



Historic England

Call for Proposals for: aerial investigation and mapping to enhance local authority Historic Environment Records and address research agendas.

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# Summary

Historic England seeks proposals for archaeological surveys using aerial photographs and lidar as a main source. This call is for projects to start this financial year (before end March 2020) at a cost of £40,000 or less. A maximum of two proposals is sought from each organisation. These must not duplicate previous proposals. Funding of projects will depend on Historic England grant capacity.

The projects must use Historic England standards for aerial investigation and mapping projects but should also consider multi-disciplinary approaches. Projects will be chosen that make best use of resources to ensure that England's vulnerable historic environment is safeguarded in the most cost-effective way at a time of social, environmental, economic and technological change.

There is much that we do not know about England's historic environment. Important archaeological sites and landscapes remain hidden or are poorly understood. We need to identify and better understand this archaeological resource in order to protect it effectively. Mapping and recording from aerial photographs and lidar are proven techniques for identifying and analysing archaeological sites and landscapes, particularly over large areas. This information is most effective when available through historic environment records where it can directly influence planning decisions and inform further work. Proposals must be for areas with a high potential for archaeological discovery from aerial sources and where this information will have the greatest impact in terms of improved understanding and heritage protection.

Proposals must demonstrate how they will contribute to the strategic activities of Historic England as set out in the Corporate Plan. Historic England has adopted a public value framework (PVF) to provide assurance to its stakeholders, including the taxpaying public, that it invests public money in ways that optimise value. Therefore proposals should make a convincing case that the project will make a real and positive impact on England's heritage. It should address the following questions:

- How will the project represent a good return on investment?
- Why do we need the project now, what are the consequences if it doesn't happen?
- How does the project address other strategies such as local research frameworks or local government plans?

# Background

Historic England, and its predecessors, developed aerial investigation and mapping standards (formerly called the National Mapping Programme (NMP)) to ensure effective use of aerial photographs and lidar to identify, map, record and better understand archaeological sites and landscapes. Area based projects, covering 100 square kilometres or more, can efficiently process large volumes of archive material to collate archaeological information into a geographical information system (GIS) for use in a historic environment record. This provides data for use in strategic decision making and research. Analysis and synthesis of this archaeological information, usually in a report, communicates better understanding of the character and significance of landscapes.

Just over half of England has been covered by Historic England (and predecessor) aerial investigation and mapping surveys and these have had a significant impact on the historic environment record. Over 120,000 archaeological sites have been discovered and each year thousands more are added to the record as a result of NMP projects.

New projects will examine areas where aerial investigation and mapping is most needed and where this technique will be most effective. For example, there is increased pressure on land in England due to the need for more housing, amenities, major infrastructure and as a result of potential changes to agricultural practices because of the decision to leave the European Union. We therefore need to have an informed and robust understanding of the historic environment to ensure that we do not lose or compromise our heritage. Projects must be in areas with a high potential for archaeological discovery and improved understanding from aerial photographs and lidar.

## Aims

The main aim of the Call for Proposals is to ensure we target resources in areas where our surveys will have the greatest impact on heritage management.

The Call will enable Historic England to target resources where there is greatest archaeological potential for surveys using aerial photographs and lidar as the main sources.

The main aim of the resulting projects will be to improve planning decisions at local, regional and national levels by providing significant amounts of new and improved information for local historic environment records.

Projects should address significant physical or thematic gaps in archaeological knowledge identified in regional research frameworks or other published material.

Projects should aim to cover areas not already subject to Historic England aerial investigation and mapping surveys. However, areas already covered by older (pre-digital) projects will be considered if there is a strong business case and a new project will add significantly to the knowledge of the area. See appendix 1 for map of previous and current project areas.

Projects will identify and describe local, regional and nationally significant archaeological sites or landscapes to enable appropriate levels of protection.

Project results will champion our 'hidden heritage' by making information available on previously unrecognised or poorly recorded archaeological sites and landscapes.

Project results will champion the use of archives by demonstrating the archaeological value contained in physical and online archives with aerial photographs and lidar.

The projects will highlight where existing Scheduled Monument descriptions could be improved.

Proposers are strongly advised to consider 'added value' elements to the project. This could include context for development-led work (including large-scale strategic projects), thematic/synthetic approaches linked to research framework objectives, projects with a complementary fieldwork component (including community projects), landscape approaches integrating the buried resource with characterisation data, or projects taking forward the analysis of existing aerial investigation and mapping project data.

## **Business Case**

There is much that we do not know about England's historic environment. Important archaeological sites and landscapes remain hidden or are poorly understood. We need to identify and better understand this archaeological resource in order to protect it effectively. Mapping and recording from aerial photographs and lidar are proven techniques for identifying and analysing archaeological sites and landscapes, particularly over large areas. This information is most effective when available through historic environment records where it can directly influence planning decisions and inform further work.

We need to identify those areas most in need of aerial investigation and mapping. These must be areas where this technique will significantly improve our knowledge and understanding of the historic environment. Therefore, each project proposal should identify potential strategic threats or opportunities to archaeological remains in the suggested area and explain how the survey will address these. Proposals should demonstrate how effective aerial investigation and mapping would be in identifying and improving our understanding of the archaeological resource in the proposed area.

Potential surveys will focus on areas where substantial gaps in our knowledge exist and where threats from agricultural change or forestry intensification is greatest, and/or where there is significant or complex development pressure.

Project proposals should demonstrate how they meet the Historic England Corporate Plan and our main purpose which is to improve people's lives by protecting and championing the historic environment.

Proposals should demonstrate how they would meet key issues identified in regional research frameworks.

Proposals will mainly be assessed on the business case taking into account the following:

- Brevity and clarity of information provided and compliance with guidance on Management of Research Projects in the Historic Environment (MoRPHE).
- Realistic costs, timescale and value for money.
- Potential of the project to address key threats/opportunities in national and local contexts.
- Potential of the project to significantly improve understanding and appreciation of the historic environment and contribute to research frameworks.
- Ability of the project team to deliver high quality work to agreed timescale and cost.

Project proposals received in the last Call (2017) will not be considered. This does not mean we are ruling out work in these areas, and in future we may accept repurposed proposals that meet our priorities.

## Stakeholders

The key stakeholders in aerial investigation and mapping projects are local planning authority historic environment services. Project proposals must demonstrate that they were prepared in close consultation with the relevant local authority staff to identify key priorities in the area proposed. In particular, proposals must show they have considered cost effective means of entering data directly to the Historic Environment Record.

The relevant Historic England regional team, in particular the Inspector of Ancient Monuments, must be consulted to discuss priority areas and topics.

Historic England Archive is a major stakeholder and air photo loans for aerial investigation and mapping projects are subject to terms and conditions. See the appendix 4 for further details.

Partnerships are welcomed with universities, protected landscapes (Areas of Outstanding Natural Beauty, National Parks) and other heritage organisations (e.g. National Trust, Heritage Lottery Fund) especially if they bring funding for some, or all, of the aerial investigation and mapping.

# Methods

Proposals must be laid out using the MoRPHE Project Planning template in appendix 2– proposals in other formats will be rejected.

Projects must be planned using MoRPHE Project Planning Note 7 -Interpretation and mapping from aerial photographs and other aerial remote sensed data – see appendix 3.

Projects must use Historic England aerial investigation and mapping standards in appendix 4.

Projects must contact the Historic England Archive for a coversearch to inform timetable assessment. Projects must also ensure that mapping and monument records are integrated into the relevant historic environment record.

Proposals should describe the likely contents of the report and how it will address the main research aims of the project.

# Products, Communication and Engagement, and Archiving

The main products will be digital mapping, records in the relevant local authority historic environment record, a report and material for the Historic England website.

Regular communication with key stakeholders should be scheduled throughout the project. Projects must include liaison with Historic England Listing Group in the early stages of the project to discuss the process for identification and recording of archaeological sites of potential national importance. The project will follow Historic England grants processes and will be monitored by a Project Assurance Officer. Progress updates are supplied as brief statistics each quarter and in highlight reports. Historic England Aerial Investigation and Mapping team will carry out quality control on all projects.

Projects should consider opportunities for engagement with the research community and local people through publication, events, social media or other means. This must include consideration of how the project may contribute to Enriching the List through links to the final project report.

All mapping will be Historic England copyright licenced for use by the relevant historic environment record or other project partner. Monument records and mapping must be integrated into the relevant historic environment record as part of the project. Historic

England air photograph loans must only be used for the NMP project. Scans of Historic England Archive aerial photographs must be deleted on completion of the project. The project report will be Historic England copyright and will be issued as part of the Historic England Research Report Series.

## **Assessing Impact**

Impact assessment is a means of measuring the effectiveness of activities and projects and judging the significance of the changes or benefits brought about by these actions. Impact can be gauged in terms of reach (how many people/organisations were influenced by the work) and significance (the difference it made to these people/organisations). Gathering and assessing evidence of impact should be considered in proposals.

Historic England has adopted a public value framework (PVF) to provide assurance to its stakeholders, including the taxpaying public, that it invests public money in ways that optimise value. Therefore proposals should make a convincing case that the project will make a real and positive impact on England's heritage. It should address the following questions:

- How will the project represent a good return on investment?
- Why do we need the project now, what are the consequences if it doesn't happen?
- How does the project address other strategies such as local research frameworks or local government plans?

## **Budget**

Proposed projects should not exceed a cost of £40000 each (excluding any VAT that might be payable) and must start in financial year 2019-20 i.e. before March 2020.

# How to apply

Proposals should be based on the template attached to this document and must include a task list, timetable and costs. We will not be commissioning Project Designs.

Please submit proposals by emailing [HPCcalls@HistoricEngland.org.uk](mailto:HPCcalls@HistoricEngland.org.uk)

The Heritage Protection Commissions Programme Guidance for Applicants can be downloaded from the HPC web pages. <https://historicengland.org.uk/services-skills/grants/our-grant-schemes/hpc/>

## Timetable

Proposals must be submitted by 7th October. Applicants will be informed of the decision by 28th October.

## Further information

For questions about the project please contact Helen Winton at [Helen.winton@historicengland.org.uk](mailto:Helen.winton@historicengland.org.uk).

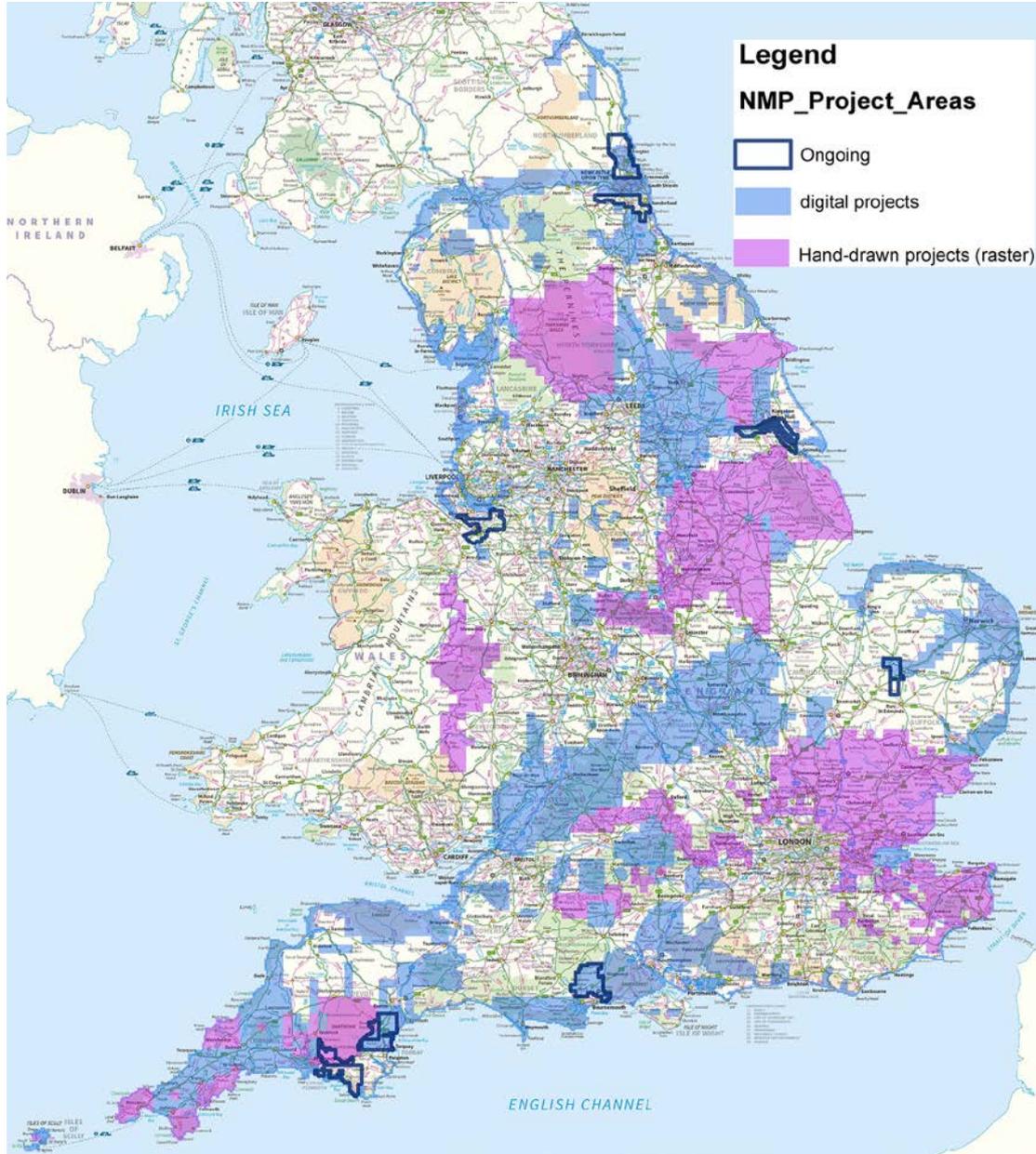
For further queries about the application process, deadlines etc please contact Tim Cromack at [Tim.Cromack@HistoricEngland.org.uk](mailto:Tim.Cromack@HistoricEngland.org.uk)

If you would like this document in a different format please contact our Customer Services department:

Telephone: 0370 333 0607

Email: [customers@HistoricEngland.org.uk](mailto:customers@HistoricEngland.org.uk)

# Appendix 1 previous and current project areas



# Appendix 2 Format for proposals

This template should be used in conjunction with the information in the Call document, general Morphe guidance and Morphe PPN7 (appendix 3).

