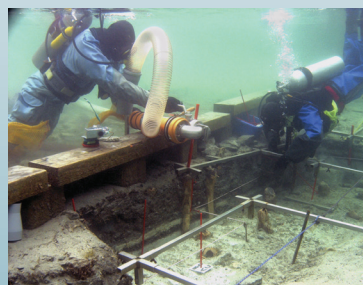


A STANDARD AND GUIDE TO BEST PRACTICE FOR ARCHAEOLOGICAL ARCHIVING IN EUROPE

EAC GUIDELINES 1



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FOREWORD



from the President of the EAC



As archaeology has developed from object-based studies to more complex contextual and scientific analyses, a comprehensive archive has been developed, which comprises written records, drawings, photographs and digital data. Finds assemblages have also diversified, so that they now include, as well as the typical range of artefacts, environmental remains, waste products and a variety of samples taken for further analysis.

From the outset, archaeologists have taken responsibility for the preservation of finds but it was some time before they began to appreciate the importance of the records both as primary evidence and the only thing that will survive of a specific site. This archive is therefore critical to the preparation of the final report and subsequent publications but also constitutes a knowledge base which will be essential in any revisiting of the conclusions and interpretations in the light of new data collected by future archaeologists.

Going beyond the needs of scientific research, and with the increasing popularity of archaeology, this documentation is also of interest to other users, for example teachers and academics needing material for illustrations, and supports public dissemination through exhibitions, conferences and publication. It is also an essential source of information for those authorities responsible for the planning of modern development.

Many large archaeological units or research teams have evolved their own archiving systems, sometimes in a very sophisticated way, and some European states have published guidelines for the preparation of archives but no general principles and overall guidelines for use across Europe had previously been formalised.

In 2008, the *Europae Archaeologiae Consilium* (EAC) decided to examine the question of archiving archaeological documentation. The working group created by the EAC following that decision brought together several specialists from a number of member countries and secured the establishment of the ARCHES project supported by the Culture Programme 2007-2013 of the Education, Audiovisual and Culture Executive Agency of the European Union.

The authors of this document are fully aware that the structure of archaeological research and services in each country is the result of the history and the political and administrative organisation of that country and of its prevailing economic conditions. The “Standard and Guide” does not require a specific type of organisation but sets the high level principles which all archaeologists should bear in mind when starting an archaeological project or planning an overall organisation of their archaeological archives. It sets out best practice procedures applicable throughout the whole process of archiving, from the very beginning of an archaeological project to the transfer of the archive to a permanent repository. It also includes a checklist of all the issues which need to be considered and makes useful technical recommendations.

The expertise of the members of the working group and their personal involvement in this field, have enabled them to produce the following “Standard and Guide to Best Practice for Archaeological Archiving in Europe”. This document represents the state of the art in the field and sets a standard for an ideal archaeological archiving system which the EAC is proud to support and disseminate. We encourage our members to work towards its adoption or integration in national guidance wherever appropriate.

The EAC Board wishes to thank all the many specialists who dedicated their time to the working group and participated in the ARCHES project to develop this Guide, the importance and usefulness of which cannot be doubted.

THE ARCHES PARTNERSHIP



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1. INTRODUCTION

Archaeological narratives of past socio-economic and cultural developments can give meaning and context to the present day life of each human being. They position the individual in the continuum of human development and history and help in coming to grips with the temporary nature of human existence and the relative nature of culture.

Archaeological narratives are based on research activities. By its very nature, archaeological field research destroys its own evidence by removing objects from their context by excavation. This makes archaeology unique compared to other scientific disciplines. As observations in the field can never be repeated, the process of excavation must be carefully registered and documented.

The objects found during the research are stored in archives, usually, but not always accompanied by the documentation recording the original find circumstances. This documentation is often called the raw or the primary data, consisting of field drawings, maps, databases registering the finds, reports, photographs, results of laboratory analyses etc. These primary data, together with the physical finds, are the closest we can ever get to the lives of past generations and especially non literate ancient cultures. These data and objects are the primary source of archaeological information. They are essential archaeological heritage which needs protection in its entirety. Only when this heritage is preserved in the archive in its entirety will it be possible for future generations to use the evidence to create their own narratives.

Archaeologists study the remains and their find circumstances before they are moved to the final archive. The results of their researches are published in monographs and articles which are shared among colleagues, sold on the market and made available through various channels of dissemination. These results are “static”, created on the basis of the knowledge of their epoch. Future scientists will have more data and more information available and re-assessment and recombination of the information of earlier research is likely to occur. To make the archaeological evidence and results sustainable, it is of vital importance to ensure that archaeological archives are easily accessible, legible and comprehensible for future generations.

The storage and accessibility of publications in libraries is well organised and governed by international standards of



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annotation and disclosure. The storage of the finds in the archives, together with the descriptive documentation is less standardised. The actual procedures followed are often built on local practice, unregulated by national or international bodies. This hampers the accessibility and the reuse of the available resources for scientific, educational or managerial purposes.

Today a wide spectrum of users needs access to archaeological archives such as: archaeologists operating in excavation units both in the public and the private sector, non-archaeologists such as civil servants responsible for local land use policies, landscape architects who want to incorporate archaeological added value into their development plans, citizens with various purposes, solicitors contesting claims and more. Since archaeological documentation has become increasingly reliant on digital technologies, the archaeological archives are, alongside the libraries, becoming increasingly important as central repositories of our knowledge of the past.

The ARCHES project is aimed at making the archaeological archives throughout Europe sustainable by guiding them into easily accessible collections of finds and documentation by accepted standards of procedures, ready for reuse, now and in the future by all who have a genuine interest in the past.

1.1 THE AIM OF THE GUIDE

The aim of the Standard and Guide to Best Practice in Archaeological Archiving in Europe (hereafter called ‘the Guide’) is to make archaeological data, information and knowledge available, stable, consistent and accessible for present and future generations. Archaeological archives contain material objects (finds), records and data about our past which are irreplaceable and vulnerable to damage and loss. The Guide consists of a Standard accompanied by best practice Guidance for archaeological archiving, both of which will enable archaeologists to archive properly the material and documentary results of their work. It sets out how to care for and curate that archive both before and after it is placed in permanent storage.

1.2 SUSTAINABILITY

The aim of the Guide is to make archaeological archive practice throughout Europe consistent, in order to facilitate access to and the preservation of the archaeological record. This is achieved by producing standards and best practice for the creation, compilation, transfer and curation of archaeological archives that are sustainable and open to further development.



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Direction of Monuments and Sites

An important effect of this initiative will be the management of sustainable archaeological archive repositories that promote the use of the resource they curate.

Once the Guide has been published the aim is to keep it relevant, up-to-date, and in use, thereby contributing to making the Archive repositories sustainable. This will be led and facilitated by the EAC Archaeological Archives Working Party.

The Guide will be:

Cross-domain

The EAC Archaeological Archives Working Party will make connections between archaeology and other relevant domains of cultural heritage like the built environment and cultural landscape, but also the domains of archiving science, digital collection, computer science and information management.

Participatory

It will be demand-driven by stakeholders and communities.

Standards-oriented

It will use and connect to existing international standards in archiving and description of collections on paper and in (advanced) digital environments.

The full sustainability policy produced by the ARCHES Partnership can be downloaded from the ARCHES website¹.

1.3 THE CONTENT OF THE GUIDE

The Guide comprises:

Standards for Archaeological Archiving

The Standard consists of a set of high level principles. It represents the standard for archaeological archiving that *must* be met by an archaeologist or organisation undertaking any form of archaeological work that results in an archive.

Guidance for Archaeological Archiving

The Guidance takes the principles of the Standard and expands them into fuller practical advice on how to archive the products of archaeological work. It is for use across European partner countries as a Guide for the practice of archaeological archiving and as such is designed to work alongside more

1. The European Archaeological Archiving Standards and Guidance: WP7 - Ensuring the Sustainability. <http://archaeologydataservice.ac.uk/arches>



6. © Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt, Klaus Bentele

7. © Duncan H. Brown



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detailed standards specific to international, national, regional or local requirements in archaeological practice, conservation and curatorial care. It is not meant to replace such standards already in existence. As a best practice exemplar it is hoped it will aid and advise the development of fuller local standards in archaeological archiving.

The Guidance is intended as a 'how to' manual which sets out best practice to be applied both to the process of archaeological archiving and to the care and curation of archaeological archives. It is recognised that whilst for some many of these practices may be the norm, for others they may be currently out of reach, therefore this guidance sets out exemplary practice that can be achieved over time. It is hoped that the Guidance will help in this process, by assisting in making the case for improved facilities or local procedures wherever this is necessary.

Checklist of archaeological archiving tasks and roles within an archaeological project.

The checklist is a chart which sets out the archiving tasks as the project progresses and the title of the person or persons who would normally undertake each task, such as project manager, finds specialist etc. These are written as generic tasks lifted from the Guidance section of the Guide and the names of personnel are simply an idealised example. In this format however, the chart can be used as a quick archiving checklist for those who are not familiar with the archiving process.

The Guide recognises that whilst the archaeological process remains basically the same across Europe, more detailed activities, tasks, personnel and responsibilities associated with archaeological archiving can differ from country to country and state to state. More detailed templates, therefore, will eventually be found on the ARCHES website, which tailor those procedures and personnel more specifically to current practice in national, regional or local administrative entities.

Although at the time of publication, the Guide templates have been formally adopted in only seven countries, it is hoped that as the use of the Guide becomes more widespread the EAC Working Party will contact other countries in order to add their own practices for inclusion in the Guide. Blank templates for this purpose can be found at <http://archaeologydataservice.ac.uk/arches>.

Bibliographies on archaeological archiving.

The final section consists of country, region or state specific bibliographies, which set out related standards and guidance in the practice of archaeology, conservation and curatorial care.

It is also hoped that other countries will provide bibliographical information for inclusion in the future.

1.4 HOW TO USE THE GUIDE

The Guide is aimed at *everyone* involved in any archaeological activity that produces an archive and all those involved in the care and curation of those archives, whether that archive consists of two sheets of paper detailing an archaeological observation or comprises a wealth of both documentary records and material evidence.

