

5 Landscape and heritage

5.1 Why consider landscape and heritage?

5.1.1 Landscape

Landscape is a broad term used to summarise the visual appearance of an area or a specific site. The formation of an area's landscape appearance depends on numerous factors ranging from topography and the underlying geology through to land use and human settlement (Figure 5.1).

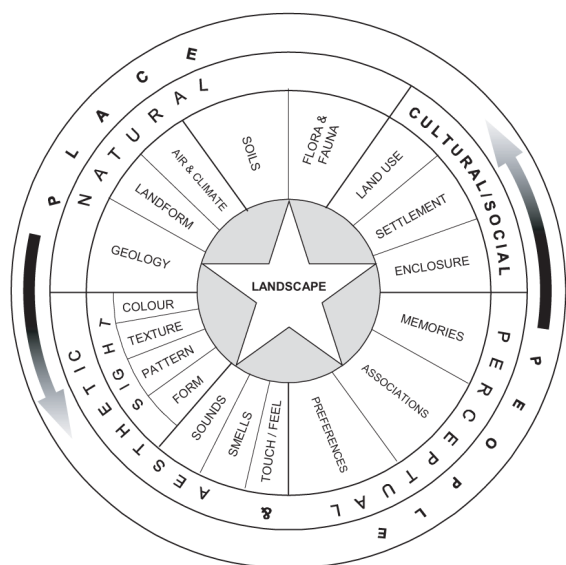


Figure 5.1 Factors affecting landscape appearance

The diagram illustrates the combined influences that all act to create landscape appearance.

Reproduced with permission from *Landscape character assessment: guidance for England and Scotland* (Countryside Agency and Scottish Natural Heritage, 2002).

Landscape appearance provokes subjective responses in people. One group of people might consider a rural scene to be a beautiful countryside idyll, whereas another group may view it as uninteresting agricultural scenery with nothing of visual interest to give it merit. People's subjective responses are also related to the proximity of the landscape to places that hold emotional attachments for them, namely their homes, places they visit for recreation and relaxation, or where they conduct business.

People have emotional attachments to landscapes and they are often opposed to any significant changes to the landscapes that they value.

In the context of most fluvial schemes – and particularly flood defence works – the general public may not feel capable of commenting on the engineering aspects of the scheme, but they do feel qualified to comment on the appearance of the project. The 'tip of the iceberg' principle should be remembered by the project team working on designing and constructing a flood defence asset. This principle is that all the best engineering practice below ground or within the asset cannot be seen and it is only the visible part that is perceived as the flood defence by the public. Figure 5.2 gives an example of the application of this principle.

Another matter that can fall into the broad field of 'landscape' is the opportunity for providing public art and interpretation in association with the scheme. Artwork, if it is designed well and is appropriate to its setting, can bring valuable character and enjoyment to a project. But to achieve a successful outcome, the procurement, design, delivery and integration of artwork into a wider engineering project needs to be carefully planned and the process should preferably involve local residents.

Further insight and guidance into landscape and environmental design for rivers can be gained from *National Environmental Assessment Service (NEAS) operational guidance. Volume 3: Landscape and environmental design guidance* (Environment Agency, 2007). **Box 5.1** summarises why it is vital to consider landscape in fluvial design.



Figure 5.2 The tip of the iceberg effect

The best engineering practice can be covered up and hidden by the external cladding to a flood defence structure.

It is this external appearance that people live with and feel able to comment upon. Attention must be given to the completed external appearance of the proposed development – in this case a floodwall – to ensure that it is appropriate for its immediate setting. In this wall, various cladding materials have been used and the adjacent hard landscaping has been enhanced to create an improved riverside walkway.

Frankwell flood alleviation scheme, Shrewsbury

Box 5.1 Why landscape must be considered in fluvial design

- People assign emotional value to landscapes and will comment strongly about, and indeed object to, the appearance of river and flood alleviation works that they do not like.
- The strength of people's feelings depends on the proximity of the landscape to them and how they use or view an area.
- The value of a landscape needs to be understood before the impacts upon it can be assessed.
- Landscape appearance should be retained where it is perceived to be of high quality.
- Negative impacts on landscape appearance should be mitigated as part of flood defence works.
- Where it is perceived to be of moderate or low quality, landscape appearance can be improved by enhancement works.
- Local planning authorities protect landscape appearance and require detailed information on the future appearance of works they are asked to approve.
- Landscape mitigation and enhancement works can add significant costs to a project. They need to be justified and be appropriate to the setting of the works.
- Landscape works need to be estimated and planned for appropriately, just like any other part of a fluvial project.

5.1.2 Heritage

Heritage is a collective term used for a number of specific subject areas, including:

- archaeology;
- individual historical buildings and structures;
- historic townscape areas;
- historic land-use patterns;
- cultural heritage and events;
- industrial heritage and development;

- designed parklands and gardens;
- veteran trees and ancient hedgerows;
- battlefields and war memorials.