## Document control

Title:	<i>Include a document control grid in your proposal</i>
Author(s):	
Derivation:	
Origination Date:	
Reviser(s):	
Date of last revision:	
Version:	
Status:	
Summary of Changes:	
Circulation:	
Required Action:	
File Name/Location:	
Approval:	

## 1. Project Name and Area

### Background

A brief summary of the context and motivation for the project. Provide an accurate location map – projects must be defined by full OS one kilometre squares irrespective of crossing county or other administrative boundaries. Please also provide a shape file with your proposal.

### Aims and Objectives

Refer to potential protection outcomes in this area. Describe the opportunities for the project to deliver additional benefits beyond heritage protection, for example research potential, partnerships or community work. Refer to how the project will meet the key research questions relevant to this area.

### Business Case

Include a brief business case explaining how the project will meet the aims of relevant areas of the Historic England Corporate Plan, Historic England Research Agenda and regional or local strategies and research agendas. Include a statement of the archaeological potential of your area and the likely impact of the project.

### Methods

A brief outline of how you will achieve your project aims and objectives. Why and how using Historic England standards will be effective in achieving the aims of the project.

Describe how the proposed methods conform to Morphe PPN7 - for example how you propose to access material at the Historic England Archive. You must specify how data will be entered into the local authority historic environment and how it will be disseminated.

### **Stages, Products and Tasks**

Provide a list of main stages and products. Provide a task list with allocation of days required for each of the main tasks.

### **Interfaces**

Mention who has been consulted in the relevant Historic England Regional team, in particular the Inspector of Ancient Monuments and Listing advisor. Mention interfaces with other local initiatives where relevant.

### **Project team**

Include a brief outline of relevant project team experience (including delivery of aerial investigation and mapping projects) and their roles.

### **Project timescale and budget**

Include the project timescale (including proposed timescale for each mapping block if necessary) and budget. Provide a brief explanation of how the budget or resources were calculated including a short timetable assessment based on available sources.

# Appendix 3 Morphe PPN 7

## Preface

MoRPHE Project Planning Notes (PPNs) form an integral part of the Management of Research in the Historic Environment (MoRPHE) Project Management Methodology issued by English Heritage in 2006 and updated to reflect changes to the organisation and the creation of Historic England. This PPN has also been updated to reflect the name change from National Mapping Programme to Aerial Investigation and Mapping.

They are intended to be presented together with, and read in conjunction with, the 'MoRPHE Project Managers Guide' which gives generic guidance on project management. The Project Managers Guide can be downloaded from the Historic England 'Free Publications' list website:

<https://historicengland.org.uk/images-books/publications/morphe-project-managers-guide/>

It must be emphasised that Project Planning Notes represent guidance on planning and running projects. They do not supplant or replace accepted standards and guidelines on the practice of particular skills or techniques.

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# Introduction

## **Scope of this Project Planning Note**

This PPN provides guidance on the planning and management of projects that involve the interpretation and mapping of archaeological landscapes using aerial photographs and other remote sensed data such as lidar (airborne laser scanning) derived images.

This PPN provides an overview of the processes involved in production of a Project Proposal and Project Design for projects that use aerial photographs as a main source.

This PPN is particularly relevant to projects using Historic England's methods and other projects where aerial images are a primary source, such as desk based assessments. Guidelines on Historic England aerial investigation and mapping methods and standards are available on request from Historic England.  
[helen.winton@historicengland.org.uk](mailto:helen.winton@historicengland.org.uk)

This PPN mainly covers large area projects, such as those using Historic England aerial investigation and mapping (AI&M) methods, but can be adapted for smaller areas or site based work.

This guidance applies to internal Historic England projects and those undertaken by contractors funded by the National Heritage Protection Commissions Programme (NHPCP). Applicants for grants must also consult the specific NHPCP guidance.  
<https://historicengland.org.uk/services-skills/grants/our-grant-schemes/hpc/>

This document does not cover flying and the taking of oblique aerial photographs. This is covered in MoRPHE PPN 5: Aerial Reconnaissance.

# Planning

## General considerations

The following sections identify aspects to be considered during the planning of a project. Some aspects should be considered for the Project Proposal and others may need more detailed documentation in the Project Design. Project Proposals and Designs for AI&M SURVEYS must follow the layout in the MoRPHE Project Managers' Guide (pages 44-46).

From the outset there should be consultation with potential stakeholders including the relevant local authority. For NHPCP commissioned projects this consultation must also include the appropriate Historic England Local team and Aerial Investigation and Mapping team.

Early consultation with relevant aerial photograph archives is necessary to ensure that access or loan arrangements are agreed.

Where the assessment of aerial photographs forms part of a wider multi-disciplinary project, ensure that the timescale and aims complement the other strands of the project.

### BOX A: CONSIDER THESE ASPECTS WHEN PLANNING

Clear project objectives and scope

Clear definition of the project area

Clear idea of likely products

Quantification of aerial photographs, lidar and other remote sensed data

Quantification of current archaeological knowledge

Costs of copyright and licensed use of source material

Timetable assessment

Project Stages and Tasks

Team structure and skills

Allowance for liaison with stakeholders

Risks and their management

Archive and dissemination

Project Closure

## Setting Objectives

Objectives should be clearly articulated and include their expected contribution to the understanding and protection of the historic environment. Include the potential for integrating results with existing knowledge and heritage management infrastructures, in particular the relevant Historic Environment Records and the Historic England National Record of the Historic Environment.

Objectives should clearly identify the archaeological scope of the project. For Historic England supported projects this must meet AI&M standards.

Refer to relevant Regional Research Frameworks, World Heritage Site Research Agendas and designated area Management Plans.

Projects should reference the Historic England corporate plan.

<https://historicengland.org.uk/about/what-we-do/corporate-strategy/>

Define the project area to include a small buffer zone. Provide accurate illustrations and describe the project area in the Project Proposal and Project Design.

For larger projects, such as those using Historic England AI&M methods, divide the project area into blocks for aerial photograph loan management and project review stages.

AI&M projects should usually cover a contiguous area and consider the location of previous projects. For Historic England supported AI&M projects, whole kilometre squares should be completed where possible, even if they cross an administrative boundary.

Likely list of products or outcomes:

- A geo-referenced digital map of the form and extent of all archaeological features visible on aerial photographs and other remote sensed data, linked to:
- Database records of the location, indexed classification, archaeological description and analysis, and main sources for all archaeological sites visible on aerial photographs and other remote sensed data.
- A summary report with an overview of the archaeology recorded by the project, analysing its character, diversity, distribution and associations in the landscape
- Recommendations for heritage protection/development control
- MoRPHE End of Project Report

Other products should be described in the Project Design. This could include dissemination outcomes and statements on monument condition or landscape change. A list of typical products is in Annexe 1.

Standards for digital mapping and database records should be clearly stated in the project design and agreed with stakeholders. Projects funded by Historic England

projects must adhere to national standards including the current Historic England standards for digital mapping and database recording.

Where heritage protection or development control outcomes are anticipated, there should be good liaison with the relevant Local Government Archaeologist and, when of national relevance, the Historic England Local Team, to ensure that recommendations can be followed up.

### **Quantification of aerial photographs, lidar and other remote sensed data**

The identification and quantification of available aerial photographs and other sources is an essential part of project planning. Archives of aerial photographs and lidar will usually provide the main source material. The use of other remote sensed data, such as multi spectral surveys, must be clearly justified in terms of suitability and potential value.

Data derived from airborne laser scanning, known as lidar, is increasingly available in formats suitable for archaeological survey. Consult the Historic England lidar guidelines (Crutchley and Crow 2010) to help assess the potential for lidar to contribute to a project.

Identify the numbers and types of aerial photographs, and any other readily available sources of images and remote sensed data. Sources include the Historic England Archive, Cambridge University Collection of Aerial Photography (CUCAP), HERs, Environment Agency, and online sources of aerial photographs, such as Google Earth.

Request a 'coversearch' of aerial photographs from the Historic England Archive by providing a clear definition of the proposed project area. Access the CUCAP catalogue online. Use the Heritage Gateway to find out how to access information held in relevant HERs and whether the information is available in a suitable format for a quantification.

For Historic England AI&M projects, include distributions of aerial photographs against a suitable map background, and a table of figures in the Project Design.

Assess how you will view aerial photographs depending on whether they are prints, born digital images, digitised prints or online images. Prints currently form the bulk of archives and need to be viewed in person and will often require a stereoscope for effective analysis. Different types of digital images, lidar or other remote sensed data may require specialist equipment or software.

Where possible, during the execution stage of the project, the aerial photographs, and other remote sensed data, should be viewed simultaneously for the same site, or area, so that the maximum amount of information can be extracted efficiently from the appropriate source.

Ascertain any costs, and conditions of use, associated with acquiring sources from the key archives. Historic England approved projects may be able to borrow prints from CUCAP and the Historic England Archive subject to certain conditions. Pan Government Agreement (PGA) sources may also be available.

For large area projects, and other projects requiring large numbers of aerial photographs, the quantification assessment should include a strategy and agreement for accessing and viewing aerial photographs held in key archives such as CUCAP, the Historic England Archive, and HERs.

If, after all existing sources have been assessed, it is felt there is still a need to commission new photography, lidar or other remote sensed data then this should be a separate project stage with a Review Point. It is important to remember that all forms of remote sensing are seasonally and weather dependent and a considerable lead in time is required to capture appropriate data.

### **Quantification of current archaeological knowledge**

To help assess the necessary timescale for the project, carry out a quantification of current archaeological knowledge in the project area.

The quantification should include geographic location, distribution, period and type of archaeological sites in the Historic England National Record of the Historic Environment and the local HER, as well as any other relevant source.

Contact the Historic England Archive Services team for information in the Historic England National Record of the Historic Environment. Use the Heritage Gateway to find out how to access information held in relevant HERs.

For Historic England AI&M projects, present the quantification in the Project Design, as a table of figures, with distributions shown against a suitable map background.

### **Copyright and licensed use of source material**

Ensure you have adequate base mapping and height data. Ensure correct licences are in place for the use of this data.

Copyright permission and referencing information must be sought for all material, such as images or historic maps, sourced from the Historic England Archive, CUCAP, HERs or other third parties such as companies who supply lidar. The Historic England Archive and HERs etc do not always hold the copyright for items in their collection.

It is the responsibility of the Project Team to ensure that conditions of use are adhered to for maps, photographs and other data.

All products of Historic England AI&M projects are either Historic England copyright or licensed for their use subject to terms and conditions.

### **Timetable Assessment**

- Assess the time required for the project based on
- experience of previous projects
- quantification of aerial photographs and other data
- access arrangements at archives (including possible loans)

- quantification of archaeological knowledge to anticipate the expected density of archaeological features
- additional tasks beyond interpretation, mapping and recording

The Timetable Assessment should estimate the expected rate of mapping. This allocation includes analysis of aerial photographs and other relevant sources, photo rectification, digital mapping of archaeological features, and monument recording.

An average of 0.8-1 person day per square kilometre is usual for the interpretation, mapping and recording phase of Historic England AI&M projects. More, or less, time may be required depending on the density and complexity of the archaeological remains, the number of aerial photographs and the scope of the project.

For Historic England AI&M projects the Project Design must demonstrate how the quantification of aerial photographs and other sources, and current archaeological knowledge have been used to estimate time allocations for mapping and recording.

Itemise time for tasks such as visiting AP archives, AP loan management, field trips, meetings, progress reports, dissemination, and report writing. Time allocated to these tasks, especially report writing, must reflect the size of the project area and the anticipated density and character of archaeological sites.

Include a GAANT chart in the Project Design to illustrate the timetable of tasks for the duration of the project.

### **Likely project stages**

Project stages follow the MoRPHE Project Managers' Guide (page 13) and should include the following as a minimum, with appropriate Review Points:

- Start-up
- Initiation
- Execution
- Closure

Project tasks for aerial photograph interpretation and mapping projects are normally completed in one Execution Stage. The number of Review Points will depend on the duration of the project. See Annexe 2 for a list of typical tasks. The key elements are

- Project set-up and management
- Interpretation, mapping and recording
- Landscape analysis and reports
- Meetings and dissemination
- Archive including delivery and integration of data into the HER and Historic England Archive

**Table 1. Typical stages and products**

Stage	Research products	Archive products	Dissemination products
Start up	Project Proposal		
Review Point R1: Has the project area been agreed? Have the relevant sources been assessed?			
Initiation	Project Design		
Review Point R2: Does the PD sufficiently define project scope, methods and timetable? Has the timetable assessment been carried out properly? Is the project infrastructure in place? Are access arrangements in place for all sources, in particular for aerial photographs? Are data exchange agreements and mechanisms in place?			
Project set-up		Project management file	Web Page Highlight Report(s)
Mapping (Block 1 etc)	Digital Mapping Monument Records	Loan lists Rectified photographs	HER records via Heritage Gateway
Review Point R3: Is the project keeping to the agreed timetable? Is the quality of the mapping and recording to the standards defined in the Project Design?			
Report	Summary Report Heritage Protection recommendations	Project proposal for publication	Archive and web (PDF) versions of Report Web Page update
Review Point R4 Does the project report meet the requirements defined in the project design? Will there be a further publication?			
Archive/data exchange	Digital mapping Monument records	Project management file	Summary Report End-of-Project-Report
Review Point R4 Has the project delivered its aims and objectives? Are the products completed? Has data exchange taken place?			
Closure			End-of-Project-Report

## **Team structure and skills**

The team structure should follow the MoRPHE Project Managers' Guide (p16) and include the following roles

- Executive
- Manager
- Experts

The Project Executive has responsibility for the project and sets the overall direction while delegating day-to-day responsibility to the Project Manager, although these roles can be combined on small projects.

