



Environmental Framework for Waterway Restoration Projects in England and Wales



Canal &
River Trust

In partnership with:



The Inland
Waterways
Association

Keeping our waterways alive!

Foreword

The inland waterways offer a place to escape to and provide a link between people and nature – a ‘green/blue corridor’ through town and country. As well as offering areas of natural beauty for us to enjoy, they also provide a haven for wildlife, diverse plant life and areas of scientific interest.

Places for wildlife in the UK are under increasing pressure and public policy now recognises the need to do ‘more, better, bigger and connected’. As linear corridors, waterways are contributing a great deal to this agenda as well as delivering massive public benefits across a wide range of social and economic indicators.

Whilst restored waterways bring environmental benefits, it is true that unrestored waterways often already provide a special habitat for wildlife. This presents a challenge for restoration groups to bring these waterways back into use whilst simultaneously conserving the existing value and delivering further environmental benefits.

Negotiating current environmental legislation can be difficult but through recognition of the role of waterways in providing this range of benefits including environmental value, challenges can be turned into opportunities. And this is the approach that we must adopt for management of all our inland waterways.

Recently there have been a number of changes to environmental legislation and we hope that you will find this guide useful in helping you to adopt the right approach and make the most out the environmental opportunities of your waterway restoration.

Peter Birch

National Environment Manager, Canal & River Trust

“The waterway network is part of the fabric of our nation but it’s easy to forget that not so very long ago some of our most popular canals were almost lost forever.

The fact that we can still enjoy them today is thanks largely to the vision, dedication and sheer hard work of volunteers in the 60’s and 70’s. These inspiring men and women just wouldn’t take no for an answer and worked on the basis that nothing was impossible. We need to recapture that same spirit today to ensure we bring more of these once proud waterways back to life.”

Sir Tony Robinson



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Introduction

This guide provides information on environmental legislation and policy that may require consideration when undertaking waterway restoration projects and any waterway projects that may have an environmental impact.

The aim of the guide is to help project promoters i.e. people involved in these projects to:

- ensure projects are completed lawfully;
- avoid project delays and additional costs; and
- maximise opportunities to protect and enhance the waterway environment.

This guide links to the Restoration Work Stages reference guide produced by the Canal & River Trust (the Trust) and The Inland Waterways Association (IWA). The Restoration Work Stages set out the core outputs for waterway restoration projects, with each stage broken down into nine key themes to address. This guide focuses on two of these themes in more depth; 'Built Heritage and Natural Environment' and 'Water Management' and provides more information on how to achieve the related project outputs at each stage of development.

Though the guide is based around issues arising on restoration projects, much of the information can be applied to any type of waterway project with the potential for environmental impact. It can also be referred to at any stage of the project, even if the project is part way to completion.

An overview of the actions and tasks required to maintain compliance with environmental legislation during waterway development projects is provided on page 7.

The Environmental Regulatory Framework in England and Wales

Projects that have the potential to affect the environment are subject to a wide array of policy and legal obligations, that are enforced through a regulatory framework and the planning system. This chapter provides an overview of the legal framework and the regulators that implement and enforce environmental legislation.

Legislation

International Agreements

International agreements inform regional and domestic policy and regulation worldwide. They are unlikely to directly influence waterway restoration projects, but set the overall operating environment. In 2015 for example, the United Nations Conference on Climate Change held in Paris resulted in the UK Government agreeing to international climate change targets.

European Union (EU)

A significant proportion of UK environmental legislation originates from the EU. EU Directives are interpreted by each member state and transposed into domestic legislation. EU Regulations are directly applicable to each member state, although they may still be regulated by national government.

UK Legislation

There are two levels of UK legislation
Primary and Secondary Legislation:

Primary legislation comprises Acts of Parliament that provide the policy principles and broad requirements of the legislation. An Act has to pass through a number of stages before it is enacted and they are not regularly amended unless there are changes to policy.

Secondary legislation (also referred to as delegated legislation) is law made by an executive authority under powers delegated by primary legislation. Most delegated legislation in Great Britain is made in the form of a statutory instrument (SI),

most commonly in the form of regulations, rules or orders. SI's are frequently updated by additional amendments, so it is important to be aware of the most recent changes. SI's may be different for England, Wales, Scotland and Northern Ireland.

In Wales, legislation is drafted by the Welsh Government and passed by the UK Parliament or the National Assembly for Wales. All UK legislation is available to view on the legislation.gov.uk website.

Planning Policy

Waterway projects may require planning permission depending on the size and nature of the project. Early discussion with the Local Planning Authority is the best way to determine if planning permission is required. If planning permission is required, try to build support for the project by emphasising how the project will meet any planning requirements.

The Town and Country Planning Acts are the principal acts in relation to the planning system, setting out the framework in which planning authorities must operate. The Acts are supported by a range of additional policies and regulations. A Plain English guide to the planning system is available on the gov.uk website.

The National Planning Policy Framework details the Government's planning policies for England and further information is supplied in the National Planning Practice Guidance.

The context for planning policy in Wales is contained within two main documents; Planning Policy Wales and Minerals Planning Policy Wales. The Policies are supplemented by a series of Technical Advice Notes (TANs) and Minerals Technical Advice Notes (MTANs), whilst Policy Clarification letters provide advice and guidance on specific subjects.

Local Plans and Local Development Plans produced by Local Authorities are based on the requirements of the NPPF and must be adhered to by projects

requiring planning permission. The guide *Local Plans: Delivering inland waterway restoration projects in England and Wales* produced by the Trust and IWA shows how the planning system can help to deliver long-term restoration schemes.

Regulators

There are number of regulators that may require consultation on a proposed project.

Natural England

Natural England is the non-departmental public body responsible for ensuring that England's natural environment, including its land, flora and fauna, freshwater and marine environments, geology and soils, are protected and improved. Its powers include designating sites for nature conservation (Sites of Specific Scientific Interest (SSSI) and Natura 2000 sites) and issuing licences for protected species.

Environment Agency (EA)

The Environment Agency is a non-departmental public body with responsibilities relating to the protection and enhancement of the environment in England. It is the main regulator of discharges to air, water, and land, which is controlled by consents or permits. It is also responsible for regulating waste management activities, flood defence and fishery management.

Natural Resources Wales (NRW)

Natural Resources Wales is a Welsh Government sponsored body, with a very wide regulatory remit. It is the main regulator for, waste management, issuing consents and assents for designated sites, European protected species licensing, water discharges, water resources and fisheries. Waterways that cross the border between England and Wales may be regulated for planning activities by either the EA or NRW (contact the regulator to find out). For example, the EA leads on the River Severn and NRW leads on the River Wye. However on the ground delivery is provided according to geography, so if the catchment is in Wales then NRW would deliver and vice versa.

Historic England

Historic England is the statutory adviser and a statutory consultee on all aspects of the historic environment and its heritage assets in England.

Local Authorities

Local authorities are responsible for the development and implementation of Local Plans and granting planning permission. They also have duties in relation to local air quality management and contaminated land. They also have a duty for the preservation and enhancement of the historic environment, including Grade 2 listed buildings.

Cadw

Cadw is the Welsh Government's historic environment service, charged with protecting the historic environment of Wales. It is responsible for identifying and designating historic assets of national importance and supporting the conservation and effective management of them.

Forestry Commission England

The Forestry Commission is the government department responsible for sustainable management of woodlands. The Commission also manages tree felling licensing in England. In Wales, this is managed by Natural Resources Wales.

Statutory Undertakers

Statutory undertakers are bodies that have been given statutory powers in relation to their functions. The Trust is a statutory undertaker as are public bodies such as the Environment Agency and private bodies such as utilities companies managing water and sewerage.

Under the Wildlife and Countryside Act 1981 statutory undertakers have a duty when undertaking their function to take 'reasonable steps' to further the conservation and enhancement of the features of interest for which SSSIs are designated. Statutory undertakers must consult with the relevant regulator before carrying out operations likely to damage features of a SSSI, even if the operations would not take place on land included in a SSSI.

Integration of this Guide with the Restoration Work Stages

This chapter demonstrates how environmental management and compliance corresponds with the Restoration Work Stages developed by the Trust and The Inland Waterways Association. An overview of the action to be taken at each stage of a restoration project is supplied in the matrix overleaf.



Strategic Definition: Strategic environmental appraisal of the site setting

Develop a vision for how the project will contribute to the future of the waterway and undertake an initial strategic appraisal to gain a high level understanding of the environmental context in which the project will be undertaken. This is the first opportunity to identify the significant issues that could affect the project design and require further investigation.

Scoping and Evaluation: Outline environmental assets and constraints

A more detailed study of the baseline environmental conditions should be undertaken to enable potential opportunities and risks to the project to be identified, including 'important' ecological receptors. Consider whether planning permission and/or an Environmental Impact Assessment (EIA) is required.

Initial Design: Comprehensive assessment of environmental assets and constraints

Outline engineering designs are produced. At the same time a greater understanding is developed of the built, natural and water assets on site, leading to the development of management plans to minimise damage and maximise value.

Planning for project delivery: Obtaining licences, consent and permissions

Mitigation measures to reduce any environmental impacts and constraints to be integrated in design and engineering detail of the project, including the technical design and specification of water control structures and flood mitigation works. If planning permission is required, submit the planning application at this stage.

Developed Design: Technical design and mitigation measures

Licensing and the issue of permits, consents and permissions is the main system of control used by environmental regulators. Prior to project delivery all the necessary licences required should be obtained.

Construction: Pollution prevention, damage minimisation and control

Focus on managing and controlling the risk of environmental harm from construction activities and to meet any planning or regulatory conditions. All contractors and volunteers working on site should be made aware of any environmental requirements.

Handover, Use and Aftercare: Monitoring, measuring and maintenance

Post-project monitoring may be required, including tests for water quality and success of mitigation measures. Responsibility for monitoring and maintenance should be determined and factored into the waterway management plan.