All these heritage areas are subject to different designations and consenting regimes. One thing they do have in common is that the elements are part of our national heritage and cannot be replaced.

A system of protection, research and interpretation is promoted in the UK with different national agencies responsible across the home nations. These include:

- local planning authorities;
- county archaeological services;
- English Heritage;
- Cadw in Wales;
- Historic Scotland;
- Environmental Heritage Service in Northern Ireland.

These agencies supply guidance for identifying heritage assets in an area and consenting works regarding:

- listed buildings and structures;
- conservation areas;
- scheduled ancient monuments;
- archaeologically important areas;
- registered parks and gardens;
- designated historic landscapes;
- ancient hedgerows and tree preservation orders;
- historic battlefields.

The process for consent applications varies between authorities. It is recommended that experienced practitioners are used to give advice and, if required, to make applications for works affecting such heritage features.

Further reference can be found in *Guidance for project managers within NCPMS and NEAS. Volume 4: Archaeology and the Environment Agency* (Environment Agency, 2006). **Box 5.2** summarises why it is vital to consider heritage in fluvial design.

Box 5.2 Why heritage must be considered in fluvial design

- To protect known and unknown national assets that cannot be replaced.
- To record and preserve historic features for future generations.
- To interpret heritage features, encouraging a better understanding of an area's past use and development.
- Works may not be given development consent if there is an unacceptable heritage impact.
- Exploratory works – especially intrusive archaeological investigation ('digs') and evaluation – can add programme delays and considerable cost to a project, so this need must be identified early.
- There is considerable risk that unknown heritage features are discovered during construction, adding significant time and cost to a project as they are investigated, the impacts upon them are assessed and, where necessary, mitigated.

5.2 When to consider landscape and heritage issues

The process of delivering a river scheme such as a flood defence or weir maintenance works has been split into five stages. Table 5.1 gives summaries of typical landscape and heritage matters at each stage and the level of detail required. These lists are not exhaustive and careful review is required to reflect the characteristics of individual sites.

Table 5.1 Landscape and heritage issues to consider at different stages of a river scheme

| Development stage | Landscape issues | Heritage issues |
|---------------------------------|---|--|
| Inception | <ul style="list-style-type: none"> ▪ Identifying major landscape designations such as national parks and areas of outstanding natural beauty. ▪ Reporting on their potential implications. | <ul style="list-style-type: none"> ▪ Identifying heritage designations such as scheduled or listed status or presence of conservation areas that require further investigation or may necessitate additional mitigation work. |
| Assessment and approvals | <ul style="list-style-type: none"> ▪ Landscape character assessment and landscape visual impact assessment to inform the assessment of options and to feed into EIA procedures. ▪ Outline design proposals sufficient to allow negotiation with, and applications to, consenting authorities. | <ul style="list-style-type: none"> ▪ Desktop research of known heritage material leading to a site assessment. ▪ Non-intrusive investigation surveys, considering unknown assets that, in turn, may later lead to pre-contract intrusive investigation works. ▪ Heritage impact assessment of varying options and gaining heritage consents. |
| Detailed design | <ul style="list-style-type: none"> ▪ Landscape proposals for mitigation and enhancement works. ▪ Such works can include hard materials like wall cladding and paving works. ▪ Soft works include tree and shrub planting, garden and land reinstatement, seeding and habitat creation. | <ul style="list-style-type: none"> ▪ Detailing mitigation works. ▪ Approving other people's designs to minimise negative impacts on heritage assets. ▪ Ensuring conditions placed on any heritage approvals are adhered to. ▪ Evaluation of historical assets is best undertaken in advance of the main works so as not to hold up the construction project. |
| Construction | <ul style="list-style-type: none"> ▪ Site inspection and monitoring of construction impacts on trees and other protected landscape features. ▪ Ensure that the landscape impact of any site changes can be assessed and mitigated if required. | <ul style="list-style-type: none"> ▪ Site inspection and monitoring of construction impacts on heritage features. ▪ Monitoring of the construction activities to ensure that the discoveries of unknown historical assets – usually archaeological in nature – are assessed and recorded. This is usually called a 'watching brief'. |

| | | |
|--|---|--|
| <p>Maintenance, management and interpretation</p> | <ul style="list-style-type: none"> ▪ On completion of the main engineering works, a maintenance period is required for landscape planting works. This gives the best chance of successful establishment. ▪ Management is the process by which the design intent of the landscape works is delivered. ▪ Maintenance activities are the activities that are undertaken to achieve the management objectives. | <ul style="list-style-type: none"> ▪ Interpretation of the historical artefacts and research is required. ▪ Such reports are logged with county archaeologists and sometimes with the National Archive Service. This allows future analysis of findings for a geographical area and desktop assessment of future schemes. ▪ If assets of interest are found, they can be interpreted for the benefit of local people. |
|--|---|--|

5.3 How to consider landscape and heritage issues

Appointing landscape and heritage professionals reduces the risk of delays and unforeseen construction costs.