The Project Manager will prepare the Project Design and carry out project planning, identification of Risks, internal monitoring of quality, costs and timetable.

The Project Experts undertake aspects of the project in accordance with (and may contribute to) the Project Design. Project Experts should have a minimum of 4-6 months professional experience of interpretation and mapping of archaeological landscapes using aerial photographs. For Historic England AI&M projects this is a requirement. A person specification is outlined in Annexe 3.

When Project Experts are not available, training should be provided. This should usually form a separate project. The trainer must be an acknowledged specialist with at least 2 years' experience of interpretation and mapping of archaeological landscapes using aerial photographs. Calculate the effect of training on the project timetable and cost. Allow time for the trainer and for the initially slower work rate of the trainee. Training requirements vary but up to 45 person days for the trainee is usual.

## **Risks and their management**

Document Project Risks, in the Project Design, in a tabulated Risk Log following MoRPHE guidelines (page 46).

Minimise delays by early agreement on how to access and view aerial photographs in archives such as CUCAP, Historic England Archive and the HERs.

For larger projects, minimise the risk of delays by agreeing a timetable for access to the photographs with the Historic England Archive. For Historic England AI&M projects it may be possible to arrange for loans of material but this must be agreed with the Historic England Archive in advance and documented in the Project Design.

Minimise the risk of potential loss of data due to IT systems failure with rigorous backup routines. Describe the strategy for this in the Project Design.

Carry out appropriate consultation at the project planning stage to ensure project products, especially digital data, and project scope are compatible with relevant heritage management infrastructures and stakeholder needs.

# Project Execution

## BOX B GENERAL PRINCIPLES FOR SUCCESSFUL PROJECTS

Work to the agreed project scope from the outset

Ensure aims are met through proper project review at defined stages

Ensure regular and timely communication with the Historic England Archive and other providers of aerial images

Communicate project results within the team throughout the project, including both archaeological features and potentially misleading non-archaeological features

Have regular quality assurance within the team. Historic England Aerial Investigation and Mapping staff will also do this for sample areas of all Historic England AI&M supported projects

Carry out regular communication with stakeholders

### **Project set-up**

Ensure all relevant data sources are available from the outset. This will require careful planning and appropriate early discussions with the relevant heritage data managers and providers of aerial photographs and other images.

Ensure data recording standards and mechanisms are agreed and are in place from the outset.

Ensure Project Experts have some familiarity with the landscape, archaeology, geology and soils of the project area.

### **Interpretation, mapping and recording**

The main process of interpretation, mapping, and recording should be a continuous cycle of work for each Project Expert. The project experts should carry out database recording immediately after completion of mapping of a given area, when memory of the evidence is fresh. The area covered in each cycle may vary depending on the size of the project, types of archaeological feature, and individual preference, but should not exceed 25 square kilometres.

Project Experts should undertake regular discussion to minimise errors and variations in recording between individuals and to enhance expert local knowledge.

Project experts should maintain an overview of results considering possible heritage protection outcomes, key sites, landscapes, potential illustrations and observed gaps in knowledge and data sources. If it is within the project remit, also discuss opportunities for dissemination.

### **Landscape analysis and summary report**

The Project Experts should carry out the analysis and write the summary report. Consider the observations of the project team, even when an individual writes the

bulk of the report. Historic England Aerial Investigation and Mapping team must review Historic England AI&M reports.

The detailed structure of the report should be directly related to the results of the interpretation and mapping. It should include an archaeological overview and recommendations for heritage protection.

There are a wide variety of reports on the Historic England website, which provide examples of different formats and approaches from Historic England AI&M and other projects using aerial photographs as a main source.

<https://historicengland.org.uk/research/research-results/research-reports/>

## Review

### **Approaches to assessment of quality**

Specify formal review points following MoRPHE guidelines (p12)

For NHPCP funded projects, Historic England will assign a Project Assurance Officer (PAO), who will act as the contact point between Historic England and the commissioned organisation. The PAO and the commissioned organisation will set milestones, review points and stage payments for the final contract.

Specify and timetable a quality assurance process in the Project Design. The quality assurance should include checks on project scope as well as checks of the quality of mapping and recording.

The time allocated for quality assurance should include preparation time and time for feedback and any amendments or actions required. Newly trained project experts require higher levels of quality assurance.

The Historic England Aerial Investigation and Mapping team will provide general advice and undertake quality assurance checks on sample areas of all Historic England AI&M projects.

### **Communication and documentation to support continuous review**

Facilitate ongoing communication and collaboration between the project team and stakeholders by direct contact, meetings, or reports.

Document progress for each project review point. For Historic England AI&M projects, a short Highlight Report must be submitted to the Historic England PAO.

Historic England AI&M projects are required to provide a report for each quarter of the financial year. This short report, of no more than 150 words, will include project statistics, as specified by Aerial Investigation and Mapping, and a brief statement of progress, archaeological highlights and project milestones.

For long running projects, liaison meetings with stakeholders are recommended. Hold these at about six monthly intervals throughout the project to present progress and discuss archaeological highlights.

## Archive and Dissemination

### **Project data and archives**

The products of projects that involve the interpretation and mapping of archaeological landscapes, using aerial photographs and other remote sensed data, usually comprise digital mapping, digital database records and a summary report.

The primary archive for aerial photograph interpretation and mapping projects should be a publicly accessible organisation, such as a Historic Environment Record, Sites and Monuments Record, or the Historic England Archive and Historic England National Record of the Historic Environment.

Historic England AI&M data is archived at the Historic England Archive. Historic England AI&M projects should include costs for the transfer of data to Historic England and/or relevant HER/SMR, in accordance with the Association of Local Government Archaeological Officers (ALGAO), and with any known partners and stakeholders. All Historic England AI&M products are either copyright of Historic England or project partners but all parties, and some stakeholders, will be licensed to use the data.

Establish a mechanism for data exchange of digital mapping and monument records to and from project stakeholders at the Project Design stage.

### **Reports and other dissemination**

Projects should be signposted at an early stage in the project, preferably with a web page. A brief project summary of all NHPCP commissioned projects must be provided for the Historic England website.

The summary report should provide a synthesis of the archaeology, analysing its character, diversity, distribution and associations in the landscape. It should include relevant details of methods, project statistics and recommendations for future heritage protection and research.

For all NHPCP funded projects, a digital copy of the report should be submitted to Archaeology Data Services (ADS) <http://ads.ahds.ac.uk/>

For Historic England AI&M projects, digital copies of the report must be provided at full resolution for archive and as a fully accessible low resolution version for internet dissemination.

If further publication is considered appropriate, a proposal should be drawn up for the necessary work to be undertaken as a separate project or project stage.

Project results can be disseminated at conferences and outreach events. The Project Design should include the costs of preparation time and attendance.

## Project Closure

An End-of-Project Report should be lodged in the project archive and presented to the sponsor. This report will include an assessment of lessons learned reviewed via a post-project evaluation plan as defined in the MoRPHE Project Managers' Guide (page 49).

## Further information

### **Information technology systems, hardware and software**

IT provision and associated costs require some consideration and planning. The minimum IT infrastructure required for a project that involves the interpretation and mapping of archaeological landscapes, using aerial photographs and other remote sensed data, is listed below.

Hardware:

- Computer suitable for moderate data processing with a large high quality monitor.
- Scanner.

Software:

- Image viewing/scanning/manipulation software such as Adobe Photoshop or equivalent.
- Specialist photo transformation software such as the University of Bradford AERIAL system or AirPhoto.
- Mapping software such as GIS, AutoCAD or equivalent.
- Monument recording database conforming to National Record of the Historic Environment standards.
- Word processing package, such as Microsoft Word or equivalent, for report writing
- Microsoft PowerPoint or equivalent for presentations.

Specialist photo transformation software used for Historic England AI&M projects must be approved by Historic England.

Specialist software may be required to get the most out of data derived from airborne and satellite multi spectral sensors, laser scanning (lidar) etc. This should be specified at the PD stage.

The preferred option for Historic England AI&M projects is to use Historic England systems. Where a project is based outside Historic England offices, the preferred option is direct input to the relevant HER. If this is not possible then a mapping and database structure compatible with systems at Historic England and the relevant HER must be established at the project design stage.

### **Working environment and equipment**

An appropriate work space is required for viewing aerial photographs. Good natural light, controlled with a window blind, and a desk lamp are necessary to view prints. Position the computer to avoid glare when viewing digital images on screen.

Enough desk space is required to lay out aerial photographs, and view stereo pairs, next to the desk lamp and to the computer, scanner etc used for mapping and recording.

Archaeological interpretation is aided by the stereoscopic viewing of pairs of aerial photographs. This is most easily achieved by the use of a pocket stereoscope with a magnification of 2x. Pocket stereoscopes and mirror stereoscopes with a higher magnification may also be useful, particularly when dealing with historic aerial photographs and very detailed interpretation. Use of a stereoscope is mandatory for Historic England AI&M projects.

Relatively low cost technology for on-screen 3D viewing of digital images is developing and use of this technique should be considered when suitable born digital images are available. A hand held stereoscope is still the most effective method for viewing the large volumes of prints typically involved in mapping from aerial photographs.

### **Access to and storage of aerial photographs**

Make suitable arrangements to access and view aerial photographs. Wear suitable gloves when handling prints held in archives.

Commissioned projects using Historic England AI&M methods may be able to borrow prints from the Historic England Archive subject to certain conditions. These conditions require suitable storage of aerial photographs as defined by and agreed with the Historic England Archive.

### **Background reading**

The basic methods and parameters for archaeological aerial photograph interpretation have remained largely unchanged for many years. Useful introductions are:

Riley, D N 1982 Aerial Archaeology in Britain. Shire, Princes Risborough.

Wilson, D R 2000 Air Photo Interpretation for Archaeologists. (2nd edition) Tempus, Stroud.

Lidar is a developing technology; recently published guidelines provide a starting point.

Crutchley S and Crow P 2010. The Light Fantastic: Using airborne laser scanning in archaeological survey. Swindon: Historic England.

<https://historicengland.org.uk/images-books/publications/using-airborne-lidar-in-archaeological-survey/>

### **Sources of aerial photographs and other remote sensing data**

The Historic England Archive collection of aerial photographs is an essential source.

Historic England Archive Services  
The Engine House  
Fire Fly Avenue  
Swindon  
SN2 2EH

Tel: 01793 414600 Email: [archive@historicengland.org.uk](mailto:archive@historicengland.org.uk)

Cambridge University holds another important national collection of aerial photographs and should be consulted. *In 2019, it is currently closed.*

Cambridge University Collection of Aerial Photography (CUCAP)  
CUCAP Library, Department of Geography,  
University of Cambridge,  
Downing Place,  
Cambridge CB2 3EN  
Tel: 01223 764 377  
<http://www.geog.cam.ac.uk/cucap/>

Local Historic Environment Records (or Sites and Monuments Records) will normally be able to advise on the availability of local collections. See the website of the Association of Local Government Archaeological Officers (ALGAO) website for contact details. [www.algao.org.uk](http://www.algao.org.uk)

Many websites now offer seamless aerial photographic cover. These provide relatively up to date colour photographs. The drawback is that they cannot be viewed stereoscopically and the resolution, while mostly good, can be variable. The easiest to use examples include

[www.bing.com/maps/](http://www.bing.com/maps/) Free internet service. Vertical photographs supplemented by oblique images in some areas.

<http://earth.google.com> Free internet service with global coverage of varying quality/resolution. Note the Historic Imagery option allows access to multiple sets of images for many areas.

There is no central repository in the UK for lidar data; the most extensive ‘off-the-shelf’ collection is that of the Geomatics Group, a specialist business unit within the Environment Agency.

<https://historicengland.org.uk/research/methods/airborne-remote-sensing/lidar/> provides information on downloading EA lidar.

## Acknowledgements

Thanks to colleagues in Remote Sensing, Archive Services, and all those who responded to the online consultation. Thanks to Edmund Lee and team for advice on planning and producing this document.

## Contact details

This Project Planning Note was written by Helen Winton, Yvonne Boutwood and Pete Horne. Comments and suggestions for further improvement are welcome. [helen.winton@historicengland.org.uk](mailto:helen.winton@historicengland.org.uk)

Information on aerial survey projects can be found at <https://historicengland.org.uk/research/methods/airborne-remote-sensing/>

For advice on the Historic England aerial investigation and mapping standards contact Helen Winton, Aerial Investigation and Mapping Manager.

For advice on regional issues, contact the local Historic England Office. Further information is available at <https://historicengland.org.uk/about/contact-us/local-offices/>

# Annexe 1 Typical products

<b>Product number</b>	<b>P1</b>
Product title	Event Record
Purpose of the product	To signpost the project to potential users.
Composition	Textual record identifying project area, location, specification, methodology, sources and project contact.
Derived from	Project Design
Format & presentation	Digital textual record
Allocated to	Project Experts
Quality criteria and method	Relevant data standards applied.
Person/ group responsible for quality assurance	Project Manager
Person/ group responsible for approval	Project Executive
Planned completion date	Created once PD agreed, updated at completion of project.