Environmental Actions at each Work Stage

The numbers in brackets correlate to the RIBA Plan of Work (2013).
www.ribaplanofwork.com

	A (0) Strategic Definition	B (1) Scoping & Evaluation	C (2) Initial Design
<p>Water Management</p> <ul style="list-style-type: none"> • Water resources study • Water demand • Water discharge • Flood risk management • Water Quality <p>Stakeholders; Restoration Promoters, Environment Agency (EA), Natural Resources Wales (NRW), The Trust, IWA, Hydrologist, Ecologist, Local Planning Authority (LPA).</p>	<ul style="list-style-type: none"> • Identify expected types and potential scale of use e.g. leisure craft, boat trips. • Potential water sources e.g. streams/rivers, groundwater, existing waterway networks or reservoirs. • Key flood risk concerns using the Environment Agency freely available flood maps. • Check the applicable River Basin Management Plan and see what it says about the waterbody being considered for restoration – this could be a major obstacle if the Plan does not allow for change. • Preliminary consultation with the EA / NRW. • Consult The Trust's Water Resource Strategy. • Consult Catchment Abstraction Management Strategy to see if water is available in the area. 	<ul style="list-style-type: none"> • Collate information to inform water demand calculations, including no. of locks, no. of boats, canal dimensions, simple construction/geology issues (that will affect canal losses). • Identify local water resources and check Abstraction Licensing Strategies to see if water is available for abstraction. • Identify flood plain using EA publicly available maps. • Identify Water Framework Directive River Basin Management Plans (RBMPs) constraints and opportunities. 	<ul style="list-style-type: none"> • Assess the implication of the information collated on the restoration and address any immediate complications, or identify further studies or modelling work needed at Stages D to F, via preparation of briefs. • Contract a suitably skilled and experienced hydrologist to complete flood risk assessment, water demand calculations and water availability assessment. • Consult waterways navigation authorities regarding water demand calculations and water resource availability from the existing waterways networks (if connected).
<p>Natural Environment Ecology – flora, fauna and habitats</p> <p>Stakeholders; Restoration Promoters, Local Wildlife Trust, Natural England (NE), NRW, Local Planning Authority, The Trust, IWA, Ecologists, Forestry Commission, Local interest groups.</p>	<p>Ecological scoping study, use available information on previous or similar schemes and publicly available records to determine likely constraints such as Statutory and Local Plan Designations and recorded presence of Protected Species.</p>	<ul style="list-style-type: none"> • Undertake a preliminary Ecological Appraisal comprising a detailed desk study and walkover assessment by competent ecologist. • Contact relevant stakeholders to agree scope of ecological assessment. • Identify trees in conservation areas or tree protection orders in place on the line. 	<p>Ensure protected species and sites are integrated in to the project design or appropriate mitigation is likely to be achievable.</p>
<p>Geology, Contaminated Land and Pollution</p> <p>Stakeholders; Restoration Promoters, Geo-environmental Specialist, LPA, EA, NRW.</p>	<p>Compile a brief history of the site to identify potential sources of ground contamination.</p> <p>Identify underlying geology of the site.</p>	<ul style="list-style-type: none"> • Phase 1 Desk Study/ Preliminary Risk Assessment. • Consider access routes required during the construction phase and include these areas in the ecological and heritage assessments. • Consider the contaminated land risk of dredging or digging out infilled canals. 	<p>Phase 2 Ground Investigation if the desk-study shows risk of contamination.</p>

D Planning for Project Delivery	E (3) Developed Design	F (4) Detailed Technical Design and Major Funding	G (5) Construction	H (6&7) Handover / Use / Aftercare
<p>Develop a Water Management Plan incorporating the results from the surveys, Water Framework Directive (WFD) requirements, and licences and technical design fixes required. To include both initial fill and ongoing water supply requirements.</p>	<ul style="list-style-type: none"> • Incorporate technical design fixes for water management into the design. • Incorporate sustainable drainage systems (SuDS) and flood prevention technology into the developed design. 	<p>Submit the Water Management Plan with the planning application, if the planning application has not already been made.</p>	<ul style="list-style-type: none"> • Apply for abstraction or impoundment licence(s) if required. • Obtain permit or consent to discharge for water discharge if required. • Pollution prevention measures during construction. • Undertake initial fill of water to restored/new sections to agreed plan. 	<ul style="list-style-type: none"> • Plan and implement for day to day water control activities – setting feeds/abstractions, responding to rainfall events (or periods with insufficient rainfall/flow), maintaining navigable levels/depths. May include manual or telemetry monitoring and/or control of water levels, flows, lock use, pumping. • Implement plans for maintenance and upkeep of the waterway. • Water Framework Directive water quality monitoring. • Abstraction and discharge reporting to EA or NRW.
<ul style="list-style-type: none"> • Ensure additional detailed ecological surveys are undertaken as required to determine appropriate mitigation. • Obtain initial advice on mitigation licensing from Natural England. • Prepare appropriate ecological report to accompany planning application as required (e.g. ecological appraisal or ecological impact assessment as required). 	<ul style="list-style-type: none"> • Develop Conservation and Mitigation Management Plans, incorporating the results of surveys undertaken and mitigation measures required. • Further consultation with stakeholders. 	<p>Submit the ecological reports with the planning application as required. Ensure mitigation measures are incorporated into the detailed technical design. Apply for mitigation licences on granting of planning permission.</p>	<ul style="list-style-type: none"> • Ecology 'clerk of works' may be needed to prepare the site and prevent damage to protected species e.g. newt capture. • Ecology 'watching brief' during construction to ensure ecological damage does not occur. 	<ul style="list-style-type: none"> • Follow-up surveys to review impact of the restoration on ecology may be required. • Implement Mitigation Management Plans for any mitigation features that may be required and review the plan periodically.
<ul style="list-style-type: none"> • Site Investigation Phase 3 and 4 if required: Remediation Design, Execution and Validation/Verification. • Produce a site-specific remediation methodology. • Consult with regulatory authorities to ensure satisfactory design and implementation of the remediation programme. 	<ul style="list-style-type: none"> • Factor remediation of contaminated land into the design and into the project management plan. • Include contaminated land assessment and mitigation in the planning application and Environmental Statement (if an Environmental Impact Assessment (EIA) is required). 	<ul style="list-style-type: none"> • Include methods for the management of emissions likely to be produced on site during dredging, excavation or construction stages. 	<ul style="list-style-type: none"> • Management of contaminated waste material from dredging. • Discharge planning permission conditions if applicable. • Store waste, chemicals and oil securely on site, use registered waste management contractors, and obtain a licence, permit or exemption for transporting waste, spreading waste soils. 	<p>Pollution monitoring.</p>

03 Environmental Actions at each Work Stage (cont)

	A (0) Strategic Definition	B (1) Scoping & Evaluation	C (2) Initial Design
<p>Heritage</p> <p>Stakeholders; Restoration Promoters, Historic England, Cadw, NRW, LPA, Local heritage interest groups, Heritage specialist, IWA, Canal and River Trust Heritage Advisor.</p>	<p>Compile a brief history of the heritage features along the waterway using available information and check the Local Plan for protected sites.</p>	<ul style="list-style-type: none"> • Desk study to identify listed features. • Consult Historic England and the Local Planning Authority on the need for listed building consent. 	<p>Assess the implications of protected sites on the design of the restoration; it may need to be changed as a result of restrictions to development.</p>
<p>Planning and EIA</p> <p>Stakeholders: Restoration Promoters, LPA, Local stakeholders e.g. businesses, developers and the public, The Trust, IWA.</p>	<ul style="list-style-type: none"> • Identify if the route is safeguarded within the Local Plan and understand aims of the Local Plan. • Review the National Planning Policy Framework and how the restoration can use the NPPF as an opportunity. Identify local stakeholders. 	<ul style="list-style-type: none"> • Informal discussion and inquiries with the Local Planning Authority regarding planning permission and EIA. • Identify other developments that may impact on restoration. • Engage local stakeholders 	<ul style="list-style-type: none"> • Seek to protect the route in the Local Plan. • Formal pre-application scoping enquiries for planning and EIA to determine the information that should be included.
<p>Work Stage Outcomes</p>	<p>A high level overview and understanding of the environmental context of the project.</p>	<p>Baseline condition of the site:</p> <ul style="list-style-type: none"> • Phase 1 ecology, ground investigation surveys and reports. • List of all listed heritage and archaeological features. • Indication of potential constraints and opportunities. • Recommendations for further surveys required. • Confirmation of planning permission and/or EIA required. • Dialogue established with key stakeholders. Keep records. 	<p>In depth understanding of the assets on site:</p> <ul style="list-style-type: none"> • Phase 2 ecology and ground investigation surveys. • Assessment of the environmental impacts of the project. • List of recommended mitigation measures. • Initial built heritage and natural environment plans • Water resources study. Flood risk assessment • Planning pre-application records. • Restoration design plans.

D Planning for Project Delivery	E (3) Developed Design	F (4) Detailed Technical Design and Major Funding	G (5) Construction	H (6&7) Handover / Use / Aftercare
Contract further surveys based on the findings of the preliminary heritage and archaeology appraisal.	List methods for heritage conservation required in the Conservation Management Plan.	<ul style="list-style-type: none"> • Include demolition of buildings in conservation areas in the planning application. • Obtain Listed Building Consent if needed. 	Meet any heritage consents imposed in the planning permission.	Maintain heritage features if required.
<ul style="list-style-type: none"> • If planning permission is required prepare outline planning application for the project as a whole. • If EIA is required prepare an outline environmental statement. 	<ul style="list-style-type: none"> • Prepare planning application. • Prepare Environmental Statement (if EIA required). 	<ul style="list-style-type: none"> • Submit planning application and environmental statement (If required). • Consultation period begins. • Planning permission is granted or refused, with or without conditions. 	Discharge planning conditions.	
<p>Documented survey results and recommendations:</p> <ul style="list-style-type: none"> • Phase 3 and 4 ground contamination remediation design. • Feedback from the regulatory authorities on plans for remediation. • Outline planning application. 	<ul style="list-style-type: none"> • Conservation Management Plan. • Water Management Plan. • Ground contamination and remediation management plans. • Full planning application. 	<ul style="list-style-type: none"> • Planning application submission including results of surveys and Conservation Management Plan. • EIA Environmental Statement submission (if required). • Consents and permits required for construction. • Documented report for managing contaminated land, emissions and preventing pollution. • Local Planning Authority decision and consultee responses. 	<ul style="list-style-type: none"> • Licences, permits and consents. • Mitigation licence for each protected species and submit mitigation reports to Natural England. • Report to the LPA as required. • Waste management permit or licence if required. • Waste transfer notes and hazardous waste consignment notes. • Records evidencing discharge of planning conditions if relevant. 	<ul style="list-style-type: none"> • WFD monitoring records. • Abstraction monitoring reports. • Day to day monitoring records. • Records of maintenance.

