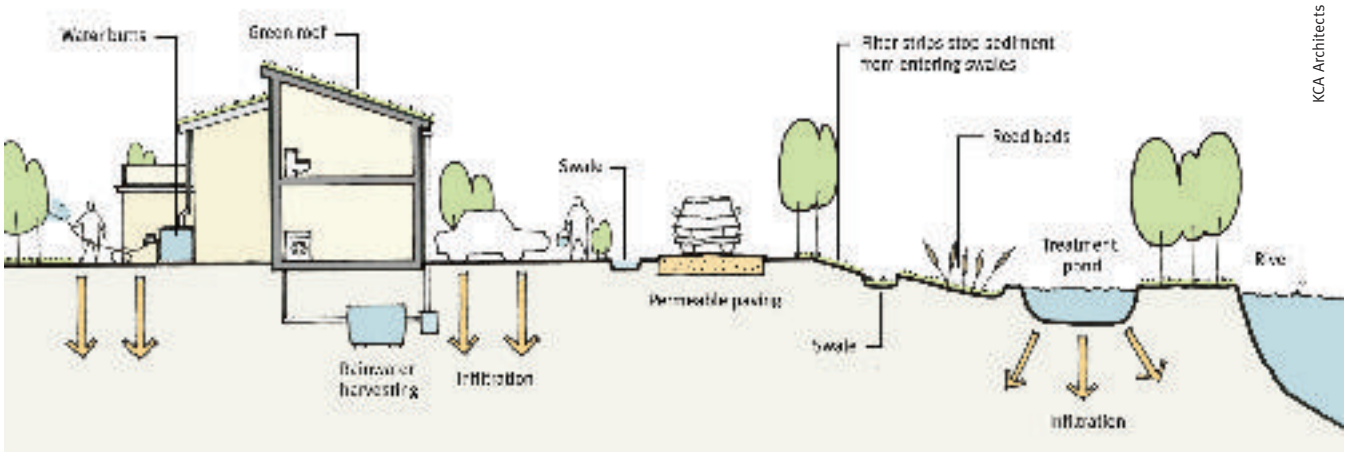
- amenity benefits;
- quantity of surface water run-off;
- quality of surface water run-off.

By doing so it helps to protect and improve wildlife in the area, and improve the landscape and attractiveness of the site.

SUDS use a wide range of techniques that have been tried and tested on projects throughout England and Wales. They can be applied to a variety of schemes, from small developments through to major residential, leisure, commercial or industrial operations with large areas of hard standing and roof. A particular benefit is that they can be successfully retro-fitted to existing developments. →

1. Surface water is drained into a pond in this development in Bicester.

2. There are various options for SUDS that you could use on your site. This diagram illustrates a few of these and how they can work together. Use CIRIA guidance to help you choose the right design for your site.



KCA Architects

Our advice

You will get the best results if you consider the use of SUDS options early in the site evaluation and planning process, not just at the detailed design stage. This will ensure drainage costs are adequately considered at the start of the development. A well-designed SUDS scheme may even save you money. For example, by avoiding the need for gully pots or for constructing surface water sewers.

There will be a SUDS technique to suit your site – whether it is using infiltration, swales and ponds, lined wet ponds or green roofs. To determine the right technique you should first establish the soil conditions and hydrology of the site and use the results of your investigations to support your drainage proposals. Your choice can also be significantly influenced by the quality of the land (whether it is affected by contamination), the need to protect vulnerable groundwater sources and the permeability of the soil.

SUDS solutions are most cost effective when designed to work with the natural drainage pattern of your site. For example, you can design them to use existing ditches or natural depressions for swales and ponds. You can design them to form part of hard and soft landscaped areas.

Ponds and green spaces will provide habitats for wildlife to flourish, reduce pollution and provide areas for people to enjoy, adding value to your site. Even in the most constrained site you can use green roofs to reduce surface water run-off (see section 2.2.8 for the other benefits of using green roofs), or to collect rainwater for flushing toilets or watering gardens (see section 2.2.3). ➔

1. Use permeable paving rather than concrete. This type of paving allows rainwater to infiltrate into the ground, topping up groundwater supplies. By reducing the rate of surface water run-off it can help to reduce the risk of flooding.

2. Peabody Trust used sedum roofs on this social housing development in Fulham, London to reduce surface water run-off.

3. An attractive finish to SUDS at Wheatley.

Maintaining drainage systems

In the early stages of your site design, consider how the drainage system will be adopted and maintained in the future. It is likely these decisions will influence the design just as much as the technical considerations.

also see

- **2.2.1 Managing the risk of flooding**
- **2.2.3 Using water wisely**
- **2.2.4 Wildlife and green space**
- **2.2.5 Preventing pollution**
- **2.2.7 Land affected by contamination**
- **2.2.8 Sustainable construction**
- **3.1 Environment Agency permissions**

→ See 3.2 for the full **environmental checklist**

Managing surface water
what we expect of you

→ see 3.1 for **permissions**

- Before you plan your site, consider how you can manage the **rate of surface water run-off** so that it is similar to the conditions before the development. Also consider the effect this run-off will have on any receiving watercourse.
- Speak to us about the surface water drainage proposals for your site. We can tell you what **consents** you will need, which types of SUDS are unsuitable and whether you will have to take **special precautions** to prevent pollution or reduce infiltration.
- Where infiltration techniques are not possible, or where space is limited, you can still use features such as **green roofs** to reduce the rate or total amount of run-off.
- Use **CIRIA** guidance to inform your choice of SUDS design for the development.
- Demonstrate in your **flood risk assessment** that you will deal with surface water by installing the best combination of SUDS techniques for your site.
- Whilst constructing your site, protect **adjoining areas** from flooding.
- You will need to consider your **timetable for construction**. Where permeable surfaces are installed, you need to ensure they are not blocked with silt from site activities.
- Ensure you have an adequate **management** and **maintenance system** in place.

→ **more information**

Sustainable drainage systems (SUDS): A guide for developers, Environment Agency.

There is a wealth of SUDS guidance on the CIRIA website **www.ciria.org.uk/suds**. This includes the **Interim code of practice for sustainable drainage systems** by the National SUDS Working Group.

Details of green roofs at **www.livingroofs.org**

Links to these documents plus other useful information are on our website: **www.environment-agency.gov.uk/developers**

Case study Soakaways help reduce run-off

Ravenswood, Ipswich
1999–2000

Developers
Bellway Homes

Benefits
Reduces risk of flooding; replenishes groundwater levels; creates habitat for wildlife; will save £600,000 in its lifetime compared with a piped system.

Site background

This former airfield off Nacton Road in Ipswich is now a village-style development of approximately 1,000 homes. It includes a school, sports centre, leisure areas, public open space, plus a commercial and retail area.

The scheme

The developers, Bellway Homes, designed the Ravenswood site so that all surface water run-off was drained through a combination of soakaways and infiltration basins. Without these systems, the traditional piped discharge from the site during a one-in-100-year storm event would have been 6,600m^3 of water. Using SUDS, the discharge for the same flood event is now zero.

Houses and driveways are connected to individual soakaways. The roads are drained by a piped system that discharges to the infiltration basins running along the main boulevards. →

1. Rainwater is drained from the roads and discharged into these attractive infiltration basins.

Natural drainage

This infiltration scheme uses the natural drainage path of the soil. Its permeable deep water table provide a large unsaturated zone that can accommodate this surface water. This technique helps groundwater levels to replenish, and the infiltration basins create wildlife corridors through the development. Using finances from commuted sums, Ipswich Borough Council manages the SUDS as public open space. Over its lifetime the scheme has the potential to save £600,000 in construction and maintenance costs compared with a piped system.

1–3. The scheme is attractive, low maintenance, and creates corridors for wildlife through the development.

2.2.3 Using water wisely

Far too many developments use more water than they should. Taking steps to save water can save you money and protect supplies.

There is a shortage of water in the south and east of England. Climate change and population growth are placing increasing demands on our water supply. Our changing lifestyles also mean that the amount of water we use each day is increasing. Overuse leads to impacts on wildlife and the wider environment. It can lead to water restrictions.

Building water-saving measures into your development can do a lot to reduce overall demand. They will be viewed positively by the Environment Agency, water companies and planning authorities.

Water efficiency targets

The new draft Code for Sustainable Homes will introduce various targets for water efficiency. These targets will allow buyers to compare properties for how water efficient they are. In London the Mayor has set a minimum water efficiency standard for new residential developments of 110 litres, per head, per day. Our own research has shown that this standard can be achieved in new buildings at no extra cost. ➜

also see

2.2.2 Managing surface water

2.2.8 Sustainable construction

3.1 Environment Agency permissions

1. Reservoirs were seriously low in south-east England in 2005/6, following well over a year of below-average rainfall.

1. Rainwater harvesting systems allow rainwater to be re-used for flushing toilets, washing clothes and watering the garden.

2. Sales of water butts soared after the hosepipe bans during the drought in summer 2006.

3. Climate change will bring longer, drier summers. As a result, water shortages may be more common in the future.

Techniques to save water

You can save water in your development by installing or using:

- water efficient appliances and fittings, such as 'A-rated' washing machines, low-flow taps and showers and low or dual-flush toilets;
- leak-detection systems for major supplies;
- rainwater harvesting and re-use systems;
- drought-resistant landscaping.

Even simple measures can help. For example, reducing the length of hot water pipe-work will mean people won't need to 'run' the water.

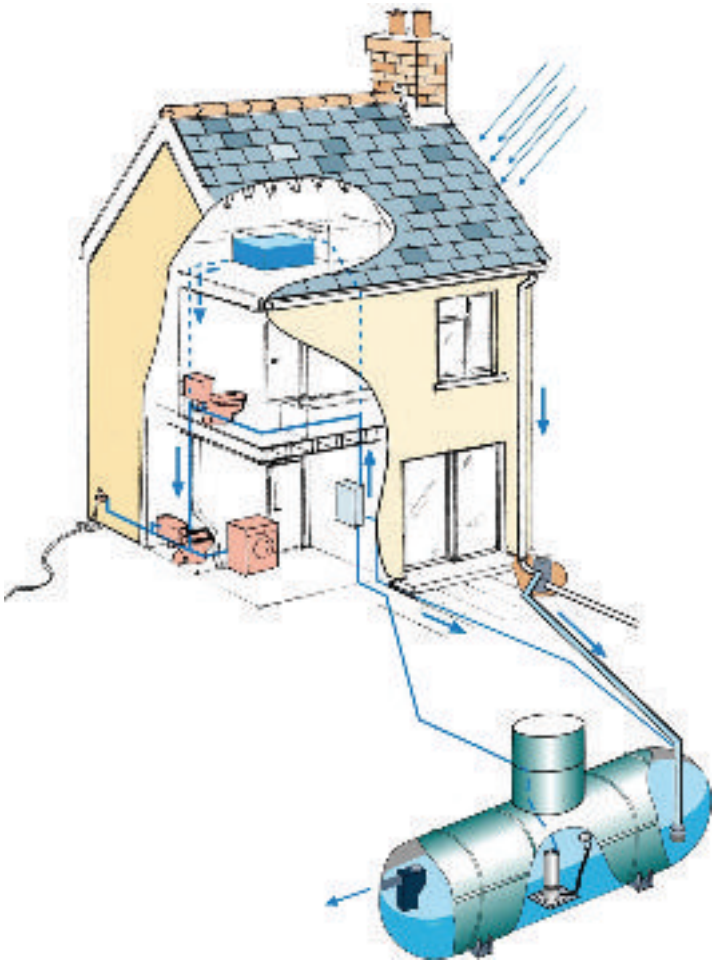
Get permission

As water supplies are so precious, it is vital we protect them properly. We do this through a system of consents.