<b>Product number</b>	<b>P2</b>
Product title	Digital Map
Purpose of the product	Graphical depiction of archaeological features interpreted and mapped from aerial photographs.
Composition	A geo-referenced digital map of the form and extent of all archaeological features visible on aerial photographs, with attached data tables. Linked to Product P3 by unique identifier number.
Derived from	Aerial photographs and other airborne remote sensed data.
Format & presentation	Geo-referenced vector data (e.g. .shp or AutoCAD .dwg)
Allocated to	Project Experts
Quality criteria and method	Standards defined in the Project Design and checked by sample quality assurance.
Person/ group responsible for quality assurance	Project Manager, Project Experts
Person/ group responsible for approval	Project Executive
Planned completion date	Draft created during project, finalised on completion of each mapping block.

<b>Product number</b>	<b>P3</b>
Product title	Monument Database Record
Purpose of the product	Textual record of archaeological features, including aerial photograph interpretation.
Composition	New and enhanced database records identifying the location, indexed classification, archaeological description and main sources, including aerial photographs. Linked to Product P2 by unique identifier number.
Derived from	Aerial photographs and lidar imagery
Format & presentation	Digital textual record in format defined in Project Design to meet National Record of the Historic Environment (NRHE) or Association of Local Government Archaeological Officers (ALGAO) standards.
Quality criteria and method	Standards defined in the Project Design and checked by sample quality assurance.
Allocated to	Project Experts
Person/ group responsible for quality assurance	Project Manager, Project Experts
Person/ group responsible for approval	Project Executive
Planned completion date	Ongoing through project finalised on completion of each block. If data transfer involved, dates for this should also be listed.

<b>Product number</b>	<b>P4</b>
Product title	Summary Report
Purpose of the product	Dissemination of the project results.
Composition	A summary report recording the methods, scope and results of archaeological aerial photograph interpretation and mapping. To include a synthesis of the archaeology, analysing its character, diversity, distribution and associations in the landscape. Opportunities and recommendations for heritage protection.
Derived from	Project mapping and database analysis and research
Format & presentation	Digital text with illustrations in formats such as Word and .PDF format.
Allocated to	Project Experts
Quality criteria and method	Editing text and comment by Project Manager and stakeholders where appropriate.

Person/ group responsible for quality assurance	Project Manager, Project Experts
Person/ group responsible for approval	Project Executive
Planned completion date	As agreed in PD

<b>Product number</b>	<b>P5</b>
Product title	End of Project Report
Purpose of the product	Dissemination of project management and lessons learnt.
Composition	An overview summarising the Closure stage of the project and recording any useful lessons learnt to aid future project management.
Derived from	Project meetings, liaison and documentation.
Format & presentation	Digital textual record in Word or .PDF format.
Allocated to	Project Manager and Executive
Quality criteria and method	Editing text and comment by Project Experts
Person/ group responsible for quality assurance	Project Manager
Person/ group responsible for approval	Project Executive
Planned completion date	As agreed in PD

<b>Product number</b>	<b>P6</b>
Product title	Web page
Purpose of the product	To signpost the project and help disseminate the results of the project.
Composition	Text and illustrations
Derived from	Project mapping, analysis and research
Format & presentation	Digital text with illustrations
Allocated to	Project Experts
Quality criteria and method	Editing text and comment by Project Manager
Person/ group responsible for quality assurance	Project Manager
Person/ group responsible for approval	Project Executive
Planned completion date	Initially created after agreement of the PD, the web page should be updated with results and provide a link to the summary report at the end of the project.

## Annexe 2 Typical Task List

Task Number	Task	Product	Performed by	Days
	Project set-up and management			
1.1	Set up project files and manage			
1.2	Acquire and manage aerial photograph sources and loans e.g. Historic England, HERs, lidar (if available), online and any other sources			
1.3	Create event record	P1		
1.4	Acquire data sources e.g. monument data, mapping, other relevant supplementary sources			
1.5	Set up and manage project files			
	Interpretation, mapping and recording			
2.1	Analyse and interpret aerial photographs and other sources			
2.2	Create digital mapping	P2		
2.3	Create monument records in Historic England	P3		

	monument database (as part of a transfer process to HERs), HER or project database			
2.4	Perform quality assurance checks and data cleaning	P2,P3		
	Documentation and landscape analysis			
3.1	Collate data and write quarterly and Highlight reports			
3.2	Analyse aerial survey results and plan summary report	P4		
3.3	Write summary report	P4		
3.4	Peer review of summary report	P4		
	Meetings and dissemination			
4.1	Attend review and team meetings			
4.2	Attend field visit(s) as necessary with project stakeholders and partners			
4.3	Prepare web material for project	P6		
4.4	Deliver project lectures, presentations and attend			

	other events			
4.5	Distribute summary report			
4.6	Evaluate project, write and disseminate End-of-Project report	P5		
	Archive			
5.1	Collate archive and metadata	P1,P2, P3		
5.2	For Historic England AI&M projects - archive project data in standard format with Historic England Archive	P1,P2, P3		
5.3	Deliver data to local authority HERs and project stakeholders and partners	P1,P2, P3		

# Annexe 3 Person Specification for Project Expert

See also comments above in 2.10

<b>TRAINING, EXPERIENCE AND QUALIFICATIONS</b>	
<i>Essential</i>	<i>Desirable</i>
Good honours degree in archaeology or related subject	
Experience of digital mapping techniques and databases	
Experience of aerial photograph interpretation	
<b>KNOWLEDGE AND SKILLS</b>	
<i>Essential</i>	<i>Desirable</i>
Good knowledge of British landscape archaeology	Knowledge and/or experience of aerial reconnaissance techniques
Familiarity with types of primary and secondary material related to the archaeology of England	Knowledge of a related discipline (e.g. geology, geophysics or other investigative techniques)
Good verbal and written communication skills	
Knowledge of the principal uses made of aerial photographs in a range of environments	
Good understanding of maps including the implications of the range of map products and scales and ability to read grid references	
<b>INTERPERSONAL SKILLS</b>	
<i>Essential</i>	<i>Desirable</i>
Ability to work for long periods without supervision	Ability to communicate to a wide range of professionals and stakeholders
Ability to manage time effectively and balance conflicting demands	
An enthusiastic and positive manner	
Ability to work effectively in a team	
Excellent interpersonal skills	
<b>PARTICULAR CIRCUMSTANCES</b>	
The work is largely desk-based and requires a significant degree of concentration and critical visual analysis.	

## Document control

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## Preface

This technical guide provides information required for Aerial investigation and mapping projects.

This technical guide complements the Management of Research in the Historic Environment (MoRPHE) Project Management Planning Note 7 Interpretation and mapping from aerial photographs and other aerial remote sensed data.

<https://content.historicensland.org.uk/images-books/publications/morphe-project-planning-note-7/morphe-ppn7.pdf/>

When project planning, they are intended to be presented together with, and read in conjunction with, the 'MoRPHE Project Managers Guide', which gives generic guidance on project management. The Project Managers Guide can be downloaded from the Historic England website: [www.english-heritage.org.uk/morphe](http://www.english-heritage.org.uk/morphe)

# Appendix 4 Historic England Standards and Guidance for Aerial investigation and mapping projects

## 1 Introduction

### *1.1 Scope of this Technical Guide*

- 1.1.1 This Technical Guide provides information on standards for Historic England aerial investigation and mapping projects. It provides details of the processes involved in production of mapping and recording from aerial photographs and other airborne remote sensed data such as lidar.
- 1.1.2 This Technical Guide applies to large area projects but can be adapted for smaller areas or site based work.
- 1.1.3 This guidance should be used in conjunction with Management of Research in the Historic Environment (MoRPHE) Project Management Planning Note 7 Interpretation and mapping from aerial photographs and other aerial remote sensed data.  
<https://www.historicengland.org.uk/images-books/publications/morphe-project-planning-note-7/>
- 1.1.4 This guidance applies to Historic England projects and those undertaken by contractors funded by the Heritage Protection Commissions Programme (HPC). Applicants for grants must also consult the relevant guidance:  
<http://www.historicengland.org.uk/services-skills/grants/our-grant-schemes/grants-available/hpc/>
- 1.1.5 This document does not cover flying and the taking of oblique aerial photographs. This is covered in MoRPHE PPN 5: Aerial Reconnaissance.

# 2 Overview

## 2.1 Background

- 2.1.1 The Aerial investigation and mapping standard aims to promote best use of aerial photographs and lidar data to create archaeological maps and descriptions suitable for historic environment records. This systematic synthesis of archaeological information is intended to assist research, planning, and protection of the historic environment.
- 2.1.2 The standard products are a digital archaeological map with linked archaeological descriptions, and a synthesis of the archaeological results, usually a report. Analysis of the project results should describe the character, significance, diversity, association and distribution of archaeological sites and landscapes, visible on aerial photographs, within a project area.
- 2.1.3 This document outlines the minimum standards required for Historic England funded projects and the information should be adapted to suit stakeholder requirements and the archaeological resource in each project area. The document is regularly updated in response to queries from those working on such projects. Please contact Helen Winton if you have any suggestions for improvements.

## 2.2 Overview of methods

The following describes the main elements of aerial investigation and mapping.

### *Mapping and recording*

- The following sources must be consulted: all aerial photographs from the Historic England Archive, Aerial Photography for Great Britain (APGB) agreement, Historic Environment Record/Sites and Monuments Record (HER/SMR), online sources (Google, BING, Channel Coastal Observatory) and Environment Agency, or other, lidar data. Other readily available sources of photographs can be consulted if it does not add significantly to the project timescale. The CUCAP library is currently closed but the potential of the collection must be assessed at proposal stage to ensure that they are not a key source.
- The Historic England Archive Services team will manage air

photograph loans. In certain circumstances, large aerial photograph loans may be delivered to non-Historic England offices but must be used and stored according to Historic England Archive guidelines (see below).

- All archaeological features visible on aerial photographs are transcribed and recorded to an agreed level of detail. The scope of Historic England aerial investigation covers all buried (cropmarks and soilmarks) and surface archaeological remains (earthworks and structures), potentially dating from the Neolithic period to the mid-20th century, including industrial and military features. See section 8 for details of scope.
- All mapping must be carried out using a Historic England approved aerial photograph rectification programme and digital drawing package. All monument recording must be carried out to Historic England/MIDAS standards. This would preferably be directly into the relevant HER/SMR but alternatively into the National Record of the Historic Environment. Project proposals must assess and explain any costs for transfer or incorporation of monument records and mapped data to the relevant HER/SMR. See sections 9-11 for details.

#### *Dissemination*

- The report will refer to the character, diversity, association and distribution of archaeological sites and landscapes, visible on aerial photographs and lidar, within the project area. The report will highlight any major new discoveries and will provide a synthesis of the results of the interpretation, transcription and background research. The report should place the results in the context of current archaeological research and make recommendations for further work. The report will identify and discuss sites or areas of local, regional or national archaeological significance. The report will also include metrics that assess the impact of the project.

#### *Data transfer, archive and copyright*

- mapping is ©Historic England but will be licensed for use by partner organisations.
- mapping and monument records must not be passed to third parties without the prior agreement of Historic England unless already agreed under Terms and Conditions issued to a partner organisation.
- The main repositories are the relevant HER/SMR and the Historic England Archive.

## **2.3 General considerations**

- 2.3.1 The following sections identify technical aspects to be considered during the planning and execution of a project. Some technical aspects should be considered for the Project Proposal but will need more detailed documentation in the Project Design. Project Proposals and Designs must follow the layout in the MoRPHE Project Managers' Guide (pages 44-46) and the guidelines in the [Morphe Project Management Planning Note 7: Interpretation and mapping from aerial photographs and other aerial remote sensed data.](#)
- 2.3.2 Early consultation with relevant aerial photograph archives is essential necessary to ensure that access or loan arrangements are agreed. Early consultation is also necessary to ensure that providers of other essential sources such as base mapping, height data, historic maps and monument records can provide the data in time for project start-up.
- 2.3.3 During the project planning stage, consult with potential stakeholders including the relevant local authority, to discuss general technical requirements for the project. This consultation must include the Historic England Aerial Investigation and Mapping team.
- 2.3.4 Where the assessment of aerial photographs forms part of a wider multi-disciplinary project, ensure that the technical requirements complement the other strands of the project.
- 2.3.5 Consider the following aspects to determine the technical requirements for the project
- Definition of the project area;
  - Project sources;
  - Project scope;
  - Location and suitable working environment for the project team
  - Technical requirements for products;
  - Hardware and software;
  - Technical requirements for data transfer;
- 2.3.6 All products are usually ©Historic England but are usually licensed for use subject to terms and conditions.

## **2.4 Defining the project area**

- 2.4.1 Define the project area to include the focus of the project

with a small buffer zone. Provide accurate illustrations and describe the project area in the Project Proposal and Project Design.

- 2.4.2 It is useful to supply the project area as a shape file, or equivalent, so that stakeholders and suppliers of aerial photos and other data know the exact extents of the area.
- 2.4.3 Whole kilometre squares must always be completed, even if they cross an administrative boundary. There may therefore need to be data transfer to different Heritage Environment Records.

## **2.5 Project sources**

- 2.5.1 Sources for must include the Historic England Archive (formerly the National Monuments Record), relevant local collections, such as those held by local authorities in Historic Environment Records (HER), and online sources of aerial photographs, such as Google Earth, BING, and Britain from Above. Environment Agency lidar must be consulted. If available, and where suitable, satellite images may be used. The Cambridge University Collection of Aerial Photography (CUCAP) is currently closed. See section 2.13 for more details on sources.
- 2.5.2 Background material must be obtained from published sources and the data held in the Historic England National Record of the Historic Environment (NRHE) and local HERs.
- 2.5.3 Suitable background maps and height data are required for photo rectification, georeferencing and mapping. Geological maps and soils information should also be consulted.
- 2.5.4 Where possible, during the execution stage of the project, the aerial photographs, and other remote sensed data, should be viewed simultaneously for the same site, or area, so that the maximum amount of information can be extracted efficiently from the appropriate source. All, or most, sources must therefore be available from the project start.
- 2.5.5 Assess how you will view aerial photographs depending on whether they are prints, born digital images, digitised prints or online images. Different types of digital images, lidar or other remote sensed data may require specialist

equipment or software.