04 Water Management

Water management is an ongoing challenge relevant to both existing waterways and new developments.

For waterway restoration projects, water management can be the determining factor for successful realisation of the project. The key water management considerations for restoration projects are:

- water demand – how much water is needed;
- water supply – what are the available water resources;
- water quality;
- water management at the operational phase.

The Water Resources Strategy 2015–2020 presents the Trust's action plan for achieving the vision of 'living waterways that transform places and enrich lives'. The strategy includes 14 strategic actions that set out how the Trust intends to manage water resources across the network in the next 5 years. Strategic action no. 4 commits the Trust to 'Ensure that appropriate water resources assessments are undertaken for any proposed restoration or new canal development, aiming for no net impact on long term water resource levels of service'.

The key requirement is that the water resources assessment is *appropriate*. For example, a relatively short section of canal with no locks, being fully rebuilt, in an area of good clay geology or with a full lining, that links to a section of canal with adequate resources, may require only a limited amount of detailed work to determine its acceptability in terms of proving no net impact on the existing system (based on outline/feasibility/detailed stages). In other situations, for example a new canal of considerable length, with many locks, in areas of scarce water resources, will lead to a more comprehensive/complex water resources assessment, that is built up and developed over a number of the Restoration Work Stages.

Water Management at the Strategic Decision Stage

At the earliest stage of the project consider how the waterway will be used e.g. the approximate number of boats expected to be using the waterway. The type and extent of use will affect the water demand of the development and this information will be required for the water resources study.

Scoping and Evaluation Water Management

At the Scoping and Evaluation stage of the project start pulling together information to address requirements of the Water Framework Directive, obtain an initial flood risk assessment and make initial estimates for boat traffic and other water demands, especially losses. This information will feed into the water resources study and flood risk assessment to be undertaken over the course of the next work stages. Initial consultation with the EA, NRW, the Trust and IWA to identify their requirements.

Water Resources Study

At the Initial Design stage of the development a Water Resources Study should be undertaken to identify potential water demand of the waterway and the water resources available to meet the demand.

For canal restoration projects a full Water Resource Study must be developed and made available to stakeholders and regulators including the EA, the Local Planning Authority (LPA) and the Trust. Early consultation will help steer the process and inform the Water Resources Study. The water resources study may also be submitted with planning applications and may feed into EIA Environmental Statements if the project requires EIA.

Estimating Water Demand

The Water Resources Study should include a reliable estimate of the potential water requirements of the restoration project, for example that used by locks



to allow boats to pass through (known as lockage water), lock leakage, seepage and leakage from the canal bed, up-take of water by vegetation, and evaporation.

Start with an initial estimate of the water demand for lockage by estimating the numbers of boats likely to be using the canal. If the canal is already navigable data can include records of boat movement. In cases where this information is not available, for example if the canal has been in-filled, estimates can be drawn from national survey data or information drawn from comparable canals. When estimating water demand, consider seasonal variations (e.g. more boats passing through locks in summer) and the way locks are likely to be used (e.g. if many boats are likely to be travelling in one direction at the same time, if boats are likely to accumulate in one pound near pubs or other attractions, or if locks are wide enough and the route busy enough for more than one boat to share a lock).

The Water Resources Study must also address the impacts of the project on water quality and impacts on flora and fauna.

Engage a professionally qualified hydrologist to develop the estimates. The hydrologist will need to work with the project engineers and the project officer to confirm the initial design of the restoration so that the parameters can be factored into the resourcing calculations. Significant changes to the project at later stages are likely to result in amendments to the calculations.

For canal restoration projects the Trust's Water Management Team can advise on seepage, leakage and evaporation estimates (collectively termed the loss rate) and the data can be fed into the Trust's models for calculating water demand.

Water Supply Options

The Water Resources Study should also consider where the water to fill the canal will come from and what resources will be used to top up water levels over time. There are several water supply options, all of which should be considered initially, taking a view on the capital and operational costs over the whole life of the project, as well as the likelihood and viability of accessing a reliable source.

Water resources that can be used to supply waterway restoration projects include:

The existing waterways network: If the waterway being restored connects (or is intended to connect during the restoration process) to another canal or river, then a supply may be taken from the existing waterway network with the permission of the Trust or relevant Navigation Authority. To take water from the existing network, a Water Resource Study must be supplied so that the impact of the extraction of water from existing waterway can be assessed.

Reservoirs: Reservoirs hold large quantities of water that can be used to support the water levels of the canal network. Many reservoirs have been built for the purpose of supplying canals with water.

The water is usually gravity fed from the reservoir to the canal, although it can also be supplied by pumping, stream or siphon. The requirements for owners and operators of reservoirs are dependent on the size of the reservoir and its risk level (determined by the Environment Agency). More information about reservoir management is available from the Environment Agency.

Groundwater: Groundwater can be used in places where a porous underground formation (Aquifer) exists. It can offer benefits over direct surface water supply as groundwater can be more resilient to drought. It can also be a more cost-effective option than reservoirs, and is usually easier to get permission and land-take for, with fewer asset management requirements in the longer-term. However the high costs for drilling boreholes and installing pumps, dosing to precipitate iron, and energy to power the pumps, should be taken into consideration. Groundwater abstractions are licensed by the EA/NRW and are covered by Catchment Abstraction Management Strategies (CAMS). Note that where groundwater levels are too high, they may pose a risk to infrastructure.

Back pumping: Back-pumping systems pump water from the lowest lock of the flight back to the top of the flight, ready for the next boat to pass through. Although back-pumping requires considerable energy to operate, the advantage of the system is that it does not use additional water resources. Back-pumping is not a stand-alone solution (as it only recirculates lockage water, and cannot recover or replenish canal losses) but it can supplement other water supplies.

If there is a possibility that back pumping might be required then consideration should be given to installing the pipework and pump housing while constructing new locks. Although the costs of constructing the new lock will increase, this approach is more cost-effective than retrofitting back pumping infrastructure.

Drainage Inputs: Water from land drainage and runoff can supplement the canal and also offers opportunities to contribute to flood alleviation, by receiving and storing flood water, releasing it slowly over time. Drainage inputs are a feeder supply and may require a permit for discharge into the waterway. The quantity and quality of drainage inputs can be highly variable and requires management to avoid pollution of the waterway.

It may also be possible for the canal to receive treated effluent from sewage treatment works, typically operated by the water industry. Challenges can arise relating to water quality and pollution risk, but these sources have the potential to provide a very reliable water supply.

Water Abstraction and Impoundment

Water abstraction is taking water from a surface source (e.g. a river, stream or canal) or an underground source to be used elsewhere. Abstractions are regulated under the Water Resources Act (WRA) 1991, the Water Act 2003, the Floods and Water Management Act 2010 and the Water Resources (Abstraction and Impounding) Regulations 2006. Many abstractions require a licence issued from the EA or NRW. Applications are assessed against local water availability to help ensure that a balance is maintained between water availability and water demand. The Abstraction Licensing Strategies (ALS) show how much water is available in the river catchment area.

There is currently an exemption for navigation authorities, which means that a licence is not usually required to transfer water for navigation purposes. However, this exemption is currently under consultation and may be lost in the near future. It is therefore recommended that the Environment Agency is contacted for up to date information.

If it is not possible to obtain an abstraction licence, it may be possible to trade water rights with an existing licence holder, if the transfer is approved by the EA or NRW in Wales.

If an abstraction licence is in place, it is usually a requirement of the licence to measure and report on the quantity of water abstracted to the Environment Agency or Natural Resources Wales (even if no water is abstracted).

Measuring and recording the amount of water abstracted using a meter helps to ensure that abstraction is within the limits set out in the licence. The conditions of the licence state whether a meter must be installed. The EA and NRW can come to site to inspect abstraction procedures and check that abstraction returns are accurate. Enforcement action may be taken if there is a breach of the licence conditions or if an offence

is committed, so monitoring and reporting in accordance with the licence requirements is a priority. An impoundment is any structure that can permanently or temporarily change the level or flow of a water body, such as; dams, weirs, fish passes, hydropower turbines, sluices, penstocks, culverts, lock gate, retaining walls, flumes, reservoir banks and temporary diversions during construction work.

An impoundment licence is required before work starts on the structure. Exemptions from licence requirements apply to low risk, low impact activities, for example; placing a notch in a weir to encourage fish migration or fixed control and passive flood prevention structures within the channel that only hold back flood water, and maintenance activities. A full list is available from the Environment Agency.

Water Quality

The water chemistry of the waterway is determined by the composition of the water supplies that feed into it. Several sources may be used, which may be from outside the surrounding natural catchment or via pumped groundwater. The resulting chemistry of these mixed sources needs to be carefully monitored to ensure that the chemistry of the water will support a diverse community of plant and animal species.

In addition, cross-catchment transfer of water can result in the spread of plants and animals, including Invasive Non-Native Species (INNS), which can cause significant damage to the ecosystem of the water body (more detail on INNS is supplied in the Water Framework Directive Section of this guide). Information on how connected water bodies may be affected should be obtained at an early stage.