Landscape architects are chartered professionals trained to consider landscape and visual matters. The website of their professional body, the Landscape Institute (<http://www.landscapeinstitute.org>) offers free guidance as to the appointment of landscape architects and the work stages they are expected to adopt.

Heritage consultants normally specialise in particular areas. Depending on the heritage nature of a project, a number of professionals may therefore be needed to provide support. A good starting point is to consult the heritage officer of a local authority to learn about the known and potential heritage interest at a site. The appointment of relevant heritage experts can then be made to cover such matters as archaeology, industrial heritage, landscape heritage and heritage architecture. A number of organisations exist to promote the activities of heritage professionals and include:

- Council for British Archaeology (<http://www.britarch.ac.uk>);
- The Society for the Protection of Ancient Buildings (<http://www.spab.org.uk>);
- Garden History Society (<http://www.gardenhistorysociety.org>) – historic gardens and parklands;
- The Battlefields Trust (<http://www.battlefieldstrust.com>) – information and advice regarding historic battlefields in Britain.

When appointed, landscape architects and heritage professionals should have a clear written brief to allow both them and the client to understand what is expected from the commission. They need to provide inputs to all the stages of a typical fluvial project as defined in Table 5.1. Key decisions taken at the start of a project, before landscape and heritage professional involvement, may reduce the end quality of the scheme. Such poorly informed decisions can also lead to costly redesign work as landscape and heritage challenges are encountered further into the project programme.

5.3.1 Legal and statutory framework

There is an important distinction between statutory and voluntary requirements when considering landscape and heritage issues. The prime statutory requirements arise from planning conditions or consents to work in sensitive environments such as conservation areas or Sites of Special Scientific Interest (SSSIs).

Local planning authorities – typically local authorities but on occasion national park authorities – stipulate their landscape and heritage requirements within their Local Development Framework (LDF). The LDF is the replacement of the local plan and sets down the planning policies and designations that apply within the authority's boundary. In addition there may be either adopted or unadopted supplementary planning guidance. This could include conservation area management plans, townscape design guides, or specifications for the investigation and protection of heritage assets.

Covenants may be in place on certain areas such as common land, village greens and playing fields. These should always be investigated to see if they exist on a site and, if they do, what they allow or restrict.

Voluntary requirements are sometimes entered into where the developer of a scheme agrees to carry out additional environmental works as part of their project. For fluvial works these could assist in the delivery of enhancement works, such as better access along and onto a watercourse, habitat creation, or general environmental improvements to benefit the public use of an area. They may not necessarily assist in the operational performance of the main river works, but can add greatly to the public perception of quality and satisfaction with a scheme. Such enhancements require funding from either the project budget or from other sources, such as external partnerships. Either way, legal agreements regarding the payments of money and future adoption of the enhancement works should be carefully drafted and entered into before committing to spend budget on such elements.

Buildings, like buried archaeological sites, are often protected via statutory designations. Structures are assessed and either protected as scheduled ancient monuments, designated as Grade I, Grade II* or Grade II listed buildings, recorded on the local sites and monuments record, or described on a local list maintained by a planning authority. But even though a building has not been designated or recorded in this way, it may still be important and worthy of protection.

In England and Wales, the Environment Agency has a legal duty to enhance the environment and recreation within it. The Rivers Agency in Northern Ireland state in their vision the need to manage flood risk in the province to facilitate the social, economic and environmental development of Northern Ireland. Finally the Scottish Environmental Protection Agency (SEPA) monitor and report on the condition of Scotland's environment and consider that their primary role is to protect and improve the environment.

5.4 Common landscape techniques explained

This section explains frequently used landscape techniques and reporting methods experienced in fluvial design work.

5.4.1 Landscape character assessment (LCA)

This report-based document is used to analyse a landscape and to understand the characteristics that combine to create its overall character. LCAs operate at a range of scales from county size down to individual sites or stretches of river. They are produced to a recognised methodology as detailed in *Landscape character assessment: guidance for England and Scotland* (Countryside Agency and Scottish Natural Heritage, 2002).

The LCA informs the project team:

- what is valuable in landscape terms;
- what should be retained and ideally enhanced;
- what drivers for visual change exist within the landscape;
- its particular vulnerability to different types of development.

5.4.2 Landscape and visual impact assessment (LVIA)

This report-based document typically leads on from an LCA and considers the particular visual impacts of a specific proposal. The LCA defines what is important and why it is important in a landscape, whereas the LVIA considers change to the landscape character resulting from planned development and the visual impact for people who will be able to see the proposed scheme.

These reports contain numerous existing photographs showing the landscape characteristics and important views and scenes in order to explain how people currently experience the area. They are also likely to contain modified photographic images showing the visual impacts of the proposals, a judgement as to whether the visual impacts are positive or negative and, if significant, the magnitude of the impact. The reporting of visual impact closely mirrors that of the environmental impact assessments that they are used to inform. Guidance and the methodology for LVIA are presented in the second edition of *Guidelines for landscape and visual impact assessment* (Landscape Institute and IEMA, 2002).