## **2.6 Project Scope**

- 2.6.1 The Sphere of Interest is defined as all archaeological features visible on aerial photographs, or other airborne remote sensed data, as cropmarks, soilmarks, parchmarks or earthworks and, in certain cases, as structures.
- 2.6.2 The earliest sites recognised on aerial photographs usually date from the Neolithic onwards. Projects therefore record all archaeological features visible on aerial photographs with a date range from the Neolithic to the twentieth century.
- 2.6.3 Aerial Investigation and mapping methods require some selectivity in mapping and recording, particularly for the more recent periods. Guidelines for the most commonly encountered examples of such variations to the Sphere of Interest are detailed in Section 5.

## **2.7 Location and suitable working environment for the project team**

- 2.7.1 The location of the project team will influence the technical systems used. The preferred option is to directly input to Historic England systems or the relevant local authority HER systems. If this is not possible then a mapping and database structure compatible with systems at Historic England and the relevant HER must be agreed. Data standards for recording and mapping must be discussed with the relevant HER and NRHE at the project proposal stage and details must be agreed and included in the project design.
- 2.7.2 Data transfer arrangements between the Historic England NRHE, local HERs and stakeholders must be discussed at the project proposal stage and agreed at the project design stage.
- 2.7.3 Historic England funded projects for large areas and conforming to our standards may be able to borrow prints from the Historic England Archive subject to agreement with the Archive Services team. Conditions include suitable storage of aerial photographs as defined by and agreed with the Historic England Archive. See Section 4 for guidance on mandatory storage requirements for aerial

photographs.

- 2.7.4 Project teams should be located in offices with controlled access to natural light and with enough desk space to lay out and view aerial photographs using a stereoscope. The equipment required for archaeological mapping, such as a large monitor, scanner etc, should be taken into consideration when arranging desk space.

## **2.8 Technical requirements for products**

- 2.8.1 Digital georeferenced aerial photographs are created from scans of prints or born digital photographs. See Section 6 for requirements for photo rectification.
- 2.8.2 All mapping is carried out in a digital environment using geographical information systems. A geo-referenced digital map is created of the form and extent of all archaeological features visible on aerial photographs and other remote sensed data. See Section 7 for mapping specification.
- 2.8.3 All monument recording is carried out to Historic England and MIDAS standards. See Section 8 for the database recording specification.
- 2.8.4 A report recording the methods, scope and results of the project with an overview of the archaeology, analysing its character, diversity, distribution and associations in the landscape. See Section 9 for technical specification for reports.

## **2.9 Hardware and software**

- 2.9.1 The minimum IT infrastructure required for a project that involves the interpretation and mapping of archaeological landscapes, using aerial photographs and other remote sensed data, is listed below.
- 2.9.2 **Hardware:**
- Computer suitable for moderate data processing with a large high quality monitor, or two monitors.
  - Scanner.
- 2.9.3 **Software:**
- Image viewing/scanning/manipulation software such as Adobe Photoshop or equivalent.

- Specialist photo transformation software such as the University of Bradford AERIAL system or AirPhoto.
- Software to create lidar visualisations e.g. Relief Visualisation Toolbox or GIS.
- Mapping software such as GIS, AutoCAD or equivalent.
- Monument recording database conforming to National Record of the Historic Environment (AMIE) and ALGAO standards.
- Word processing package, such as Microsoft Word or equivalent, for report writing
- Microsoft PowerPoint or equivalent for presentations.

2.9.4 Specialist photo transformation software used for Historic England funded projects must be approved. Contact Historic England Aerial Investigation team for advice on lidar visualisations.

## **2.10 Stereoscopes**

2.10.1 Archaeological interpretation is aided by the stereoscopic viewing of pairs of aerial photographs. This is most easily achieved by the use of a pocket stereoscope with a magnification of 2x. Pocket stereoscopes and mirror stereoscopes with a higher magnification may also be useful, particularly when dealing with historic aerial photographs and very detailed interpretation. Use of a stereoscope, mainly for viewing stereo pairs of vertical photographs, is mandatory.

## **2.11 Technical requirements for data transfer**

2.11.1 Projects must ensure that monument records and mapping can be provided in suitable formats for transfer to the NRHE or the relevant HER. At present mapping should be available as AutoCAD and/or shape files with the data attached, as specified below.

## **2.12 Quality Assurance**

2.12.1 The Historic England Project Assurance Officer (PAO) will monitor overall progress of the project and act as the contact point for advice between Historic England and the contracted organisation.

2.12.2 A quality assurance (QA) process, by the project team, must be specified and timetabled in the project design. This will include preparation time prior to QA and

time for feedback and any updates.

2.12.3 Additional QA on mapping and recording will be carried out by Historic England Aerial Investigation and Mapping staff.

2.12.4 Each quarter, projects must provide a short report indicating the number of kilometre squares completed (mapped and recorded), numbers of new and amended monument records, along with a brief statement of progress (no more than 150 words) including archaeological/project highlights.

### ***2.13 Aerial photographs and other aerial sources***

The following sources must be used. These are subject to different copyright arrangements and must be used solely for the project. Permission to scan and reproduce must be discussed at project start-up.

Historic England

Archive Services, The Engine House, Fire Fly Avenue

Swindon, SN2 2EH

Tel: 01793 414600

Email: [archive@HistoricEngland.org.uk](mailto:archive@HistoricEngland.org.uk)

<https://www.historicengland.org.uk/images-books/aerial-photos>

Air Photography for Great Britain (APGB) sources of aerial photographs will be supplied by the Historic England Aerial Investigation and Mapping team.

Local HER/SMRs will advise on the availability of local collections and these should be used if they do not duplicate Historic England Archive material. These will usually comprise a limited range of vertical photographs and some specialist oblique photographs. See the website of the Association of Local Government Archaeological Officers (ALGAO) website for contact details.  
[www.algao.org.uk](http://www.algao.org.uk).

Projects must use at least BING and Google Earth and any other online sources available. These provide relatively up to date colour photographs. The drawback is that they cannot be viewed stereoscopically and the resolution, while mostly good, can be variable in more remote areas.  
[www.bing.com/maps](http://www.bing.com/maps) <http://earth.google.com>

There is no central repository in the UK for lidar data; the most extensive 'off-the-shelf' collection is that of the Environment Agency – free to download

from the EA website. Advice on formats and processing is available from [simon.crutchley@HistoricEngland.org.uk](mailto:simon.crutchley@HistoricEngland.org.uk)

The CUCAP aerial photograph library is currently closed. The online catalogue should still be consulted to assess the potential of the collection and included in the report.

<https://www.cambridgeairphotos.com>

## **2.14 Maps and height data**

It is the project manager's responsibility to source maps and height data, and permission for their use. The commissioned organisation, a local authority or private contractor, will normally use their own licence agreements. When this is not possible Historic England may be able to provide mapping and height data.

- 2.14.1 Use the most accurate maps available for photo rectification and as a background to mapping. The minimum standard for is OS 1:2,500 scale MasterMap or equivalent. APGB orthorectified photos may be more accurate in some areas – consult with Historic England Aerial Investigation and Mapping team if required.
- 2.14.2 Use OS historic County Series mapping (1st to 4th editions) and any other readily available historic maps.
- 2.14.3 Height Data with a maximum of 5m intervals between contours must be used. This must be used during photo rectification so should be in a suitable format. This can be supplied by the Historic England Aerial Investigation and Mapping Team via the APGB agreement.

## **2.15 Other sources**

- 2.15.1 Projects must refer to Monument and Event records from Historic England and relevant HERs for archaeological background. All details of a monument record need to be consulted, in particular the sources. Therefore full monument records must be sourced from the Historic England National Record of the Historic Environment (NRHE). The level of data available from HERs varies but as much information as possible should be obtained, preferably as a single data set (digital data, printouts etc) rather than accessed online. The most efficient method for accessing the data should be used, for example accessing monument data via the Heritage Gateway is acceptable but only if it provides all information required and is quicker than accessing the data through your mapping package and/or digital printouts.
- 2.15.2 Previous surveys, where relevant should be identified at the project planning stage and consulted from the Historic England Archive or HER. Previous aerial

investigation and mapping surveys adjoining the current project area, will be supplied by Historic England.

2.15.3 Consult relevant published material, including reliable online sources.

# **3 Historic England Aerial Photography loans for Historic England funded aerial investigation and mapping projects: policy and guidance**

## ***3.1 Projects eligible for loans***

Loans from the Historic England Archive aerial photography collections into the custody of non-Historic England staff will be made only to the following types of projects:

- 3.1.1 Historic England commissioned projects approved by Historic England using our aerial investigation and mapping standards.
- 3.1.2 Historic England funded Coastal Zone Assessment projects where these include an aerial investigation and mapping component and where the results are submitted to the overall Historic England dataset.

In the case of dispute over whether a project falls within these categories the final decision as to whether to loan material will be taken by the Director of the Historic England Archive.

## ***3.2 Provision of loans***

Costs for couriers for loans to and from the Historic England Archive must be included in the project design.

## ***3.3 Loanable material***

Historic England will only loan material from the Historic England Archive aerial photography collections for which a separate archival master exists either in the Historic England Archive holdings or in the holdings of another public institution.

The following will not be loaned:

### **3.3.1 Films**

### **3.3.2 Transparencies which have not been copied**

### **3.3.3 Prints where original films or good quality copy films are not held**

The Historic England Archive reserves the right not to loan material in poor condition.

Where feasible the Historic England Archive will supply photo copies of items which cannot be loaned, subject to format and condition of originals.

Cover searches for projects will supply an initial indication of which material can be loaned, but this will be subject to assessment of condition when material is withdrawn from the archive.

## **3.4            *Management of loans***

Loans will be issued in “blocks” of prints, with a block consisting of up to 2000 vertical prints and up to 2000 oblique prints (including photo copies of material where appropriate).

No project will be allowed to hold more than two blocks of material at any one time.

The preparation and issuing of loan blocks will be to a timetable agreed with the Historic England Archive at the outset of the project. Projects are therefore urged to discuss their requirements with the Historic England Archive at the earliest opportunity to ensure that their requirements can be incorporated into the Historic England Archives timetable.

All loans will be to a named project representative, who will take responsibility for the management and safe return of the material.

If requested specific prints will be returned to the Historic England Archive within 48 hours of receipt of a request in order to support enquiries from external users.

## **3.5            *Care of loans***

Loans of material will be transferred to and from projects either by project staff or by a courier firm agreed with the Historic England Archive. All transfers will be at the expense of the project.

Loaned material should not be removed from the agreed premises without the agreement in writing of the Historic England Archive except to return to the Historic England Archive

Projects will need to make appropriate arrangements for the secure storage of the loaned material when not in use and overnight. If a project does not have access to archive storage then material should be kept in a lockable fireproof cupboard. This should be able to maintain the contents at under 170 deg C for over 120 minutes. The cabinet should not be sited in an area where it might be subject to flooding, such as a basement.

The premises on which the material is to be stored should have an effective 24 hour fire alarm and security system. There should also be an appropriate disaster plan in place. Details of the systems in place should be supplied to the Historic England Archive.

All staff working with loaned material will be supplied with guidelines on the correct way to handle and protect the photographs, which they must conform to.

All projects receiving loans will need to show that they have insurance cover of at least £80,000 to cover the cost of replacing the loaned prints should these be lost or damaged.

### ***3.6 Storage of loans***

Vertical photograph loans are supplied by sortie and organised by library number. During surveys, it is essential to compare photographs of the same area taken at different times. Therefore teams reorganise loans by geographical area to ensure the efficient use of the photographs. It is usual for each sortie to be divided into bundles, usually by Ordnance Survey 1:10,000 scale quarter sheet. A label indicates which area of the quarter sheet is covered by the particular sortie. Bundles of photographs are then stored in boxes, usually per quarter sheet.

The Historic England Archive recommends glassine photo bags to store bundles of photographs. A label on the front of the bag indicates at a glance the location of the photographs within the study area. Pencil should be used to indicate the details on the diagram so that it can be rubbed out and reused. The tape used to attach the diagram will need to be magic tape (low stick) to minimise the impact of it attaching to any photographs. Paperclips, or similar, **must not** be used on bundles of aerial photographs.

Project teams must calculate and include the cost of suitable photo bags in the project design. Information on cost and suppliers is available from Historic England Archive Services. Numbers of bags required can be estimated by sorting the AP coversearch by quarter sheet.

### ***3.7 Use of loans***

Loans are supplied solely for reference use in the agreed project. The loan of a print does not imply permission to make a copy of that print or to publish it - contact the Historic England Archive for advice. Where copying for research is permitted, copies of loaned material should not be supplied to third parties, and copies, whether in digital or hard copy formats should not be retained by the organisation beyond the lifetime of the project except in the context of the agreed project archiving strategy. Specific permission must be sought from the rights holder before publication of any image in any media.

### ***3.8 Recall of loan***

Irrespective of the terms of the loan Historic England / Historic England Archive reserves the right to recall at any time any borrowed item, though as far as possible reasonable notice of recall will be given.

## 4 Sphere Of Interest

The Sphere of Interest is defined as all archaeological features visible on aerial photographs as cropmarks, soilmarks, parchmarks or earthworks, and some structures. The earliest sites recognised on aerial photographs usually date from the Neolithic onwards. Projects therefore record all archaeological features visible on aerial photographs with a date range from the Neolithic to the twentieth century.

