

Discovery, Innovation and Science in the Historic Environment

# RESEARCH



Historic England

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# Welcome...

## **...to this Spring issue of Research magazine.**

This issue brings you a mixed set of research highlights. However, the golden thread that connects them all is the research resources we offer, whether people are looking for information on a specific historic place, a whole area, theme or for methods applied to heritage.

In 'Historic England's New Mapping Resources', Simon Crutchley and Damian Grady take a look at two recent – and already enormously popular – tools to help a broad range of researchers explore our aerial archaeology mapping and aerial photographs more generally through interactive maps.

Gary Winter from our Archive then reveals how we are working towards 'Celebrating the Harold Wingham Collection Through Active Participation' by which we mean how we are working on enhancing understanding of a collection of one of aerial archaeology's 'unsung heroes' together with his colleagues and friends.

In 'The Historic England Research Reports Database: introducing an important resource for researchers', Kirsty Stonell Walker 'lifts the lid' on thousands of reports compiled over the decades by Historic England and its predecessors that you can now easily access directly through our main website.

These resources are digital, however there continues to be an appetite among the research community and beyond for traditional publications, which are the subject of Alison Welsby's contribution 'Historic England and Liverpool University Press: A Publishing Partnership'.

Finally, 'Daylight Harvesting and Historic Buildings' by Geraldine O'Farrell is an example of the type of research that will aid those looking for case studies of climate change adaptation methods. It is part of a wide range of research we are taking forward to underpin our Climate Change strategy and the drive to achieve net zero.

**John Cattell**  
*National Head of Research  
with Historic England.*

**Front cover image:** A late prehistoric enclosure surviving as an earthwork on Castle Hill above Leck in the North Pennines. © Historic England 11/12/2012, image reference 28364\_001

We are the **public body** that **helps people**  
**care for, enjoy** and **celebrate**

England's **spectacular**  
**historic environment**

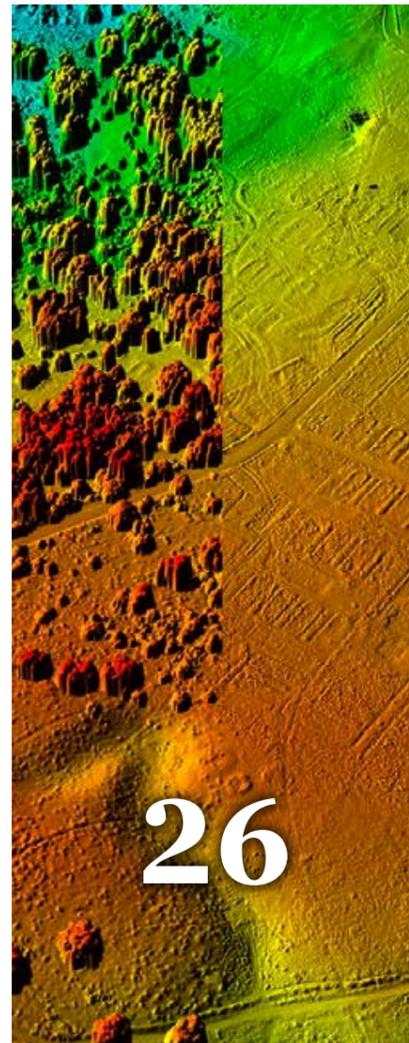
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**Historic England and Liverpool University Press**  
A publishing partnership.



**Daylight harvesting and historic buildings**  
Saving energy and therefore carbon is becoming ever more critical.

## RESEARCH magazine

Editor  
Colum Giles

Designer  
Vincent Griffin

Web design  
Robin Page

Managing Editor  
Robin Page

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# Historic England's new mapping resources

Giving digital access to our aerial photography  
and archaeological mapping data.

## Introduction

Expanding digital access to our data is one of Historic England's Strategic Activities, but it is only recently that new technology has enabled us to make such a large amount of data available online.

Historic England recently launched two web-based tools, which provide free access to over 400,000 aerial photographs from the Historic England Archive and 30 years of aerial archaeology mapping. These new resources – the Aerial Photography Explorer and the Aerial Archaeology Mapping Explorer – give the public and heritage professionals alike unparalleled access to our aerial survey data, allowing them to discover and explore the changing face of England's urban and rural landscapes over the last 100 years. They have proved to be a huge hit.