5.4.3 Visualisations, photo-sketches and photomontage

These drawings and images are used to illustrate what a proposal will look like. The actual terms are sometimes used inaccurately, so they are defined below.

- **Visualisation** (Figure 5.3) – a hand-drawn image of what a development will look like using the graphic and interpretive skills of an artist to illustrate the appearance of proposals.
- **Photo-sketches** (Figure 5.4) – manipulating an existing photograph to include a representation of the proposals using the existing photograph as a background. The proposed parts of the photo-sketch are ‘eyed-in’ by a technician or draughtsperson to the best of their efforts. These images should be viewed only as sketches.
- **Photomontage** (Figure 5.5) – this is the construction of a three-dimensional (3-D) computer model of the proposals and surrounding landform onto which photographs of the existing view are digitally ‘draped’.

Photomontage is the most accurate of the three, but is a costly method of creating views of a proposal –although once a computer model is constructed and images overlain, the generation of photomontage images from a number of locations becomes more cost-effective. Photomontages can also be used to generate ‘fly-throughs’ of proposals.



Figure 5.3 Visualisation

Hand-drawn to represent the appearance of proposals using the skills of the artist to portray matters accurately. This visualisation depicts a proposed riverside floodwall in a sensitive urban setting, as part of the Frankwell flood alleviation scheme, Shrewsbury.



Figure 5.4 Photo-sketches

Combination of hand-drawn or computer-drawn proposals presented on the background of an existing photograph to give a photo-realistic image of proposals. This photo-sketch illustrates proposed timber cladding on a floodwall around a playing field, as part of proposals for the Nottingham left bank flood alleviation scheme.



Figure 5.5 Photomontage

This is the most accurate way of presenting what a new proposal will look like. A 3-D computer model of the proposal and surrounding landform has the image of the existing view 'draped' over it to create the photomontage.

This photomontage shows the change in landscape scene when a new flow control structure is proposed. To allow the viewer to understand the change, it is common practice to present 'before' and 'after' images together.



[Banbury flood alleviation scheme](#)

5.4.4 Environment Agency standard suite of landscape drawings

The Environment Agency has identified a set of landscape drawings with the objective of ensuring that landscape and other environmental considerations are considered and summarised throughout the evolution of a fluvial project. Listed in order of production these are:

- **Environmental site appraisal plan** – survey and evaluation of site features and conditions to identify opportunities and constraints;
- **Options plan** – preparation of scheme options in outline form, giving details of operational improvements and landscape enhancements;
- **Indicative landscape plan** – preliminary environmental constraints and opportunities relating to the development of a preferred option;
- **Final landscape masterplan** – illustration of the preferred option after detailed site planning and design options;
- **Landscape management and maintenance plan**;
- **Works information** – detailed design drawings, bills of quantities, specifications and any specific landscaping conditions of contract.

Further guidance on these drawings is given in *Landscape and environmental design guidance* (Environment Agency, 2007).

5.4.5 Management and maintenance plans

Money is often wasted implementing landscape works that ‘fail’ because there has been inadequate investment of time or money in setting up future management and maintenance works.

The most important time for planting schemes (sometimes referred to as ‘softworks’) is in the first two years after planting. This is the establishment period when plants are at their most vulnerable to drought and competition from weeds, grazing damage by rabbits and deer, accidental damage and vandalism.

The ideal solution is to have a written plan in place that sets down:

- the proposed management objectives for the landscape;
- the maintenance activities necessary to achieve the objectives;
- supporting plans to locate the different areas of works.

Landscape management and maintenance plans are best included in packs of ‘as-built’ drawings and in completed health and safety files – for projects notifiable under the Construction (Design and Management) Regulations 2007 (CDM Regulations) – for future site managers.

Hard landscape requires maintenance works as well. These may be as simple as sweeping paths or painting railings or more specialist such as adopting and maintaining lighting equipment but, like the softworks, they need to be carefully planned for. If it is proposed to seek local authority adoption of hardworks, they should be designed to the local authority’s adoptable standards (readily provided to developers). Be aware that local authorities may wish to inspect works they are due to adopt during their construction and request a payment for their future maintenance. Highway adoption has a well-defined process that must be followed in accordance with the requirement of the local highway authority.

There are cost implications and public and staff liabilities associated with managing landscape works. These must be recognised and planned for.

Establishment maintenance and long-term management and maintenance need to be defined and allocated to an agreed organisation. This can be the riparian owners, the project’s developers or other third parties such as local authorities or wildlife trusts. If landscape is to succeed and add quality to a scheme it must be adopted by an organisation with adequate resources to conduct regular work, rather than leaving it to fend for itself.

5.5 Examples of successful landscape works

Figures 5.6 to 5.13 give examples of successful landscape measures associated with fluvial construction projects.