You must contact us if you are likely to be:

- abstracting water from surface or underground sources;
- interrupting the flow or impounding water from a watercourse;
- drilling any boreholes within 16m of any flood defence structure;
- discharging to a watercourse or into the ground. →

1



Acorn Environmental Systems

Your development can play a vital role in securing future supplies. Work closely with the water companies to plan new supplies and design water efficient homes.

2

1. Encouraging consumers to use less water is one solution to the problem. Another is to make sure all developments are made as water efficient as possible.

2. For most homes, installing a water meter reduces the water bills and the amount of water the household uses.

New water supplies

Introducing new water supplies can take considerable time to plan and bring on stream. If you want a company (usually a water company) to supply water, liaise with them while you are still choosing your site – don't just assume they can provide your development with the necessary water and supply infrastructure.

Contact us for valuable information on water resources, water companies, water efficiency and specific supply and infrastructure issues. We can show you maps of Groundwater Source Protection Zones and explain possible restrictions on building in them.

→ see 3.2 for the full **environmental checklist**

Using water wisely
what we expect of you

- Talk to the local planning authority and relevant water company to ensure they can provide the water **supply infrastructure** and **enough water** for the lifetime of your development.

→ see 3.1 for **permissions**

- Contact the local Environment Agency office for advice on our **consents**. You must obtain all necessary consents before you start work on the site.
- Design your development to at least meet the minimum level of the **Code for Sustainable Homes**.
- Consider **water and energy-efficient appliances and fittings** in your development such as 'A-rated' washing machines and low or dual-flush toilets. In London the Mayor has set a minimum water efficiency standard for all new developments of 110 litres, per head, per day.
- If your development is large, consider **leak-detection, rainwater-harvesting** or even **rainwater re-use** systems. However you must understand their management and maintenance requirements.
- Provide **water butts** and use **drought-resistant landscaping** to keep your development looking good.

→ **more information**

Conserving water in buildings, Environment Agency. Includes 11 fact cards on saving money through water efficient technology and a list of suppliers.

Sustainable Homes: The financial and environmental benefits, Environment Agency.

Water Savings Trust feasibility study: An options assessment and evaluation, Environment Agency.

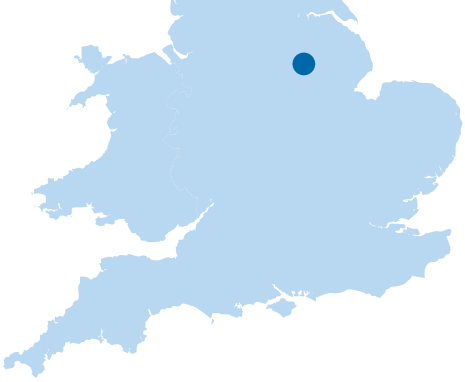
Harvesting rainwater for domestic use: An information guide, Environment Agency.

Waterwise: Good for business, great for the environment, Environment Agency.

BREEAM (BRE Environmental Assessment Method) is the world's most widely used means of reviewing and improving the environmental performance of buildings. Visit **www.bre.co.uk** for details of schemes and EcoHomes checklists.

The Water Technology List on **www.eca-water.gov.uk** provides a comprehensive list of approved water using products.

Links to these documents plus other useful information are on our website: **www.environment-agency.gov.uk/developers**



Case study A shining example of water efficiency

Millennium Green, Nottinghamshire
1998–2000

Developers
Gusto Homes

Benefits
Rainwater can be harvested to provide 18 days' supply; the site uses 50 per cent less water each year; each household uses 50,000 litres less water each year.

Site background

The overall winner of the Environment Agency's 2003 Water Efficiency Awards was Gusto's Millennium Green project near Newark. The development was awarded this for using a variety of water-saving techniques and incorporating other environmental measures into the site.

The scheme

Designed and developed by Gusto Homes – a small, privately owned house-building company – 24 houses and an office use an automated rainwater-harvesting system, halving the amount of water they use. The system has proved so successful that it is sold by Gusto to other developers to be used as part of their approach to sustainable drainage systems.

The buildings were fitted with an advanced system that the company developed itself called Freerain. The system allows enough water to be stored in underground tanks for 18 days' supply. This harvested water is not for drinking, but is used for flushing toilets, washing machines and the garden. If the supply becomes low, the tank is automatically topped-up by mains water. ➜

1. The houses on the Millennium Green site use harvesting systems to recycle rainwater for flushing toilets, washing machines and watering gardens.

2. As a whole, the site uses half of what it would use without these systems in place.

'Not only have we helped our householders save water, but we have also been able to raise general awareness of the potential for building water efficiency measures into new homes.' Gusto Homes

Other environmental features of the development are:

- dual-flush toilets;
- aerated taps and shower units;
- solar water heaters;
- heat-recovery air conditioning.

Following detailed analysis of two homes on the site, it was found that together the harvesting system and the water efficient appliances reduced water use by 50,000 litres each year. Gusto was able to make even more savings by reducing the size of the water infrastructure such as the storm drains and soakaways.

Using sustainable drainage systems

More recently the company has developed a system integrating rainwater harvesting with a sustainable drainage approach. This system allows overflow from the storage tank to feed into another tank instead of flowing into soakaways. This water can then be released at a controlled rate and manner.

Sharing good practice

As a result of the success of the Millennium Green project, Gusto provides complete rainwater harvesting systems to other development companies. They helped establish the Association of Rainwater Recycling Companies whose aim is to encourage high standards in designing and providing similar systems.

1. The Freerain rainwater harvesting system is fully automated. If the tanks become low, they are automatically topped-up with mains water.

2. The houses are installed with solar panels on the south-facing roofs to generate electricity.

3. Mr and Mrs Woodhurst moved over 100 miles to the Gusto development, partly so they could live somewhere with green credentials. They say the move has drastically reduced their energy and water bills.

2.2.4 Wildlife and green space

We have an important regulatory role to protect our native species and habitats. We can help you to create an environment where wildlife can thrive, especially along rivers and in wetlands.


1


2

Our conservation team can provide you with expert advice on most species and habitats. They may assess your development proposal to make sure that it contributes to the UK Biodiversity Action Plan. This is the Government's plan for nature conservation and underpins our role in protecting and improving wildlife.

1–2. Multifunctional spaces are highly valued: they provide areas for recreation and relaxation. Green spaces can also provide free environmental services to your development.

Early consultation with us will avoid unnecessary costs and delays and will increase your chances of receiving our consent. Speaking to us will allow you to identify ways to increase the economic, social and ecological value of your development at little cost.

Protecting wildlife

When planning the design of any new development, you need to consider how your proposals will affect wildlife habitats. To gain our consent and allow your development to take place, we need to be satisfied that your proposal is ecologically acceptable. We give expert advice to the planning authority on the wildlife costs of developments. Therefore it makes sense to include our requirements at the start of the process to reduce your costs and maximise your chances of gaining both planning permission and our consent.

We have a legal duty to protect and improve the environment. This duty always forms part of our assessment of any application for our consent. If we believe that there will be unacceptable damage to wildlife, we may refuse consent and so prevent the development from taking place.

Working with you

Rather than put a stop to your proposals, we would like to work with you from the start to improve habitats on your site and make sure you avoid damaging the environment. This will allow you to avoid negative publicity and even prosecution. But improving these habitats can even increase the value of your site.

Contacting us early on will mean we can help guide your design proposals. This often makes the process far easier and cheaper. It will open up more ➜

1. Having valuable green spaces near a development will have a positive impact on the local community.

opportunities for your site and make applying for consents from us a lot easier and faster.

A financial asset

Any existing or new wildlife on your site can be both a financial and social asset. Independent published research shows that properties directly overlooking high-quality green space are worth 5–7 per cent more than similar properties without those views. Improving the quality and quantity of the water flowing in rivers can increase the value of adjacent properties from 2–15 per cent.

In addition to improving wildlife, green spaces provide free environmental services to a development. They can reduce surface water run-off, the risk of flooding and reduce pollution. They can act as urban heat sinks and improve water quality. They can help reduce the impacts on or from climate change.

Our advice

We advise that you carry out an ecological assessment early in the design process. This will help you understand the environmental requirements and avoid unforeseen problems later on.

You may need to design your proposal so that it will protect existing habitats and species. Your designs should:

- avoid any negative impacts on wildlife;
- mitigate and compensate to prevent any long-term negative effects;
- carry out enhancements where possible.

We can help you with this process if you contact us before any designs have been started.

We can also advise you on your responsibilities for controlling and managing invasive species on your site, and improving freshwater fisheries.

Create new habitats

You will improve your chances of gaining consent if you create new habitats that meet the planning authority's and our environmental targets. We can advise you on how you can achieve this. These habitats can increase the value of your development. They often need less maintenance than traditional landscaping, and so will reduce management costs. ➔

An ecological masterplan will help shape your development in a way that's far more likely to be acceptable to the planning authority and us. A management plan will allow you to make sure your development continues to work well.

If your site is close to a watercourse, we will advise you to create an undisturbed green buffer between it and your development. This should be free of roads and access routes and managed to develop a natural character with native trees, shrubs and grassland, all rich in species.

There are huge opportunities for restoring river and wetland habitats, particularly in heavily urbanised areas. This has already been achieved on many sites with benefits to the economic value of the development, social well-being of residents and local wildlife.

We can provide you with the necessary guidance and advice on how you can achieve this for your development. It will make it more attractive to your customers, local people, planning authorities and wildlife. We can also provide guidance on which ecological assessments will be required and any mitigation or compensation that will be required.

Involving the local community

Wherever you build, there will be interest from the local community. By encouraging participation you can help meet local community needs and open space targets. Sutcliffe Park in Lewisham is a great example of this.

also see

2.2.9 Recreation, society and health case study

2

1. The local community will have a greater enjoyment of your site if you include areas of green space.

2. Water voles were once one of the most familiar residents of our rivers, but have undergone a catastrophic decline over recent decades.

also see

2.2.1 Managing the risk of flooding

2.2.2 Managing surface water

2.2.5 Preventing pollution

2.2.7 Land affected by contamination

2.2.9 Recreation, society and health

3.1 Environment Agency permissions

→ see 3.2 for the full **environmental checklist**

→ see 3.1 for **permissions**

Wildlife and green space

what we expect of you

- Before you design your proposal, talk to us and other environmental organisations about your obligations. Find out which **consents** you will need and what information you will need to provide. We can provide advice and guidance on enhancement opportunities.
- Carry out an **environmental assessment** that is proportional to the size and nature of your development. This should identify the opportunities for improving wildlife and both highlight and avoid any potential ecological impacts.
- Draw-up an **ecological master plan** to capitalise on opportunities to create, manage and enhance wildlife habitats within and affected by your development. Use the guiding ecological principles from **Planning Policy Statement 9,** the environmental assessment and local biodiversity action plans.
- Design **multifunctional green spaces** that provide a range of environmental and social benefits. Make them part of a linked local network to help ensure their longer-term maintenance.
- Establish any **mitigation** and **compensation** measures *before* the impacts take place.
- **Time your operations** so they avoid sensitive periods, such as bird breeding or fish spawning seasons.
- Provide and protect **buffer zones** if you are working close to watercourses or sensitive sites. Control invasive species such as Japanese knotweed.
- Encourage public awareness and **community** participation.
- For large sites, have a plan for the **continued maintenance** of any newly created or enhanced areas.