These new resources give unparalleled access to our aerial survey data.

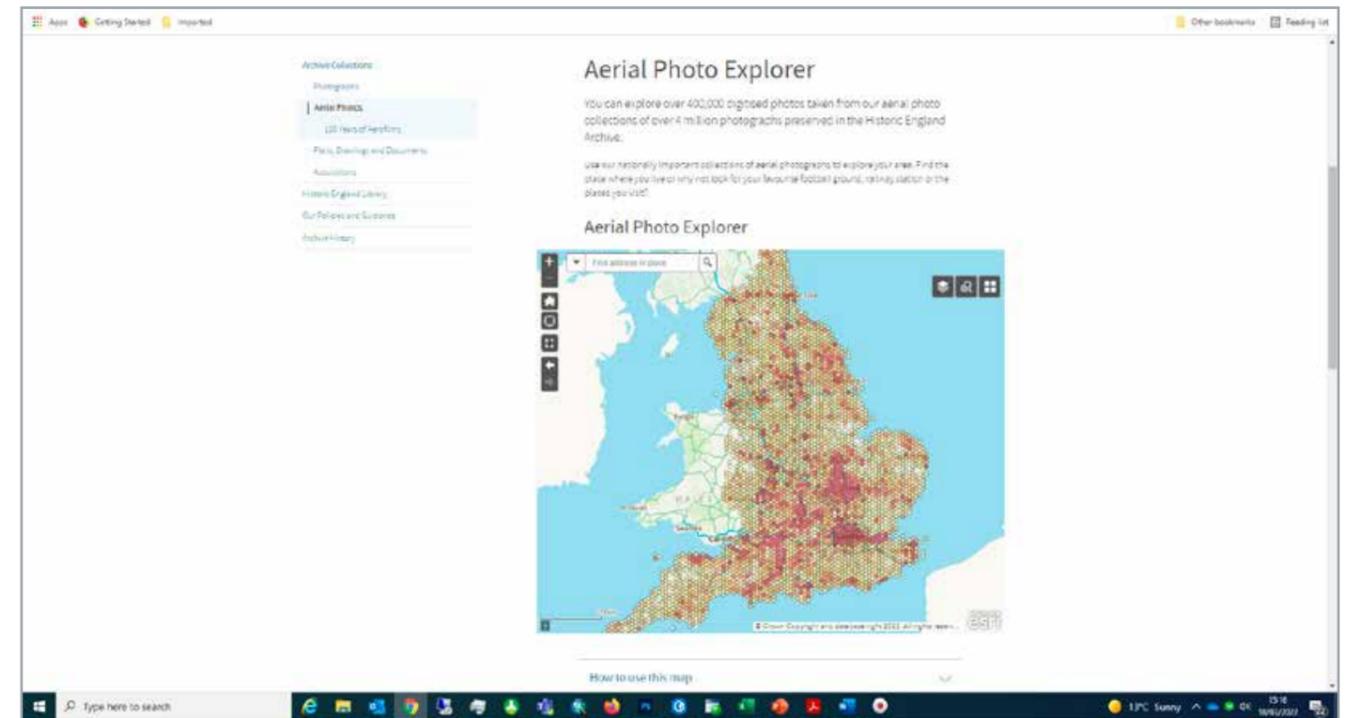


Fig 1: Screenshot showing the landing page from within the Historic England website, where one gains access to the APEX application.

## The Aerial Photograph Explorer

The Aerial Photograph Explorer (APEX) gives the public and heritage professionals access to over 400,000 aerial photographs.

The digital collection is made up of oblique photographs (taken from the side or front of the aircraft) and vertical photographs (taken from cameras looking straight down). Over 300,000 of the oblique photographs are images taken with digital cameras by the Historic England aerial reconnaissance team since 2005. The subjects primarily cover new archaeological discoveries and monitoring of known sites and landscapes.

Over 80,000 oblique photographs were taken by Aerofilms, a private aerial survey company set up just

after the First World War. The Aerofilms collection provides a fascinating view of England before and after the Second World War. Scanning of thousands of the Aerofilms photographs was funded by the Heritage Lottery Fund (now the National Lottery Heritage Fund) as part of the [Britain from Above](#) project. Since then, more Aerofilms images have been scanned by the Historic England Archive and can be seen on APEX.