It is accepted that there will always be differing practices and approaches to archaeology within various European countries. For example, in many states or countries the material archive is separated for long term storage from the project documentation, whereas in others they are seen as an integral whole and are always kept together. It is right and just that differing practices exist, and this publication does not seek to challenge or change national, regional, local or other systems which work and which preserve the archive in a good condition for posterity. Rather the Guide sets out best practice principles, actions and tasks for archaeological archiving which can overlay and work alongside more detailed archaeological standards and practices that exist elsewhere.

Here, the term ‘archaeologist’ applies to all those involved in the archaeological process, such as field and finds workers, illustrators, photographers, conservator-restorers, surveyors and curators. The Guide applies equally to students and amateur archaeologists as it does to those undertaking archaeology in a professional capacity. The Guide is also intended for use by those involved in monitoring and commissioning archaeological activities.

Throughout the Guide reference is made to the practices and standards of various administrative entities that may include nations, states, regions, cantons, shires, cities or towns. It is not desirable to list all of those variants every time such distinctions are made. The phrase national, regional or local is therefore applied throughout to signify geographically defined administrative entities of all types.



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12. © Archeologický ústav AV ČR, Praha, v.v.i.

The Guide is comprised of three main sections accompanied by a bibliography and a glossary of terms.

- The Standard sets out standards which must be met by everyone involved in the archaeological archiving process. It is intended as a suite of standards for adoption by all academic, government, practising, commissioning, professional and monitoring bodies in the field of archaeology.
- The Guidance is meant to lead any archaeologist, in whatever capacity, through their responsibilities towards the archive from the very start of the archaeological process to the end result of long term curation in a repository. It follows a logical and chronological line through any archaeological activity, via the broad stages each piece of archaeological work normally follows. It sets out the practices which should be followed during these stages in order to produce a stable, ordered, internally consistent and accessible archaeological archive.
- The Archiving Checklist sets out what archiving tasks the personnel involved in an archaeological project should be doing at each stage of a project. Anyone playing a part in an archaeological project, whether this involves working in the field, laboratory or office, or in any specialist capacity, should be able to look at the templates (country and state specific ones will eventually be downloadable online)² and see when and how they need to follow the archive process at any point in an archaeological project.



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1.5 BACKGROUND TO THE ARCHES PROJECT AND THE PRODUCTION OF THE GUIDE

This publication has been produced under the auspices of the Europae Archaeologiae Consilium (EAC)³ and is the product of work undertaken by seven representative partners, taken from six countries in the European Union and Iceland as well Switzerland as an associated partner. It has been made possible by a grant from the Culture Programme⁴.

2. <http://archaeologydataservice.ac.uk/arches>

3. <http://www.european-archaeological-council.org/>

4. Culture Programme 2007-2013, Strand 1.2.1: cooperation measures, Agreement Number - 2012- 1399/ 001- 001

In Metz 2008 the EAC held a symposium on archaeological archiving, which revealed that many member countries shared common problems. The most pressing issues were identified as: variations in archaeological recording practice and the creation of consistent records as a resource; setting and sustaining digital archive standards; maintaining good curatorial practice to ensure the continuing preservation, security, circulation and accessibility of archaeological information and materials in accordance with the Valetta Convention, 1992⁵. It was unanimously agreed that a European guide to best practice and a universal standard for archaeological archives should be developed.

An EAC working party on archaeological archives was formed in 2008, and on being awarded the Culture 2007-2013 grant in early 2012 work began on the ARCHES project. This has culminated in the publication of the Guide. The Guide is based on existing standards and guidance, which have been updated and enhanced by the results of consultations and workshops in the partner countries during 2013.

Further information and downloadable copies of country specific translations of the Guide and associated documentation can be found on the ARCHES website:

<http://archaeologydataservice.ac.uk/arches>. A link to the website can also be found on the ARCHES page of the EAC website <http://www.european-archaeological-council.org/13-0-Archives.html>

5. European Convention on the Protection of the Archaeological Heritage (Revised) Valetta, 16.I.1992 <http://conventions.coe.int/Treaty/en/Treaties/Html/143.htm>



15. © English Heritage

16. © Landesamt für Denkmalpflege Baden-Württemberg, O. Braasch

2. THE ARCHAEOLOGICAL PROJECT

2.1 WHAT IS AN ARCHAEOLOGICAL PROJECT?

Throughout the Guide the term ‘archaeological project’ or ‘project’ will be used to describe any piece of archaeological activity that results in an archive.

A project is understood generally to be a temporary piece of work undertaken to meet stated goals and objectives which will operate to a timetable and an end date, deliver a product, and have defined scope and resources. It will usually have a project manager and be undertaken by one or more persons brought together for that particular activity. The term project therefore, is used in the Guide as it fits the practice of archaeology, where it is aimed at completing defined pieces of targeted work.

For the definition of an archaeological project see the Standard 4.1.

2.2 THE STAGES OF AN ARCHAEOLOGICAL PROJECT

The main stages of an archaeological project will be used to describe the archiving process throughout this Guide. They are defined as:

Planning

The start up or initiation stage, a time when: documents such as project outlines and/or designs, tenders, work specifications and methodologies, will be written; research aims and objectives identified; project scope, stages, products and tasks described; a project team identified, specialists consulted and resources allocated; temporary care and long term curation procedures and repositories identified; project review schedules agreed and communication, disaster management and health and safety plans devised. This is the stage where archive creation and compilation begins.

Data Gathering

In archaeology this stage is often applied to fieldwork but for the purposes of the Guide, data gathering means the execution stage of a project, when archaeological data and/or materials (finds) are collected. Whether the archaeologist is undertaking original research in the field, the office, laboratories or stores, this is the stage where factual data is recorded with minimal interpretation.



Analysis, Reporting and Archive Transfer

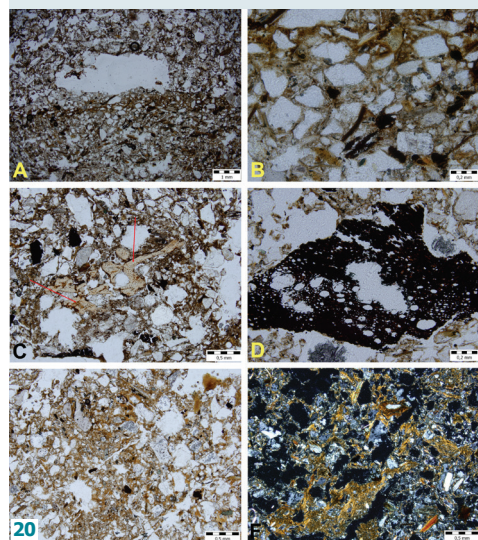
This stage is commonly called post-excavation, however not all archaeological projects will involve excavation, as for example in building recording, survey or finds analysis and this stage has been renamed to reflect modern archaeological practice. Analysis involves fuller, targeted recording and interpretation, whether that is of the field records, a finds assemblage or the results of a geophysical survey. The resulting records, such as data and images, will be included in the archive.

This stage will normally end with a final report. Different types of analysis may result in the creation of several reports, some of which will be included in the final project report. The acceptance of those reports into the project archive is an important element of creating an accessible resource.

Once analysis and reporting have been completed, it is expected that the project will no longer generate new records, materials (finds) or samples and the project archive will be compiled and prepared for transfer to a repository for long term curation.

Care and Curation

Curation is the process of ensuring that archive materials remain stable, secure and accessible in the long term. It is an ongoing process that ensures the integrity of an archaeological archive after the project has been completed but the care of all archive components is a process that should start at the beginning of a project, from the point any documentation is created or material objects (finds) are collected. Any archaeological materials or documentation created or collected from the planning stage onwards will require temporary care until transfer to a repository for long term curation. Care of the components selected for archiving is an activity which forms a thread running throughout an archaeological project and will involve both temporary care and long term curation of the documentary and material (finds) archive.



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21. © Duncan H. Brown

3. THE ROLE OF ARCHIVING WITHIN AN ARCHAEOLOGICAL PROJECT

3.1 WHAT IS AN ARCHAEOLOGICAL ARCHIVE?

Throughout the Guide the term ‘archaeological archive’ or ‘archive’ will be used to describe *any* documents or materials (finds) produced during an archaeological project and selected for archiving. For the definition of an archaeological archive see the Standard 4.1.

It is accepted that archives from archaeological projects do not strictly fit with the common understanding of the term ‘archive’, as in most cases an archaeological archive mixes together documentary archives and material collections, if not always in the same place, then always by association (in cases where the material archive is stored separately from the documentary archive but is fully cross referenced). However, whilst it is not a perfect term and from country to country the terminology or practice may differ, it is still the best and most widely accepted term for the present purpose.

3.2 WHAT IS ARCHAEOLOGICAL ARCHIVING, WHEN DOES IT HAPPEN?

Archaeological archiving is a dynamic process, which begins the moment a project is planned. Archaeological documentation and materials (finds) which add information to the sum of human knowledge of the past will be selected for archiving as the project progresses and should be managed following the Standard and Guidance presented in this document and also, where applicable, in more detailed international, national, regional or local standards. Archive creation and management are not things that only happen at the end of a project, when transfer to a repository is imminent; it is a process that maintains and protects all archaeological archive components from the outset.



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4. STANDARD FOR ARCHAEOLOGICAL ARCHIVING

4.1 DEFINITIONS

An **archaeological archive** comprises all records and objects recovered during an archaeological project and identified for long term preservation, including artefacts, ecofacts and other environmental remains, waste products, scientific samples and also written and visual documentation in paper, film and digital form.

An **archaeological project** is any programme of work that involves the collection and/or production of information about an archaeological site, assemblage or object in any environment, including in the field, under water, at a desk or in a laboratory. Examples of an archaeological project include: intrusive projects such as excavation, field evaluation, watching brief, surface recovery and the destructive analysis of objects; non-intrusive projects such as landscape or building survey, aerial survey, remote sensing, off-site research such as desk-based assessment and the recording of objects or object assemblages. The re-investigation of archives in curatorial care also constitutes an archaeological project.