Figure 5.6 Localised floodwall in a sensitive, rural village setting

This reinforced concrete floodwall has a different cladding treatment on its wet and dry sides. The dry side (upper image) is visually prominent within the village and has been clad in local walling stone, with a recessed mortar joint to mimic the appearance of a dry-stone wall. The wet side has full mortar joints to prevent sediment build-up and plant colonisation becoming a maintenance problem.



[Black Brook flood alleviation scheme, Chapel-en-le-Frith, Derbyshire](#)



Figure 5.7 Localised floodwall in a sensitive, urban setting

Taking its lead from the building materials in the nearby conservation area, this wall relies on stone, brick colour and brick detailing to satisfy the requirements of local planning and conservation officers.

The wall has not been taken up to the full flood defence level to avoid adverse impact on views of the river. Instead the piers at regular intervals provide support for demountable defences (see Chapter 9), which are installed only in times of flood. The stainless steel handrail is a safety measure.

[Hereford flood alleviation scheme](#)

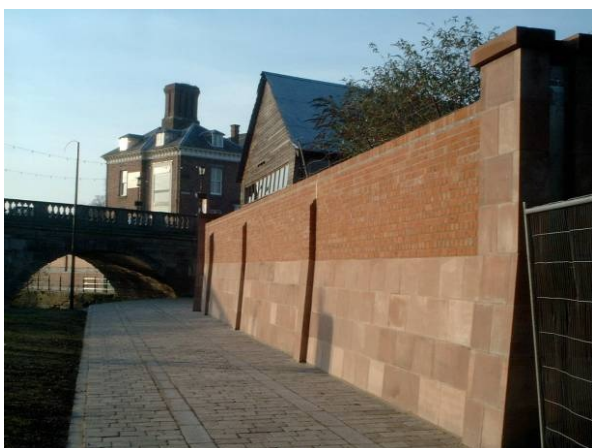


Figure 5.8 Town centre floodwall

In this case, the larger block size in the stone cladding reflects the scale of the wall, with two cladding materials being used to break up the vertical scale of the wall.

The choice of stone and brick type and their bond patterns reflect local building materials. The false piers have been added to divide the horizontal expanse of the wall into more visually pleasing segments.

[Frankwell flood alleviation scheme, Shrewsbury](#)



Figure 5.9 Earth embankment

Earth embankments are typically grass-seeded and left free of shrub and tree planting to avoid compromising their flood-proof core by roots or burrowing animals. This makes their actual form a critical landscape consideration.

Here a rounded embankment has been formed with side slopes of approximately 1 in 6. This requires more material to construct than a typical 1 in 3 trapezoidal embankment and increases the embankment footprint, leading to additional land take and costs. For the sake of visual amenity and minimising landscape impact, more expensive embankment forms are sometimes necessary, as in this example forming part of the Hereford flood alleviation scheme.



Figure 5.10 Weirs and sluices

Weirs attract people, as they are a dynamic and interesting element on a river. A balance has to be struck between public safety and access.

Weir work frequently combines heritage and landscape issues, as many weirs are associated with industrial heritage sites. In addition fish migration issues, maintenance access and recreational use for kayaking can all influence works at a weir.

All these elements need to be considered and brought together as a cohesive whole. A successful scheme, such as this weir at Darley Abbeys Mills, Nottingham, will appear to be designed as one entity rather than as a number of disparate elements.

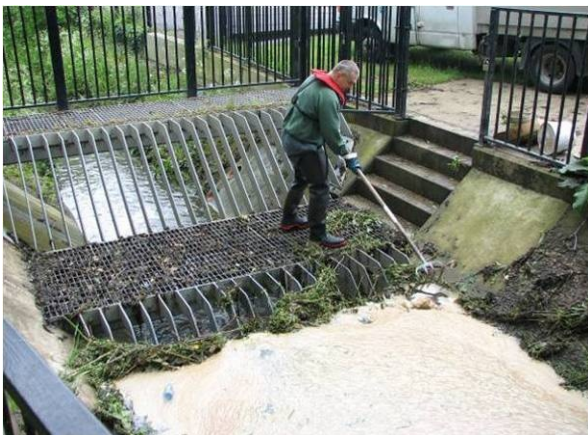


Figure 5.11 Trash screens

Trash screens and other functional elements of a river are designed to operate successfully in extreme conditions. They are there to reduce the risk of flooding and need to be accessed and operated safely.

There is little opportunity to turn them into areas of beauty, but sensitive choice of location and the use of screening can reduce their visual presence. Ancillary features such as railings, control buildings and the like can be improved, as in this example in Salford, where railings have been painted black and a square bar section specified.



Figure 5.12 Locks, canals and navigations

These features are frequently high in heritage value and have conflicting requirements placed upon them.

They must allow safe public access, facilitate boat navigation, accommodate lock mechanisms, mooring facilities and boat servicing, while also take account of water supply considerations.