Water Control Manuals

It is good practice to develop a Water Control Manual (WCM) that includes processes for water management at the operational phase, such as investigating significant water control incidents and managing water level monitoring. Any projects that connect in to the existing waterway network operated/managed by the Trust will be required to produce a WCM to the Trust's Mandatory Standard for 'Water Control & Management'. Although not mandatory for canals outside the Trust's network, the Standard is a useful guide for water management on all canals.



The water level of waterways can change considerably over short periods; even canal levels, which are typically much less variable than rivers, can change rapidly. The variation of water levels on a canal is dependent on a number of factors, including; the length and depth of pounds, proximity to controlled and uncontrolled inflows, how often upstream and downstream locks are used, and the height of the canal banks above the highest water level anticipated.

Where canals lie in a flood plain, overtopping the banks could cause physical damage to masonry, brickwork structures and the stability of the towpath. Restoration design must provide capacity for excess flows. Flooding can occur from canals by overtopping or structural breach. This is usually due to the failure of the canal embankment but can also be due to the canal acting as a conduit for floodwater from another source.

Flood Risk Management

The Environment Agency and Natural Resources Wales are the Risk Management Authorities responsible for all main rivers. They must be contacted if there are plans to erect or alter a structure in, under, above or within, 9 metres of a main river. They should also be contacted regarding considerations for obtaining flood defence consent if applicable to the project.

Lead Local Flood Authorities (LLFA), including unitary authorities and county councils, are responsible for developing, maintaining and applying a strategy for local flood risk management in their areas and for maintaining a register of flood risk assets. They also have lead responsibility for managing the risk of flooding from surface water, groundwater and ordinary watercourses. The Department of Communities and Local Government (DCLG) has a key role in the planning process to ensure flood risk is appropriately taken into account in the planning process. Policies for flood risk can

be found in the National Planning Policy Framework. The Trust can also offer support on issues relating to flood risk management and potential impacts on canal infrastructure.

When developing the business case for a project likely to affect the waterways, it is encouraged that all stakeholders are engaged in identifying potential environmental enhancements and flood risk management solutions. Engagement between organisations is crucial for flood risk management, as the Government is pushing for greater efficiency and coherence in publicly funded environmental decision making and there are regulatory requirements to engage with stakeholders and citizens. The broader constituency involved in flood risk management governance is also a source of support and information. Project promoters will also have the opportunity to access joint funding and engage in new partnerships for collaborative delivery of regional and/or local environmental enhancements with statutory regulators, water companies, wildlife trusts, developers and other stakeholders.

Flood Risk Assessment

A Flood Risk Assessment (FRA) is likely to be required for restoration projects and any other projects that could affect, or be affected by, flooding.

New developments are steered toward areas with the lowest probability of flooding i.e. Flood Zone 1. However, this may not be suitable at the restoration location and in this case it must be considered against the 'vulnerability classification' i.e. how at risk to flooding the project is likely to be, ranging from 'Water Compatible' to 'Highly Vulnerable' and 'Essential Infrastructure'. Navigation facilities are considered Water Compatible.

In line with National Planning Policy Framework (NPPF) guidelines, the following table details when FRAs should be carried out;

Flood Zone	Definition	FRA required?
1	Low probability – land having less than 1 in 1000 annual probability of river or sea flooding	Only if development is >1ha
2	Medium Probability – Land having between 1 in 100 and 1 in 1000 of river flooding or between 1 in 200 and 1 in 1000 annual probability of sea flooding	YES
3a	High Probability – Land having a 1 in 100 or greater annual probability of river flooding or land having a 1 in 200 or greater annual probability of sea flooding	YES
3b	The Functional Floodplain – Comprises land where water has to flow or be stored in times of flood.	YES

Note that the findings of an FRA may not always prove that a site can be made safe from the risk of flooding. If required, the report will contain details of any further detailed hydrological studies considered necessary, such as minor watercourse flood modelling, flood defence breach modelling, or production of flood warning and evacuation plans.

At this point it is essential to engage a qualified flood risk specialist to complete the initial flood risk assessment. They can liaise with the EA/NRW, the LLFA and sewerage undertakers on behalf of the project promoters. The initial FRA is likely to involve:

- site walkover assessments;
- obtaining and assessing published flood risk information;
- comparison of site levels with modelled flood levels;
- assessment of the impact of climate change;
- production of surface water run-off calculations.

Baseline conditions of flood risk to the site from all potential sources are defined by means of a desk study, site walkover, information received from the EA/NRW and any information contained within the area's Strategic Flood Risk Assessment published by the Local Authority. Information regarding flood history, flood level data, assets, and other related information for the site will be required in order to complete the assessment; this information is normally obtained from the EA/NRW. A range of sources are consulted when considering flood risk, including; national policies, technical guidance for planning, planning policy statements as well as standalone briefings mainly from the EA/NRW,



British Geological Society, Natural England and Local Authorities.

The FRA will identify and assess the risks of all forms of flooding to and from the project and demonstrate how these flood risks will be managed, taking the potential effects of climate change into account. The assessment will also identify opportunities to reduce the probability and consequences of flooding.

Flood Defence Consent / Land Drainage Consent

Consent may be required from the EA/NRW (under the Water Resources Act 1991), the Local Flooding Authority or the Internal Drainage Authority (under the Land Drainage Act 1991) to undertake work that may affect a watercourse including temporary works.

The EA/NRW issue Flood Defence Consent for projects taking place on Main watercourses and the Local Flooding Authority issues Land Drainage Consent for projects carried out on 'ordinary' watercourses. An ordinary watercourse is every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows; that does not form part of a main river. Main watercourses are not necessarily the biggest ones, rather those that are important for flood defence. For example, the section of the Stroudwater canal between Ebley and Wallbridge acts as a conduit for three streams that flow into it and is classed as a main river. Which channels are 'main' can be found on the Environment Agency website 'Flood Map for Planning'.

Consent is required to ensure works do not increase flood risk, damage flood defences, or harm the environment, fisheries, or wildlife. It has no bearing on other legislation, such as planning.

06 Water Framework Directive

The EU Water Framework Directive 2000/60/EC (WFD) sets out the requirements and objectives for EU Member States to preserve, restore and improve the water environment and is implemented through the Water Framework Directive Regulations, 2003 in England and Wales. The WFD applies to all ground and surface waters, which means that any waterway project must comply with the requirements of WFD and not compromise progress made toward achieving environmental WFD objectives.

To implement the WFD in the UK, hydrologically-discrete areas have been drawn up, comprising groups of catchments termed River Basins. All water bodies are assigned to a River Basin District and are identified and classified according to their physical and biological characteristics. They are assessed against WFD criteria and given a quality rating. The UK had an initial target to ensure all waterbodies were in 'good ecological status' by 2015, however this has been deferred until 2027.

The quantifiable signs that determine the quality rating for a water body are:

- Biological – Composition and abundance of aquatic flora, invertebrate fauna and fish.
- Hydromorphological – channel morphology, connectivity, quantity and dynamics of flow, connection to groundwater bodies, river depth and width variation, structure and substrate of the river bed.
- Physio-chemical – phosphate, nitrate, dissolved oxygen, thermal conditions, salinity, acidification status, nutrient conditions, pollution by substances e.g. heavy metals.

Heavily Modified Water Bodies (HMWB) e.g. river navigations and Artificial Water Bodies (AWB) such as canals, are assessed for their 'ecological potential'. The assessment takes into consideration the use of the water body and the presence or absences of any mitigation measures required to achieve good ecological potential.



Where all applicable mitigation measures have already been taken or screened out, the water body can be classified as Good Ecological Potential or better. Where applicable mitigation measures are yet to be completed, the water body is classified as Moderate Ecological Potential (MEP). This is then combined with the outcomes from other assessments to give an overall classification of the water body.

Planning for WFD

At the Strategic Definition stage obtain a copy of the River Basin Management Plan (RBMP) for the area from the Environment Agency. The RBMPs describe the river basin district, the pressures that the water environment faces, the current state of the water environment, and what actions will be taken to address the pressures.

Restoration projects must integrate with the River Basin Management Plan targets for the waterbody. These targets may have been set without reference to the aspiration for restoring navigation and the first task should be to assess what the Plan says about relevant waterbodies and discuss how restoration fits into that with the relevant Environment Agency Catchment Coordinator. This should be completed before the Design phase of the project because it is fundamental to the progress of the restorations.

The RBMP also provide information on the:

- state of the water environment;
- pressures affecting the water environment;
- objectives for protecting and improving the water environment;
- actions or measures needed to achieve the objectives.

Use the RBMP to identify the baseline ecological and chemical water condition of the area's water bodies that could be affected by the work. Then factor this into the project planning to determine appropriate maintenance, improvement and mitigation measures that will ensure that the project contributes to achieving the WFD objectives.

Considerations for WFD

A plan should be developed for how the restoration will be designed to meet the WFD quality standards. This is likely to include regular water monitoring or technical options. For example, the free passage of fish is a key requirement of the WFD, so fish and eel passage might need to be considered in places where there are barriers along the waterway.



A license is required to handle White Clawed Crawfish

Any activity that could affect water quality for example, construction activity or discharge from boats, should be assessed and mitigated against ahead of time.

Also consider the environmental impact of any modifications that will need to be made to the structural or physical nature of the water body. Under the WFD, modifications that have the potential to cause harm to the local ecology, can be made only if the work is essential for the use of the water body. All other modifications must be altered or managed to reduce or remove their adverse impact.

'Bioengineering' is a method of engineering that helps to reduce the environmental impact of modifications, through balancing conservation, recreation and engineering needs. For example, where banks are eroded and destabilised, 'Nicospan' a lightweight woven geotextile material, can be used to help stabilise the banks and create the required profile. As the material is permeable to water and usually backfilled with soil or dredgings, it allows vegetation to grow through it. This encourages the establishment of reed fringes which help to create a naturally stabilising bankside habitat in the long term.

Coir rolls are another bioengineering solution that provide structural stability for banks. The rolls are constructed from biodegradable coir fibre which aid natural vegetation establishment. As the vegetation matures, it roots into the coir banks, creating a sustainable form of erosion control and bank support, whilst providing significant biodiversity interest and helping to improve water quality.