A further 900 oblique photographs available on APEX were taken by the Royal Air Force from reconnaissance Spitfires, with front-facing cameras in the wings where the guns would normally be situated. >>

Over 300,000 of the oblique photographs are images taken with digital cameras by the Historic England aerial reconnaissance team since 2005.

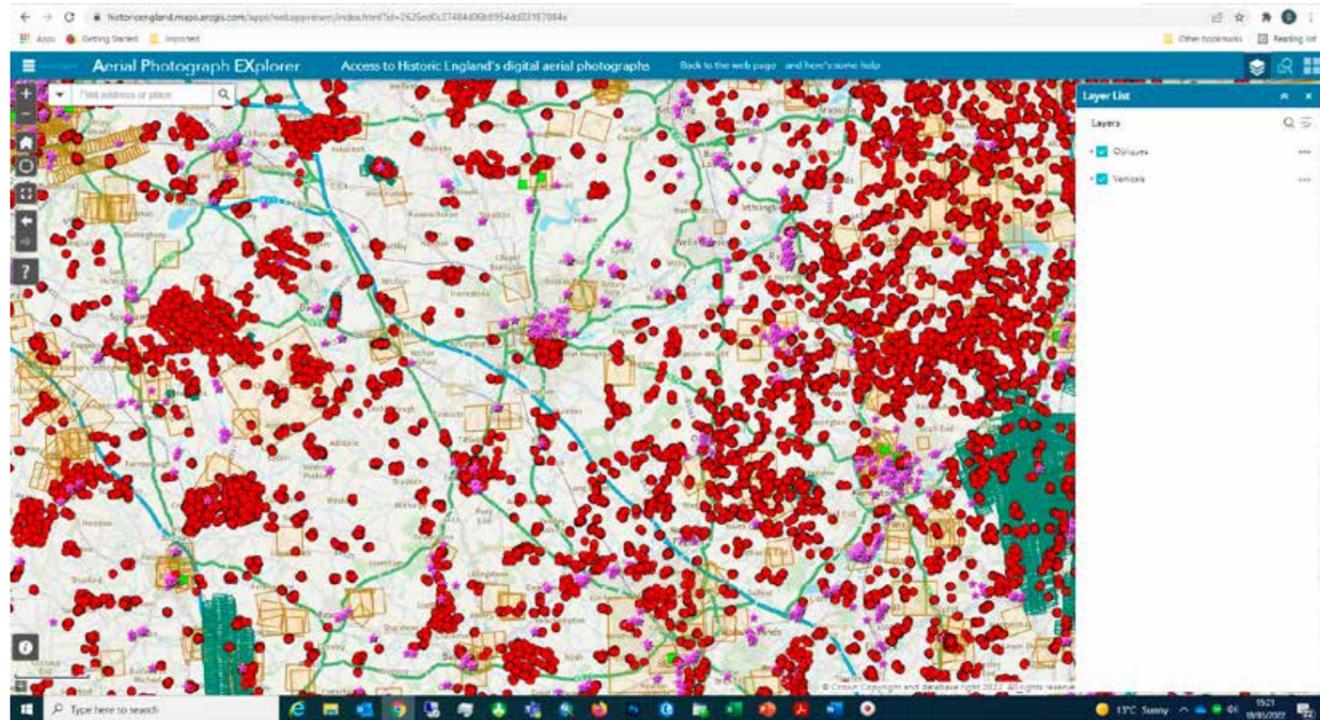


Fig 2: Screenshot from APEX showing the 'Fullscreen' version of APEX with the different types of photos highlighted according to symbology.

The vertical layers consist mainly of 37,000 RAF photographs taken during and after the Second World War. These photographs, along with the RAF obliques, paint a vivid picture of the impact of war on England as the country adapted to defending itself with radar, anti-aircraft obstructions, and anti-aircraft batteries. They also chart the impact of enemy bombing on major cities and key military sites. The aerial surveys undertaken by the RAF in the late 1940s and 1950s made an important contribution to post-war planning as the country worked towards rebuilding and feeding itself. The remaining vertical photographs were taken by Historic England for cropmark prospection and detailed surveys of large

archaeological landscapes to help colleagues carrying out research.