4.2 COMPOSITION

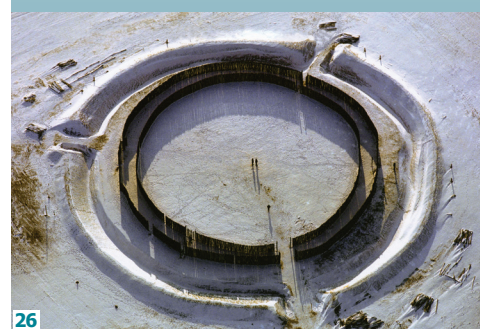
An archaeological archive consists of two main elements:

- The documentary archive comprises records and associated documentation created during the course of an archaeological project.
- The material (finds) archive comprises objects and associated samples.

Documentary Archive

The documentary archive can be comprised of:

- Drawn, photographic, written and printed material on paper.
- Drawn material on film.
- Photographs on film, transparencies, x-radiographs, videotape and microfilm.
- Digital files on hard drives or transfer media.



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und Archäologie Sachsen-Anhalt,
Gert Pie

The documentary archive may include:

Analytical results, CAD files, catalogues, correspondence, contracts, databases, digital aerial photograph interpretations, elevations, excavation archives, geophysical and other survey data, GIS files, images, indexes, maps, notes, notebooks, object images, plans, pro-forma, records, reports, satellite imagery, spreadsheets, section drawings, site photographs, specifications, text files, 3-D data.

Material (Finds) Archive

The material (finds) archive may include:

- Artefacts, such as pottery, tile, worked stone, glass, metalwork, worked bone, leather objects and textile.
- Ecofacts or environmental remains, such as animal bone and plant remains.
- Waste products, such as slag, hammerscale and off-cuts.
- Material recovered from scientific sampling, which is often the product of laboratory analysis, such as environmental samples, thin-sections, microfossil slides, casts.
- Human remains, which may require specific treatment in accordance with relevant national, regional or local standards and legislation.

4.3 PRINCIPLES

1. All archaeological projects must result in a stable, ordered, accessible archive.
2. It must be recognised that all the processes of an archaeological project affect the quality of the resulting archive.
3. Standards and procedures for the creation, selection, management, compilation and transfer of the archive must be agreed and documented in the design of every archaeological project and understood by all project personnel.
4. Ensuring the security and stability of the archive is a continuous process and a universal responsibility.
5. The entire archive must be compiled in a way that preserves relationships between each element and facilitates access to all parts in the future.
6. An archaeological project is not completed until the archive has been transferred to a recognised repository and is fully accessible for consultation.



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4.4 RESPONSIBILITY

The manager of an archaeological project has responsibility for ensuring that the archive is created and compiled to the standards described in this document.

Every person involved in an archaeological project has a duty of care towards the archive and must make sure that it is created and compiled to recognised standards, using consistent methods, and it is not at unnecessary risk of damage or loss.

Once the archive has been transferred it is the responsibility of the receiving repository to ensure that the archive is stored to recognised standards for long-term preservation, documented according to accepted internal procedures and made accessible for consultation.

4.5 STANDARDS FOR ARCHAEOLOGICAL ARCHIVES

These standards are intended to apply to all parts of the archive and all stages of the archaeological process, from planning to curation of the end product.

General standards

1. All archive items must at all times be treated carefully and handled, packed and stored in conditions that minimise the risks of damage, deterioration, loss or theft.
2. All archive items must be marked or labelled with a unique identifier related to the archaeological project and/or the repository.
3. The archive must be organised in such a way as to preserve the contextual relationship between the documentary and the material (finds) archive elements.
4. Selection criteria and procedures must be fully documented and included in the project archive.
5. Long-term storage must be conducive to preservation, security and accessibility.

Specific standards

The documentary archive

6. All types of record must be indexed and created according to consistent, accepted standards in content, format and file naming and use recognised terminology.
7. Recognised stable materials or media must be used when creating analogue written or visual records.
8. All original records, including those born digital, must be considered for inclusion in the archive.

Grabungsnummer 2008-2	
Fundort Sl	Jahr 11
Quadrat 53A	Yq 126
Fundnummer 1270	
Signatur CW	Foto <input type="checkbox"/>
	Zeichnung <input type="checkbox"/>
	Katalog <input type="checkbox"/>
Befund 4.6	
Tonauftrag	

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Paper

- Each type of written document must be ordered together prior to transfer to the repository; e.g. all drawing indexes must be packed together in sheet number order.

Visual records

- All drawings and photographs must identify the subject and where appropriate include a scale and a north sign, or other means of location/orientation.
- Media suitable for long term storage in its original form must be used for unrepeatable photographs, e.g. those taken on site during an excavation.

Digital

- A digital back up strategy must be in place at the outset of a project and implemented throughout the project lifecycle.
- Creation of the digital archive must be fully documented, with information such as software used, operating systems, types of hardware, dates, creators, field descriptions, and the meanings of any codes.
- Transfer and short-term storage media are not suitable for the long-term preservation of the digital archive and should only be used to submit digital material for permanent archiving.
- All digital files and transfer media must be free of viruses before submission to the repository.
- A digital archive index must be compiled and deposited in digital form with the digital archive.
- Long-term storage must be on permanent servers that are regularly backed up and all software and hardware must be refreshed and the archived data migrated as necessary. Hardware and software refreshment and data migration must be fully documented.
- The digital archive must be deposited in a Trusted Digital Repository where it can be preserved and maintained for the long-term future and made accessible.

The material (finds) archive

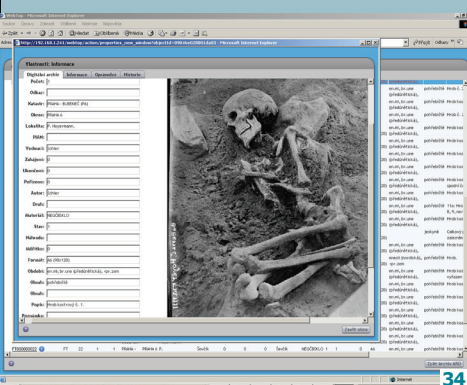
- All finds must be cleaned and/or conserved as appropriate, according to recognised standards and using consistent methods, to ensure their long-term survival.
- All finds must be marked or labelled, as appropriate, with project and context identifiers and, where relevant, the individual object identifier.



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5. GUIDANCE FOR ARCHAEOLOGICAL ARCHIVING



This section details best practice procedures for archaeological archiving throughout all the stages of an archaeological project. The workflow which follows should be recognisable to all those involved in archaeology but the actions and tasks which are described are specific to the creation, compilation, transfer and curation of a stable, consistent, accessible and sustainable archive.

The actions which apply to archiving in each project stage are explained first then the tasks which apply to these principles are set out as bulleted points.

5.1 PLANNING

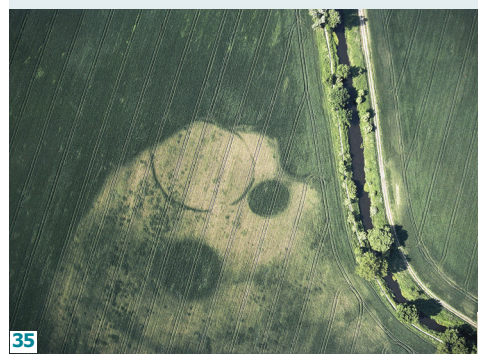
During this stage, project documentation will be produced which will set out the aims and objectives of the project, and the personnel, strategies, timetable, tasks and resources necessary for the work to take place.

This is the stage at which the archiving requirements of the project should be determined, as follows.

5.1.1 The structure and character of the future archive

The structure and character of the future archive should be agreed on and understood by all concerned, including the expected final content of the archive and how it will be managed (the Standard 4.3.)

- Standards should be set for project records (e.g. context records, object records, site plans) including their creation in both digital and analogue formats; what media will be used and procedures followed to ensure a consistent record, including digital file formats, file naming and classification schemes, metadata protocols and storage media. Where they exist, standards or conventions set in international, national, regional, local or specialist guidelines should be followed.
- The anticipated material (finds) assemblage and the archiving procedures to be followed during identification, recording, and management should be defined. This should detail the manuals to be used and any packaging, temporary storage, curation or movement requirements.
- Wherever they exist, international, national, regional, local and/or repository standards for archaeological archives and collections management should be followed.



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Ralf Schwarz

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kulturarvssýrðir

5.1.2 Selection for archive

A selection strategy should be agreed at the project planning stage. This should set out the criteria for selecting records, documents, data files and materials (finds) for inclusion in the project archive. It should also set out how things that have not been selected for archive will be dispersed or discarded. This strategy should be devised in accordance with the project research aims or management questions (the Standard 4.5). Account should be taken of any national, regional or local research frameworks and also of the collecting policies of the recipient repository.

- All components of the documentary record and the material assemblage should be subject to selection for retention in the archive at any time during the project lifecycle. Documents should be subject to version control and a clear digital management policy should be in place which enables the deletion of duplicate or superfluous digital files.
- A selection strategy should be drawn up with input from all the relevant members of the project team, including specialists and the curator of the repository or repositories into which the final archive will be received.

5.1.3 The security of the archive and disaster management planning

It is vital that security or disaster management plans are devised and implemented that safeguard the archive, and also potential archive components, from damage and loss (the Standard 5.1, 5.3). Such plans, which could be a part of the disaster management plan for the project itself, should be included in the planning documentation.

- Ensure the disaster management strategy includes the means of safeguarding the information that is contained in the archive, including the implementation of security copying or back up systems for both analogue and digital data. It should detail the standards which will be adhered to in order that the documentary and material archive will be created, collected and stored to ensure against damage, cross contamination, loss or theft.
- Ensure the disaster management strategy covers the security of the archive whilst on site/in the field, during transportation or movement of material objects (finds) and information, during analysis in the office or laboratory and in store during temporary care. Disaster plans should also be in place at archive repositories.