Managing Non-Native Species

Non-native species (NNS) are plants and animals that have been introduced to the UK by human activity (either deliberately or accidentally). A small proportion of non-native species can have serious negative impacts on native British species and the wider environment; this minority are often referred to as invasive non-native species (INNS).

INNS can also have negative impacts on local people and businesses and some, such as Giant Hogweed, can cause a potential health risk and damage to buildings.

The Non-native Species Secretariat (NNS) has responsibility for helping to coordinate the approach to invasive non-native species in Great Britain and the website includes useful information on identifying the different types of NNS, INNS and biosecurity measures.

INNS can adversely affect habitats and species in a number of ways including:

- downgrading of water body ecological quality ratings under the Water Framework Directive;
- affecting the ecological condition and biodiversity of areas protected at local, national and EU level;
- reducing the population of native species by preying on, out-competing and displacing native species;
- spreading disease.

For example the invasive Signal crayfish, introduced from America in the 1970s, is now prevalent in waterways throughout the UK and is driving native crayfish towards extinction through the spread of crayfish plague and competition for resources. In addition, the Signal crayfish feed on fish and amphibian eggs, tadpoles, juvenile fish and aquatic invertebrates, which affects the populations of these species, causing further imbalance in the ecosystem.

Some invasive non-native species of aquatic plant choke the waterways, affecting the ecology and the amenity of the water body by interfering with activities such as angling and boating. Aquatic plants can grow very quickly, for example Floating Pennywort can grow up to 20cm a day. The plants can form dense mats in the water which reduce light and oxygen levels in the water which in turn harms fish and other natural life. Non-native aquatic plants can be expensive and very difficult, or impossible, to control, therefore prevention is the best defence measure.

The key principles of NNS management are Prevention (through biosecurity measures and awareness), Rapid Response (through surveillance, monitoring and early detection), and Site-specific Controls (for example using matting to suppress the growth of invasive waterweed, or using herbicides (with the agreement of the EA), or biological controls.

Biosecurity helps to reduce the risk of spreading invasive species. Biosecurity measures should be implemented by people working on site during restoration development, as well as by users of the waterway once the restoration is complete. Simple hygiene checks after being in contact with the water can make a big difference.

- Check equipment and clothing for organisms.
- Clean and wash all equipment, footwear and clothing thoroughly.
- Dry all equipment and clothing – some species can live for many days in moist conditions.

Waterways and their associated terrestrial habitats and built structures provide attractive habitats for urban and rural wildlife. Legal obligations in relation to protected species and sites and invasive species apply to all projects regardless of the size.

Project managers and contractors are required to ensure that all requirements in relation to environmental compliance are addressed at the appropriate stage. Ecological surveys should be undertaken by a suitably experienced and skilled ecologist at an early stage to ensure any potential constraints are identified.

In the first instance, an ecological scoping survey or a preliminary ecological appraisal of the entire footprint of the works should be undertaken.

The preliminary appraisal will inform the need for more detailed surveys that may be required if the project has the potential to affect any important ecological receptors such as protected species or designated sites.

Protected species associated with waterways include water voles, otters, white-clawed crayfish and rare aquatic plant species. However, other species should also be considered, for example badgers can be found on adjacent embankments or in woodland or scrub; great crested newts may be present in adjacent ponds or in disused waterways which have become impounded or naturally ponded; reptiles may use towpath and embankment habitats and dormice could be present in adjacent woodland, hedgerows and scrub. Bats are often found around waterways; the Daubenton's bat for example roosts in trees and wooden structures such as old boat docks. Ecological surveys will also consider the presence of invasive non-native species (covered in more details in the Water Framework Directive section of this guide).



Conservation and Protected Sites, Habitats and Species

Certain species of plants and animals are protected under the Wildlife and Countryside Act 1981 (as amended). The Act also enables the protection of important sites, through designation as Sites of Special Scientific Interest (SSSI). Some species and sites are given additional protection under the Conservation of Habitats and Species Regulations 2010 (as amended).

There may be restrictions on the activities and developments that have the potential to affect a designated site, so it is important to find out as early as possible if the project is wholly or partially within a protected area.

The MAGIC website provides information on protected sites in England and the Natural Resources Wales website lists protected sites in Wales.

Site designations include:

- Areas of Outstanding Natural Beauty
- Local and National Nature Reserves
- National Parks
- Sites of Special Scientific Interest (SSSIs)
- Special Areas of Conservation (SACs)
- Special Protection Areas (SPAs)
- Ramsar sites
- Local Wildlife Sites (also known as Sites of Importance for Nature Conservation). These are non-statutory but are normally protected through local plan policies.

Scoping Surveys and Ecological Appraisals

Initial Scoping Survey

An initial desk-based study is typically undertaken at an early stage to identify any existing records of protected species and habitats in the local area. Information sources used include, publicly available satellite imagery, biological records from Local Biological Record Centres, local interest groups such as bat and badger groups, and internet-based resources such as MAGIC and the National Biodiversity Network.

Whilst free to use internet resources can provide a general indication of presence of a certain protected species or site, records from local groups and record centres are required to provide a more accurate baseline.

A short site visit is also typically undertaken, during which key habitats are noted and the likelihood of the presence or absence of protected and invasive species is identified. This survey may not include production of detailed species lists; however enough information should be collected to produce a scoping report or constraints plan to inform decision making.

Preliminary Ecological Appraisal

Preliminary ecological appraisals should meet the requirements set out in the Chartered Institute of Ecology and Environmental Management (CIEEM) guidance. This involves identification of important ecological receptors, an evaluation of the importance of the habitats and species present and some level of assessment of impacts. It is frequently combined with a scoping survey.

An ecological appraisal provides an initial assessment of the likely impacts of the project and determines the needs and scope of any subsequent survey and impact assessment. It is recommended that all ecological surveys are undertaken by a suitably experienced and skilled ecologist.

Ashby Canal – SSSI Protection Case Study

A section of the Ashby Canal running through Hinckley and Bosworth has been designated as a SSSI because of its aquatic plant community and the invertebrates that it supports. To facilitate the Shackerstone Festival, Natural England requested that additional measures were put in place to protect the aquatic plants that grow at the edges of the canal. As the passage or mooring of boats can damage these plants the Trust installed 200m of nico-span sheeting to protect the plants from boat wash. The additional measures allowed boaters to continue to use the canal and to attend and enjoy the festival, whilst ensuring the protection the SSSI features.

If planning permission is required a PEA may be sufficient to accompany the planning application. However, if the scale of the proposal is particularly large or it has the potential to have a significant environmental effect, a more detailed report may be required, typically referred to as an Ecological Impact Assessment. It is advisable to consult with the LPA as to the level of survey effort and reporting required.

Consideration should be given to creating opportunities for biodiversity enhancement of the site during the design stage. Biodiversity enhancement is an objective of the National Planning Policy Framework 2012 which states that 'opportunities to incorporate biodiversity in and around developments should be encouraged... moving from a net loss of biodiversity to achieving net gains for nature'. Examples of enhancements include incorporating bat and bird boxes on suitable trees along the river corridor and enhancing ponds for amphibians, or incorporating native plant species that maximise flowering and production of pollen, nectar, berries or fruit, which benefit invertebrates, birds and small mammals.

A preliminary ecological appraisal typically comprises a desk-based study, followed by an extended Phase I habitat survey and any additional species-specific surveys that may be required.

The PEA report may be reviewed by the LPA and other stakeholders and should, therefore, provide enough evidence to show that a satisfactory level of survey effort has been undertaken. It should identify

all ecological receptors to the project and provide an evaluation of their importance and make an initial assessment of likely impacts of the proposals on them. Should an environmental impact assessment (EIA) be requested by the LPA, it is recommended that the CIEEM Guidelines for Ecological Impact Assessment are followed.

Detailed Ecology Surveys

If the preliminary ecological appraisal identifies the presence of, or potential for, protected species or habitats, further surveys (sometimes termed 'Phase 2' surveys) may be required to inform the ecological assessment.

The type of survey required and the time it takes to complete varies depending on the species in question and the scale/scope of proposals. A licence must be obtained to survey protected species, including bats, great crested newts, dormice, white-clawed crayfish and sand lizards.

Certain ecological surveys can only be undertaken within a particular season, therefore, early identification of potential protected species and forward planning of surveys is critical to prevent project delays.

For example, great crested newt surveys require multiple sites visits, at least half of which must be undertaken between mid-April and mid-May, with all visits falling between March and typically June.

If this window is missed it may not be possible for an LPA to determine a planning application until the data is available the following year.

Project managers should be aware of the potential seasonal constraints and should consult one of the many ecology survey calendars freely available online.

Mitigation

Following completion of the surveys and subsequent impact assessment, measures to avoid, minimise and/or mitigate for any impacts will be proposed and should be built in to the project design.

Wherever possible, measures should be adopted to avoid impacts altogether and protected habitats and species should be retained on site. Impacts may be avoided through careful design of the proposals and the implementation of best practice working methods. This may include the production of a Method Statement and supervision by an Ecological Clerk of Works (ECoW) who will carry out



pre-construction checks for sensitive habitats and species, monitor biodiversity aspects at the site, manage licence conditions for protected species, and ensure agreed method statements are implemented.

If in situ protection is not possible, habitat recreation or species translocation (often requiring consent or a licence) may be required. Habitat creation and species relocation can be time-consuming and expensive; it is usually easier and cheaper to retain features in situ.

Where impacts cannot be avoided a licence may be required from the relevant regulator to enable works to be undertaken. European protected species licences can only be issued once planning permission has been granted, therefore, it is important to ensure that mitigation is built into the consented scheme. The regulator may require justification for the works and measures to ensure the favourable conservation status of the species is maintained.

Rochdale Canal Case Study

Rochdale Canal was reopened in 2002 following a restoration project that included:

- refurbishment of 24 locks;
- cutting a new section of channel;
- dredging of the original line; and
- construction of 12 new road bridges.