Close consultation with British Waterways (or the applicable navigation authority) is recommended to gain its advice and consent to any works.

[Dutton locks, Weaver Navigation, Cheshire](#)



Figure 5.13 Artwork

The provision of artwork associated with a fluvial project can fall within the remit of a landscape architect. The works can at times be difficult to procure in terms of their interface with major construction on site.

Artwork in the public realm must be robust, not compromise public or operational safety, and must be appealing to the wider public.

The commissioning of an artist, public approval of their proposals, procurement and installation of the artwork must all be considered in the wider project programme and allocated an adequate budget.

[This panel mosaic was incorporated into the Hereford flood alleviation scheme.](#)

5.6 Common heritage techniques explained

This section explains important heritage techniques and reporting procedures that may be encountered in the design and construction of a fluvial scheme.

5.6.1 Desk study

This is a frequently used term for many professions. The UK has extensive historical map records and archives of land use dating back centuries. These resources should form the basis of research combined with reference to national and regional resources such as the county archive and the sites and monuments record (SMR).

A desk study can quickly and cheaply define the known heritage value of a site and the likelihood of unknown assets being found.

5.6.2 Rapid field surveys and geophysical investigation

Most commonly used to assess the likelihood of archaeological assets being found, these techniques are non-intrusive as they do not disturb the ground. An experienced archaeologist armed with good desk study maps can walk over an undeveloped area and recognise changes in ground conditions and levels that the untrained eye would not appreciate. A geophysical survey takes this technique one stage further by using ground-penetrating radar to assess the difference in magnetic fields between previously disturbed and undisturbed ground profiles (see Figure 5.14). Both these techniques are relatively cheap compared with exploratory digs and can guide more expensive excavation works to the most important areas.



Figure 5.14 Geophysical survey

This geophysical plot shows the presence of a British-Romano settlement that was investigated as part of the Banbury flood alleviation scheme. This area was then discounted as an area for potential excavation to win earth material for a proposed floodbank on the grounds of the added cost for investigating and recording the archaeological features.

The four white areas in the centre of the survey are WW2 anti-aircraft gun emplacements that are also of high heritage value. This illustrates the need to consider more recent heritage as well as older artefacts.

5.6.3 Evaluation survey

Where unknown archaeological assets are suspected, a small limited archaeological dig can be undertaken to ascertain if there is an asset worthy of full investigation. These evaluation digs save the wasted cost of exploration of a whole site that turns out to have little or no heritage value. Typically 5% of an area of likely archaeological significance is evaluated.

5.6.4 Record or exploration survey

Where there is a need to understand and record the value of a heritage feature, a full exploration survey is required. Such a survey records the character of the asset for future study, sets constraints for construction in its vicinity, or allows for unavoidable damage or wholesale destruction to take place in the knowledge that a full record has been made of the feature.

5.6.5 Watching brief

Where archaeological assets are suspected but have not warranted a full record survey, a watching brief can be put in place. This is when an archaeologist observes the opening of the ground and

excavation through parts of the soil profile they suspect might contain archaeological assets. The archaeologist will halt works to investigate any features of note to assess if the area requires further investigation. There is a higher risk of delays to a main construction programme and resulting cost implications if finds are made during the construction period.

5.6.6 Archival report

Such a report should be written after the completion of every piece of heritage survey that captures knowledge about the site. Such reports are forwarded to regional and national archives to allow future interrogation by other heritage professionals as they compile studies in the area or on specific topics.

5.6.7 Managing archaeological issues on a project

The Environment Agency's National Environmental Assessment Service (NEAS) has developed a specific approach aimed at separating archaeological risk from the construction phase of projects, including the consideration of archaeology in most geotechnical investigations.

This approach presumes a preference, in many cases, for pre-construction evaluation and excavation, rather than a watching brief. Watching briefs are increasingly viewed as a high-risk strategy to managing archaeological issues, moving the potential discovery of unknown sites into the construction phase of projects.

On larger schemes, the Environment Agency typically follows this list of activities with regard to managing archaeological risk:

- discussion with an experienced archaeologist about the project;
- desk-based assessment;
- archaeological assessment during geotechnical investigation;
- geophysical survey;
- design input to avoid known sites in the design phase of any works;
- archaeological evaluation to assess survival on the ground (or under it);
- further design input during the construction planning stage – to avoid locating borrow pits, haul routes, site compounds and other temporary works on sites of known archaeological interest;
- archaeological excavation of sites at risk (if necessary);
- defined observation (watching brief) of unexcavated areas that carry some archaeological interest, during the construction phase;
- public engagement by showing people what has been found and deduced;
- publication to county and national archives.

5.6.8 Secondary issues associated with heritage matters

Figures 5.15 to 5.20 demonstrate a range of issues that may not at first be considered, but which can influence the preparation of construction proposals.