37. © Riksantikvarieämbetet, Jacob Wilhelm Gerss, 1807, Public domain

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5.1.4 Tasks and resources

At the planning stage the tasks and resources required for the project will be identified and allocated and it is important that the needs of the archiving process are included in these plans (the Standard 4.4).

- During the creation of the project plan, archiving activities and tasks should be programmed and timetabled. Important archiving milestones, for example obtaining landowner agreements, copyright and transfer of title agreements, or fulfilling deposition conditions, should be programmed in, and any scheduling issues which may affect these milestones should be noted.
- Qualified and experienced specialists, including conservator-restorers, should be consulted to ensure sufficient resource is identified and allocated to make the project archive ordered, internally consistent, accessible, stable, secure and properly cared for from the beginning of the project until the archive is safely deposited in an approved repository.

5.1.5 Identification and involvement of the repository

Unless national, regional or local laws or regulations dictate where the archive must go, the recipient repository, or repositories, should be identified and involved at the project outset so that the future of the final archive can be guaranteed, and the archive compiled in accordance with the repository's specifications. It is important to ensure that any national, regional or local legal regulations which apply to the project archive are followed and are described in the project planning documentation.

- Ensure that both the analogue documentary archive and the material (finds) archive are transferred to a repository, or repositories, approved in accordance with national, regional or local accreditation schemes (the Standard 4.3.6) and that the digital archive is deposited with a Trusted Digital Repository (the Standard 4.5.18). Any repository must provide nationally, regionally or locally recognised standards of curatorial care and good access to the archive for all future users.
- Ensure that the repository curators participate in the project planning process from the outset.



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5.1.6 Transfer of title and copyright

The rights of title to the archive and issues over copyright are complex and it is not possible in the Guide to go into any specific detail, as this would involve discussing varying national laws and procedures for several European countries. However, general principles do hold.

- Copyright and transfer of title, where appropriate, should be clarified and agreed during the project planning stage. If there are any copyright or transfer of title issues affecting the project archive, then it is important to ensure that these are resolved in accordance with national, regional or local legislation.

5.2 DATA GATHERING

During this stage of the project, planning is put into effect and archaeological data and materials are collected, either in the field or elsewhere.

5.2.1 Ensuring access to the archaeological archive

Project staff and researchers will need to access the archive contents both during and after the lifetime of the project. It is therefore important to document, organise and index the documentary and material (finds) archive in order to keep it comprehensible and accessible (the Standard 4.3). The following practices should be employed throughout the lifecycle of the project, with the resulting documentation also becoming part of the archive.

- It should be easy to find a way through all parts of the archive. The archive should be fully indexed, beginning with an overall catalogue of contents, which leads on to deeper levels of individual indices for other elements such as context records, finds lists and drawings.
- A project summary should be created that will introduce researchers to the aims and objectives, scope, location, content and results of the project. It should include links to any previous work undertaken on the project/site. The summary should be kept updated and complete until the project is finalised and the archive transferred to a repository.
- Project documentation should make clear how and why the archaeological records and materials (finds) were



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created, collected, selected and analysed. This could include information such as recording methodologies or sampling strategies. This is an essential tool for both the data creator and the researcher. It facilitates data management⁶ during the lifecycle of a project and also acts as an aid to understanding and interrogating the archive once the project is complete⁷.

- The application of metadata is essential for accessing the digital archive. Metadata provides summary information about a digital file or dataset to enable the user easily to access and use the information, or decide whether it will be useful or not.
- In the case of digital data, it is important to follow international metadata standards⁸ to ensure that information can be clearly understood and easily re-used by both people and computers. Choosing the metadata standard best suited for the information can sometimes be difficult. A project should work closely with a Trusted Digital Repository when determining how the digital archive must be described and which metadata standards to choose.
- Metadata can be applied on three levels:
 - Project:** this should describe the general context, geographical situation and time span of the project and the files that belong to the project.
 - Content:** this level includes all glossaries, vocabularies and variables that have been used when recording data with a concordance of what the terms mean.
 - File:** this should describe the specific content of the file.

5.2.2 Validity and comprehensibility of information

It is essential to ensure that all the elements of an archive form a seamless whole facilitating movement between each part of the archive⁹ (the Standard 4.3). This is a duty not only for the project manager but for the project team as a whole:

6. For best practice advice on digital data management in archaeology see <http://Guides.archaeologydataservice.ac.uk/>

7. Examples of project documentation include: project designs, written schemes of investigation etc and their revisions, recording systems and techniques, selection and sampling strategies, manuals used, classification systems in use such as numbering systems or identifiers and translations of codes or abbreviations.

8. Dublin Core Metadata Initiative: <http://dublincore.org/> see especially <http://dublincore.org/documents/dces/> for the basic element set.

CIDOC Conceptual Reference Model, www.cidoc-crm.org

The Inspire Directive, <http://inspire.jrc.ec.europa.eu>

9. For example, it must be possible to make connections between context records, finds records and photographs and one should also be able to trace individual finds back to the context, layer, trench and location. It should also be possible to research parallels in the wider archaeological record.



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44. © Minjastofnun Íslands, Íslands kulturalvssystir

- The relationships between the project and the wider archaeological record should be clear. References and links to such things as research frameworks, associated publications and reports, and similar or related projects, will make it possible to interrogate the project archive within international, national, regional and local contexts.
- The relationship between the archive and its origin should be clear, whether that origin is a site or a finds assemblage; and it should be possible to link all parts of the project archive back to their exact point of origin¹⁰.
- The relationships within the project archive should be clear. All data and images should be referenced to associated materials objects or documentation, and vice versa¹¹.
- Wherever standardised and accepted terminology controls exist, such as glossaries or thesauri, they should be used and cited in the project metadata. If they do not exist then at the very least it should be ensured that terminologies are consistently used throughout the project record and that the relevant glossaries are included in the archive. Digital information retrieval and manipulation is reliant on searching and filtering within the data¹².

5.2.3 The creation of a stable archive

Archiving is a process that aims to preserve information and material for posterity. The physical products of an archaeological project are unique and irreplaceable; therefore the project team should ensure that adequate care is taken of it from the project outset. Procedures and practices should be followed which promote the lifespan of the archive (the Standard 4.3):

- During data-gathering, especially in the field, common sense measures for keeping the archive, clean, dry, appropriately managed, packaged and stored should be applied.
- Objects requiring conservation should be stored in a way that maintains the conditions in which they were found, for example wet organic objects should not be allowed to dry out. They should also be brought to a qualified, experienced conservator-restorer as soon as possible after recovery.
- During the analysis stage, archives are usually held in normal office conditions or in temporary storage facilities until final deposition in an approved repository. It is

10. For example, site plans and sections should be geo-referenced; finds should be marked or labelled with both a site identifier and an appropriate context or individual identifier.

11. For example the drawings should be linked to the context record, photographs to the site plans, and object records link accurately back to the correct objects.

12. For example if the term 'posthole' is used in one place and 'post-hole' in others, effective and efficient searching and filtering becomes impossible.



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essential that facilities and office practice should not endanger the safety and lifespan of the archive¹³.

- One of the prerequisites is that digital files must be readable in the future. To make these files sustainable and readable they should be transferred as soon as possible from portable carriers such as local hard disks, CDs, memory cards and data sticks to servers that are under permanently controlled, well managed, safe conditions.
- Standards for care and curation of the archive (see 5.4) should be employed until the archive is transferred to a recognised or trusted repository.

It is the responsibility of all to use methods and materials in the creation of the archive which will aid its durability. Since most individual countries and states have their own specifications on drawing media, storage boxes, etc. it is not possible to specify exact materials in the Guide. Country, regional or state specific bibliographies should be referred to in this instance¹⁴. However, whether in the field or elsewhere general principles apply:

- Appropriate materials should be used as carriers of information and as packing and containers for the archive¹⁵.
- Appropriate materials and procedures should be used to provide the information and labels on the documents and finds¹⁶.
- Appropriate treatment should be given to all finds before they become part of the archive¹⁷.

5.2.4 Disaster management

During data gathering it is essential, whether in the field or elsewhere, to develop and maintain a strategy for securing the archive against damage and loss. Archaeological archives are unique and irreplaceable. Whilst any disaster may seem a remote possibility, accidents can and do happen and there can be hazards in all environments.

13. For example by not smoking, drinking or eating over site plans, leaving photographs in strong sunlight, or by storing archives in damp cellars, near water sources or where rodents, insects or other pests may be present.

14. <http://archaeologydataservice.ac.uk/arches>

15. For example, paperwork not in active use should be stored in acid free boxes, analogue photos stored in polyester hangers or acid free inert sleeves, and sensitive finds stored with the appropriate humidity and temperature controls. Good quality drafting film, paper, inks etc should be used which will be durable over time.

16. For example, if drawing on drafting film, the pencils used should not be so soft that the drawing rubs off during handling or storage. All handwriting, whether on paper records, drawings or labels should be clear, durable, legible, securely attached and written in a format specified by project data management strategy.

17. For example, finds should be clean and dry (unless otherwise recommended) before storage and packed in appropriate packaging material. Any sensitive or fragile material should be treated by a conservator-restorer as soon as possible.



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A good disaster management plan identifies the areas of risk and puts in place a contingency plan in the event of any of those areas of risk developing into something real. The security of the archive should be an important part of this plan.

The following factors should be taken into account. Is the location in an area susceptible to flood or theft? Are buildings damp, do they leak, are they secure, and are any archive holdings a fire risk? Are all storage areas safe, is the shelving secure, has the electrical wiring been tested? Such a plan includes setting up a disaster reaction team and notification system, an IT security plan, systems for salvage, clearance and cleaning, requirements for equipment, fire prevention systems and telephone numbers for emergency services¹⁸.

- It is important that a project disaster management plan is in place during this stage and that all project staff are aware of its contents and understand their role in its implementation. Conditions will differ according to location whether one is on site, in temporary accommodation or in the office/laboratory/finds/archive store, but developing a disaster management plan is no less valid.
- Information on digital carrier media is vulnerable to corruption or loss. It is of primary importance that a system of security copying and regular back ups is maintained and that the security/back up copy is held in an alternative location wherever possible¹⁹.