→ **more information**

Planning Policy Statement 9 (PPS9): Biological and geological conservation, Office of the Deputy Prime Minister (now Department for Communities and Local Government).

Code of practice on conservation, access and recreation, Department for Environment, Transport and the Regions (now Department for Environment, Food and Rural Affairs).

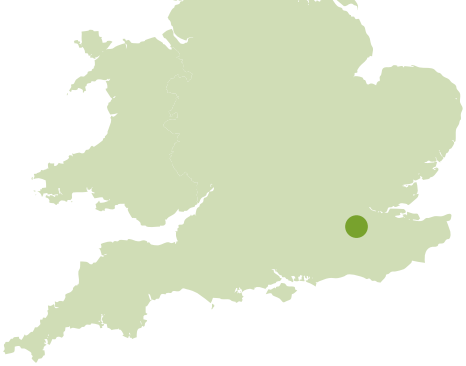
Find out more about the UK Biodiversity Action Plan at **www.ukbap.org.uk**

Guidance on changes to the development control system, Office of the Deputy Prime Minister.

Manual of river restoration techniques, River Restoration Centre.

Local sites: Guidance on their identification, selection and management, Department for Environment, Food and Rural Affairs.

Links to these documents plus other useful information are on our website: **www.environment-agency.gov.uk/developers**



Case study Concrete channel transformed into a natural river

Brookmill Park, south London
Completed 1998

Developers:
Docklands Light Railway Ltd
CGL Rail
LRG

Benefits:
Improved habitats for fish and invertebrates; improved green space for the community to use; reduces the flood risk.

Site background

The extension of the Docklands Light Railway in south London provided the opportunity to divert and restore a section of over-engineered channel and turn it into a semi-natural river.

The scheme

The concrete flood channel of the River Ravensbourne at Brookmill Park in Lewisham was chosen as the route of the extended railway. This route would require the least number of trees to be cut down and reduce the visual impact of the railway on the green space and surrounding area.

New habitats for wildlife

The river was diverted out of its concrete channel along a new 300m meandering course. The semi-natural river was re-designed to include different depths to improve the diversity of wildlife. ➜

1. The River Ravensbourne has been transformed into a semi-natural channel, providing valuable space for the local community to enjoy.

1. Before: The over-engineered concrete channel of the river before the work began.

2. After: The semi-natural river now provides habitats for fish and invertebrates to thrive.

3. The project was a good opportunity to improve an area of green space within an urban environment.

Pools, riffles and shelters now provide habitats for fish and invertebrates to flourish. Stone deflectors provide hard substrates for algae and associated invertebrates and create a cleansing velocity through the pools. The higher third stage widens to create a flood meadow with grassed banks.

The chalk aquifer beneath the river diversion was protected with a polypropylene liner. Because of this channel diversion, the quality of flood protection provided by the River Ravensbourne has been improved.

The park is now used and appreciated more by the local community.

2.2.5 Preventing pollution

Pollution can occur at any stage of a development, so it's essential you plan ahead from the outset.

Measures to prevent pollution are usually very simple and only require that you plan ahead. They can save you wastage and reduce the risk of you being prosecuted. But if pollution prevention measures are to work, managers must be committed and employees must be trained.

When you are considering a site, talk to the sewerage company (usually the local water company) to ensure that there will be adequate sewerage and sewage treatment capacity available to treat the wastewater from your development. Industrial developments pose particular risks during their operation and will need careful planning to build in appropriate pollution control measures. Where groundwater is vulnerable we may prohibit or control activities that pose an unacceptable risk of pollution. For example, we may limit or not allow landfilling or discharges to land or soakaways.

Construction poses the largest risk

The biggest risk of pollution often occurs during construction, particularly from the following activities:

- dewatering;
- digging foundations;
- moving contaminated soil;
- drainage misconnections;
- discharges to rivers, streams or the ground;
- run-off from construction materials and/or exposed ground;
- wheel washings;
- oil or chemical spills. →

1. Wrongly connecting foul water drains to surface water drains will pollute rivers and streams. This is the cause of this sewage fungus.

2. Make sure there will be sufficient sewerage capacity and infrastructure for your development.

Most pollution incidents can be prevented with simple and cheap housekeeping techniques. Before construction starts, read our guidance notes and plan how you will control these activities to prevent pollution and avoid being prosecuted.

→ see 3.1 for **permissions**

Talk to the local Environment Agency office to make sure you have all the necessary permissions and consents before work starts. Even if you don't need our formal consent, it is still your responsibility to comply with all environmental legislation and ensure that the activities on your site do not cause pollution. →

Take steps to prevent pollution

The basic measures you should take to prevent causing pollution are:

- prepare a drainage plan and mark the manholes to prevent pollutants accidently reaching the surface water sewers;
- carry out any activities that could cause pollution in a designated, bunded area, away from rivers or boreholes. Where possible it should drain to the foul sewer;
- use settlement ponds to remove silty water;
- store all oils and chemicals in a fully bunded area to prevent leaks or spills;
- get advice on what consents you need and apply for them in good time. This must be before construction begins.

1. You must take precautions to prevent any pollution from your site. If you do not take reasonable steps, you will be prosecuted.

2. All oils and potentially polluting chemicals must be stored in a bunded area to prevent leaks and spills.

Sustainable drainage

You can help protect water quality during the lifetime of your development by using sustainable drainage systems (otherwise known as SUDS). These will allow you to reduce surface water run-off and pollution and put less strain on the sewerage system. To be effective they need to be managed and maintained throughout the lifetime of the development.

also see

- **2.2.2 Managing surface water**
- **2.2.6 Managing waste**
- **2.2.7 Land affected by contamination**
- **3.1 Environment Agency permissions**

If pollution has been caused on your site, you must contact us immediately on our 24-hour incident hotline **0800 80 70 60**.

more information

Pollution Prevention Guidance Notes (PPGs), Environment Agency (and other organisations). There are over 20 guidance notes available. In particular you should see **PPG02: Above ground oil storage tanks, PPG03: Use and design of oil separators in surface water drainage systems** and **PPG06: Working at construction and demolition sites.**

Groundwater protection: Policy and practice, Environment Agency.

Is your site right? A 10-point checklist explaining what essential environmental management practices should be in place, Environment Agency.

Visit **www.environment-agency.gov.uk/osr** for details of the oil storage regulations.

www.netregs.gov.uk provides plain English guidance on how to comply with environmental law as well as advice on good environmental practice.

DVD: Pollution prevention pays, Environment Agency.

Control of water pollution from construction sites: Guide to good practice (SP156), CIRIA.

Control of pollution from construction sites (C532), CIRIA.

Environmental good practice on site (C650), CIRIA.

Planning Policy Statement 23 (PPS23): Planning and pollution control, Office of the Deputy Prime Minister (now Department for Communities and Local Government).

Links to these documents plus other useful information are on our website: **www.environment-agency.gov.uk/developers**

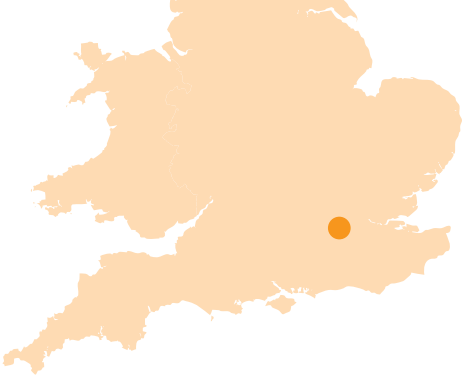
→ see 3.2 for the full **environmental checklist**

Preventing pollution
what we expect of you

- You must **avoid** anything during the development process that **pollutes** the environment. Consider this as part of your environmental assessment.
- Talk to the local planning authority and sewerage company to ensure there is a **sufficient treatment capacity** for the lifetime of your development.
- Investigate the past use of the site to make sure operations will not disturb any land affected by **contamination**. If the site includes contamination, consult the local authority and the local Environment Agency office.

→ see 3.1 for **permissions**

- Talk to the local Environment Agency office as early as possible to discuss our **consent** requirements. You must obtain all required **consents** before starting work.
- Find out from us whether your site is within a **Groundwater Protection Zone** and any special precautions you must take.
- Avoid pollution and prosecution by following our **Pollution Prevention Guidelines**.
- Follow good environmental site practice. Examples of this are set out by **CIRIA**.
- Make sure your managers are committed and employees are suitably **trained**. They should all understand why preventing pollution is important.
- Take care to avoid contaminating **groundwater** by being aware of what makes it vulnerable.
- During construction, regularly inspect and maintain **drainage features and discharges**. Make sure permeable surfaces are protected from silt.
- Obtain our permission to use **herbicides** or **pesticides** in or near water. However first of all you should consider alternative or mechanical methods.
- Keep your site secure from **vandalism** – you will be responsible for any pollution caused.



Case study Reedbed filters industrial estate pollution

Slyfield Industrial Estate, Guildford
2004

Developers
Thames Water
Guildford Borough Council
Environment Agency

Benefits
Reduces pollution from industrial estate; balances flows; encourages wildlife; cost 10 per cent of using a conventional oil separator.

Site background

Slyfield Industrial Estate is to the north of Guildford and close to a number of housing developments. Originally a landfill site, it was developed as an industrial estate in 1965.

Over the past 25 years, oil pollution has been a recurring problem in the River Wey close to the industrial estate. Oil from the estate was running into a backwater and flowing into the river.

The scheme

Together with Thames Water and the local council, we found and contained the sources of pollution during an extensive pollution prevention programme. However it was not possible to remove all of the oils that had polluted the network over time.

To protect the river from any further pollution, a reed bed and balancing pond were created in the backwater. At a cost of only £40,000, the reed bed is now treating flows from the backwater in a sustainable way.

Drainage from Slyfield Industrial Estate now passes through a 1m surface water drain into a large, open inlet chamber with oil booms. This chamber balances the flow of water before passing over a weir into the reed bed. ➜

1. The pollution prevention work on the industrial estate has drastically improved the water quality of the backwater discharging into the River Wey.

1. The surface water drain discharges into an open inlet chamber with oil booms.

2. The roots of the reeds clean-up the organic and chemical pollutants that flow over the reed beds.

3. This part of the River Wey is now a cleaner environment for wildlife.

We don't recommend reedbeds as a primary method of preventing pollution. But in many situations they can be an excellent final safety measure that also enhances the environment.

How the reeds work

The reeds are able to clean-up the pollutants through using the aerobic organisms among their roots to tackle the organic and chemical pollutants. The water gradually passes through the reed bed to the overflow weir, where it joins the existing channel, containing more reeds and foliage. It is then discharged into the River Wey. In times of heavy rain, high flows by-pass the reed bed to prevent any erosion.

As well as reducing pollution, the reed bed balances flows, encourages wildlife and improves the area, providing a better environment for the local community. It was constructed at about one tenth of the cost of a conventional on-line oil separator and doesn't need as much maintenance work.

2.2.6 Managing waste

The UK produces 435 million tonnes of solid waste a year, a quarter of which is from the construction and demolition industry.