The archaeological mapping is meant to be viewed against an OS map, and therefore will not usually record non-archaeological features visible on aerial photographs and depicted on the modern base map and still in use, such as buildings, field walls, hedges, canals and railways. The project design should describe the strategy for dealing with features visible on aerial photographs and marked on historic maps – the archaeological context or importance should determine whether features such as field boundaries, shooting butts, sheepfolds, relict quarries, canals, railways, tracks etc should be mapped. This should be discussed with project partners at project start-up.

Some selectivity may be required in mapping and recording, particularly for the 20th century. Guidelines for the most commonly encountered examples of such variations to the Sphere of Interest are detailed below and any variance from this should be defined in the project design.

The monument record and GIS attributes must record which elements of any particular archaeological site survive or have been levelled and/or destroyed.

### **4.1 Previous surveys**

Where a previous survey (of cropmarks or earthworks) has resulted in the production of a plan it is necessary to assess the sources used and the quality of the resultant plan. Such surveys should, where possible, be incorporated into the mapping (subject to copyright) and updated where necessary. Where an existing survey has been done to a higher specification and larger scale, this can be used (subject to copyright) as the basis for a simplified plan appropriate to the project specification. Plans resulting from excavation and geophysical survey of sites visible on aerial photographs should be treated in the same manner as those from field and aerial survey and used to aid mapping and interpretation.

If an existing survey does not reach current standards, the area should be re-mapped from aerial photographs. However, if it has relied on sources unavailable to the surveyor then these should be described in the relevant monument records. Where it is not possible to verify a pre-existing survey, for example, when trees mask the site, it should not normally be mapped, but it should be described in the relevant monument record if the information is not already in the HER/NRHE.

## **4.2 Cropmarks, parchmarks, soilmarks**

All sub-surface archaeological remains are mapped and recorded when visible as cropmarks, parchmarks or soilmarks.

## **4.3 Earthworks**

Map and record all archaeological earthworks visible on aerial photographs. This includes features visible as earthworks on early photographs, which have been levelled, and archaeological features marked on the OS maps that are within the project sphere of interest.

## **4.4 Buildings and Structures**

Map and record all foundations of buildings visible as cropmarks, soilmarks, parchmarks, earthworks or ruined stonework. Standing roofed or unroofed buildings are usually more appropriately recorded by other methods, so will not normally be mapped. The exceptions are in specific archaeological contexts (e.g. industrial and military complexes and country houses), or when associated with other cropmark and earthwork features. If buildings have been demolished since the photography, then it may be appropriate to map them, in order to make an association explicit. Alternatively, they may be recorded solely in the monument record.

Map and record other structures (designed originally without a roof) not depicted on the OS base, particularly 20th century military structures. Structures depicted by the Ordnance Survey (e.g. sheepfolds and shooting butts) can be mapped if considered to be of archaeological significance to the project. (See below for more detail, section 9.10 20th century military features).

Other stone, concrete, metal and timber structures that are of archaeological relevance (eg fish traps, timber circles) should be mapped.

## **4.5 20th Century Military Features**

The standard includes First and Second World War remains and Cold War features visible on aerial photographs or lidar. Mapping of military sites should aim to be a “snapshot” of the main features of the site at a relevant date such as the latest development of the site eg 1945. Military structures to be mapped include outlines of extensive features such as airfield perimeter and runways, camp perimeters as well as buildings and earthwork structures, and all ephemeral features such as barbed wire, lines of tank cubes, etc.

## **4.6 Industrial Features and Extraction**

The aim should be to provide a survey of the extent and character of industrial remains in so far as this can be seen on aerial photographs. The scope for

industrial recording is immense and data already exists within national databases, local specialist recording groups and literature. **Assess this at the project design stage to formulate a strategy for the level of detail to be mapped and recorded.** Features usually mapped include buildings (roofed or unroofed), structures, spoil heaps and transport features associated with industrial processes. The strategy for mapping and recording of widespread and common small-scale extraction of resources for immediately local use (eg chalk pits, marl pits, and minor or modern stone quarries, gravel extraction, peat working) should be discussed with project partners and described in the project design.

#### ***4.7 Parkland, Landscape Parks, Gardens and Country Houses***

If appropriate map and/or record former country houses if demolished within the date range of the available aerial photographs. Make or amend a monument record if the house is adequately depicted by the OS. Map all relict garden features. In some cases it may be appropriate to depict and record features normally outside the scope such as tree avenues. Map and record all vestigial earlier features preserved within parkland and gardens (eg prehistoric features or medieval deer parks). Treat significant parks and gardens in an urban context (originally or since engulfed) in the same manner.

#### ***4.8 Transport***

Major transport features (i.e. disused canals and main railways) were included in the Ordnance Survey Archaeology Division sphere of interest, appear on various editions of OS maps, and were subsequently recorded in AMIE; they should not be mapped unless considered to be archaeologically significant in the context of the project. Smaller features (e.g. local tramways), which were outside the Ordnance Survey sphere of interest, should normally be mapped and recorded, especially in the context of associated features.

#### ***4.9 Coastal Archaeology***

In coastal areas, recording will identify features within the intertidal zone and depict them using appropriate conventions. Where features, such as wrecks, move about, map the latest position and explain the movement in the monument record, with key sources and record whether covered over with mud or sand on the latest source. For Rapid Coastal Zone Assessment Survey projects recording may be limited to the seaward side of a line 100m above mean high water rather than the usual full OS 1 km square.

#### ***4.10 Urban areas***

In areas built up in the twentieth century, historic aerial photographs (most are from the 1940s onwards) will record archaeological features and aspects of the landscape not recorded on historic maps. Map all archaeological features visible on aerial photographs and lidar irrespective of whether they are built over. Project stakeholders should be consulted to agree a strategy for recording features or changes to urban areas that are not already recorded on historic maps. This may not involve mapping but could include sourcing

illustrations that record landscape change relevant to the historic environment in a project area, for use in the report.

#### ***4.11 Natural features***

Exclude all geological or geomorphological features. If there is risk of confusion archaeological remains, then the natural features should be explained in the monument record. In exceptional circumstances natural features may need to be mapped to fully understand the archaeology but this must be agreed at project design stage to ensure it is appropriate use of project resources. A discussion of common 'confusing' features should be included in the project report.

# 5 Photo Rectification and lidar visualisation

The distortions inherent in aerial photographs mean that to produce accurate plans of the archaeology, it is necessary to transform proportionally (rectify) and geo-reference each aerial photograph to a suitable map base before tracing off the archaeological features. Although manual transcription such as the network methods may have to be used, computer rectification should be used wherever possible. Note that some computer packages only offer “rubber sheeting” which stretches rather than rectifies the image.

- Specialist rectification software approved by Historic England, such as AERIAL or AirPhoto, must be used.
- Control must be derived from either OS 1:2,500 scale MasterMap (or equivalent) or orthophotos supplied through the APGB agreement.
- Use a digital terrain model (DTM) to employ a 3-D geometric transformation which takes account of the variations in surface height and is therefore more accurate.

The most commonly used software in the UK is AERIAL developed by John Haigh and the University of Bradford. This is now freely available - for further information please contact Aerial Investigation and Mapping, Historic England. [remotesensing@historicengland.org.uk](mailto:remotesensing@historicengland.org.uk)

The Bonn Archaeological Software Package AirPhoto software by Irwin Scollar has similar functionality to Aerial but has been developed, in response to user needs mainly across Europe, to deal with the different map projections available around the world. AirPhoto can be downloaded for a free trial. <http://www.uni-koeln.de/~al001/>

Staff should be experienced in the use of specialist programmes and best practice must be followed. Further advice can be obtained from Historic England if required.

## ***5.1 Use of Rectified Images***

Choose the best aerial photographs that include control information and the most archaeological information. Several sources may be required. Once the major elements of a site have been transcribed, it is acceptable for minor details to be sketch plotted if necessary, for example, when a key photo has no control.

## **5.2 Use of Google Earth Images and other georeferenced data**

Where appropriate use Google Earth and other additional sources of imagery (Lidar, APGB etc.) which do not require rectification as they usually come with georeferencing information.

## **5.3 Control points**

Control points are distinct locations that you can see on both the map and the aerial photograph (e.g. junctions of field boundaries). They are necessary for both manual and digital transcription techniques.

Control points need to be:

- Well placed: Evenly spread to surround all of the archaeology as only the area within the control points is accurately rectified. Also avoid placing control points in alignments as this reduces the variables available. Ideally use at least 6 or 7 control points: the more control points used, the less the average error and the better the overall accuracy.
- Actually visible: only use control points you can actually see on both the photograph and the map. E.g. for buildings make sure you can see the foot of the wall, not just the roof (using roofs will add a height displacement).
- Preferably using “hard” detail. Try to avoid “soft” control points; be aware that hedges and other boundaries can be over a metre wide in the field, but are mapped down their centre as a single line. If you have to use streams and hedges use an intersection at their centre to reduce the overall error. Some maps have standardised road widths; again, use the intersection (e.g. of a field boundary) with the centre line of the road.

Understand the quality and limitations of the base-map you are using. The accuracy of your mapping will be within the range of accuracy of the base map that you used for control, no matter how accurate a fit you get to the map. You should aim for an accuracy of 2m or less at each control point.

## **5.4 Lidar visualisations**

Lidar data should be acquired in a format suitable for visualisation – this will usually be environment agency .asc format from the Data.gov.uk. Suitable software (GIS or the Relief Visualization Toolbox) should be used to create visualisations. A 16 direction hillshade should be used as a minimum but other visualisations should be used as appropriate.

Contact the Historic England Aerial Investigation and Mapping team for advice.

The Relief Visualization Toolbox is free software developed by Institute of Anthropological and Spatial Studies at the Research Centre of the Slovenian Academy of Sciences and Arts funded by Slovenian Research Agency ArchaeoLandscapes Europe project funded by European Commission's Culture programme. <http://iaps.zrc-sazu.si/en/rvt#v>

# 6 Mapping Guidelines

Archaeology is traced off geo-referenced and rectified aerial photographs using AutoCAD or a comparable drawing or GIS package. The components of archaeological sites are depicted as a series of standardised layers or attributes depending on their form; for example as banks, ditches or structures. Additional layers/attributes can be used if a project remit requires it. A monument polygon must be created to define the full extent of each monument record in the Monument database.

All GIS systems work on the basic principal that all features are points, lines or polygons. The use of points (usually depicted by symbols) in AutoCAD and other drawing packages is to be avoided because of problems of migration into GIS systems.

## **6.1 General guidance on transcription**

- 6.1.1 Draw the extent of each component on different layers depending on the form: bank, ditch, etc.
- 6.1.2 Draw features to an appropriate level of detail. This will depend on the scale of photo and the quality of the rectification.
- 6.1.3 Use the minimum number of nodes/points possible – as a guide, remember that your data will usually be viewed at 1:2500 or smaller scales, such as 1:10,000 or 1:50,000 scale.
- 6.1.4 Use polygons to depict as many features as possible. For example, it is important to depict archaeologically significant changes in width such as thickened terminals.
- 6.1.5 A single line depiction may be acceptable for certain monument types in exceptional circumstances. This must be agreed with all stakeholders and detailed in the project design.
- 6.1.6 Features should be drawn to the appropriate level of detail, using an appropriate number of nodes.

## **6.2 General guidance on drawing Monument Polygons**

- 6.2.1 Well defined and accurate Monument Polygons make it easier to read / view data in GIS, especially in busy

areas, and will assist with monument evaluation, research and protection.

- 6.2.2 Most monuments are defined by a single Monument Polygon although dispersed sites can be defined with multiple Monument Polygons. The unit of record in the monuments database will define the extent of the polygons; therefore all decisions will be based on the nature of the archaeological evidence.
- 6.2.3 Generally describe features in a single monument record when overlapping phases cannot be clearly identified in a complex site. If there are overlapping monuments from clearly different periods then these should be described in separate records. For a site with apparently continuous multiple phases, even when separate phases can be distinguished, use a single monument record where the possible relationships between the phases can be explained. Record dispersed features of the same period separately, unless they form parts of the same site, for example dispersed elements of a medieval settlement or an airfield.
- 6.2.4 Monument Polygons must indicate the extent of the monument as recorded in the database, not just the parts drawn as part of the process.
- 6.2.5 Monument polygons must indicate the full extent of the site, not just the component parts. For example the monument polygon for a three sided enclosure must include the interior of the enclosure, not the extents of the three sides only. Avoid using circles on non-circular sites – the monument polygon should roughly reflect the shape of the monument.
- 6.2.6 A large buffer area is not required. If there is the possibility, but no evidence, of further features, this must be explained in the descriptive text, for example satellite burials around a barrow or the continuation of a settlement or road.