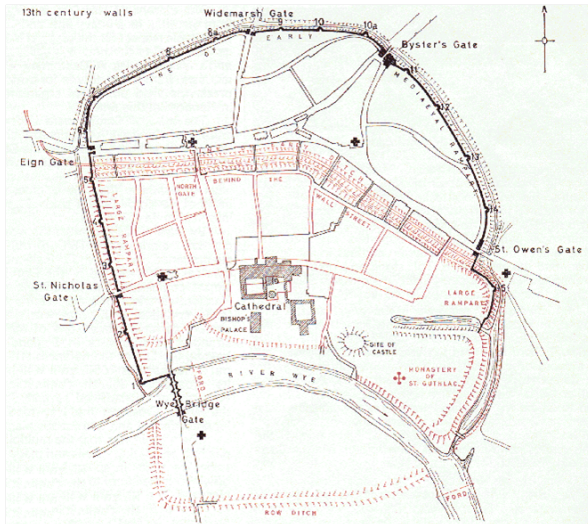


Figure 5.15 Value of desk-top research

Interrogation of historical data and early editions of OS maps by an experienced practitioner will identify potential areas of archaeological interest. They can also identify other information that could influence construction such as spring points, rubbish tips, made ground and changes in the course of a river. This particular historical map allowed the identification of civil war defences at Hereford, that were subsequently investigated by excavation

This illustration and the photographs below were provided by Ed Wilson, archaeologist and NEAS officer, Environment Agency.



Figure 5.16 Setting of historical features

Additional value and interest is placed on the setting of historical features such as bridges, weirs, docks and riverside heritage buildings. Whether they are designated heritage features or not, local planning authorities and statutory consultees pay particularly close attention to works in the vicinity of heritage features because there is an increased chance of disturbing assets or reducing the visual appeal of the feature itself, reducing the quality of the surrounding setting.

Listed bridge in Hereford



Figure 5.17 Major construction activity

Archaeology is at times a major construction activity and it has to be managed as such. It is subject to CDM Regulations, as is any other construction activity, and its risks need to be assessed properly. This photograph shows the different levels of archaeological exploration required to investigate civil war defence structures, as part of advance works for the Hereford flood alleviation scheme. Enough time and budget must be made available in construction programmes to conduct the required works, ideally in advance of main construction contracts.



Figure 5.18 Environmental impacts

Archaeological excavation can lead to adverse environmental impacts, including the severing of tree roots as illustrated in this photograph of advance archaeological works undertaken as part of the Hereford flood alleviation scheme.

A balance has to be struck between the need to understand a site's heritage assets and compromising its visual amenity by potentially killing trees.

The potential environmental impacts of archaeological works may need to be assessed in advance by environmental impact assessment methods.



Figure 5.19 Contaminated ground

Archaeological works often encounter historical rubbish tips and waste areas.

The photograph illustrates excavation of a medieval rubbish pit in Hereford. Whether contamination is historic or contemporary is of limited importance when it needs to be contained and remediated.

Working in proximity to churchyards may also yield human remains that need to be reported to the police and the local coroner.



Figure 5.20 Public safety

Archaeological sites are features of interest to members of the public, particularly if the excavation is in advance of the main works or in a busy public area. This interest must be anticipated, with the control of public access and public safety being of paramount importance, to avoid injuries occurring.

This photograph shows 2m high temporary fencing, with warning signs and ground protection mats, for archaeological works associated with the Hereford flood alleviation scheme.

5.7 Who to consult on landscape and heritage matters

Table 5.2 lists five groups of consultees and advisors. These are further sub-divided, because speaking with one part of a large organisation does not guarantee receiving the most appropriate information or approval of proposals. The right-hand column lists the information sources that these organisations are likely to hold and which can be useful in the fluvial design process.