### How to use APEX

Users can search their area of interest using a gazetteer or the pan and zoom tools. There are two layers of data – oblique photographs and vertical photographs. Clicking on a dot marking the centre of an oblique photograph or the footprint of a vertical image allows the user to browse thumbnails. It is also possible to carry out queries based on dates of photography or user-defined areas. Individual images can be viewed in more detail at high resolution and there are tools for sharing photographs on social media or embedding them in websites. >>

The aerial surveys undertaken by the RAF in the late 1940s and 1950s made an important contribution to post-war planning as the country worked towards rebuilding and feeding itself.

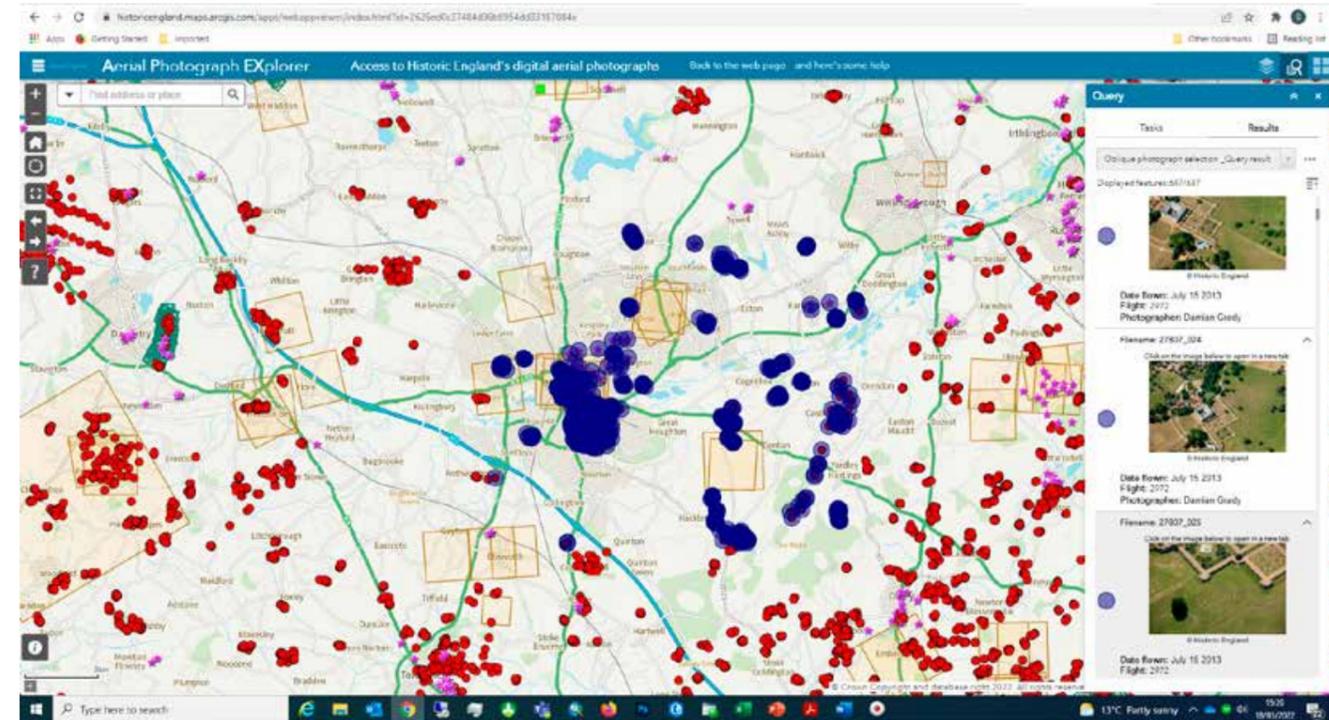


Fig 3: Screenshot from APEX showing how features selected by the 'Query' tool are highlighted and appear as a filmstrip, allowing a user to quickly scan through and select the image they want to look at in more detail.