During the project a 20km stretch of canal between Littleborough to Failsworth was designated as a Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) due to the large population of the European protected plant species, floating water-plantain and the diverse range of water plants present in the canal.

The restoration and future operation of the canal had the potential to cause significant and irreversible damage to the protected species and habitats within the SSSI/SAC. However, the restoration team worked closely with Natural England to agree protection and monitoring measures that would enable the project to proceed without causing unacceptable environmental damage.

Methods used to ensure that the ecological works had the best chance of success included:

- conserving the floating water-plantain in situ by restricting the dredging profile to a 6m channel on the tow path side;
- translocation of species to alternative sites on the canal;
- translocation of species off site and return post restoration;
- creating 20 in-channel reserves

A monitoring protocol was also agreed to ensure that the canal continued to meet its conservation objectives, and to help identify the root cause of any problems that might arise. Monitoring included aquatic plant surveys and water quality monitoring. Levels of navigation were also recorded to assess the impact of boating on the aquatic fauna. Monitoring has shown continued development of floating water-plantain populations and stability of water quality.

Appropriate mitigation should be designed by the ecologist engaged on the project, with close consultation with the project manager. This may require production of a management plan for any mitigation features required. The plan should be periodically reviewed and updated. More information on survey requirements and example mitigation measures is available from Natural England.

Trees

If the development is likely to have an impact on trees in the area, they should be assessed during the ecological survey or may require a separate arboricultural survey. Trees can be protected, for example if they are a habitat for a protected species or if they are located in a conservation area. If the tree is a habitat it must be managed in line with the requirements for protected habitats and species outlined above. If the tree is located in a Conservation Area it is likely that authorisation will be required from the Local Planning Authority to remove or otherwise damage the tree.

Trees may also be protected under a Tree Preservation Order (TPO). TPO's are made by the local planning authority to protect specific trees, groups of trees or woodlands. Cutting down a tree under a TPO, or causing damage to its structure or roots, is prohibited without the local planning authority's written consent. If consent is given, it is likely to be subject to conditions which must be followed.

If a tree needs to be felled during a project, a tree felling licence may be required from the Forestry Commission or Natural Resources Wales.



Geology, Contaminated Land and Pollution

The stability and permeability of the ground is of critical significance to the cost of construction and the longevity of waterways and waterway structures. Start by identifying the underlying geology of the site. The *Geology of Britain Viewer* tool on the British Geological Society (BGS) website identifies the likely bedrock and superficial deposits at any location in the UK on an interactive map. Detailed geological maps are available to view on the BGS Maps Portal. Information on the risks of ground instability caused by coal mining can be obtained from an interactive map on the Coal Authority website. The locations of aquifers (underground layers of water-bearing permeable rock or drift deposits from which groundwater can be extracted) are shown on the Aquifer Maps available on the Environment Agency *What's In My Backyard* website.

Compile a brief history of the site using historic maps to look into the history of the site and identify industrial land uses (e.g. brick works, mines or steel works), that could have resulted in ground contamination. Guidance on potential ground contamination caused by historical industrial use is given by the DOE Industry Profiles. Maps can be purchased from companies such as Envirocheck and GroundSure.

The Coal Authority's website provides an indication of whether the site is likely to be affected by old mine workings; if the site is within a designated Development High Risk Area, a Coal Mining Risk Assessment prepared by a suitably qualified consultant would be required to have a planning application for restoration work validated.

Contaminated land is polluted land that has the potential to cause harm to people, animals or other receptors, or cause groundwater pollution. It is regulated under the Part 2A of the Environmental Protection Act 1990 and if it is encountered on a project, legal responsibility for remediation can fall to the landowner. However, remediation may also

be undertaken voluntarily or to satisfy planning conditions set by the Local Authority in accordance with the National Planning Policy Framework.

Scoping and Evaluation – Ground Survey

The canal network operated as a vital component of the Industrial Revolution, transporting raw materials and finished goods throughout the country. As a consequence of the heavy industry in the vicinity of the canals, emissions and discharges from the factories polluted the water and ground, resulting in a legacy of contaminated land. During the decline of the canal network in the 20th Century, some canals were infilled with industrial and municipal waste, which also lead to ground contamination and build-up of noxious underground gasses. Pollutants may include heavy metals, e.g. arsenic, cadmium and lead, oils and tars, chemical substances and preparations, e.g. solvents, gases, and asbestos. Contamination by radioactive substances is also possible and is regulated under separate statutory guidance.

Wherever possible, land contamination should be identified and remediated well before restoration works take place. When previously unidentified contaminated land is exposed during a restoration project, the Local Authority may determine who is responsible for managing the contamination, usually this is whoever caused or allowed the contamination in the first place. However, if they cannot be identified, or no longer exist, the responsibility (and cost) may fall on the person who currently owns or used the land. The Local Authority will decide how the land should be cleaned up and will serve a 'remediation notice' to the polluter or other appropriate person telling them how and by when they must clean up the land.

At the Scoping & Evaluation stage contract a qualified geo-environmental consultant to complete a 'Phase 1 Site Investigation' desk study.

The consultant will determine the historic land use of the site and complete a geological and hydrogeological assessment using maps, records and data as well as a visual inspection of the site to identify potential contamination. Conceptual modelling is used to map the findings. If there is potential for contamination of the site, an intrusive 'Phase 2 Site Investigation' is required. The consultants undertaking the Phase 1 and Phase 2 Investigations should be suitably qualified and be a member of a professional body, such as The Geological Society.

Ground Investigations

Ground investigations may be required to determine the composition and properties of the waterway bed and lining material, to assess whether the lining extends behind the bank protection, or to locate services or other buried structures during conservation, maintenance or restoration projects.

Ground investigations are also required for developments where a Phase 1 ground survey has identified potential for land contamination. A more in-depth analysis of the nature of the contaminated land must be carried out through intrusive testing (as for ecology surveys this is termed a 'Phase 2' investigation).

The scope for Phase 2 Site Investigations is dependent upon the outcome of the Phase 1 study, but can include:



- intrusive surveys: trial pitting, window sampling, cable percussion and rotary drilling;
- on-site geotechnical testing including soakaway testing;
- design and construction of groundwater and gas monitoring wells;
- logging of ground conditions in accordance with British Standards and recovery of soil samples;
- groundwater monitoring and sampling;
- ground gas monitoring;
- chemical analysis.

In line with industry practice, site investigations should be supervised by a Ground Specialist (ICE 1993), with experience of development on the waterways. The investigation should be carried out to British Standard BS5930:2015. More information can be found from the Institution of Civil Engineers. Soil testing must be carried out by a UKAS accredited laboratory.

Site investigation is considered to be a construction activity and should therefore comply with the Construction, Design and Management Regulations (CDM) 2015. The CDM Regulations place specific legal duties for health and safety on organisations or individuals that contract construction projects. More information on the CDM Regulations is available from the Health & Safety Executive (HSE).

During the site investigation the following precautions should be taken:

- Take care not to disturb wildlife including badgers, nesting birds, bats, water voles and reptiles.
- If a borehole needs to be drilled or trial pit excavated within six metres of the water's edge or within the water channel, permission must be sought from the Trust.
- Waterway walls are not capable of bearing loads, this should be considered when using and locating plant.
- Avoid disturbing the canal lining.

Contaminated Land Remediation

If contaminated land is identified remediation will be required to manage the potential liabilities and make the site suitable for its current or intended use. If contracting remediation work the following measures and documentation should be provided to ensure successful clean-up is achieved:

- remediation options appraisal and cost benefit analysis;
- detailed environmental remediation strategy;
- negotiation and agreement of the remediation strategy with the relevant regulators;
- strategy implementation by qualified remediation contractors;
- validation of the scheme thorough sampling and analysis; and
- validation report for regulatory approval and sign-off.

Dredging Projects

Dredging is necessary to remove the sediment and debris that builds up on the bottom of waterway channels. Dredging is either completed using excavators on the bank or mounted on boats to dig out the silts and transport them elsewhere for recycling, re-use or disposal, or by agitating the silts (by plough, pressure or suction) to suspend them and allow the flow or tides to disperse the silt downstream.

A hydrographic survey may be required to establish the quantity of silt that needs to be removed. A silt sampling survey and analysis should be undertaken to establish the quantity of silt and test for contamination to see how best to re-use, recycle or dispose of the dredged materials.

Dredgings are subject to waste legislation unless there is an immediate use for the silt on site e.g. backfilling bank protection or topping up the

towpath (if the silt is suitable). Hazardous material (e.g. contaminated silts) need to be disposed of appropriately or cleaned on site prior to reuse. Disposal of liquid waste to landfill is prohibited by law, therefore to send dredgings to landfill it is necessary to undertake pre-treatment (e.g. de-watering) that satisfies the requirements of current guidance published by the EA and DEFRA.

The choices available for reuse, recovery and disposal of dredgings are dependent on the physical and chemical properties of the material. Alternatives to disposal include: spreading silt onto agricultural land if the material is relatively uncontaminated and if it is possible to demonstrate that there is some benefit to agriculture in doing so; and re-using free draining sands and gravels produced by dredging as secondary aggregates. Waste permits or exemptions may be required for these activities (see information in the section below).

More information on managing dredging waste is supplied in the good practice document '*Sustainable management of dredged material from inland Waterways*' produced by the Association of Inland Navigation Authorities (AINA).



Pollution Prevention During Construction and Operation

The canal is at risk of pollution incidents during construction and when the canal is operational. Safe storage of chemicals and waste, as well as communication with stakeholders can minimise the risk of pollution.

Waste licences, exemptions and permits

Waste generated during construction, excavation, remediation and dredging, is regulated under the Waste (England and Wales) Regulations 2011 and the Environmental Permitting (England and Wales) Regulations 2010. The Environment Agency and Natural Resources Wales are the regulators for waste management activities. All waste uplifted from site must be taken by licensed waste carriers and disposed of at permitted waste management facilities.