The Government is committed to reducing the amount of waste going to landfill and increasing the amount of waste that is re-used or recycled.

You can significantly reduce the amount of waste you produce by separating waste and re-using and recycling aggregates. Doing so can save you money.

Waste disposal is an increasingly expensive option because of the shortage of landfill sites and the increased taxes and regulations. In line with regional plans it is now becoming standard to treat waste close to its source, rather than transporting it for disposal.

Your responsibility

We make sure waste is managed safely through a system of permits and by monitoring compliance. Come and talk to us early in your planning process. Waste management licences, for example, can take up to four months to process, and planning consent needs to be in place. Some activities are exempt from waste management licensing but need to be registered with us and meet specific criteria. →

→ **also see**

- **2.2.5 Preventing pollution**
- **2.2.7 Land affected by contamination**
- **2.2.8 Sustainable construction**
- **3.1 Environment Agency permissions**

1. We live in a throw-away society where each household generates around 1.2 tonnes of waste each year.

2. Where possible, waste from your site should be re-used or recycled.

You need to assess the likely types and quantities of waste that will be generated as soon as possible. This will help you to identify waste management sites and suitable haulage contractors (who must be registered waste carriers).

Your duty of care

Remember that your duty of care extends from when your waste is produced to its final disposal, re-use or recycling. This is a minimum requirement in making sure the waste you produce on-site is not disposed of illegally.

A good way to make sure you have fulfilled your duty of care is to only offer payment to waste contractors when you receive a valid receipt from a suitable waste management facility.

Management plan

A site waste management plan will help you identify your major impacts and liabilities. It will also help you plan in advance and benchmark your activities. The focus of the plan should be to reduce unnecessary use of resources. It should outline how you will segregate waste, optimise recycling options and identify how any hazardous wastes will be minimised and segregated for appropriate management. The Government has indicated that these plans are likely to become statutory for all projects over £200,000.

Your subcontractors also need to follow duty of care obligations. Include this as a requirement in their contracts, together with a request for them to use the facilities for segregating waste.

Understand the environmental and financial value of your soils on-site and protect them. They have a valuable role in landscaping, habitat creation, sustainable drainage and preventing pollution. You can create noise attenuation bunds which can also reduce unnecessary disposal costs. Avoid unnecessarily capping the soil. To reduce on-site and off-site movements, balance cut with fill where appropriate.

You should aim to conserve resources and energy through environmentally sound forward planning. You can improve your reputation and green credentials through benchmarking and accreditation under environmental management schemes. ➜

You have a duty of care to make sure you legally dispose of any waste you produce. You could be fined thousands of pounds or even face a prison sentence if it is fly-tipped.

1. An example of bad storage of waste on a construction site.

2. Segregating your waste makes it easier to recycle and re-use more of your materials.

Reduce, re-use, recycle

Finally, whether your development is an office, housing or commercial premises, you should make space within it for waste to be stored and sorted. It is imperative we take steps to reduce and recycle our waste, and providing space for segregating and recycling waste will allow the people who live or work in your development to do the same.

1. You should provide space within your site for residents to sort and store their waste.

2. You must make sure the person or company who removes your waste is a registered waste carrier. Otherwise you could be fined under your duty of care if the waste is fly-tipped. Visit our website for a list of the registered waste carriers.

3. On-site sorting and re-use of construction materials saves lorry movements and costs.

→ see 3.2 for the full **environmental checklist**

Managing waste
what we expect of you

- At a minimum, make sure you comply with your **duty of care** obligations. Set strict contractual obligations on all subcontractors to make sure none of the waste produced from your operations is disposed of illegally.
- Make sure you understand your **legal obligations**. You may want to take the advice of lawyers or consultants.

→ see 3.1 for **permissions**

- Speak to the local Environment Agency office about your **waste management obligations**. Understand which **permissions** you will need from us and demonstrate your compliance with the regulations across the life of the project.
- Draw-up and follow a **site waste management plan** for each major project. For smaller projects make sure you have assessed the likely types and amounts of waste.
- Minimise and segregate **hazardous waste**.
- Understand the environmental and financial value of your **soils on site** and protect them.
- Talk to the local planning authority about the method and systems they use for sorting and collecting **recycled waste**.
- Provide your buildings with **storage space** for segregating and recycling waste. Subcontractors should also use these facilities – write this into their contracts.
- Follow the **Waste Hierarchy**: reduce, re-use, recycle, recover, dispose. Use materials that can be re-used at the end of their life and which have minimal impact on the environment.
- Keep your site secure and don't be a victim of crime. Construction companies often suffer from **illegal fly-tipping** and you will be responsible for its clean-up and any pollution caused.

→ **more information**

Construction and demolition waste: Your legal duty of care, Environment Agency.

Is Your Site Right Right? A 10-point checklist explaining what essential environmental management practices should be in place, Environment Agency.

www.netregs.gov.uk provides plain English guidance on how to comply with environmental law as well as advice on good environmental practice.

You can search for the registered waste carriers closest to you at: **www.environment-agency.gov.uk/publicregisters**

Site Waste Management Plans: Guidance for construction contractors and clients. Voluntary code of practice, Department of Trade and Industry.

Planning Policy Statement 10 (PPS10): Planning for sustainable waste management, Office of the Deputy Prime Minister (now Department for Communities and Local Government).

www.envirowise.gov.uk provides practical advice to businesses on minimising waste and resource efficiency.

BRE benchmarking and waste measurement tools: **www.smartwaste.co.uk**

Links to these documents plus other useful information are on our website: **www.environment-agency.gov.uk/developers**

Case study Construction waste reduced by half

Great Western Hospital, Swindon
Completed 2002

1

Developers
Carillion plc

Benefits
Reduced the amount of waste produced on-site by 50 per cent; construction was faster and safer; fewer delivery journeys.

Site background

Sustainability was a key feature when replacing Swindon's Princess Margaret Hospital with a new hospital with better health facilities.

The scheme

To reduce the amount of waste produced on the site for the new Great Western Hospital, the developer put into place sustainability action plans that managed the whole supply chain. These plans demonstrated a rarely found, joined-up approach to sustainability.

In other projects the developer had found that the majority of waste produced during construction was plasterboard. At Great Western they avoided this by selecting and ordering the correct board sizes to reduce wasted off-cuts. They also sorted and recycled waste and returned any unusable pieces to the manufacturer on the lorries delivering fresh boards. ➜

1. The developers managed the whole supply chain during the construction of the hospital to reduce the amount of wastage on-site.

1. Through ordering specific components only, the construction of the site was faster and safer.

Ordering specific components allowed them to complete the construction of the site faster and safer. It even minimised the number of delivery journeys. For example, walling consisted of pre-fabricated concrete panels with pre-installed insulation and windows. The supplier's factory monitored any wastage.

The sustainability measures

The project reached its target of reducing waste by half. The developer did this by:

- preventing unnecessary materials arriving on the site;
- segregating waste to be re-used and recycled;
- seeking local markets for unwanted materials if it was not possible to re-use or recycle waste on-site.

2.2.7 Land affected by contamination

The redevelopment of brownfield land is subject to complex legislation that controls both the permissions you need and how the development must proceed.

1

It is important to be aware that brownfield land is not necessarily contaminated. If there are waste management licensing implications or watercourses at risk, talk to the local Environment Agency office to make sure you understand your legal obligations and avoid significant delays or unworkable plans.

1. Developing brownfield land is an opportunity to recycle land, clean-up contaminated sites and help environmental, social and economic regeneration.

Land contamination is a material planning consideration. The Government's **Planning Policy Statement 23 (PPS23): Planning and pollution control** advises you to submit enough information with your planning application to determine the risks from contamination. It states that you must also prove to the local planning authority that there is a realistic option for treating the site.

You should consult with both the local authority and us before submitting your application. We will support them in imposing conditions to make sure contamination is dealt with to protect the environment and provide a site suitable for the proposed use.

→ **also see**

2.2.5 **Preventing pollution**

2.2.6 **Managing waste**

3.1 **Environment Agency permissions**

Assessing the risk

In the UK, investigating and treating land affected by contamination is based on a risk assessment framework. This is set out in the publications **Guidelines for environmental risk assessment and management** and the →

1. Dual-phase extraction: Remediation of soils and groundwater using a mobile plant. Controlled by a Mobile Treatment Licence, techniques such as this can help avoid the need for 'dig-and-dump'.

2. Some brownfield and derelict land can become important wildlife habitats, public green spaces or a core part of urban green networks.

3. Sonic drilling. You will need to make sure you identify and deal appropriately with any contamination on your site. Speak to the local authority and us to make sure you understand your obligations.

1

2

3

Model procedures for the management of land contamination (CLR11). There are numerous other guidance documents and technical reports that support this framework. See **more information** in this section.

Non-landfill solutions to remediation may include on-site treatment. This involves techniques such as soil washing, bioremediation, permeable barriers and soil solidification and stabilisation. However, in addition to dealing with the source or the pathway, pollutant linkages can equally be broken by dealing with the receptor, such as the proposed use of a site or its layout. →

The national target for developing brownfield land for housing is currently 72 per cent. Changes in legislation – for example, the Landfill Directive – have significantly increased the cost of disposing of contaminated soils making 'dig-and-dump' no longer an easy or cheap option.

1. On-site remediation using biopiles at an oil refinery.

You should work with the local authority and us to make sure any risk of contamination to watercourses are continually addressed. Where the risks are significant, we may choose to provide site-specific advice or comments. You should take precautions to protect controlled waters throughout the development process.

We have improved our mobile plant licensing system to help operators redevelop brownfield land in a more economic and timely way, and without compromising the environment. Speak to the local Environment Agency office to make sure you are aware of the changes and how they affect you.

Technical terms explained

Receptor – In general terms, something that could be adversely affected by a contaminant. For example, people, an ecological system, property or a water body.

Pathway – The route or means a contaminant could take to expose or affect a receptor.

Pollutant – The relationship between a contaminant pathway and receptor.

More definitions are provided in **Model procedures for the management of land contamination (CLR11).**

→ see 3.2 for the full **environmental checklist**

Land affected by contamination

what we expect of you

→ see 3.1 for **permissions**

- Make sure you understand your **legal obligations** when remediating land affected by contamination. You may want to take the advice of lawyers or consultants.
- Speak to the local authority's contaminated land team and the local Environment Agency office to make sure you have correctly understood your **obligations** and the **permissions** you will need.
- Make sure you do not pollute the environment or harm human health. Follow **best practice** and conform to the **regulations**.
- Follow the **risk assessment framework** outlined in **Guidelines for environmental risk assessment and management.**
- Follow the **Model procedures for the management of land contamination (CLR11)**.
- **Understand the implications** of Part 2A of the Environmental Protection Act 1990 (the Contaminated Land regime). Take into account advice contained in **PPS23: Planning and pollution control**.
- Investigate the previous use of the site. **Assess the risks** from contamination through at least a proper desk study and conceptual site model.
- Where contamination is likely, you will need to carry out a further risk assessment including **on-site investigations** – involving soil and water sampling.
- **Monitor and audit** the site during construction. All work must continue to meet your plans and risk assessment, and must comply with the regulations.

→ **more information**

Model procedures for the management of land contamination (CLR11), Department for Environment, Food and Rural Affairs (Defra) and Environment Agency.

Environment Agency guidance on requirements for land contamination reports, Environment Agency.