5.2.5 Selection and retention

During this stage a clear strategy for what documentary and material (finds) archive elements are to be selected for retention should be both understood and implemented by the project team and it's use monitored by the project manager. The selection and retention strategy should be flexible and open to amendment; for example the discovery of unexpected finds or stratigraphy may affect the decision about what was previously identified for dispersal.

5.3 ANALYSIS, REPORTING AND ARCHIVE TRANSFER

During this stage the principles outlined in section 5.2 Data Gathering still apply, but there are some extra considerations.



18. For fuller advice see 'Disaster Management Planning for Archaeological Archives, IFA Paper no 8, Kenneth Aitchison, 2004, IFA and AAF' <http://www.archaeologists.net/publications/papers>

19. See ADS.

5.3.1 Maintaining the integrity of the original data when creating new information

Documentation created during the data gathering stage should not be altered as it contains scientific facts or results with minimum added interpretation and holds information that cannot easily be obtained again. Once the project enters the analysis stage more layers of an analytical and interpretative character begin to be added to this data.

- If original written records are to be amended or enhanced, use inks or pencils of a different colour. This enables future researchers to understand the thought processes and sequences of interpretation that apply to the analysis of those records.
- Digital datasets created during data gathering should be 'frozen' and secured and any subsequent work should be carried out on copies of this data. This procedure maintains the integrity of the original data and provides a back up should subsequent versions become corrupted or unusable.
- Practice version control in the creation of new digital files that contain data from existing files; name files with different version numbers to show the order in which they were created and amended or updated.

5.3.2 The care and treatment of materials during analysis

During analysis both documents and materials (finds) are normally dispersed to various specialists for investigation and conservation procedures.

- It is important that all internal and external specialists are made aware of and are obliged to follow, the project data management and archiving strategy as developed in the planning stage and outlined in the previous section, including for example, file naming, terminology and glossary controls, indexing and ordering systems and version control management.
- The integrity of the archive should be maintained as information and material gets re-ordered or moved around. If any material archive is re-ordered, repacked or re-boxed during these analyses or treatment then this must be fully documented and this information included in or returned with the archive.
- If destructive methods of analysis, such as thin sectioning or carbon dating, are employed then a record of this procedure, its result and its effects on any remaining material must be recorded in the archive.



- The security of the archive must be maintained, and any dispersal of material objects (finds) and/or records to and from external specialists should be recorded in the archive management documentation, and the chosen method of transportation should be sufficiently secure.

5.3.3 Special treatment of human remains

- In some cultures human remains have significant meaning or an ethical or religious importance. Where applicable the national, regional or local law or guidelines regarding their treatment should always be followed.

5.3.4 Implementing and refining selection strategies

The original selection and retention strategy should remain in force, but should be kept under regular review. This is especially useful at the stage where finds assemblages are evaluated for their potential for analysis and again during analysis when a secondary selection process may be undertaken after re-identification procedures.

- It is important that the selection and retention strategy is reviewed against the project research or management objectives as the project progresses and that any changes to the selection and retention strategy are recorded and agreed by all concerned, including the recipient repository.
- Any finds discarded as a result of this process should be documented as having been discarded and when and why this happened. If any finds have been reburied, then their reburial location should be recorded.
- Selection and discard should not lead to any substantial loss of information which detracts from the project research or management objectives.

5.3.5 Data management

During the analysis stage, it is likely that more than one person will be working on the project data and creating new files in the project records.

- Everyone involved in this process should be conversant with the file naming and structure protocols that were defined at the planning stage, in order that all the project information is easily maintained and able to be accessed.
- During the analysis stage it is important to employ version control methods to keep track of edits and different versions of the project documentation. This will also provide an audit trail of revisions and updates, up to and including the final versions.



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5.3.6 Preparation for the transfer of the archive to a recognised or trusted repository

The curator of the recipient repository/repositories should be involved in the project from the planning stage and the project should follow the repository's requirements for deposition guidance from the outset in order that preparation for transfer will be easy (the Standard 4.3). The following should be standard for any submission:

- The project archive should be accompanied by a project summary and overall contents list.
- All parts of the archive should be fully indexed and ordered, and the archive should contain a master index to its component parts.
- All parts of the project documentary and material archive should carry the project ID and classification information (object, photo, context number etc).
- Project documentation, such as recording systems and techniques, selection and sampling strategies, project designs, recording manuals etc should accompany the archive.
- All digital files should be ordered in a clear directory structure and employ folder and file naming conventions which aid retrieval of information. The metadata and metadata policy for the digital archive should accompany the archive.
- The digital archive should be virus free on transfer and a copy should be retained until successful transfer is assured.
- The material and documentary archive should be packaged in materials and boxes suitable for long term preservation in storage in accordance with national, regional, local or repository standards and in sizes as specified by the repository.
- Where appropriate, material objects (finds) should be cleaned before being put into storage. Any cleaning should have been undertaken by or after consultation with a conservator-restorer and in accordance with any national, regional, local or specialist guidelines.
- Prior to long term storage any wet or damp objects (finds) should have received the appropriate conservation treatment. Wet or damp objects should have been dried out in a controlled way, with the exception of metal from wet contexts. Artefacts which have dried out must not be re-hydrated.



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54. © Riksantikvarieämbetet, CC BY

- Finds selected for x-radiography, either for identification purposes or during the conservation process, should be x-rayed prior to long term storage and the associated x-ray records (which should be stored with the digital/ photographic/paper archive as appropriate) should be fully cross referenced to the objects.
- The material (finds) archive should be ordered according to its material type, packing and storage requirements. Different types of objects, such as pottery and animal bone, should be kept separate.

5.4 CARE AND CURATION OF THE ARCHIVE

Although this section appears after those on planning, data gathering and analysis and report writing, it should be made clear that care of the archive components should actually begin to take place as soon as any data is created or material collected and continue on throughout the project; it is not something which should only take place once the archive has been deposited at the end.

The project team should ensure that all elements of the archive are maintained to the best standards possible throughout the lifecycle of the project (see the Standard 4.3).

Therefore this section should be read as applying to every stage of a project up to and including permanent storage of the archive. As such it has been necessary to target the advice to different situations identified for the purpose of the Guide as:

Active use: applies to when the project team members including conservator-restorers and specialists are actively working on project data and archaeological materials.

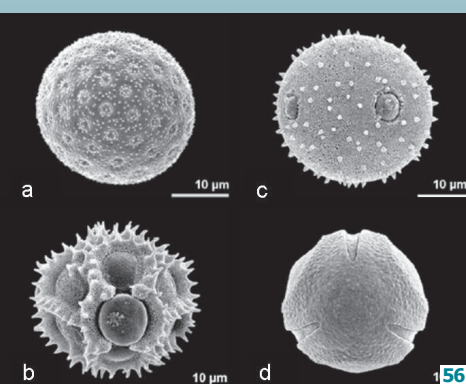
No longer in active use: applies to when some or all parts of the project have been completed and the use of some or all items from the documentary and/or material archive is finished, but the project archive has not been deposited into a repository for long term curation.

Temporary storage: applies to the storage of documentary and material archive components after the archive has been compiled for transfer, and project work is thus completed, but before it has been deposited with a repository for long term curation.

Long term curation: applies to the long term care and management of an archaeological collection in a repository.



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5.4.1 Care of documentary and material archive components in active use

- During data gathering, analysis and report writing, archive components in active use must be maintained in the best conditions possible, and every effort must be made to ensure that the risks of damage, deterioration, fading, damp, theft and loss are minimised.
- Whilst in general use by project teams and specialists, all documentary and material archive should be handled with due care and attention. Wherever possible both material and documentary archives should be protected in the appropriate storage boxes, sleeves or cabinets. Digital data should be subject to internationally, nationally, regionally or locally recognised information technology management procedures.
- Appropriate storage conditions for all elements of the documentary and material (finds) archive must be maintained throughout the phase of active use. It is important, for instance, to recognise that conserved and un-conserved objects may require different environments.

5.4.2 Care of documentary and material archive components no longer in active use

Once digital data are no longer in active use a system of regular back ups along with good data management housekeeping may no longer be enough to protect the data, especially in cases where transfer to a digital repository can take a number of years. Technological change can be rapid and the physical media on which data are stored are not permanent. What went into storage may quickly become obsolete and unreadable. Therefore the Guide recommends the preservation of digital data by migration: i.e. continually migrating information from older hardware and software to newer systems. Some archaeological practices may not have the resources to act as a de facto digital preservation repository, however there are a few simple steps which can be taken to ensure the maintenance of the digital archive once the data is finalised and out of active use:

- Once documents and images created on analogue media are complete they should be moved as soon as possible from active office use into archive storage until eventual deposition.
- The Guidance provided in sections 5.4.3 – 5.4.5 should be followed as far as is practically possible for all documentary and material archive in temporary storage prior to deposition.



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58. © Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt, Juraj Lipták

- Once work on individual digital files has ceased they should be moved to the project archive and that should be recorded.
- Digital files should be fully indexed within the project archive and certified as virus free before storage.
- Once in the project archive all digital files should be actively managed as set out in 5.4.4 below, in order to prevent obsolescence.

5.4.3 Accommodation for archives in temporary storage

It is highly desirable that the temporary storage time prior to final deposition is kept as short as possible. However it has to be accepted that in some cases, especially where projects are large or long running, temporary accommodation of the archive can last many years whilst analysis and report writing are undertaken. Wherever possible, temporary storage conditions should adhere to the national, regional or local rules for permanent storage of archaeological collections.