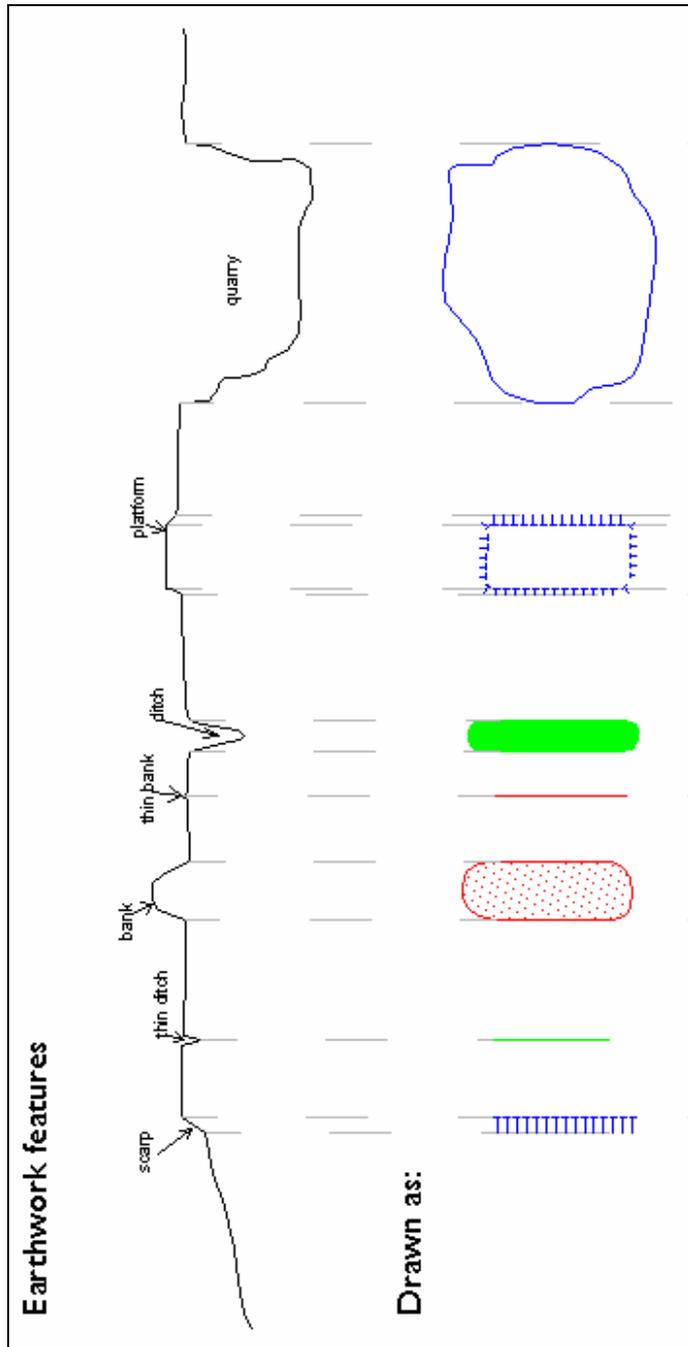
### **6.3 *Data standards for attributes***

- 6.3.1 The standard layers are listed below.
- 6.3.2 Standards for meta-data for mapping are still being developed. The minimum standard for meta-data is the monument record number that must be attached to all

relevant parts of the mapping.

- 6.3.3 “Short hand” monument data is replicated as meta-data in the mapping for some projects, for example those using AutoCAD instead of GIS. This typically includes monument number, period, site type, form of remains, and photo reference. This data must replicate the entries in the monument record. Other data which can be attached includes project data although this is also kept in the Historic England maps database.
- 6.3.4 Project meta-data is attached when mapping is imported to the Historic England corporate GIS.

## 6.4 Example of depiction of some layers/attributes



## 6.5 layers/attributes

Digital mapping must be supplied to the Historic England Archive (EHA) in standard format. Any extra layers/attributes must be defined in the project design and agreed with stakeholders, including the relevant HER/SMR.

LAYER NAME	COLOUR	DESCRIPTION
ANTI_TANK_CUBES		Non-standard layer. Continuous line indicates the extent of anti-tank cubes
BANK	Red (1)	Use to outline banks, platforms, mounds and spoil heaps .
BARBED_WIRE		Non-standard layer. Continuous line indicates the extent of barbed wire.
DITCH	Green (3)	Use to outline cut features such as ditches, ponds, pits or hollow ways.
EXTENT_OF_FEATURE	Orange (30)	Use to depict the extent of large area features such as airfields, military camps, or major extraction.
MONUMENT_POLYGON	White (7)	Use to indicate the extent of the monument record as defined in the NRHE or HER database.
RIDGE_AND_FURROW_AREA	Cyan (4)	Use to outline a block of ridge and furrow. Attributes should indicate if levelled or extant earthwork.
RIDGE_AND_FURROW_ALIGNMENT	Cyan (4)	Line or arrow(s) (hand drawn not a symbol) depicting the direction of the rigs in a block of ridge and furrow. Attributes should indicate if levelled or extant earthwork.
STRUCTURE	Purple (190)	Use to outline structures including stone, concrete, metal and timber constructions e.g. buildings, Nissen huts, tents, radio masts, camouflaged airfields, wrecks, fish traps, etc.
SCARP_SLOPE_EDGE	Blue (5)	The top of the "T" indicates the top of slope and the body indicates the length and direction of the slope. Use to depict scarps, edges of platforms and other large earthworks.

# 7 Monument Recording Standards

The guidelines refer to specific requirements for monument recording. Therefore these guidelines should be used with the Historic England National Record of the Historic Environment (NRHE or AMIE) Monument Recording Guidelines, or relevant HER/SMR monument recording guidelines.

Standards for HER/SMR can be found at <http://www.algao.org.uk/Cttees/HERs/HERStandards.htm>

## **7.1 Unit of record**

The archaeological nature of the site determines the unit of record. Use different monument records to describe distinct sites of clearly different periods. Use a single record to describe an archaeological site, such as a cropmark complex, where overlapping phases cannot be clearly dated. Use a single monument record to describe a site comprising dispersed, but clearly grouped, elements, such as a medieval settlement. Do not use single monument records for very dispersed (more than 200m apart) features– these should be recorded individually unless they form part of a coherent archaeological complex. A monument record should describe the full extent of the monument; do not use separate monuments for administrative convenience according to OS quarter sheet or modern field boundary.

## **7.2 Core fields**

### **7.2.1 Location data**

A single grid reference for the centre of the site is the minimum required for monument recording. In cases where the elements of the sites are dispersed try to give a grid reference which corresponds with part of the site i.e. try to avoid giving grid references which fall in a blank area, even though this may be the centre of the site. This may be unavoidable but should be explained in the text. A polygon depicting the extent of the site/monument (or multiple polygons for a dispersed monument) must be created in AutoCAD or GIS. Record County/District/Parish.

### **7.2.2 Indexing (period, monument type, evidence)**

A record of the date/phase, monument type and evidence is mandatory. It must reflect the chronology and interpretation expressed in the summary text. It is intended to aid retrieval, and should not be considered as a statement of fact. Multiple phases should be used where appropriate.

Use indexing that aids retrieval; in the case of most sites, this will often just be the “broad term”. Narrower terms should be used appropriately and according

to the time constraints of a project. For example a medieval settlement, or other sites comprising several elements, should be indexed according to its broad term and narrower terms for the main components described in the summary text. However the indexing should not include an exhaustive list of all components unless project time, and searching requirements, permits. Some site types, such as a field system, will not usually require narrow index terms such as field boundary, ditch, or bank unless there are unusual components, such as a pit alignment.

Use the latest evidence term for the monument, as seen on the latest available aerial photographs. Therefore this will usually be “CROPMARK”, “EARTHWORK”, or, “LEVELLED EARTHWORK”. “DESTROYED MONUMENT” is only used when all sub surface features are known to have been removed e.g. quarried away. The monument description should include a summary of changes, such as whether a feature was seen as an earthwork and then ploughed level.

Try to avoid general period types, such as “Prehistoric and Roman” and “Early Medieval or Later”. Monuments should be multiple-indexed with the appropriate periods.

Military sites should be indexed using the appropriate terms for the main elements of the site - use only the top level or broad terms e.g. it is sufficient to index an airfield with the Monument Type MILITARY AIRFIELD only, unless there are particularly interesting or surviving elements of the site, for example if the watch office or hangars survive or there are structures of an unusual type. Please note that although the drawing layer “Structure” is often used for military sites, only use “STRUCTURE” as a Monument Type when a feature forms a major part of a site and there is no alternative Monument Type or you don’t know the function. Use the appropriate Evidence Term according to NRHE/HER guidelines e.g. “EXTANT STRUCTURE”, “DEMOLISHED STRUCTURE”, or “RUINED STRUCTURE”, “EXTANT BUILDING”, “DEMOLISHED BUILDING”, “RUINED BUILDING”, and “LEVELLED EARTHWORK”.

### **7.2.3 Text/description**

Text should be clear and concise, using full sentences in grammatically correct non-technical English. Abbreviations, acronyms or “?” should not be used. The text should be suitable for heritage professionals, other professional groups and the general public. Use terms such as “listed” or “scheduled” carefully, to avoid confusion with the designated descriptions which have legal status.

In the NRHE database, there are two text fields, Summary and Long text. Projects using HER or stand-alone project databases must use a similar system.

The Summary text comprises a brief description of the site as currently and previously interpreted. Ensure that the summary covers all aspects of the

monument, not just those relevant to the air photo evidence. Period/date, monument type, form of remains, and main source (which may not be APs) should comprise the first parts of the summary text. The summary should include a brief description of the form/arrangement of elements of the site, any connections with other monuments, and any significant topographical observations. For certain sites, such as earthworks or military sites, include the dates of relevant aerial photographs to indicate the condition of the monument i.e. which parts of any particular archaeological site survive or have been levelled and/or destroyed. Grid references and detailed site descriptions should not be included in the summary text.

The Long Text comprises an incremental record of each addition to the record. The long text can provide more detailed location information where necessary. For example, grid references may clarify the relationships and locations of the main elements in the site. Use the long text to explain any discrepancies or developments in the interpretation/location of the site compared to previous text. Allocate a number, or numbers, to each relevant piece of text, corresponding to the list in the Sources/References section of the database.

#### **7.2.4 Sources/references**

Sources must list the key aerial photographs that best illustrate the site, always list both frames of a stereo pair. Sources will usually (but not always) include the rectified photographs used for mapping. Any other sources mentioned in the text, must be listed e.g. any map sources, including date and scale (if known), bibliographic sources, other unpublished surveys, excavations etc. Sources numbers must correspond to those referred to in the long text. Air photo sources must be in standard format, see below for details.

#### **7.2.5 Other Monument numbering schemes**

Enter the relevant SMR/HER number (or the NRHE number for those using HER systems). Add other numbering schemes/identifiers e.g. Scheduled number (SAM/RSM etc), Roman Road number.

#### **7.2.6 Child Monuments and Associated Monuments**

References to other records mentioned in the text. In the NRHE database, there are two ways of doing this, a parent-child relationship or associated monuments. Parent-child monument links should be used for hierarchical relationships otherwise use associated links. Professional judgement should be used in projects to determine the level of monument recording required for complex monuments. For example parent child relationships should only be created when the individual components of a large military site are of exceptional interest. Also monuments should only be given associated links if there are valid archaeological links which are mentioned in the text.

#### **7.2.7 Compiler/role details**

This is mandatory data in the NRHE database. It comprises the name, role (Air Photo Interpreter (API)), the date of the creation of the record, and the location.

### **7.2.8 Event**

In the NRHE database the event module describes a variety of archaeological investigations, e.g. excavations, desk based assessment, field survey, aerial survey etc. The event record provides a brief description of methodology, objectives, and extent of a particular project. This record is linked to each monument record created and can be used to analyse or export project results.

### **7.2.9 Archives**

This does not apply for projects using non-NRHE systems. Project coordinators using NRHE systems are responsible for requests for archive numbers and for links to archive records in monument records. In the Archives module of the NRHE database, the Historic England Cataloguing Team create a Project archive object record (a 'Series') for the whole project. An Archaeology File (AF) archive object record is created for the whole project, and child archive object records for each quarter sheet. Link each NRHE monument record created or amended as part of a project to the appropriate child archive object record for the relevant quarter sheet.

### 7.3 Database Structure

These are the minimum requirements for Monument recording based on the NRHE database. There may be slight differences in structure to HER/SMR databases. See above for more guidance on content and recording.

DATABASE FIELD		DESCRIPTION
Unique identifier		Monument number
Summary text		A brief description or “site map”
Long Text		Incremental text added as knowledge of the monument grows. May provide more detailed interpretive and location information.
Sources	Title	Use to distinguish type of source e.g. oblique photograph, vertical photograph, website etc
	Source Number	Number which relates the source(s) to the relevant parts of the Long Text.
	Comments	Free text field with all references sited in long text (including air photos etc)
Period		EH/ALGAO compliant terms to be used
Type		Use the Historic England thesaurus terms or equivalent.
Evidence		Latest known physical evidence of the site e.g. earthwork, cropmark, levelled earthwork
County/District/Parish		
NGR		One central NGR per monument.
	100km square	e.g. SU
	easting	
	northing	
Other numbering schemes		NRHE and/or HER numbers, SAM numbers etc
	Identity Method	e.g. SMR Number (Hampshire)
	Value	Monument UID
Links to other monuments	Monument number	
	Type of relationship	Parent/Child or general association etc
Roles	Name	
	Date	
	Organisation	
Event		project event number attached to records created or amended.
Collection/archive		NRHE database only

## 7.4 AP Source Formats

For information on references in reports, posters etc see copyright guidelines below.

Record sources as consistently as possible in anticipation of any future links between datasets (e.g. Airphotonet), and where these sources are available to the public on the web (Pastscape and the Heritage Gateway). In the NRHE database each source is tagged with a source type, called a GAM code.

All projects must use the formats listed below when recording AP sources in the Historic England Archive, HER or project database. Each source must have a number which links to the relevant piece of text in the long text/description.

### 7.4.1 NRHE Monument source types commonly used for aerial investigation

- 406 Vertical aerial photographs
- 409 Oblique aerial photographs
- 410 Light detection and ranging (lidar) airborne survey
- 427 Ordnance Survey map (enter scale/date in comments field)
- 416 Personal communication (name/date in comments)
- 431 API comment (enter name/date/project in comments field)
- 435 website
- 422 External reference (usually for bibliographic sources)

### 7.4.2 Examples of references for aerial photographs supplied by the Historic England (formerly Historic England Archive formerly part of the NMR):

Note that although the photo ref is simplified, the copyright is still different depending on date (see guidelines).

#### Obliques:

Obliques taken by RCHME/EH:

Use format **source film frame date-flown** for *anything* taken by RCHME/EH/HE, born digital or otherwise. NB omit the old 'index number' based on NGR.