Table 5.2 People and groups to be consulted

| Key officer or group | Potential information/expertise |
|--|--|
| 1 Environment Agency, local authorities in Scotland and the Rivers Agency in Northern Ireland | |
| Landscape architects, archaeologists, development control officers, operations managers, fishery managers, recreation officers and biodiversity officer | <ul style="list-style-type: none"> ▪ Environment Agency's <i>Landscape and environmental design guidelines</i> ▪ River corridor survey ▪ Habitat surveys ▪ Operational programmes ▪ Fishing and other recreational use of the river |
| 2 Local planning authorities (including county councils where existing) | |
| Development control officer, landscape architect, archaeologist, conservation officer, arboricultural officer, ecological officer, rights of way officer, access officer, health and sports development officers, highway officers and environmental health staff | <ul style="list-style-type: none"> ▪ Local plan or equivalent information ▪ Supplementary planning guidance (usually referred to as SPGs) ▪ Conservation area management plan ▪ Tree Preservation Order schedule ▪ Definitive plan of public rights of way ▪ Urban design guides ▪ Heritage assets database (SMR) ▪ Environmental baseline data ▪ Traffic requirements ▪ Environmental restrictions to the type of work undertaken |
| 3 Statutory organisations including the Environment Agency, Rivers Agency, Cadw, English Heritage, Natural England, Countryside Council for Wales, Scottish Environment Protection Agency, Scottish Natural Heritage and statutory undertakers including ports and harbour authorities | |
| Landscape officers, archaeologists, heritage experts, biodiversity officers, education officers, managers of specific sites, plant managers of statutory undertakers | <ul style="list-style-type: none"> ▪ Access to policy documents ▪ Experienced advice ▪ Pre-negotiation on applications that may affect designated landscapes, historic buildings or archaeological assets |
| 4 Specialist interest groups that typically promote a single issue | |
| These groups include Commission for the Built Environment (CABE), RSPB, Civic Trusts, Fieldfare Trust (better access to outdoor areas for mobility-affected people), River Restoration Group, County Wildlife Trusts and river trusts, Campaign to Protect Rural England, Campaign for the Protection of Rural Wales and Association for the Protection of Rural Scotland. Parish, town councils and community councils in Wales are added to this list, as they promote the varied interests of a particular, geographically defined place. | Specific information on their specialist subject. Larger organisations such as the RSPB, CABE and the Fieldfare Trust publish valuable guidebooks to the creation of specific habitats or better access arrangements. These organisations are valuable consultees that contain interested and informed individuals. |
| 5 The general public within the local community potentially affected by the river works | |
| Affected residents and landowners, local people, community leaders, schools and recreational users of a potential site | Allows works to be described accurately, their impacts discussed and likely timescales to be explained. If such consultation is not undertaken, ignorance of the work can lead to misunderstandings and initial perceptions that are difficult to change. |

5.8 A few do's and don'ts

Boxes 5.3 and 5.4 illustrate examples of good practice and the pitfalls to be avoided.

Box 5.3 Good practice

- Appoint landscape architects and heritage specialists at inception stage, to ensure proper project screening and obtain their help in preparing the landscape/environment and heritage brief.
- At project appraisal stage, identify sufficient budget for all necessary landscape and heritage specialist work, not forgetting future management and maintenance of landscape schemes or heritage assets.
- Encourage landscape and heritage specialist involvement in the consent process to ensure an appropriate level of support is brought to the project.
- Ensure that visual and heritage impacts of the temporary works are considered and not just the impacts of the permanent scheme.
- Any environmental or heritage constraints that you wish to place on a project should be included in the contract documents to allow contractors to plan and price for the restrictions.
- Indicate environmental and heritage constraints on a plan to show the restrictions on-site to workers, consenting authorities and other interested parties.
- Consult with consenting authorities and stakeholders as early as reasonably possible to assess their opinion on the impacts of the proposals on landscape and heritage matters.
- Make the time to consult the receiving community about the visual and land-use impacts of proposals as they develop.
- Go back to communities and interested parties to tell them about what has been found through the heritage research or archaeological digs.
- Remember the 'tip of the iceberg' effect, where people only see the visible part of any river works and judge its impact on what they can see and understand. The importance of good design for these parts of any fluvial proposals should not be under-estimated.

Box 5.4 Poor practice and pitfalls

- Appointing landscape and heritage specialists too late so that the value of their input and opinion is reduced.
- Disregarding planning or other consent conditions placed on a scheme, or failing to consider them early enough in the design process (so that they can be discharged as quickly and cheaply as possible).
- Forgetting to include the cost of appropriate landscape and heritage mitigation measures within the economic analyses for the scheme.
- Not allowing for landscape maintenance within the long-term cost planning of a scheme.
- Leaving the formal adoption of landscape areas until late in the project programme.
- Planting trees and shrubs out of planting season (November–March) – this increases the cost of the planting and the likelihood of plant failure.
- Forgetting to allow access to the landscape works for establishment and future maintenance.
- Leaving archaeological investigation until the construction phase of a project – any need for further archaeological investigation will have costly impacts on the main construction works.

Key reference

Environment Agency (2007). *National Environmental Assessment Service (NEAS) operational guidance. Volume 3: Landscape and environmental design guidance*. Environment Agency.

This guidance document aims to encourage the consistent adoption of good environmental design by defining the standards and methods of implementation expected on Environment Agency capital projects. It sets down a series of environmental design principles from the inception of a project through its construction and ongoing operation and maintenance. It is targeted towards landscape architects and other design professionals working on behalf of the Environment Agency, but its contents can be applied to most fluvial projects.

Other references

Countryside Agency and Scottish Natural Heritage (2002). *Landscape character assessment. guidance for England and Scotland*, 2nd edition. The Countryside Agency and Scottish Natural Heritage. Available from: http://www.naturalengland.org.uk/Images/lcaguidance_tcm6-7460.pdf. [Landscape character datasets are available from: <http://www.magic.gov.uk>.]

Landscape Institute and Institute of Environmental Management and Assessment (2002). *Guidelines for landscape and visual impact assessment*, 2nd edition. Spon Press.

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