- Ensure that any stores housing the documentary or material archive are not at risk of destruction or damage by vibration, contamination or breakage through natural or man-made causes such as fire, floods or tidal waves, earthquakes or landslides, explosions or pollution, either on-site or in the vicinity. Avoid and protect against rodents, insects and other pests.
- Ensure that supply systems for electricity, gas, and especially for water are kept well away from storage areas, and that the building has a fire detection system.
- Minimise the amount of movement of stored objects and store archive materials in the dark.
- Ensure that stores are kept at the temperature and relative humidity appropriate for the objects according to national, regional or local recommendations. It is generally accepted that there is an increasing risk of microbiological activity above 60% relative humidity, and increased brittleness at a very low relative humidity. However across Europe with its variety of climatic zones, different limits have been recommended and there is no general agreement, either upon temperature or humidity, but it is established that most archive categories last longer at lower temperatures and at lower relative humidity. Reference should be made to national, regional or local standards and bibliographical information for these can be found on the ARCHES website²⁰.



20. <http://archaeologydataservice.ac.uk/arches>

5.4.4 Long term curation of the documentary archive

(the Standard 4.2)

Digital data

- All files should be provided with data documentation. Data documentation enables clear access to the data and helps prevent loss of information during the process of data refreshment and migration, as the character of the data is well understood. All files should be provided with sufficient metadata to ensure that the data in the file can be easily accessed and understood. This will enable digital data to be useful to someone other than its creator in years to come.
- Data refreshment should be practised. Digital data should be checked for readability on a regular basis, and where necessary data should be copied from one magnetic or optical medium to another as the original nears the end of its useful life.
- Data migration should be undertaken according to current best practice principles in data and information management, which can change rapidly. To make files independent of the machines and the software they were made with, files for archiving should wherever possible be transferred from proprietary formats onto stable and persistent preservation formats, and migrated onto successive versions of these formats as software updates or changes²¹. All files and metadata should be validated during this process and earlier versions should not be discarded until the newer one has been checked.

It is not possible to discuss in detail the standards for digital archiving in the Guide. Detailed guidance on digital archiving can be found in the OAIS reference model²², the Guide to Good Practice section of the Archaeology Data Service website²³, The Digital Archiving and Networking Services (DANS), and websites that follow or instigate developments and discuss these, such as JISC²⁴ and the Forum on Information Standards in Heritage (FISH)²⁵. For more information on how data can be linked and openly accessed and re-used the site of

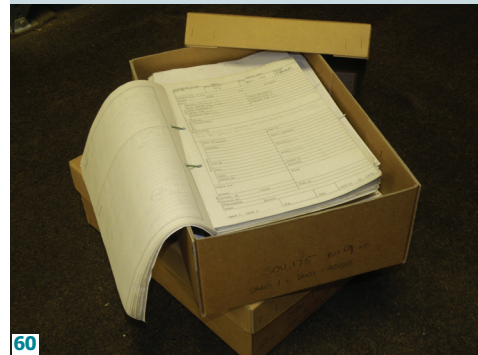
21. Examples are .xml for text and spreadsheets, .jpg and .tiff for images, and .dxf and .svg for vector drawings. Proprietary formats such as .doc, .pix, and .ai should be avoided. Sometimes a proprietary format is allowed because it is widely accepted – de facto – standard such as the .pdf format (PDF/A (ISO 19005))

22. «OAIS - Open Archival Information System (ISO 14721)» <http://public.ccsds.org/publications/archive/650x0m2.pdf>

23. <http://Guides.archaeologydataservice.ac.uk/>

24. <http://www.jisc.ac.uk/about>

25. <http://www.fish-forum.info/>



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61. © Landesamt für Denkmalpflege
Baden-Württemberg, David Bibby

Linked Open Data is a good starting point²⁶. A practical guide on how to organise research data is given by the UK Data Archive²⁷.

Analogue documentation

Analogue images and documents may take different forms with specific archiving requirements. Several general points may be articulated:

- All paper should be stored flat in acid free, dustproof cardboard boxes.
- Drawings on drafting film should be stored flat in dust free containers.
- All paperwork should be fully indexed and separate classes of documents should be grouped together. An overall archive index and a title sheet marking different groups of documents should be present.
- Documents of the same type should be organised in a logical order, by context, date and object number as appropriate.
- Any binding or labelling which could damage analogue information, such as elastic bands, staples, paperclips or self adhesive labels or tapes should be removed.
- Boxes should be stored in a dust free, dry and preferably dark environment, and well away from environmental hazards such as damp, insects or rodents.

Photographic (analogue) material

Generally, photographs should be treated as specified in the section above. However since photographic images are very vulnerable to deterioration in poor storage conditions, several particular points apply:

- Prints, negatives and transparencies, including x-radiographs should be stored in acid free paper enclosures or polyester sleeves in archival boxes or dust proof cabinets.
- All films and photographs should be fully indexed and labelled with the project identifier and other appropriate information such as the film or frame number, in a manner which does not damage the image or have the potential to rub off during handling.
- Photographic material is especially sensitive to light damage, which causes fading, and it keeps better in a cold environment. Photographic material should be stored in



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62. © Duncan H. Brown

63. © Archeologický ústav AV ČR, Praha, v.v.i.

26. <http://linkeddata.org/home>

27. Van den Eynden, V. et al 2011. "Managing and sharing data; best practices for researchers" University of Essex, Colchester, Essex (<http://www.data-archive.ac.uk/media/2894/managingsharing.pdf>)

boxes or cabinets in a dark, cool, dust free environment and well away from any potential environmental hazards.

5.4.5 Long term curation of the material archive

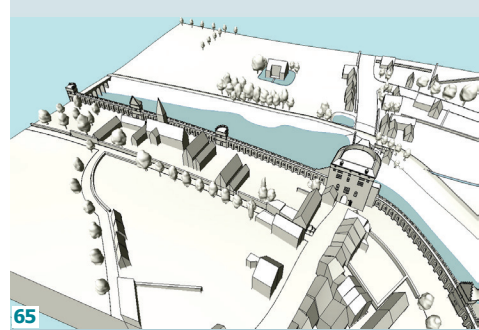
(the Standard 4.2)

General Guidelines for all classes of material

- Where appropriate, material objects (finds) should have been cleaned before transfer to long term storage.
- Any conservation work, including the cleaning of sensitive objects (finds), should be undertaken by a qualified conservator-restorer, be carried out prior to long term storage, be fully documented and the documentation added to the project archive.
- The material archive should be stored according to type, sensitivity, packing and storage requirements and different classes of material should be kept separate.
- The material archive should be fully indexed and cross referenced to its record, which should accompany the material archive into long term storage and be stored with the digital/photographic/paper archive as appropriate.
- The material archive should be labelled or marked with all object, site and context information as appropriate, and with identifiers that are legible, visible, permanent and not easily separated from the object.
- Boxes should not be overfilled and should contain adequate cushioning such as inert foam or acid free tissue between any fragile objects.
- Boxes should be stored in darkness, off the floor, in an environment appropriate for their contents, which minimises the risks of damage or deterioration.
- The storage environment should be monitored regularly and protected against large fluctuations of temperature and humidity. Checks or monitoring traps should be set to warn of any rodent or insect infestation.

Special types of finds

- Before accepting the material archive for long term storage, ensure that any objects that were recovered wet or damp have been dried out and received the appropriate conservation treatment.
- Metal objects should be packed in accordance with current conservation guidelines and specialist advice. Any humidity strips or silica gel must be monitored on a regular basis and regenerated, dried or changed as necessary.



64. © Archeologický ústav AV ČR, Praha, v.v.i.

65. © Brussels Regional Public Service, Direction of Monuments and Sites

66. © Riksantikvarieämbetet, CC By

- Ensure that all x-radiography has been carried out as appropriate and the associated images and records are fully cross referenced to the objects.

Material recovered from scientific sampling

Generally, scientific samples should be treated as specified in the general Guidelines above. However several particular points apply:

- Some samples may be subject to destructive analysis, so that nothing or little is left of the sample. This should have been recorded in the archive and the data from analysis stored with the documentary archive.
- Sample analysis, (such as thin sectioning, soil or pollen analysis) may result in the preparation of microscope slides. If the originals are to be kept in the laboratory as reference material, then the documentation should be in the archive in long term storage and where possible a duplicate set of slides should accompany these records.
- Column samples can be stored in cool dark conditions. Analysis should be carried out as promptly as possible and the data preserved in the archive.
- Wet or damp samples, such as waterlogged wood and flotation samples, must not dry out and should be kept cool, refrigerated if advised, in watertight containers. The condition of the samples should be monitored on a regular basis.

Human Remains

Human remains may be subject to special licences or permissions, including the requirement for reburial or restrictions in time allocated to the analysis period. When human remains enter storage, conditions relevant to their curation should be highlighted in the archive documentation and those conditions should be monitored and followed during storage.

- Wherever possible human bone should be packed and boxed in such a way that individual skeletons can be distinguished.
- The treatment and curation of soft tissue remains should be subject to specialist advice.



67. © Duncan H. Brown

68. © Archeologický ústav AV ČR, Praha, v.v.i.

69. © Landesamt für Denkmalpflege Baden-Württemberg, David Bibby

6. CHECKLIST OF ARCHAEOLOGICAL ARCHIVING TASKS AND ROLES WITHIN AN ARCHAEOLOGICAL PROJECT



The following chart sets out archiving tasks which occur as the project progresses through its main stages. These are generic tasks lifted from the best practice section of the Guide and in this form they can be used as a quick archiving checklist for those who are not overly familiar with the archiving process.

More detailed templates will eventually be found online which will describe the activities and tasks specific to each country, region or state and which will align better with country, regional or state agreed practice.

The checklist in the Guide also offers a general idea of who would normally undertake these tasks, emphasising the point that everyone involved in an archaeological project will have an impact on how the archive is created, compiled, cared for or curated. 'Every person involved in an archaeological project has a duty of care towards the archive and must make sure that it is created and compiled to recognised standards, using consistent methods, and it is not at unnecessary risk of damage or loss' (the Standard 4.4 Para 2)

The personnel identified in the checklist represent an ideal situation which serves a purpose as a best practice example. In the country, regional or state specific checklists which will follow the Guide, the title of the person (such as curator, conservator-restorer etc) who will normally undertake each task in this country or state will be specified, thus tailoring the checklist to actual procedure in each area.

The fully completed forms for each country, state or canton can be found on the ARCHES website <http://archaeologydataservice.ac.uk/arches>.