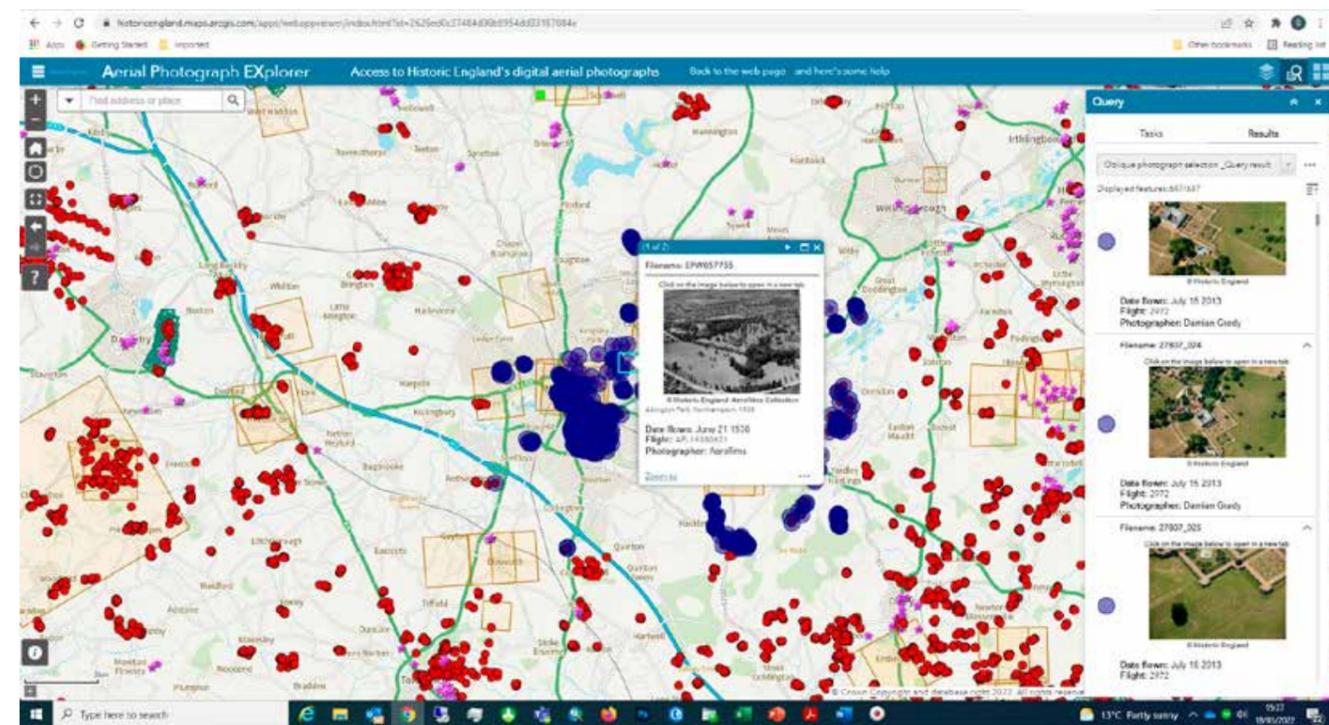


Fig 4: Screenshot from APEX showing the 'pop-up' feature, allowing users to see the basic details of individual images. The example in the pop-up, an Aerofilms image from 1938 contrasts with the more recent images selected in the filmstrip.

## The Aerial Archaeology Mapping Explorer

The Aerial Archaeology Mapping Explorer provides free online access to more than 30 years' worth of archaeological survey data produced by Historic England and its predecessor organisations. This includes projects carried out both 'in-house' and by grant-funded partners. For the first time, it is possible to view the results of over 100 archaeological aerial mapping projects in one place.

### Background

The Aerial Archaeology Mapping Explorer is a tool that displays the archaeology that has been identified, mapped and recorded through the analysis of aerial photographs and airborne laser scanning data (lidar) across England. This includes mapping all archaeological features seen as cropmarks, soilmarks,

earthworks and structures with a chronological span from the Neolithic to the 20th century. The earliest projects, carried out over 30 years ago, were hand-drawn, resulting in varying degrees of accuracy depending on the landscape and available photography. By contrast, later projects were carried out in a fully digital environment. All aerial photographs were digitally rectified (a process to accurately remove all distortions in an image) using specialist software. Increasing use of digital methods improved the accuracy, detail, and usability of the mapping products.

The mapping relies on the photos held by the Historic England Archive and other collections, including the 400,000 digitised photos that can be viewed on the **Aerial Photograph Explorer**.

For the first time, it is possible to view the results of over 100 archaeological aerial mapping projects in one place.