Planning Policy Statement 23 (PPS23): Planning and pollution control, Office of the Deputy Prime Minister (now Department for Communities and Local Government).

Guidelines for environmental risk assessment and management, Department of the Environment, Transport and the Regions (now Defra) and Environment Agency.

Department of the Environment Industry Profiles. Provide information on the processes, materials and waste associated with individual industries with regard to land contamination.

Links to these documents plus other useful information are on our website: **www.environment-agency.gov.uk/developers**

Case study A real alternative to ‘dig-and-dump’

Two waters, Hemel Hempstead
2006

Developers
Hewden Hire

Benefits
Contaminated soils treated on the site; money saved in waste disposal costs; limited disturbance by lorry movements.

Site background

During its previous use as a plant hire business, the soil and groundwater of this site in Hemel Hempstead had become contaminated by diesel and other petroleum hydrocarbons. The site is situated above a major chalk aquifer, is in a groundwater protection zone, and is adjacent to the River Bulbourne.

The scheme

Hewden’s contractors, RSK ENSR Remediation, used the remedial scheme it had already established for redeveloping brownfield sites. Following detailed site investigation and pilot test works, it was decided that the best remedial option was to treat the hydrocarbon contaminated soil and groundwater on-site by a bioremediation system.

This method allows contaminated soils to be treated on-site, eliminating the need for expensive ‘dig-and-dump’ operations. This cuts out all of the additional lorry movements and reduces the need for clean-quarried replacement fill.

On top of this, while the process is being carried out, groundwater in the open excavation can be treated. Once the soil has been remediated it can then be replaced. ➔

1. Air is drawn through the soils to aerate them and support biodegradation.

'Treating contaminated soils on-site is very common in other European countries, but is only now starting to become more widespread in the UK. The process may seem complicated and expensive, but by carefully selecting and implementing the correct remedial technology it can work out cheaper than normal soil disposal methods, as well as being more environmentally acceptable'. RSK ENSR Remediation (contractors).

Biopiling

The contaminated soils were treated in a biopile. They were placed in a specially constructed remedial bed and carefully placed into layers on a network of slotted pipes. Air was drawn through the soils in the bed via a vacuum extraction system acting on the slotted pipes. Air extracted from the bed by the system was then itself treated by passing it through vapour phase granular activated carbon before being vented into the atmosphere as clean.

The advantage of this system is two-fold. Firstly moving air physically encourages volatile contaminants to be removed from the soil. The second advantage – which was especially true of this site – is that it increases the amount of oxygen present within the contaminated soil. This supports natural aerobic soil bacteria that breakdown the hydrocarbon contaminants.

Pilot tests

Whichever approach you choose, pilot testing should be a pre-requisite to make sure the method is suitable to treat the contaminants and in a realistic timescale.

Depending on the geology of the site, bioremediation can sometimes be carried out in the ground. If this is the case you will not need extra space on the site to carry out the biopile process.

1. The quality of the emissions from this process are carefully monitored.

2. Any water generated by the process is treated before it is discharged to the foul sewer. This discharge is under consent from the local water company.

2.2.8 Sustainable construction

Sustainable construction concerns more than just the fabric of buildings; it includes *all* of the issues covered in this guide.

Building, maintaining and occupying homes accounts for almost 50 per cent of the UK's carbon dioxide emissions. New developments provide an excellent opportunity to build homes and offices that are better for the environment and have cheaper running costs.

1. Green roofs and solar panels can be used together.

2. Improving a home's efficiency can reduce annual utility bills by £138.

The design of a development can influence the lifestyles of the users. Along with the location, layout and orientation of a building, design can have a profound effect on the environment.

Efficient use of resources

We welcome new developments that incorporate energy efficiency. To tackle climate change, we urgently need to reduce energy use by adopting more efficient technologies. We also need to generate energy from sources that release far fewer – or no – carbon dioxide emissions. We support this increase in renewables, but only if it happens in an environmentally sensitive way as they can have impacts on biodiversity, landscape, transport and air quality.

Including energy and water efficiency measures in your development will mean the occupiers can have homes that are more affordable to run.

Homebuyers are increasingly interested in the environmental performance of their homes. Research conducted in 2004 revealed that 84 per cent of homeowners are willing to pay an extra 2 per cent for a property with a good eco-home rating (CABE, WWF and Halifax research).

Our own research has highlighted the cost benefits of building homes to higher environmental standards. It has shown that improving an existing home's resource efficiency by 25 per cent could cost £800, but save approximately £138 a year in utility bills. This was achieved largely through improvements to energy efficiency, as waste and water efficiencies are achieved at little or no cost. ➜

Energy Performance Certificates

Energy Performance Certificates (EPCs) are energy ratings for homes, similar to consumer-friendly 'fridge ratings'. They will be compulsory as part of Home Information Packs from 1 June 2007.

The certificates will outline the costs of heating, hot water and lighting in homes and give practical advice on how to cut these costs and reduce emissions.

It is far better to build above the minimum standards so that energy can be reduced over the building's lifetime. It will cost you more to bring existing buildings up to standard later on by retrofitting extra insulation.

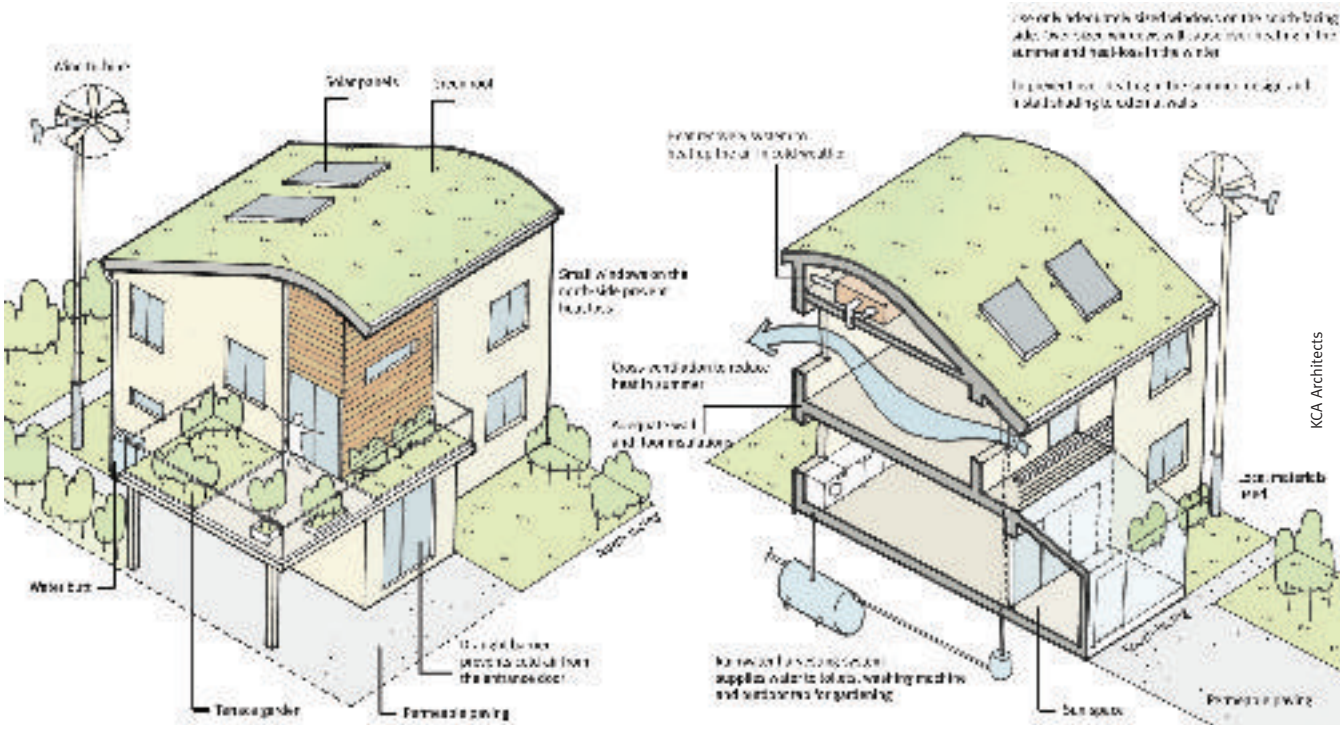
Apartment buildings may be suitable for combined heat and power schemes, and other forms of renewable energy generation. On a smaller scale, green roofs can keep the building cool in the summer and provide thermal insulation in the winter. They can be constructed largely from demolition waste, such as crushed brick. Whatever the size of the development, the arrangement of buildings can help make the most of solar energy and reduce exposure to the cold.

There are large environmental benefits to be gained from using the ground as a source of heating and/or cooling for buildings, providing the risks of groundwater pollution are addressed. See **more information**.

Quality

Many buildings will be adapted for a different use later on in their life. Although we cannot anticipate what this will be for, it is more practical to renew and adapt buildings if they were originally built of good materials and to an appropriate quality for their anticipated lifetime.

Quality is a benefit to the built environment. Building to a high quality will reduce wasting resources. ➜



1. You can improve the energy efficiency of your development by including these features where possible. The diagram shows the options for the north-facing and south-facing sides of a building.

Public transport links

You should provide good public transport links to your site to encourage people to use their cars less. Talk to the local planning authority to make sure there is sufficient public transport to and from your site, and see if you can link your development to their green travel plans.

also see


2.2.2 Managing surface water


2.2.3 Using water wisely

3.1 Environment Agency permissions

Life-cycle thinking

There are many gains from reviewing your supply chain before embarking on a major construction project. It can help you to source better-sized materials, higher specification products and those with less packaging waste. You could switch to 'take back' schemes for transit packaging.

The Government is developing a code for sustainable homes to improve the way homes are built and run. There will also be a new planning policy statement on climate change. We encourage you to embrace life-cycle thinking by using materials and construction techniques that are more resource efficient. This means using materials that have minimal impacts during construction and use, but also minimal end-of-life impacts. Using them will enhance your project and your reputation.

more information

Sustainable homes: The financial and environmental benefits, Environment Agency.

Regeneration and the Environment Agency, Environment Agency.

Details of green roofs are at **www.livingroofs.org**

Adapting to climate change: A checklist for development. Guidance on designing developments in a changing climate, Three Regions Climate Change Group.

Planning Policy Statement 22 (PPS22): Renewable energy, Office of the Deputy Prime Minister (now Department for Communities and Local Government).

Rainwater and grey-water use in buildings: Decision-making for water conservation (PR080), CIRIA.

Model agreements for sustainable water management systems. Model agreement for rainwater and grey-water use systems (C626), CIRIA.

For advice on energy savings visit **www.est.org.uk**

For more information on Energy Performance Certificates visit **www.communities.gov.uk**

Department of Trade and Industry's **low carbon buildings programme** provides grants for microgeneration technologies. These grants are for householders, community organisations, schools, the public sector and businesses.