Those countries who wish to join the ARCHES programme and include their own archiving checklist in our online Guide can find blank templates for completion on the ARCHES website.



70. © Landesamt für Denkmalpflege Baden-Württemberg, Y. Mühleis

71. © Brussels Regional Public Service, Direction of Monuments and Sites

72. © Rijksdienst voor het Cultureel Erfgoed

6.1 DEFINITIONS OF ROLES OF PROJECT PERSONNEL

The titles given to archaeological project personnel are endlessly variable, so it is important, before describing the particular responsibilities of individual team members, to establish common terminology. This is a list of the job types identified in the following checklist, with a brief description of their role, which it is hoped will enable each ARCHES partner to match the checklist with their own practices.

Archive Manager The person responsible for ensuring the project archive is fully compiled and transferred to the archive repository.

Conservator–Restorer A specialist in the conservation or restoration of archaeological objects.

Digital Information Manager The person within an archaeological project team who is responsible for managing the creation, preservation and accessibility of digital data.

Facilities Manager The person responsible for managing the premises in which archaeological projects are undertaken, especially during the stages after data collection in the field.

Finds Manager The person responsible, during an archaeological project, for managing the materials (finds) collected, including cleaning, marking/labelling, packing, recording, storage and specialist liaison.

Project Initiator The person who has identified the need for an archaeological project to be undertaken, will monitor the project outcomes but does not necessarily manage the project team.

Project Manager The leader of the project team during an archaeological project, with responsibility for ensuring the aims are met.

Project Team All personnel working on an archaeological project.

Repository Curator The person responsible for ensuring the preservation and accessibility of archaeological archives after they have been transferred to a repository for long-term care.

Specialist Any person engaged in the collection or analysis of specialised information during the course of an archaeological project, for instance a specialist in pollen or pottery.



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6.2 ARCHIVING CHECKLIST CHART

Project Stage	Guid. No	Action	Archive Tasks	Person
PLANNING	5.1.1	The structure and character of the future archive, including the expected final content of the archive and how it will be managed, should be agreed on and understood by all concerned	<ul style="list-style-type: none"> Set the standards for the creation and format of project documentation, as well as the media to be used and the procedures to be followed in order to ensure a consistent record Define the archiving procedures for the identification, recording, and management of the material assemblage. Detail the manuals to be used, and any packaging, care or movement requirements Incorporate national/regional/local /repository standards for archaeological archives and collections management 	<p>Project Initiator Project Manager</p> <p>Project Manager Finds Manager Conservator-restorer</p> <p>Project Manager Archive Manager Repository curator</p>
	5.1.2	A selection and retention strategy should be devised and agreed at the project planning stage, which should not only set out the selective activity that will take place in the field, but should also set out what will be selected or retained for archiving as the project progresses	<ul style="list-style-type: none"> Draw up a selection or retention strategy with input from all the relevant members of the project team, including specialists and the curator of the repository or repositories into which the final archive will be received 	<p>Project Initiator Project Manager Finds Manager Repository curator Specialists</p>
	5.1.3	Security or disaster management strategies should be devised that safeguard the archive from damage and loss	<ul style="list-style-type: none"> Prepare an archive security or disaster management plan that sets out the standards which will be adhered to in order that the documentary and material archive will be created, collected and stored to ensure against damage, cross contamination, loss or theft 	<p>Project Manager Archive Manager Facilities Manager Finds Manager Conservator-restorer</p>
	5.1.4	It should be ensured that the needs of the archiving process are included in establishing the resources and planning the tasks and timetable for the project	<ul style="list-style-type: none"> Archiving activities and tasks should be programmed and timetabled and important archiving milestones should be programmed in Allocate sufficient resource to archiving tasks in order to ensure that the project archive is ordered, internally consistent, accessible, stable, secure and properly cared for until it is safely deposited in a recognised or trusted repository 	<p>Project Manager Archive Manager</p> <p>Project Manager Archive Manager</p>
	5.1.5	The recipient repository, depot, or museum should be identified and involved at the project outset so that the future of the final archive can be guaranteed, and the archive compiled in accordance with the repository's specifications	<ul style="list-style-type: none"> Invite the repository curator, or curators if more than one repository is involved, to be a participant or participants in the planning process about the archive from the outset of the project 	<p>Project Initiator Project Manager Repository Curator</p>
	5.1.6	Copyright and transfer of title, where appropriate, should be clarified and agreed during the project planning stage	<ul style="list-style-type: none"> Establish copyright or transfer of title procedures. Resolve issues affecting the project archive in accordance with national, regional and/or local legislation 	<p>Archive Manager Repository curator</p>

Project Stage	Guid. No	Action	Archive Tasks	Person
DATA GATHERING	5.2.1	Document, order and index the documentary and material archive in order to keep it understandable and accessible	<ul style="list-style-type: none"> • Compile a full archive index, including an overall contents index and individual indices for all other aspects such as context records, finds lists and drawings • Produce project documentation which makes it clear how and why the archaeological data and materials were selected, created or collected • Provide metadata for both the digital and analogue documentary archive to enable the user to access and use the information easily, or take a decision as to whether this information will be useful or not • Create a project summary that will introduce researchers to the aims and objectives, scope, location and content of the project 	Project Manager Archive Manager Project Manager Digital Information Manager Project Manager
	5.2.2	All the elements of an archive should form a seamless whole facilitating movement between each part of the archive	<ul style="list-style-type: none"> • Ensure the project is linked into the wider archaeological record • Reference all data to its exact point of origin • Link all data to its associated materials or documentation, and vice versa • Use standardised and accepted terminology controls where they exist. If they do not exist then use terminology consistently throughout the project documentation and include the relevant glossaries in the archive 	Project Team Specialists Project Team Project Team Project Team
	5.2.3	<p>Adequate care should be taken of the project archive from the outset. Procedures and practices should be followed which promote the lifespan of the archive</p> <p>The strategy for securing the archive against damage and loss (either a stand alone strategy or part of a wider disaster management plan) should be put into action</p>	<ul style="list-style-type: none"> • Apply common sense measures on site to safeguard documentary information and archaeological material • Ensure that office facilities and practice do not endanger the safety and lifespan of the archive • Ensure digital material is backed up in accordance with accepted procedures • Transfer digital files as soon as possible from portable carriers such as local hard disks, CDs and memory cards and sticks to servers under permanently controlled, well managed, safe conditions • Use appropriate materials for all carriers of information and containers for the archive • Use appropriate materials and procedures to provide the information and labels on the documents and finds • Provide appropriate treatment to all finds before they become part of the archive • Employ the standards set out in 5.4.1 – 5.4.5 wherever possible until the archive is transferred to a recognised or trusted repository • Implement the archive security strategy or the disaster management plan during this stage and ensure that all project staff are aware of its contents and understand their role in its use 	Project Team Archive Manager Digital Information Manager Digital Information Manager Project Team Project Team Project Team Conservator-restorer Archive Manager Project Manager Archive Manager

Project Stage	Guid. No	Action	Archive Tasks	Person
	5.2.4	The strategy for what documentary and material archive is selected for retention should be understood and used by the project team and monitored by the project manager	<ul style="list-style-type: none"> Implement the selection and retention strategy Ensure the selection and retention strategy is amended if and where required 	Project Manager Project Team Project Manager
ANALYSIS, REPORT-ING and ARCHIVE TRANSFER	5.3.1	The documentation created during data gathering should be 'frozen' and archived and any subsequent work should be carried out on copies of this data	<ul style="list-style-type: none"> 'Freeze' and archive the digital documentation created during data gathering stage Ensure any subsequent work is carried out on copies of this data 	Archive Manager Digital Information Manager Project Manager
	5.3.2	Ensure that the integrity is maintained of documentary and material archive dispersed to various specialists for investigation and conservation procedures	<ul style="list-style-type: none"> Ensure that all internal and external specialists are aware of and follow the project data management and archiving strategy Ensure that, as information and material gets re-ordered or moved around, the integrity of the archive is maintained Ensure that a documentary record of all destructive methods of analysis is present in the archive Document movement to and from external specialists in the archive management documentation, and choose a secure method of transportation 	Project Manager Finds Manager Archive Manager Project Manager Finds Manager Archive Manager Finds Manager Finds Manager Archive Manager
	5.3.3	The national law or guidelines regarding the treatment of human bone should always be followed	<ul style="list-style-type: none"> Follow national law or guidelines regarding the treatment of human bone 	Project Team Finds Manager Specialists
	5.3.4	The selection and retention strategy should remain in force, and be kept under regular review	<ul style="list-style-type: none"> Review the selection and retention strategy against the project research or management objectives as the project progresses Ensure that any changes to the selection and retention strategy are recorded, and agreed by all concerned, including the recipient repository Document any discard and ensure the record of the discard is included in the archive, including details of any reburial locations Ensure that selection and discard procedures do not lead to any substantial loss of information which detracts from the project research or management objectives 	Project Initiator Project Manager Repository Curator Finds Manager Digital Information Manager Project Manager Repository Curator Specialists Finds Manager Specialists Project Initiator Project Manager
	5.3.5	Project digital data management policies should be enforced (such as version control, file naming and structure protocols)	<ul style="list-style-type: none"> Ensure that everyone is conversant with the project file naming and structure protocols Ensure that version control is practiced by all project personnel 	Project Manager Digital Information Manager Project Team

Project Stage	Guid. No	Action	Archive Tasks	Person
	5.3.6	Preparation for transfer to a repository or into long term storage	<ul style="list-style-type: none"> • Ensure the project archive is accompanied by a project summary and overall archive contents list • Ensure all parts of the archive are fully indexed and ordered, and the archive contains a master index to its component parts • Ensure all parts of the project documentary and material archive carry the project ID and classification information (e.g. object, photo, context number) • Ensure that project documentation, such as recording systems and techniques, selection and sampling strategies, project designs, recording manuals etc accompanies the archive • Ensure that all digital files are ordered in a clear directory structure and employ folder and file naming conventions which aid retrieval of information. Ensure the metadata for the digital archive accompanies the archive • Ensure the digital archive is virus free on transfer and a copy of the archive is retained until successful transfer is assured • Ensure the archive is packaged in materials and boxes suitable for long term preservation in storage in accordance with national, regional, local or repository standards and in sizes as specified by the repository. Ensure any metal or adhesive fastenings or labels are removed prior to deposition • Ensure the material archive is ordered according to its material type, packing and storage requirements. Ensure the finds types are kept separate 	Archive Manager Archive Manager Archive Manager Archive Manager Digital Information Manager Digital Information Manager Archive Manager Archive Manager