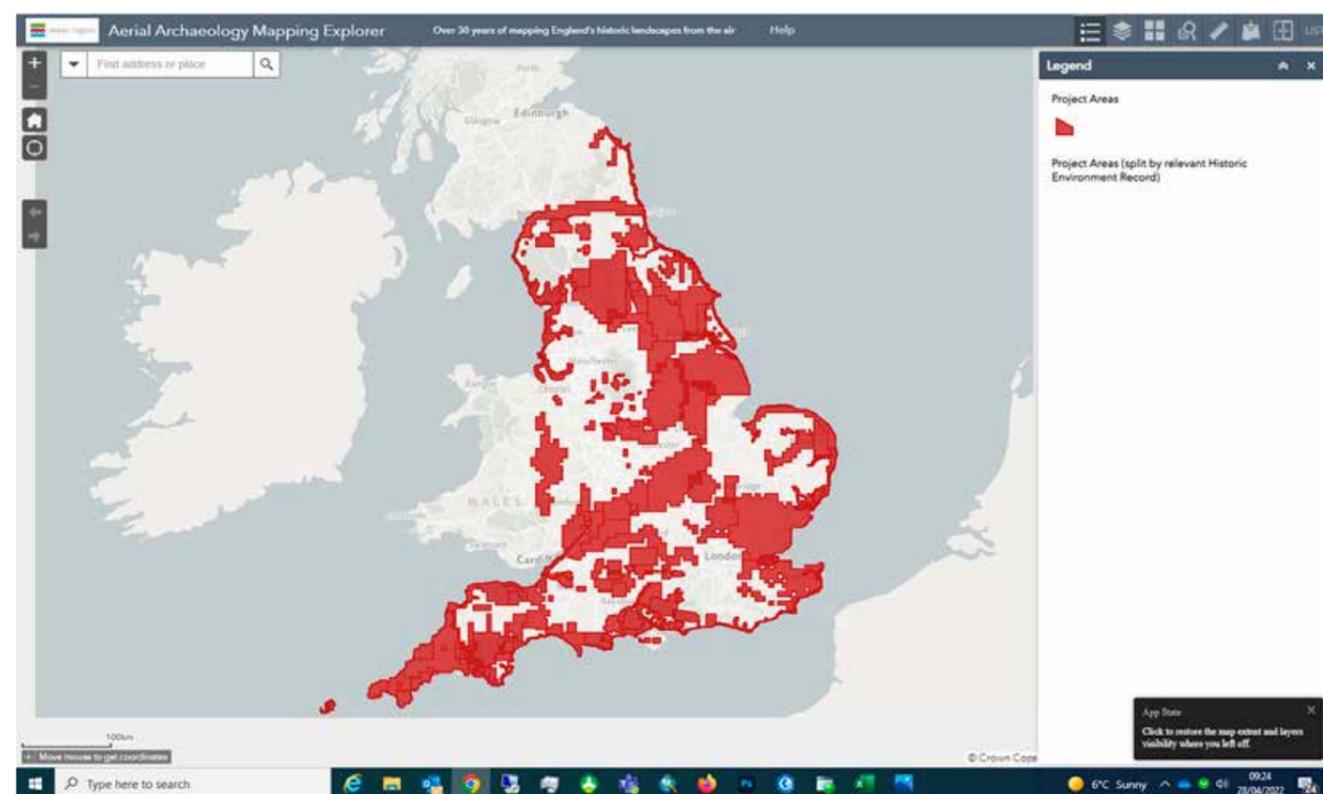


Fig 5: Opening Screenshot from AAME showing the data related to the different project areas included in the application.

Since the 2000s, additional sources of capturing information have become available and the results have been incorporated into the mapping shown by the tool. National coverage of georeferenced orthophotography has been used for mapping projects through the Aerial Photography for Great Britain (APGB) initiative, used alongside online sources such as Google Earth. A relatively new source for mapping is airborne laser scanning data (lidar) which can enable the identification of subtle earthworks or features obscured by vegetation.

### User experience

The mapping tool is designed to allow access to various levels of data, depending on scale. At the top level, there is basic information about the different mapping projects which have provided the data, including when they were carried out and in what format, as well as

links to free archaeological reports. Below that, there is information about individual monuments as described in the **Heritage Gateway** (a website that offers local and national information relating to England's heritage). Finally, the unique element of the tool provides detailed mapping of individual features, according to how they originally appeared in the landscape.