The Ground Source Heat Pump Club is a forum for the industry in the UK: **www.nef.org.uk/gshp**

Links to these documents plus other useful information are on our website: **www.environment-agency.gov.uk/developers**

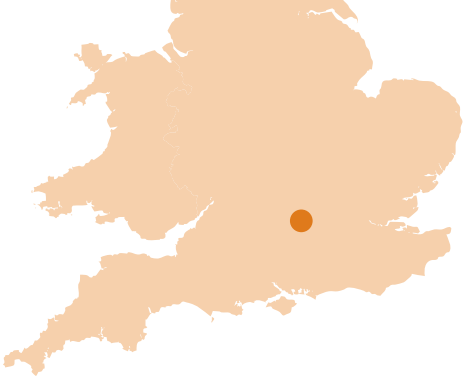
→ see 3.2 for the full **environmental checklist**

Sustainable construction

what we expect of you

→ see 2.2.3 **Using water wisely**

- Carry out an **environmental and sustainability assessment** at an early stage to help you to consider the environmental impacts and solutions in a holistic way.
- Consider **water and energy-efficient appliances and fittings** in your development such as 'A-rated' washing machines and low or dual-flush toilets. In London the Mayor has set a minimum water efficiency standard for all new developments of 110 litres, per head, per day.
- Talk to the local planning authority to find out if they have **supplementary planning guidance** or **standards** on sustainable construction.
- Speak to the local authority to find out about **kerbside recycling**. Design buildings with space for sorting and storing waste to make recycling easier.
- Think about the way **energy** could be generated on-site, the supply you will need from the neighbouring areas and any infrastructure you will need.
- If you will be using the **ground as a source of heating or cooling**, you must address the risks of groundwater pollution.
- Consider how **climate change** will affect your development by using the Three Regions Climate Change Partnership checklist.
- Talk to the utility companies to make sure their infrastructures are resilient to **climate change**. For example, gas mains and electricity cables in flood risk areas will require better protection.
- Use all of your **materials** wisely and consider the impact they will have at the end of their life.
- Carry out a **supply chain assessment** to reduce the impacts from your material suppliers in a structured way.
- **Retrofit existing buildings** to re-use resources and minimise disruption. The scope for this needs to be considered at an early stage when opportunities come up for development. It should be decided at the start of your project life-cycle.



Case study A shining example of sustainability

Howbery Park, Wallingford
Completed 2005

Developers
HR Wallingford Ltd
Environment Agency

Benefits
Solar panels generate electricity; solar thermal panels provide hot water; rainwater harvested for flushing toilets; permeable paving reduces run-off.

Site background

The owners of Red Kite House – HR Wallingford Ltd – obtained planning permission to redevelop part of Howbery Park as a business science park. We were able to influence the design of the building as we favoured using Red Kite House as our new office.

From the very start of the design process we worked closely with HR Wallingford and their team of architects, designers and engineers. It was agreed that an office would be constructed that would not only meet our operational needs but would also serve as an example of good practice in sustainable office development.

The scheme

The features of Red Kite House include:

Natural cooling and ventilation

- the building captures the wind through its curved shape and its orientation. This maximises the airflow through the building and supports the cooling processes;
- high-level exposed concrete ceilings on each floor act as a heat sink during the day. They are cooled by air entering through 100 motorised windows on each floor (which open and close automatically); →

1. Red Kite House is an award-winning sustainable building. The basic building achieves the BREEAM 'excellent' rating. Since opening it has been awarded 'Best bespoke office development outside central London, 2005' (Industrial Agents Society/Office Agents Society).

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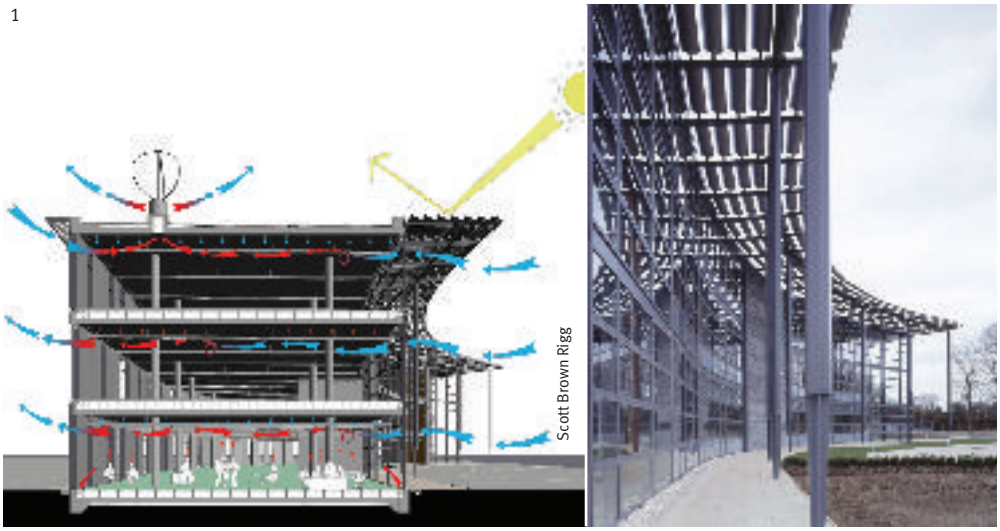


Scott Brown Rigg

1. A key consideration in the design was the orientation of the building. It was designed so that the air circulates through the building naturally.

2. The south-facing canopy provides shading to the front of the building, especially to the top floor.

- roof-mounted turbines draw air in through the top floor windows to reduce overheating in the summer;
- neutral solar control glass minimises solar heat gain in the summer whilst maximising natural daylight;
- the south-facing canopy provides shading, especially to the top floor.

Energy efficiency

- photo-voltaic cells on the south-facing canopy generate electricity. They reduce the building's carbon dioxide emissions by about 12 tonnes per year;
- solar thermal panels installed on the roof provide hot water and will further reduce carbon dioxide emissions by 1.6 tonnes per year.

Water and drainage

- a rainwater harvesting system collects rainwater from the roof. The water is held below ground in an 8,000-litre tank before being pumped through filters and used to flush the toilets. Tank overspill is directed into a nearby reed bed;
- pervious blocks in the car park allow rainwater to soak into the ground. There is a geotextile membrane here to trap any oils or other pollutants.

Red Kite House has demonstrated that for very small increases in the base-build costs, important contributions can be made to reducing carbon emissions and the pressure on limited natural resources.

2.2.9 Recreation, society and health

Clearly defined public and private space within a well-linked development can provide a safe, secure and attractive environment.

1

2

Planning guidance from central, regional and local government requests that general open space and areas for sport and recreation are included within new developments.

Green spaces can help integrate old and new developments to create truly sustainable communities where people want to live.

Adding value to your development

A high-quality environment can provide a much better place to live and improve people's health and wellbeing. On the whole, people prefer natural surroundings. Including them in your development can increase their use and enjoyment of the site. They will encourage them to take up outdoor activities such as walking, cycling or watersports, keeping them fit and healthy.

By improving local environments, you can give people places close to home where they can relax or exercise. This may greatly improve your development. You can do this by restoring neglected urban spaces and waterways, opening up access for walking, fishing or boating, or just providing small, green areas for people to relax. ➔

1. Areas for recreational activities such as fishing can improve your development.

2. Get the most out of your development by helping to restore neglected waterways.

→ see 2.2.9 case study

Our studies show that small-scale environmental improvements bring significant benefits to local communities. A good example of where this has happened is at Sutcliffe Park in south London. Following the improvements to this area, research showed that more people visited the park more often. They also stayed longer and were more likely to visit to exercise.

Transport

An integrated approach to transport will encourage a more vibrant community. You could do this by promoting car clubs or car-sharing schemes and providing easy access to frequent and reliable public transport, routes for walking and cycling and local shops and services. →

Within a development we want to see facilities and designs that encourage people to use their local environment for exercise and relaxation. Providing access to the river and other green spaces may increase the value of your site.

1. Provide safe routes through your development so that facilities such as schools are within walking distance.

2. Restoring neglected urban spaces can provide essential areas for people to relax.

1. Small-scale environmental improvements can bring significant health benefits to local communities.

2. Speak to the local Environment Agency office about improving riverside access and whether there are any recreational opportunities in your development.

The added benefits

Alongside the community benefits, these green spaces can also benefit the environment in other ways. As well as being places for recreation, relaxation and wildlife, they can be used to soak-up surface water, filter pollution and even help manage flooding.

Our advice

We work closely with local planning authorities and health authorities to make sure that, where possible, spatial planning improves local air quality and public health. If you can contribute towards community open space targets, your local authority will view your development in a better light.

We can provide advice and good practice examples of improving open spaces, riverside access and recreational opportunities. Talk to the local Environment Agency office or visit our website.

also see

- **2.2.1 Managing the risk of flooding**
- **2.2.3 Using water wisely**
- **2.2.4 Wildlife and green space**
- **2.2.5 Preventing pollution**
- **2.2.8 Sustainable construction**
- **3.1 Environment Agency permissions**

→ see 3.2 for the full **environmental checklist**

Recreation, society and health

what we expect of you

- Recognise the full **social implications** of your development on the local community.
- Talk to the local planning authority about their **open space** requirements and their **green travel plans**.
- Make sure there is viable public **transport** and pedestrian and cycle access to the site. Provide **safe routes** through your development. Public transport, shops and community facilities like schools should be within walking distance.
- Provide multifunctional green or other **open spaces** for communities to enjoy. Make sure they are managed in the long-term.
- Integrate **recreational** and **health** aspects into your landscape and ecology strategies.
- Any development that could have an adverse effect on **air quality** should receive a full assessment and a health impact assessment.

→ see 3.1 for **permissions**

- We encourage providing appropriate **access to rivers** within developments. You will need our consent for any development affecting towpaths, river banks, landing stages, bridges or other structures in rivers.

→ **more information**

A Better Place to Play: Our strategy for water-related sport and recreation (2006–2011), Environment Agency.

Better environment, healthier people: Our contribution to health, Environment Agency.

Quality of life, health and the environment, Environment Agency.

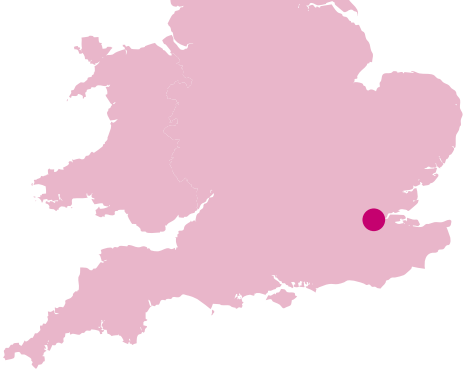
Get Hooked on Fishing is a registered charity that creates opportunities for young people to start fishing. Visit **www.gethookedonfishing.org.uk**

Planning Policy Statement 23 (PPS23): Planning and pollution control, Office of the Deputy Prime Minister (now Department for Communities and Local Government).

Start with the park: Creating sustainable urban green spaces in areas of housing growth and renewal, Commission for Architecture and the Built Environment.

Cleaner safer greener communities: How to create quality parks and open spaces, Office of the Deputy Prime Minister.

Links to these documents plus other useful information are on our website: **www.environment-agency.gov.uk/developers**



Case study River Quaggy makes a comeback

Sutcliffe Park, Lewisham
2003–2004

Developers
Environment Agency
Halcrow
Alfred McAlpine

Benefits
Underground 'culverted' river restored to its natural state; green space created for the local community; new habitats created for wildlife; risk of flooding reduced.

Site background

Running from Bromley to Lewisham, the Quaggy River has suffered considerable flooding problems over the years – caused primarily by development on the natural floodplain. The entire section of the river running through Sutcliffe Park was hidden underground. Managing flood risk in this way used to be seen as good practice. However it meant valuable floodplain was lost, together with vital natural habitats.