It is a requirement of the Waste (England and Wales) Regulations 2011 for waste producers to implement the 'waste hierarchy', which means prioritising opportunities for resource efficiency (waste prevention or reuse) above recycling or disposal. There may also be a cost incentive for utilising the waste hierarchy, as it avoids the cost of Landfill Tax which is paid per tonne of waste sent to landfill.

Environmental permits or exemptions are required for some waste management activities, for example using waste for construction activities and spreading waste on land. The cost of a permit depends on the type of activity being carried out and the environmental risk. Registered permit exemptions apply to activities that are considered low risk and are generally free to obtain. More information on permitting is available from the EA and NRW.

Pollution Control

Oil and chemical storage on site should be in secure containers to minimise risk of spillage and resulting pollution. Under the Pollution (Oil Storage) (England)

Regulations 2001, oil storage containing more than 200 litres of oil (one barrel), stored outside, must have some form of secondary containment e.g. a bund or a second skin, to prevent the risk of oil spills. It is also recommended to have spill kits on site during construction work to contain and clean up any spills that do happen.

Lime, concrete and cement are common materials used on canal and river restoration sites. If these materials are allowed to enter a watercourse they can have a devastating impact on wildlife. Lime and cement are both alkaline and their wash-outs contain suspended solids which, if allowed to enter a watercourse, can be toxic for fish and aquatic life. Washout is generated when the chutes of ready mixed concrete trucks, wheelbarrow and hand tools are washed out to remove the remaining concrete before it hardens.

To prevent the contaminants entering the water course ensure that waste water is never emptied directly onto the ground, into the watercourse or surface water drains. Wash-water management measures include; creating a 'wash-out pit' lined with a plastic lining to prevent contamination and discharging wash-water to foul sewers once the water has settled and is free from solids. To discharge water to foul sewer the local water company must give consent for the discharge and a fee will likely apply. Also ensure that bags of lime and cement are kept safely stored and dry, and that mixing is undertaken as far from the watercourse as possible.

Statutory Nuisance

Be aware that construction can generate noise and dust that can develop into nuisance issues for people living or working nearby. Contractors should have methods in place to minimise disturbance, e.g. restricted working times and damping down of dust emissions. Check this with contractors and for larger projects consider using contractors registered with the Considerate Constructors Scheme. Having

a nominated person on the project team who is responsible for community liaison helps to maintain open channels of communication between the public and the project team, and ensures that nuisance issues can be identified and addressed before they become a problem.





Waterways often comprise many historic elements such as bridges, locks, slipways, wharves, other structures and historic landscapes which contribute to the historic environment. The historic environment envelops all aspects of the environment that has resulted from the interaction between people and places through time and represents an important resource which, once lost, can never be replaced. It contributes to local distinctiveness, our sense of history and quality of life.

Heritage assets are the buildings, monuments, sites, places, areas and landscapes that define the historic environment, and their conservation ensures that they contribute to the quality of life of this and future generations.

England and Wales' most significant heritage assets are protected under national legislation and

include Listed Buildings, Scheduled Monuments and Conservation Areas. These are collectively known as 'designated heritage assets'. This means that any restoration proposals which include works to, on or within designated heritage assets may require consent to be obtained in advance of the works proceeding to ensure that proposals are lawful.

To check for the presence of any Listed Buildings and Scheduled Monuments the first point of contact should be the National Heritage List held by Historic England or Historic Wales data held by Cadw. Both organisations have a map enabled webpage that enable you to check for designated heritage assets. Maps for Conservation Areas are held within the planning section of local planning authorities across England and Wales.

For works in Conservation Areas and Grade II Listed Buildings the local planning authority Conservation Officer should be consulted. Local Authorities will seek to preserve non-listed buildings located in conservation areas where the building makes a positive contribution to the character of the area.

If the works include Grade I and II* Listed Buildings Historic England and Cadw are statutory consultees and must be included in the assessment of proposals. Works on Scheduled Monuments, including repairs, require a Scheduled Monument Consent to be submitted to Historic England or Cadw to assess the proposals and to advise the Secretary of State/ Welsh Minister whether to grant consent. Depending on the complexity of the proposed work this decision process can take up to 13 weeks.

If consent is required the application will need to be supported by an appropriate study of the significance of the designated heritage asset, a description of the proposed work and assessment of any impact upon the significance, historic remains and any proposals to mitigate or remove potential impacts.

An initial assessment of the archaeology and historic structures should be undertaken by suitably qualified and experienced heritage consultant or specialist to identify:

- designated heritage assets e.g. Listed Buildings, Scheduled Monuments and Conservation Areas;
- archaeological remains or the potential to discover previously unknown archaeological remains through consultation with the Local Authority based Historic Environment Record (HER);

- any other undesignated heritage assets e.g. local listings (i.e. Buildings of Local Interest) adopted by the local planning authorities.

If heritage assets are identified, a heritage impact assessment should be completed by a competent heritage advisor to assist in securing consent. The assessment should identify the effect of works on the historic environment. If buildings, structures or landscapes are identified with a high heritage value a Conservation Statement or Conservation Management Plan (CMP) may be required. A CMP sets out the significance of a heritage asset and details how that significance will be retained in any future use, management, alteration or repair.

Further works may include more detailed surveys either to understand the historic environment before a decision on granting consent is determined or to record historic fabric and remains before work is undertaken. This should be undertaken by a suitably qualified heritage professional but also offers opportunities for the wider community to engage in the investigation of their heritage.



Planning and Environmental Impact Assessment

Planning

In order to undertake a waterway project planning permission from the Local Planning Authority (LPA) may be required. The LPA can advise if planning permission is required for a project in its entirety or elements of a project. Holding early discussions with the LPA can also help to understand their requirements and relevant policies. If planning permission is required then the planning application can be tailored to the LPA's requirements and policies. The LPA is likely to require an appraisal of the potential environmental impact of the project with the application. Consult the LPA to find out what information they expect to see in the environmental appraisal.

The Trust and IWA can also offer advice on compiling planning applications. As statutory consultees the Trust and IWA are also asked by the LPA to comment on planning applications that may affect the canal network. Liaising with the Trust and IWA prior to submitting planning applications for development can help ensure that the information submitted is accurate and in accordance with the Trust's strategy.

Environmental Impact Assessment

Environmental Impact Assessment (EIA) is a process for identifying the significant environmental impacts of a development and is taken into account by the planning authority when deciding whether the development should go ahead.

EIA is a legal requirement for some developments if they meet the criteria set out in the *Town and Country Planning (Environmental Impact Assessment) Regulations 2011* (as amended). Under the legislation, projects listed in 'Schedule 1' always require an EIA, whereas projects listed in 'Schedule 2' only require EIA if the development is likely to give rise to significant impacts. This is a 'statutory EIA'. Waterways projects, such as large scale restorations, are usually considered to have significant environmental impacts and therefore may require an EIA. Also note that in some cases projects that do not require planning permission still require EIA.

Schedule 2 applies to the following types of waterway-related project where the 'area of works exceeds 1 hectare':

- 'Inland-waterway construction not included in Schedule 1, canalisation and flood-relief works'
- 'Dams and other installations designed to hold water or store it on a long-term basis (unless included in Schedule 1)'
- 'Groundwater abstraction and artificial groundwater recharge schemes not included in Schedule 1'
- 'Works for the transfer of water resources between river basins not included in Schedule 1'

Although it can seem advantageous to develop the restoration in sections less than 1 hectare in area, in order to avoid the requirement for EIA, in the long term it is generally more beneficial for the project to complete the EIA, as the process identifies potential constraints early on and results in fewer issues at

later stages in the project. The benefits of EIA in terms of reduced impact and financial savings are such that, for some projects, it is advantageous to undertake EIA on a non-statutory basis. This guide focusses on statutory EIA, although the process for statutory and non-statutory EIA is broadly similar.

Screening

EIA can be costly, time-consuming and generally requires external consultancy support and a stakeholder consultation period, so it is useful to identify early on if the project falls within the EIA thresholds.

The regulations allow the project promoters to apply to the Local Planning Authority (LPA) for an opinion on whether EIA is needed prior to applying for planning permission; this process is called 'screening'. This is optional but recommended. The LPA must provide a written statement of its decision and reasoning.

The Environmental Statement

An Environmental Statement detailing the likely impact of the development on the environment is submitted to the LPA with the planning application for projects requiring an EIA. There is no set format for the Environmental Statement but it must include the information listed in Part II of Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 and any relevant information listed in Part I of Schedule 4 of the Regulations.