Prints                      Historic England Archive NMR 12345/6 23-AUG-2001

Born digital                Historic England Archive NMR 12345\_001 21-MAY-2012

For born digital the underscore and leading '0's are required to search the digital image archive i.e. the frame number should always be expressed as 3 digits.

Obliques not taken by RCHME/EH/HE in the HE Archive:

Use format **EH source code EH film frame date flown (original number)**

Individuals                    Historic England Archive TMG 4559/55 15-JUL-1988  
CUCAP                    Historic England Archive CAP 7938/42 07-APR-1949 (XYZ123)

Aerofilms                    Historic England Archive AFL 60009/EPW000041 JAN-1920  
Uncertain date                    Historic England Archive CCC 5208/06729 1930s

**Military Obliques:**

Prefix with 'RAF' and use the Original Number, frame number and date, so  
Historic England Archive RAF/106G/UK/1726/FFO-0012 09-SEP-1946  
Historic England Archive RAF/541/334/PO-0167 05-JUL-1949

**Verticals:**

Include sortie, camera position, frame(s) and date

Historic England Archive RAF/106G/UK/1944 V 0086 14-MAY-1946  
Historic England Archive RAF/58/3021 F21 0174-0175 22-JUN-1952  
Historic England Archive MAL/63880 V 110312-110313 25-MAR-1963  
Historic England Archive OS/71345 V 031 19-MAR-1971

**7.4.3 Format of references for aerial photographs supplied by CUCAP**

**Obliques:**    CUCAP BW13 23-JUL-1982  
**Verticals:**    CUCAP RC8HP 075-076 30-MAY-1985

**7.4.4 Format of references for aerial photographs supplied by SMRs / HERs or other sources:**

Use an appropriate format used by the relevant body (include reference numbers and date of photograph), preceded by the name of the organisation in full.

**7.4.5 Format of references for lidar tiles**

There are two ways of using lidar data (interactive or jpeg/TIFF etc), so there are two types of lidar references, although both follow some standard rules. Lidar tiles, like obliques, need a reference to both the location and the source. This is particularly true for the Environment Agency tiles that need to make reference to the tile number (e.g. D0048684) as well as the NGR (e.g. SU 0856), because there are many examples of multiple cover of a given area.

The reference therefore needs to be:

LIDAR – Image reference (i.e. the SW corner of the image be it 2kmx2km or 1kmx1km etc.) – Source (e.g. Environment Agency) Dataset (i.e. tile reference or 1st or last return or processed DTM) - Date flown (This may be reduced to Month if data unavailable)

**Environment Agency jpeg tiles:**

LIDAR SU0854 Environment Agency D0048684 01-JUN-2007.

**Interactive tiles:**

LIDAR SU2666 Cambridge Unit for Landscape Modelling DTM 06-APR-2006

LIDAR ST5252 Cambridge Unit for Landscape Modelling LAST RETURN 01-APR-2006

LIDAR SD3872 Environment Agency LAST RETURN 01-JUN-2007

**7.4.6 Format of references for Aerial Photography for Great Britain aerial photos**

Next Perspectives APGB Imagery SU1455 01-JUN-2006

**7.4.7 Format of references for GoogleEarth**

In AMIE, use the vertical photograph General Archive Material (GAM) number 406.

EARTH.GOOGLE.COM 31-DEC-2001 ACCESSED 20-APR-2009

**7.4.8 Format of references for Web sites**

In AMIE, for the reference to successfully load into PastScape it is imperative that you include http://

Including the punctuation and spaces, the format should be:

Author [fullstop space] Year [fullstop space] Title [comma space] Publisher [space] <url> [space] [Accessed DD-MMM-YYYY]

# 8 Quality Assurance

## 8.1 QA background

Historic England Aerial Investigation and Mapping team provide general advice and perform Morphe compliant Quality Assurance on mapping and recording. **The QA process must be specified and timetabled in the project design.** Up to 5% of the total project area will be QA'd, distributed across the project area.

The precise areas to be looked at will be decided during the project and depend on how much each team member completes and the nature of the archaeological remains visible on aerial photographs.

For Morphe QA, the areas must be completed i.e. all mapping and recording finalised *and* checked. Any ongoing issues can be discussed informally with the Historic England Aerial Investigation and Mapping team.

## 8.2 QA, set up

- 8.2.1 Agree a timetable for QA for each team member in accordance with the QA strategy and timetable as set out in the Project Design.
- 8.2.2 Check sphere of interest/scope of the project as detailed in the Project Design (PD). Any variation from the PD must be agreed and discussed with the Quality Assurance Officer and the NHPCP Project Assurance Officer before implementation. e.g. mapping/recording policy on quarries, military features etc.
- 8.2.3 Choose suitable areas for QA (up to 5% per person, as specified in the PD). This will include a good range of archaeology/landscape completed by each team member. It may also include an area where there is an issue, for example with interpretation or depiction.

## 8.3 Quality Assurance Check List

- 8.3.1 Before QA, Expert to complete mapping and monument recording

Supply all photos (including online sources) for the area to be QA'd, not just those used for mapping.

Supply all rectified photos, RDA data and digital maps for QA areas

Supply all NRHE/HER monument records, not just those amended

Supply drawing in format readable in AutoCAD with "clean" layer structure – remove all x-ref's, extraneous layers etc. Remove all attached images.

### **8.3.2 Assessment of survey technique:**

Assess if all photos, and other sources, viewed properly and efficiently.

Assess standards of scanning e.g. dpi appropriate to scale of photos, appropriate amount of image manipulation (levels/contrast etc).

Assess if too few, or too many, photos rectified. Some sketch plotting is acceptable.

### **8.3.3 Assessment of rectification:**

Check standards on errors (e.g. mostly 2m or less), numbers of control points (too many, too few, good spread etc)

Check use of appropriate base map, output scale and dpi per photo

### **8.3.4 Assessment of mapping against transcription standards:**

Check import of APs

Check accuracy of depiction (i.e. accurate transcription) and appropriate level of detail e.g. too much/too little polygonisation, number of nodes used (too many, too few).

Check Object Data standards against project design. Is the team/project recording consistent.

Check strategy for edge checking.

### **8.3.5 Assessment of monument recording against database recording guidelines:**

Check all monument records for area to see if appropriate records are amended. Check all records in detail (Complete Monument Reports).

Check monument record interpretations against AutoCAD mapping.

### **8.3.6 Feedback:**

QA person to discuss mandatory amendments and suggestions for future practice face to face with the air photo interpreter.

QA person to document general suggestions and mandatory individual changes. This is for the project team and for project reviews.

Project team member to communicate which QA changes made.

# 9 Guidelines on copyright and acknowledgements

## 9.1 Acknowledgements generally

Photographs, base maps (including contour data) and air photo mapping must be referenced correctly in PowerPoint presentations, reports, publications and web material. Copyright permission and referencing information must be sought for anything sourced from the Historic England Archive, CUCAP, SMR/HERs or other third parties. Remember that the Historic England Archive, and HERs etc, do not always hold the copyright for an image in their collection so *you must double check permissions with the Historic England Archive, HER or relevant organisation.*

For publications, the Historic England Archive, and other relevant organisations, must be approached to agree likely numbers of images and resultant costs etc. When sourcing images for publication: browsing for obliques in the red boxes at the Historic England Archive is relatively straightforward but you will also need to organise access to born-digital images as these have not been printed since May 2010. The Historic England Archive need a good notice period to pull any verticals or military obliques – it would be preferable if any requests for cover searches are as specific as possible when ordering verticals e.g. specific prints, or when you want to look at areas, keep them small and, where possible, detail specific year(s) of photography required.

When images are identified for publication, scans must be ordered from the Historic England Archive, – these are done from the negative (when available) and are much better quality. This takes about 3 weeks subject to demand and the number of images ordered.

## 9.2 Ordnance Survey mapping

NB: please see further below for information on APGB Contour data

Ensure you have permission to reproduce OS mapping at the scale you need, either as an Historic England contractor carrying out core Historic England business or from your employer.

The standard acknowledgement for users of Historic England supplied OS data, which must be used on any map images:

© Crown Copyright and database right 20XX. All rights reserved. Ordnance Survey Licence number 100019088. (Where 20XX is the year the document is published)

### **9.3 Historic OS mapping**

Acknowledgement should include the date and original scale of mapping. Historic England supplied historic OS data must include the following copyright statement:

© and database right Crown Copyright and Landmark Information Group Ltd (All rights reserved 20XX) Licence numbers 000394 and TP0024. (Where 20XX is the year the document is published)

### **9.4 Mapping**

To maintain the national dataset, all mapping is Historic England copyright but may be licensed for use subject to terms and conditions.

Copyright on projects funded through the NHPCP normally rests with the commissioned organisation or Historic England. These may be licensed for use subject to terms and conditions.

Mapping must be credited with copyright information and acknowledge Historic England. Where the illustration includes a base map include words to the effect “**The base map is...**” to distinguish the base mapping from the archaeological mapping which are subject to different copyright.

### **9.5 CUCAP**

You must *always* ask permission for use of *any* CUCAP images irrespective of where they are held. Refer to the Cambridge Collection as *Cambridge University Collection of Aerial Photography (CUCAP)*. Acknowledge CUCAP in the project report for the use air photographs during the project.

### **9.6 English Heritage/Historic England Archive Aerial Photographs**

You must check copyright of all photographs supplied by the English Heritage/Historic England Archive. Do not assume the archive holds the copyright because you received the photo in the loan. Photographs must be referenced in a standard way (see below) with the relevant copyright credit unless a different format is specified by a third party copyright holder or the Historic England Archive. Where rights are not managed by Historic England, written permission must always be sought from the copyright holder before an image is used or reproduced in any way. The copyright holder will specify how they would like the image to be credited.

#### **9.6.1 Examples of credit lines for oblique photographs:**

If taken by RCHME before 1<sup>st</sup> April 1999 ©Crown copyright. Historic England Archive

Crown Copyright has a 50 year duration



You must check who holds the copyright for lidar data – don't assume it is Historic England. There are two ways of using lidar data - interactive data or jpeg/TIFF etc – which require different references. Lidar tiles, like obliques, need a reference to both the location and the source. This is particularly true for the Environment Agency tiles that need to make reference to the tile number (e.g. D0048684) as well as the NGR (e.g. SU 0856), because there are many examples of multiple cover of a given area.

Therefore, the tile reference must include: LIDAR - *Image reference* (i.e. the SW corner of the image be it 2kmx2km or 1kmx1km etc) – *Source* (e.g. Environment Agency) Dataset (i.e. tile reference or 1<sup>st</sup> or last return or processed DTM) - *Date flown* (This may be reduced to Month if data unavailable)

### 9.7.1 Environment Agency jpeg tiles:

For single original tiles use:

LIDAR SU0854 Environment Agency D0048684 01-JUN-2007.

For composites use:

LIDAR SU0854 Environment Agency DSM 01-JUN-2007 where the date is the date for the latest main tile used in the composite.

The copyright statement must be included in reports, publications or  
© Environment Agency copyright 200X. All rights reserved

For tiles where the interactive data has been used:

LIDAR SU2666 Cambridge Unit for Landscape Modelling DTM 06-APR-2006

LIDAR ST5252 Cambridge Unit for Landscape Modelling LAST RETURN 01-APR-2006

LIDAR SD3872 Environment Agency DSM 01-JUN-2007

For a new image created from interactive lidar data owned by a third party:

It is important to record both the copyright and the source. In most cases the copyright will belong to Historic England because the processing of the data counts as “added value”, but in others the image itself may have been processed by a third party. If required, contact Simon Crutchley for advice.

E.g. © Historic England; source Cambridge Unit for Landscape Modelling or  
© Peter Crow – Forest Research; source Cambridge Unit for Landscape Modelling

N.B. This relates to the creation of images from interactive lidar data **not** the manipulation of lidar jpeg tiles.

If you use the Relief Visualization Toolbox please acknowledge this in the report with the following:

Kokalj, Ž., Zakšek, K., Oštir, K. 2011. Application of Sky-View Factor for the Visualization of Historic Landscape Features in Lidar-Derived Relief Models. *Antiquity* 85, 327: 263-273.

Zakšek, K., Oštir, K., Kokalj, Ž. 2011. Sky-View Factor as a Relief Visualization Technique. *Remote Sensing* 3: 398-415.

## **9.8 APGB air photos, contour data etc**

Digital aerial photographs and height data are supplied to Historic England through an agreement called Aerial Photography for Great Britain. This is managed by a consortium called Next Perspectives made up of three companies – Airbus Defence and Space (formerly Astrium / Infoterra), Bluesky International and Getmapping. The data sometimes comes from different sources but our contact is directly with Next Perspectives and it isn't obvious which of the three is supplying what. Getmapping are the lead partner in the consortium and they manage the agreement on behalf of the others.

Contractors working on partnership projects can use the data subject to contract.

The Historic England contracts with data suppliers are subject to change so if you need more information ask Helen Winton, Simon Crutchley or Matthew Oakey.

### **9.8.1 General acknowledgement:**

“Images supplied to Historic England through the APGB agreement by Next Perspectives”.

### **9.8.2 Example of reference for APGB aerial photograph**

SU1455 01-JUN-2006 + copyright

NB: A slightly different reference is used for monument records – see monument recording guidelines on sources for monument records.

### **9.8.3 Copyright acknowledgements:**

“RGB Aerial Photography – ©Bluesky International/Getmapping PLC.”

“Height Data – ©Bluesky International/Getmapping PLC.”

“Height and RGB Aerial Photography – ©Bluesky International/Getmapping PLC.”

## 10 Contact details

Suggestions for amendments or corrections are welcomed. For this, and information on any aspect of this document, please contact:

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<https://www.historicengland.org.uk/research/current-research/discoveries/terrestrial-landscapes/>