The scheme

The main focus of the project was to return the 'culverted' river back to its natural state. In the process, the opportunity was taken to turn the bare, uninteresting park into a popular green space.

A flood storage area was constructed that can hold up to 85,000m^3 of flood water – equating to approximately 35 Olympic-size swimming pools. It now protects 600 homes and businesses from flooding.

Restoration has played a huge role in this project. Boardwalks, bridges and footpaths have been installed, avenues of trees and wildflower meadows planted, and an outdoor classroom created. There are new seating areas throughout the park, some of which have been purchased from MENCAP Riverwood, a voluntary group supporting the employment of people with learning disabilities. These unique pieces of furniture were recycled from timber found in the River Thames. ➜

1. Sutcliffe Park is now a popular green space used regularly by members of the local community. Since opening in 2004, visits to the park have increased by 73 per cent.

Now the park is a rolling environment of streams, boardwalks and viewing platforms. It includes a host of new habitats for wildlife and provides a greater level of flood protection for Greenwich and Lewisham.

1. Before: Prior to the scheme, the park was hardly used and was seen as bare and uninteresting.

2. After: Now it is a rolling environment of streams and boardwalks.

3. The flood storage area can hold approximately 35 Olympic-size swimming pools of floodwater. It protects 600 homes and businesses from flooding.

Friends of Sutcliffe Park

The local community took an active role in transforming what is essentially their park. A 'Friends of Sutcliffe Park' group was set-up by Greenwich Parks to encourage the community to get involved with the project. Local schools are using it for lessons as part of their curriculum. There are many opportunities for more community projects throughout the park.

Part 3
actions for your development

This section contains details of the permits, licences and consents you will need from us for your development to go ahead. It also contains a detailed checklist that summarises our advice provided in Part 2.

3.1 **Environment Agency permissions**
3.2 **Environmental checklist**

3.1 Environment Agency permissions

These pages list the main Environment Agency consents and permissions that you may need before you can develop your site.

The permissions are listed in alphabetical order. We've included generalised examples of the kinds of activities for which these permissions may be required.

We may need to charge you for providing consent to carry out work or for providing information for your development. More information about our charges is on our website.

You should talk to the local Environment Agency office to make sure you fully understand your legal obligations and our requirements of you. Failing to comply with the legislation may lead to prosecution. Local byelaws may also apply, so speak to your local contact to find out more.

→ More information is on our website **www.environment-agency.gov.uk/developers** Links to more details about each of these permissions are under the permissions section on these pages.

→ **also see**

1.5 Contact us

Permission	**Consignment Note**
Examples	Moving any hazardous waste.
Legislation	Hazardous Waste (England & Wales) Regulations 2005
More information:	You can download the Consignment Note from our website.

→ **also see**

2.2.5 Preventing pollution

2.2.6 Managing waste

2.2.7 Land affected by contamination

Permission	**Fisheries Byelaw Consent (removing fish)**
Examples	Removing fish from rivers, streams, lakes, ponds or tidal waters.
Legislation	Salmon and Freshwater Fisheries Act 1975
More information	Speak to the local Environment Agency office for details of the byelaws.

→ **also see**

2.2.4 Wildlife and green space

2.2.9 Recreation, society and health

Permission — **Flood Risk Management**

Examples

- works in, over, under, or within the byelaw margin of main rivers, or likely to affect the integrity of tidal defences;
- raising ground levels in the floodplain beside a main river;
- constructing or altering a culvert or structure to control the flow of the river (such as a weir) on any ordinary watercourse.

Legislation — Required under the Land Drainage Act 1991 and the Water Resources Act 1991. Associated local byelaws will apply.

More information — You must contact the local Environment Agency office as the byelaws will vary. See our website for more information about this consent.

→ **also see**


2.2.1 Managing the risk of flooding


2.2.2 Managing surface water


2.2.3 Using water wisely


2.2.4 Wildlife and green space


2.2.9 Recreation, society and health

Permission — **Hazardous Waste Premises Notification**

Examples

- you have a legal duty to register any premises if you produce hazardous waste in excess of 200kg in any year. Exemptions apply for listed businesses under 200kg, but you will still require a Consignment Note (see above);
- demolition activities. If you are excavating contaminated materials that are likely to be classified as hazardous waste. This includes oily wastes, asbestos or soils contaminated with hydrocarbons.

Legislation — Hazardous Waste (England & Wales) Regulations 2005

More information — Call us on 08708 502 858 to register or renew as a producer of hazardous waste. Visit our website for more information.

→ **also see**


2.2.5 Preventing pollution


2.2.6 Managing waste


2.2.7 Land affected by contamination

Permission — **Herbicide Authorisation**

Examples — Using herbicides or pesticides in or near water.

Legislation — Control of Pesticides Regulations 1986 (as amended)

More information — More information about this authorisation is on our website.

→ **also see**


2.2.5 Preventing pollution

Permission — **Mobile Plant Waste Management Licence**

Examples — Treating contaminated soils and contaminated controlled waters.

Legislation — Waste Management Licensing Regulations 1994 (as amended) and the Waste Management Licensing (England & Wales) (Amendment & Related Provisions) Regulations 2005

More information

- guidance, procedures and the application form can be downloaded from our website;
- please note that all existing Mobile Plant Licences have now been replaced by Mobile Treatment Licences. These licences cover a range of treatment technologies. Contact the local office for more details;
- site-specific working plans have been replaced by site-specific deployment forms. These will need approval before any work begins;
- contractors will need to consider the different technologies and assess whether any permits will be required to carry out a specific activity. These scenarios are described in more detail in the **Remediation position statements** available on our website.

→ also see


2.2.5 Preventing pollution


2.2.6 Managing waste


2.2.7 Land affected by contamination

Permission — **Navigation Registration and Licence**

Examples — Boats navigating on these rivers need an Environment Agency registration or licence: the non-tidal River Thames (from Cricklade to Teddington), River Nene, River Welland, River Glen, River Stour, River Ancholme, Great Ouse River, River Medway and Rye Harbour.

Legislation — The legislation for navigation depends on the local acts in force, and therefore varies from region to region: Anglian Water Authority Act 1977, Southern Water Authority Acts 1982 and 1988, Harbour of Rye Revision Order 1976 and Thames Conservancy Acts 1932 to 1972.

More information: — We are the navigation authority for 997km of rivers. Speak to the local office for more information.

→ also see


2.2.9 Recreation, society and health

Permission — **Pollution Prevention and Control Permit**

Examples — Landfilling waste on-site. However this does not usually apply to development or construction sites.

Legislation — Pollution Prevention and Control Regulations 2000

More information — More guidance is on our website.

→ also see


2.2.5 Preventing pollution


2.2.6 Managing waste


2.2.7 Land affected by contamination

Permission	**Prescribed Processes Authorisation**
Examples	Carrying out complex industrial processes that release potentially serious pollutants (known as prescribed substances).
Legislation	Environmental Protection Act 1990
More information	Contact the local Environment Agency office.

→ also see


2.2.9 Recreation, society and health

Permission	**Radioactive Substances: Registrations and Authorisations**
Examples	Using, storing or disposing of radioactive materials and waste.
Legislation	Radioactive Substances Act 1993
More information	Contact the local Environment Agency office.

→ also see


2.2.5 Preventing pollution

Permission	**Section 30 Fish Movement Licence**
Examples	Introducing fish into rivers, streams, lakes, ponds or tidal waters.
Legislation:	Salmon and Freshwater Fisheries Act 1975
More information:	Contact the local Environment Agency office.

→ also see


2.2.4 Wildlife and green space


2.2.9 Recreation, society and health

Permission	**Waste Carrier Registration**
Examples	• you must register as a waste carrier if you transport your own construction and demolition waste, or other people's controlled waste; • you must register as a broker if you arrange for the disposal or recovery of waste on behalf of others; • you must also comply with your duty of care.
Legislation	Control of Pollution (Amendment) Act 1989.
More information	You can register online through our website. Please note that exemptions may apply: you should check the regulations.

→ also see


2.2.5 Preventing pollution


2.2.6 Managing waste


2.2.7 Land affected by contamination

Permission	**Waste Management Licence**
Examples	Treating, keeping or disposing of controlled waste. Please note that exemptions may apply (see above).
Legislation	Waste Management Licensing Regulations 1994 (as amended)
More information	More guidance is on our website.

also see
2.2.5 Preventing pollution
2.2.6 Managing waste
2.2.7 Land affected by contamination

Permission	**Waste Management Licensing Exemptions**
Examples	Small-scale waste storage and recovery operations. This is subject to certain limitations.
Legislation	Waste Management Licensing Regulations 1994 (as amended) and Waste Management Licensing (England & Wales)(Amendment & Related Provisions) No.3 Regulations 2005
More information	Most exemptions under the 1994 regulations need to be registered with us. Applications need to be made for exemptions under the 2005 regulations. Under paragraphs 9a and 19a, you must receive planning permission before applying for these exemptions. More information is on our website.

also see
2.2.5 Preventing pollution
2.2.6 Managing waste
2.2.7 Land affected by contamination

Permission	**Water Abstraction Licence**
Examples	Abstracting or taking water from rivers, streams, lakes, ponds, tidal waters or groundwater. Also if you are constructing or altering any impounding works in rivers, streams, ponds or tidal waters.
Legislation	Water Resources Act 1991
More information	Details of our abstraction charges are on our website.

also see
2.2.3 Using water wisely
2.2.5 Preventing pollution
2.2.8 Sustainable construction

Permission	**Water Quality Discharge Consent**
Examples	• any discharges to rivers, watercourses, other surface waters, groundwater, tidal waters or the sea; • discharging sewage effluent, trade effluent or contaminated water to land or water; • any dewatering activities.
Legislation	Water Resources Act 1991 and Groundwater Regulations 1998
More information	Guidance is on our website.

also see
2.2.2 Managing surface water
2.2.3 Using water wisely
2.2.5 Preventing pollution

3.2 Environmental checklist

This checklist compiles all of the guidance and expectations described in each of the chapters in section 2.2.

Use this checklist to make sure you have fulfilled your obligations and considered advice on making your development better for the environment. You can use it for your discussions with the local Environment Agency office.

→ Visit our website to download more copies of this checklist: **www.environment-agency.gov.uk/developers** For more information visit the corresponding chapters in section 2.2.