Project Stage	Guid. No	Action	Archive Tasks	Person
CARE AND CURATION	5.4.1	Care of documentary and material (finds) archive components in active use	<ul style="list-style-type: none"> During data gathering, analysis and report writing, maintain the best conditions possible for archive components in active use and ensure that every effort is made to minimise the risks of damage, deterioration, fading, damp, theft and loss Handle all documentary and material archive with due care and attention. Wherever possible keep both material and documentary archives protected in the appropriate storage boxes, sleeves or cabinets. Digital data should be subject to international, national, regional or local information technology management procedures wherever possible 	Project Team Project Team
	5.4.2	Care of documentary and material (finds) archive components no longer in active use but not yet transferred to a repository	<ul style="list-style-type: none"> Move final versions of digital files to the project archive and record the completion of that task Index digital files fully within the project archive and certify as virus free before storage Once in the project archive actively manage all digital files as set out in 5.4.3 below in order to prevent obsolescence Once documents and images created on analogue media are complete move as soon as possible from active office use into archive storage until eventual deposition Follow the guidance provided in sections 5.4.3 – 5.4.5 as far as is practically possible for all documentary and material archive in temporary storage prior to archive transfer 	Digital Information Manager Digital Information Manager Digital Information Manager Archive Manager Project Team Archive Manager
	5.4.3	Ensuring appropriate accommodation for archives in temporary storage	<ul style="list-style-type: none"> Ensure that any stores housing the documentary or material archive are not liable to subsidence or flooding, especially at risk from earthquakes, tidal waves or landslides, at risk from fire or explosions in adjacent sites, near a place or a building which attracts rodents, insects and other pests, near a plant or installation emitting harmful gases, smoke, dust, etc, or in an especially polluted area Ensure that supply systems for electricity, gas, and especially for water are kept well away from storage areas, and the building is provided with a fire detection system Keep stores at a cool temperature and at a relative humidity below the point where microbiological activity occurs. Reference should be made to national, regional or local specific standards wherever applicable 	Archive Manager Facilities Manager Archive Manager Facilities Manager Archive Manager Facilities Manager

Project Stage	Guid. No	Action	Archive Tasks	Person
	5.4.4	Long term curation of the documentary archive	<ul style="list-style-type: none"> • Ensure the documentary archive complies with the standards set out above and the standards maintained by the repository • Copy data from digital transfer media to servers supported by regular backup procedures • Practice digital data refreshment. Check files for readability on a regular basis, and where necessary • Undertake data migration in accordance with current best practice principles in data and information management. Transfer files from proprietary formats onto stable more persistent preservation formats, and migrate onto successive versions of these formats as software updates or changes. All files and metadata should be validated during this process, and earlier versions should not be discarded until the newer one has been checked. • Store all paper horizontally in acid free, dustproof cardboard boxes • Store drawings flat in dust free containers • Ensure boxes are stored in a dust free, dry and preferably dark environment, and well away from environmental hazards such as damp, insects or rodents • Store prints, negatives and transparencies, including x-radiographs in acid free paper enclosures or polyester sleeves in archival boxes or dust proof cabinets • Store photographic material in boxes or cabinets in a dark, cool, dust free environment and well away from any potential environmental hazards 	Repository Curator Repository Curator Repository Curator Repository Curator Repository Curator Repository Curator Repository Curator

Project Stage	Guid. No	Action	Archive Tasks	Person
	5.4.5	Long term curation of the material (finds) archive	<ul style="list-style-type: none"> • Ensure the material (finds) archive complies with the standards set out above and the standards maintained by the repository • Store boxes off the floor, in a cool, dry and preferably dark environment and in conditions that minimise the risks of damage or deterioration • Store the material archive according to type, sensitivity, packing and storage requirements and keep separate each different class of material • Monitor the storage environment regularly and protect against large fluctuations of temperature and humidity. Checks or monitoring traps should be set to warn of any rodent or insect infestation • Ensure that wet or damp samples, such as waterlogged wood and flotation samples, do not dry out and are kept cool, refrigerated if advised, in watertight containers. Monitor the condition of the samples on a regular basis • Meet national, regional or local standards for the curation of human remains 	Repository Curator Repository Curator Repository Curator Repository Curator Repository Curator Repository Curator

7. GLOSSARY

Archaeological archive see definitions in Sections 3.1 and 4.1. In many European countries where the Guide has not been adopted, this term is used only to mean the records created during a project and excludes the material objects (finds).

Archaeological project see definition in Sections 2.1 and 4.1.

Archive component a specific part of the array of items that make up an archaeological archive, usually distinguished by their concomitant archive storage requirements; examples include the finds, written records, graphic images and digital data.

Analogue for the purposes of the Guide the term analogue is used to describe data or documents created in non digital formats such as on paper or drafting film or as a photographic print, negative or transparency.

Artefact something manufactured or given shape by a human being, such as a tool or a work of art; archaeological examples include pottery, stone tools, objects made of metal or worked bone, brick and tile. In some countries an artefact is any object whose formal properties and/or position have been intentionally created to support a specific purpose (practical function, social meaning, symbolic significance; cf. Neustupný 1998, 134). Artefacts can be moveable (like pottery, stone tools, etc.) or immovable (like a house, burial mound, etc.).

Assemblage for the purposes of the Guide, a group of finds found during the course of an archaeological project and thus associated with a specific context or site of human activity.

Back up to duplicate digital data files as a reserve resource should the originals become unusable.

Born Digital data or files originally created in digital form, such as a photograph taken with a digital camera, CAD files and GIS data.

Collection a group of records and/or material objects owned, stored and curated by a single institution for the purposes of future study and enjoyment. Archaeological project archives are understood to be individual components of a collection, which represents a greater, unified resource.

Compile / compilation used here to mean the activity of finally gathering together all archive materials and organizing them in readiness for transfer to a repository.

Conservation used here to mean the procedures of cleaning, stabilising and examining sensitive objects in controlled conditions.

Context a single stratigraphic unit recorded separately in the field; usually the extant structures, cut features and deposits that represent and contain archaeological evidence and finds.

Context record the record of the details (such as location, dimensions, character and stratigraphic relationships) of a context identified during archaeological investigation.

Curation the work of a curator.

Curator the person who cares for and manages access to a collection.

Digital Data files or records comprised of code that is read by a computer; digital data can be born digital or digitised.

Digital data migration preservation of digital data through the method of transferring it into current software formats and hardware configurations in order to prevent it from becoming obsolete and unreadable.

Digital transfer media portable digital data carriers, such as external hard drives, data sticks or CD rom.

Digitised data that has been entered or scanned into a computer from an analogue original, such as a hand-written context record or drawing.

Ecofact an object or find of natural material that represents evidence for human activity; examples include animal bones, seeds, charcoal. Some countries understand an ecofact also to be a natural object or an artefact possessing ecofactual properties that originate through unintentional human action, quite often without human awareness (Neustupný 1998, 136).

Environmental remains used here to mean materials collected as evidence for the state of the natural environment at any given period, such as pollen and molluscs, also some ecofacts.

Finds artefacts, ecofacts, environmental remains and waste products recovered archaeologically.

Long term storage the principle of curating collections in repositories for as long as possible.

Material meaning here substance and materiality, as applied to material objects and some records.

Material (finds) archive the material objects collected during an archaeological project and selected for long term storage.

Material object an artefact, ecofact, environmental remain, waste product or sample that could be preserved in the archaeological archive.

Metadata data about data; mainly used to summarise the content and character of digital files and datasets, with the aim of informing potential users.

Microfilm see Microform

Microform film, paper or other medium containing micro-reproductions; microfiche or microfilm are the common forms used for the long-term preservation of written records.

Project design a document that describes the plan for undertaking a project; usually including the research aims, methodology, specific tasks and stages, the timetable for undertaking each task and the resources required, such as staff and finances.

Recognised repository a repository that meets the standards required by national, regional or local schemes for maintaining required levels of curation, care and access.

Recording systems a systematic method for creating records; examples include the use of different pro-forma for describing contexts or finds.

Records used here to denote the written, digital and graphic documentation created during the description, analysis, ordering and reporting of archaeological sites, contexts, assemblages, finds or samples.

Repository the store and point of access for a collection.

Sample a fragment or part of a larger whole (usually a context or a find) collected for more detailed analysis. Some samples do not survive analysis, such as soil collected for sieving or flotation, or organic material retained for C-14 dating; others, such as pieces of ceramic made into petrographic microscope slides are objects that can be included in the archaeological project archive.

Security copy a duplicate version of any element of the documentary archive retained to preserve the information it contains should the original become lost, destroyed or unusable.

Selection the procedure for selecting archive components for inclusion in an archaeological archive intended for long term storage.

Sensitive objects / finds material objects that require specific treatment, packing and storage conditions; examples include iron objects, which should be stored in a dry environment, or textile, which requires a higher humidity.

Transfer of title the procedure by which ownership of the archaeological archive is transferred from one owner to the other; here meaning to transfer ownership to the repository.

Trusted digital repository a repository that is certified as meeting international standards of digital preservation and access; one whose mission is to provide reliable, long-term access to managed digital resources to its designated community, now and in the future.

Version control the method of identifying successive versions of a document or digital file to show which one pre-dates another.

Waste products material objects or finds created as by-products of human activity, usually in the manufacture of artefacts; examples include debitage, metal slag, hammerscale and bone or leather off-cuts.

X-Radiography the production of an image as a result of x-rays being passed through an object; commonly used in archaeology to identify, characterise, record and assess corroded metal objects. Similar methods include computer tomography (CT scanning).

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