As a minimum the environmental statement should include:

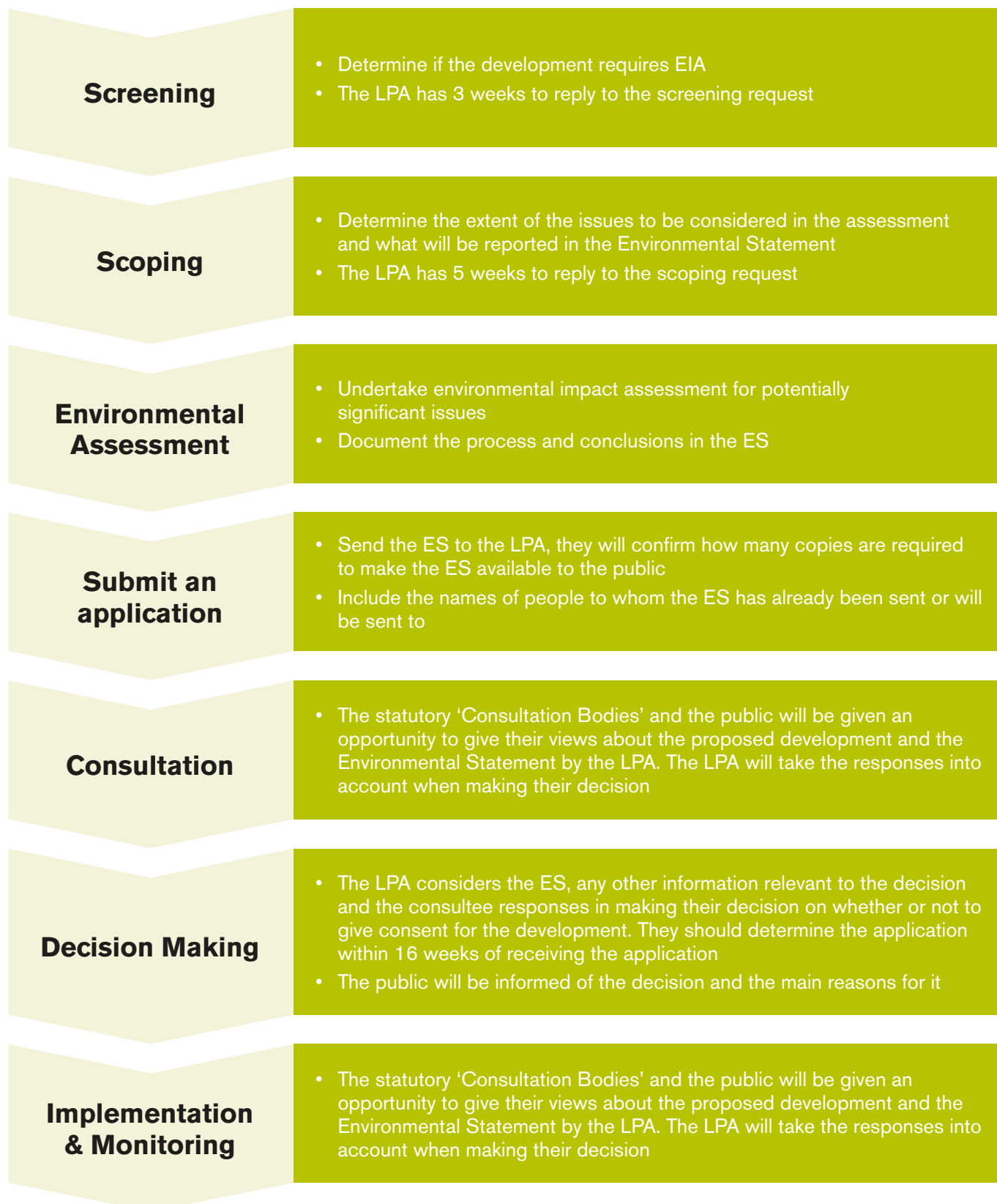
- a description of the proposed development (including physical characteristics and land use at construction and operational phases);
- the main alternatives studied and the reasons for choosing the development proposed.
- the data necessary to identify and assess the main impacts of the development;
- a description of the likely significant effects (direct and indirect) on the environment (including humans, flora, fauna, soil, water, air, climate, the landscape, cultural heritage, and interactions between these aspects);
- where significant adverse effects are identified, a description of measures to avoid, reduce or remedy the effect; and
- a summary in non-technical language.

Scoping

Project Promoters can obtain a formal (scoping) opinion from the LPA on what to include in the Environmental Statement. Again this is optional but highly recommended as it helps to ensure that the LPA and relevant consultees can consider the likely impacts of the development at an early stage and can focus the EIA on those that are relevant.



Environmental Assessment Submission and Decision Making Process



Planning for project delivery: Obtaining licences, consent and permissions

Licensing and the issue of permits, consents and permissions is the main system of control used by regulators in the UK to manage activities that could result in environmental damage. Waterways projects are subject to various licensing requirements. To prepare for project delivery obtain all the necessary licences required to proceed and submit an outline

planning application to the Local Planning Authority if the project requires planning permission.

This chapter lists licences, consents, permits, exemptions and permission that may be required to deliver a waterway project.

Licence / Consent / Permit / Exemption / Permission	Regulator / Stakeholder	Application process
Abstraction Licence Applicable to restoration projects.	Environment Agency / Natural Resources Wales	<ul style="list-style-type: none"> Check the local ALS to see if water resources are available. Issue a preliminary enquiry to EA/NRW for pre-application advice. Determine the type and duration of abstraction licence required. Submit the abstraction licence application form with an Environmental Appraisal Report / Environmental Statement the lists the potential environmental impacts of the abstraction. An annual subsistence charge is payable for abstraction licences. Exemptions apply to Navigation Authorities (at the time of writing, March 2016).
Impoundment Licence Applicable to restoration projects and other projects involving the installation of impoundment structures.	Environment Agency / Natural Resources Wales	<ul style="list-style-type: none"> Complete the EA 'Low risk impoundment checklist' to determine if an impoundment notice is required. Complete the EA 'Water Impoundment Preliminary Enquiry' form for pre-application advice. Submit the impoundment application form. No annual fee to pay.
Flood Defence Consent (Main rivers) / Land Drainage Consent (All other Ordinary watercourses) Required where works can affect the channel or bank of a watercourse e.g. piling, dredging, bridge construction, installation of scaffolding/coffer dams and other structures in the channel.	Local Planning Authority	<ul style="list-style-type: none"> Contact the authorities to discuss plans for works. Flood defence consent is regulated by the EA. Land Drainage consent is issues by the Local Flood Authority (county councils and unitary authorities). Complete the application form. The regulator will want to see full details of the work proposed at least two months before the intended start date. Fees apply per application (approx. £50). Flood Defence Consents take several months to obtain. There is an appeal process for consent refusal. Exemptions apply for Navigation Authorities.
	Environment Agency / Natural Resources Wales	
Discharge Permit For surface water discharge.	Environment Agency / Natural Resources Wales	<ul style="list-style-type: none"> Water discharge to surface water is likely to require a permit from the EA or NRW. Consult the regulator for advice on requirements and how to apply.
CRT permissions For activities that could affect the water quality of the Trust's network.	Canal & River Trust	<ul style="list-style-type: none"> All water abstraction (regardless of volume) from waterways under the control of the CRT must be registered with CRT and a licence to abstract obtained from CRT. Any water discharge to the CRT network must have consent from the Trust.

Licence / Consent / Permit / Exemption / Permission	Regulator / Stakeholder	Application process
<p>Listed Building Consent Required to alter, extend or demolish a listed building.</p>	Heritage England Local Planning Authority	<ul style="list-style-type: none"> • Check with the local authority Conservation Officer whether or not consent will be needed and get an outline of what changes to the structure would be acceptable. • Submit the application form for listed building consent to the local authority. • There is no fee.
<p>Planning Permission Required for some projects. Liaise with the Local Planning Authority (LPA) to determine if a planning application needs to be submitted.</p>	Local Planning Authority	<ul style="list-style-type: none"> • If planning permission is required start pulling together the application and continue to consult with the LPA to ensure the right information is submitted with the planning application. • Include all of the survey work completed up to this point.
<p>Environmental Impact Assessment Required for some projects. Liaise with the Local Planning Authority (LPA) to determine if EIA is required.</p>	Local Planning Authority	<ul style="list-style-type: none"> • Screening and Scoping to determine if EIA is required. • If EIA is required engage a consultancy to produce the Environmental Statement (ES). • Submit ES for determination. • Implement and monitor consent conditions.
<p>European Protected Species (EPS) Licensing Where activities are likely to make any deliberate or inadvertent, impact on one of the listed protected species of animal or plant (or their habitats) an EPS licence is required. The licence can only be given if there is no satisfactory alternative to the work; and if the action will not be detrimental to the overall conservation of the species.</p>	Natural England / NRW	<ul style="list-style-type: none"> • Submit the licence application form to Natural England. Include a Reasoned Statement of Application (RSA), which sets out the need for the development and confirms that there is 'no satisfactory alternative'; and a Method Statement to address conservation and mitigation measures. • EPS licences are free and take 30-days to be processed. • Most developments requiring an EPS licence will also be subject to planning consents. Natural England expect the planning position to be fully resolved, including all conditions relating to wildlife, before a licence application is submitted. • Specific licences are required for some species e.g. bats, but the application process is similar.
<p>Non-EPS Species Licensing You need a licence from Natural England if you plan to disturb or remove wildlife or damage habitats for non-EPS species including badgers, native crayfish and water voles.</p>	Natural England / NRW	<ul style="list-style-type: none"> • Register to use a class licence for activities that need specific skill or experience to avoid risk to the conservation or welfare of a protected species. • Notify Natural England in writing to apply. • Report on operations carried out under licence annually.
<p>Tree Felling Licencing A felling licence from the Forestry Commission is required to fell trees.</p>	Forestry Commission / NRW	<p>Check if the felling is exempt from a licence. If exempt, felling can proceed but it is best to check with the Forestry Commission first.</p> <p>Use the Land Information Search (LIS) to find out if there are any designations or other sensitivities that might need to be taken into account. Check with the local authority to see if any of the trees are covered by a Tree Preservation Order or are in a Conservation Area as this information is not available in the LIS.</p> <p>Complete an application form available on the Forestry Commissions website. Send with two signed and dated copies of a map showing the boundary of the proposals.</p> <p>If the licence is granted the applicant must comply with the conditions; usually to restock the area with trees; and maintain these trees for a period not exceeding ten years.</p> <p>No charge.</p>

Summary of Key Points

- With sufficient planning most environmental concerns can be managed without great expense or delay to the project.
- Early consultation with regulators and stakeholders, maintained throughout the project, is the most effective way of ensuring awareness of risks and opportunities to the project.
- Use competent, qualified consultants and specialists for advice and completion of surveys and reports.
- Apply for the necessary permits, licences, consent and permissions in good time to allow for pre-consultation with the regulator, stakeholder consultation periods, and determination by the regulator.
- Utilise environmental legislation to protect the project and the wider waterway e.g. by protecting the line through local plans, or by enhancing biodiversity on site and creating designated protected sites for wildlife and habitat.
- Share the work of coordinating environmental compliance measures within the project team without it becoming a burden. Consider attending training to build on knowledge and skills within the project team.
- Plan for ongoing maintenance and monitoring of the waterway once the project is complete and the waterway is in use.





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