Development:

Location:

Date:

Main Environment Agency contact:

General notes:

Recommended actions	Notes	☑
2.2.1 Managing the risk of flooding		
• Establish if your development is at risk of tidal or river flooding. Check the flood maps on our website, and any strategic flood risk assessment.		☐
• Make sure the location of your development meets the Sequential Test (PPS25). Only where there is no other choice, it must meet the Exception Test.		☐
• Maintain an effective flood defence on-site at all times. Install temporary flood defences where necessary. You must obtain our consent to do this.		☐
• Keep flood flow routes and the byelaw margin clear at all times.		☐
• Make sure your flood risk assessment assesses all possible sources of flooding. To eliminate or reduce the flood risk, it must propose mitigation measures as required.		☐
• Speak to us for advice on flood risk and to ensure you understand our flood risk management requirements. Local byelaws may vary.		☐
• Contact your planning authority to confirm whether a flood risk assessment is required. If so, find out what conditions apply and if they have any guidance or other information to help you target your flood risk assessment more effectively (for example, through a strategic flood risk assessment).		☐
• Choose your site and design the layout so it is compatible with the flood risk. You must avoid causing flooding elsewhere.		☐
• Assess and manage the risk from all possible sources of flooding. The risks may be from groundwater, river or coastal flooding (e.g. overtopping or breach of flood defences), surface water, overland flow, breached reservoirs or sewer flooding.		☐

Recommended actions	Notes	☑
2.2.1 Managing the risk of flooding continued		
• Speak with the local Environment Agency office to make sure you understand our flood risk management requirements. You should: – always check with the local office as different byelaws apply (they are contained in our publication **Living on the edge**); – assess the condition of any flood defences; – make sure there is no encroachment in front of tidal defences; – consider the opportunity to retreat riverside flood defences; – compensate for any loss of flood storage volumes in the flood plain.		☐ ☐ ☐ ☐ ☐
• Design your development so that it is safe for people to occupy, access and leave the site during a flood.		☐
• Where development is acceptable, build-in flood resilience and resistance. This will reduce damage to your development should flooding occur, and make it more insurable.		☐
• Obtain all necessary consents to manage the risk of flooding before starting work. If work is carried out without our consent, we can inspect your site and require you to put things right. We could even reclaim the cost from you for removing or altering your work.		☐
• Always leave adequate space for maintenance and renewal if you upgrade or build new flood defences. Consider setting them back from the riverside.		☐

2.2.2 Managing surface water		
• Before you plan your site, consider how you can manage the rate of surface water run-off so that it is similar to the conditions before the development. Also consider the effect this run-off will have on any receiving watercourse.		☐
• Discuss with the local planning authority their policy and requirements for surface water drainage.		☐
• Speak to us about the surface water drainage proposals for your site. We can tell you what consents you will need, which types of SUDS are unsuitable and whether you will have to take special precautions to prevent pollution or reduce infiltration.		☐
• Where infiltration techniques are not possible, or where space is limited, you can still use features such as green roofs to reduce the rate or total amount of run-off.		☐
• Use CIRIA guidance to inform your choice of SUDS design for the development.		☐
• Obtain outline acceptance of your scheme from the local planning authority and us.		☐
• Demonstrate in your flood risk assessment that you will deal with surface water by installing the best combination of SUDS techniques for your site.		☐
• You must obtain any Environment Agency flood risk management consent or authorisations before starting work (see 3.1).		☐
• Whilst constructing your site, protect adjoining areas from flooding.		☐
• You will need to consider your timetable for construction. Where permeable surfaces are installed, you need to ensure they are not blocked with silt from site activities.		☐
• Ensure you have an adequate management and maintenance system in place.		☐

Recommended actions	Notes	✓
2.2.3 Using water wisely		
• Talk to the local planning authority and relevant water company to ensure they can provide the water supply infrastructure and enough water for the lifetime of your development.		☐
• Contact the local Environment Agency office for advice on our consents. You must obtain all necessary consents before you start work on the site.		☐
• Design your development to at least meet the minimum level of the Code for Sustainable Homes.		☐
• Consider water and energy-efficient appliances and fittings in your development such as 'A-rated' washing machines and low or dual-flush toilets. In London the Mayor has set a minimum water efficiency standard for all new developments of 110 litres, per head, per day.		☐
• If your development is large, consider leak-detection, rainwater-harvesting or even rainwater re-use systems. However you must understand their management and maintenance requirements.		☐
• Provide water butts and use drought-resistant landscaping to keep your development looking good.		☐

2.2.4 Wildlife and green space		
• Before you design your proposal, talk to us and other environmental organisations about your obligations. Find out which consents you will need and what information you will need to provide. We can provide advice and guidance on enhancement opportunities.		☐
• Carry out an environmental assessment that is proportional to the size and nature of your development. This should identify the opportunities for improving wildlife and both highlight and avoid any potential ecological impacts.		☐
• Avoid impacts on protected or priority species or sites.		☐
• Protect biodiversity and create, manage and enhance wildlife habitats.		☐
• Draw-up an ecological master plan to capitalise on opportunities to create, manage and enhance wildlife habitats within and affected by your development. Use the guiding ecological principles from **Planning Policy Statement 9,** the environmental assessment and local biodiversity action plans.		☐
• Design multifunctional green spaces that provide a range of environmental and social benefits. Make them part of a linked local network to help ensure their longer-term maintenance.		☐
• Establish any mitigation and compensation measures before the impacts take place.		☐
• Time your operations so they avoid sensitive periods, such as bird breeding or fish spawning seasons.		☐
• Provide and protect buffer zones if you are working close to watercourses or sensitive sites. Control invasive species such as Japanese knotweed.		☐
• Encourage public awareness and community participation.		☐
• For large sites, have a plan for the continued maintenance of any newly created or enhanced areas.		☐

Recommended actions	Notes	☑
2.2.5 Preventing pollution		
• You must avoid anything during the development process that pollutes the environment. Consider this as part of your environmental assessment.		☐
• Talk to the local planning authority and sewerage company to ensure: – there is sufficient sewage treatment capacity for the lifetime of your development; – there are arrangements for sewage discharges to foul sewer; – what consents you will need.		☐ ☐ ☐
• Talk to the local planning authority and sewerage company to ensure there is a sufficient treatment capacity for the lifetime of your development.		☐
• Investigate the past use of the site to make sure operations will not disturb any land affected by contamination. If the site includes contamination, consult the local authority and the local Environment Agency office.		☐
• Talk to the local Environment Agency office as early as possible to discuss our consent requirements. You must obtain all required consents before starting work.		☐
• Find out from us whether your site is within a Groundwater Protection Zone and any special precautions you must take.		☐
• Avoid pollution and prosecution by following our Pollution Prevention Guidelines.		☐
• Follow good environmental site practice. Examples of this are set out by CIRIA.		☐
• Make sure your managers are committed and employees are suitably trained. They should all understand why preventing pollution is important.		☐
• Take care to avoid contaminating groundwater by being aware of what makes it vulnerable.		☐
• Identify and mark underground services.		☐
• During construction, regularly inspect and maintain drainage features and discharges. Make sure permeable surfaces are protected from silt.		☐
• Consider the effects of foundations on contaminated land and groundwater flow.		☐
• Obtain our permission to use herbicides or pesticides in or near water. However first of all you should consider alternative or mechanical methods.		☐
• Keep your site secure from vandalism – you will be responsible for any pollution caused.		☐
2.2.6 Managing waste		
• At a minimum, make sure you comply with your duty of care obligations. Set strict contractual obligations on all subcontractors to make sure none of the waste produced from your operations is disposed of illegally.		☐
• Make sure you understand your legal obligations. You may want to take the advice of lawyers or consultants.		☐
• Speak to the local Environment Agency office about your waste management obligations. Understand which permissions you will need from us and demonstrate your compliance with the regulations across the life of the project.		☐
• Draw-up and follow a site waste management plan for each major project. For smaller projects make sure you have assessed the likely types and amounts of waste.		☐
• Minimise and segregate hazardous waste.		☐
• Understand the environmental and financial value of your soils on site and protect them.		☐

Recommended actions	Notes	✓
2.2.6 Managing waste continued		
• Re-use and recycle construction and demolition waste wherever possible.		☐
• Talk to the local planning authority about the method and systems they use for sorting and collecting recycled waste.		☐
• Provide your buildings with storage space for segregating and recycling waste. Subcontractors should also use these facilities – write this into their contracts.		☐
• Follow the Waste Hierarchy: reduce, re-use, recycle, recover, dispose. Use materials that can be re-used at the end of their life and which have minimal impact on the environment.		☐
• Keep your site secure and don't be a victim of crime. Construction companies often suffer from illegal fly-tipping and you will be responsible for its clean-up and any pollution caused.		☐
2.2.7 Land affected by contamination		
• Make sure you understand your legal obligations when remediating land affected by contamination. You may want to take the advice of lawyers or consultants.		☐
• Speak to the local authority's contaminated land team and the local Environment Agency office to make sure you have correctly understood your obligations and the permissions you will need.		☐
• Make sure you do not pollute the environment or harm human health. Follow best practice and conform to the regulations.		☐
• Follow the risk assessment framework outlined in **Guidelines for environmental risk assessment and management.**		☐
• Follow the **Model procedures for the management of land contamination (CLR11).**		☐
• Understand the implications of Part 2A of the Environmental Protection Act 1990 (the Contaminated Land regime). Take into account advice contained in **PPS23: Planning and pollution control**.		☐
• Investigate the previous use of the site. Assess the risks from contamination through at least a proper desk study and conceptual site model.		☐
• Where contamination is likely, you will need to carry out a further risk assessment including on-site investigations – involving soil and water sampling.		☐
• Monitor and audit the site during construction. All work must continue to meet your plans and risk assessment, and must comply with the regulations.		☐
• Agree the final shut down of any systems, such as the pumping and treatment of groundwater, with the local authority and us.		☐

Recommended actions	Notes	✓
2.2.8 Sustainable construction		
• Carry out an environmental and sustainability assessment at an early stage to help you to consider the environmental impacts and solutions in a holistic way.		☐
• Consider water and energy-efficient appliances and fittings in your development such as 'A-rated' washing machines and low or dual-flush toilets. In London the Mayor has set a minimum water efficiency standard for all new developments of 110 litres, per head, per day.		☐
• Consider incorporating green roofs into your development to reduce surface water run-off.		☐
• Talk to the local planning authority to find out if they have supplementary planning guidance or standards on sustainable construction.		☐
• Speak to the local authority to find out about kerbside recycling. Design buildings with space for sorting and storing waste to make recycling easier.		☐
• Think about the way energy could be generated on-site, the supply you will need from the neighbouring areas and any infrastructure you will need.		☐
• If you will be using the ground as a source of heating or cooling, you must address the risks of groundwater pollution.		☐
• Consider how climate change will affect your development by using the Three Regions Climate Change Partnership checklist.		☐
• Design buildings to be adaptable to different future uses.		☐
• Talk to the utility companies to make sure their infrastructures are resilient to climate change. For example, gas mains and electricity cables in flood risk areas will require better protection.		☐
• Use all of your materials wisely and consider the impact they will have at the end of their life.		☐
• Carry out a supply chain assessment to reduce the impacts from your material suppliers in a structured way.		☐
• Retrofit existing buildings to re-use resources and minimise disruption. The scope for this needs to be considered at an early stage when opportunities come up for development. It should be decided at the start of your project life-cycle.		☐
2.2.9 Recreation, society and health		
• Recognise the full social implications of your development on the local community.		☐
• Talk to the local planning authority about their open space requirements and their green travel plans.		☐
• Make sure there is viable public transport and pedestrian and cycle access to the site. Provide safe routes through your development. Public transport, shops and community facilities like schools should be within walking distance.		☐
• Provide multifunctional green or other open spaces for communities to enjoy. Make sure they are managed in the long-term.		☐
• Integrate recreational and health aspects into your landscape and ecology strategies.		☐
• Any development that could have an adverse effect on air quality should receive a full assessment and a health impact assessment.		☐
• We encourage providing appropriate access to rivers within development. You will need our consent for any development affecting towpaths, river banks, landing stages, bridges or other structures in rivers.		☐

We welcome your views on this guide and our ways of working with you. If you have any feedback, please speak to your main Environment Agency contact or email us via our website www.environment-agency.gov.uk/developers

Would you like to find out more about us, or about your environment?

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