When using the mapping tool, selecting any identified archaeological feature provides a pop-up box, which shows basic information about the type, period and form of the feature and the source that it was seen on, as well as a link to the more detailed record or project report. At the most detailed level there are links to detailed descriptions of the 'period', 'type' and 'evidence' terms, to help those unfamiliar with some of the terminology. >>

A relatively new source for mapping is airborne laser scanning data (lidar) which can enable the identification of subtle earthworks or features obscured by vegetation.

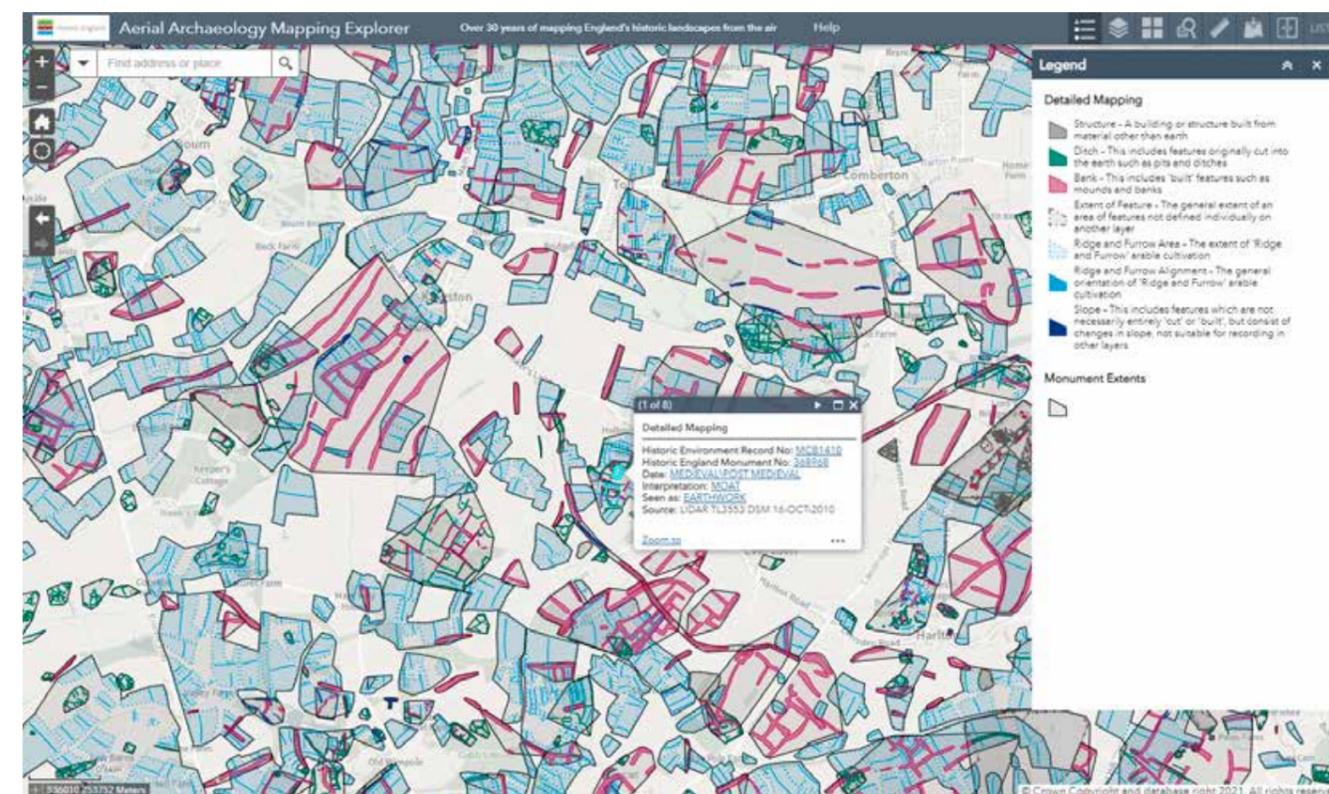


Fig 6: Screenshot from AAME showing the maximum level of detail. Features are shown in detail together with the legend explaining their symbology; features are depicted according to their original form e.g. 'positive' banks or mounds, or 'negative' pits and ditches. The extent of each monument, or group of features is also shown.

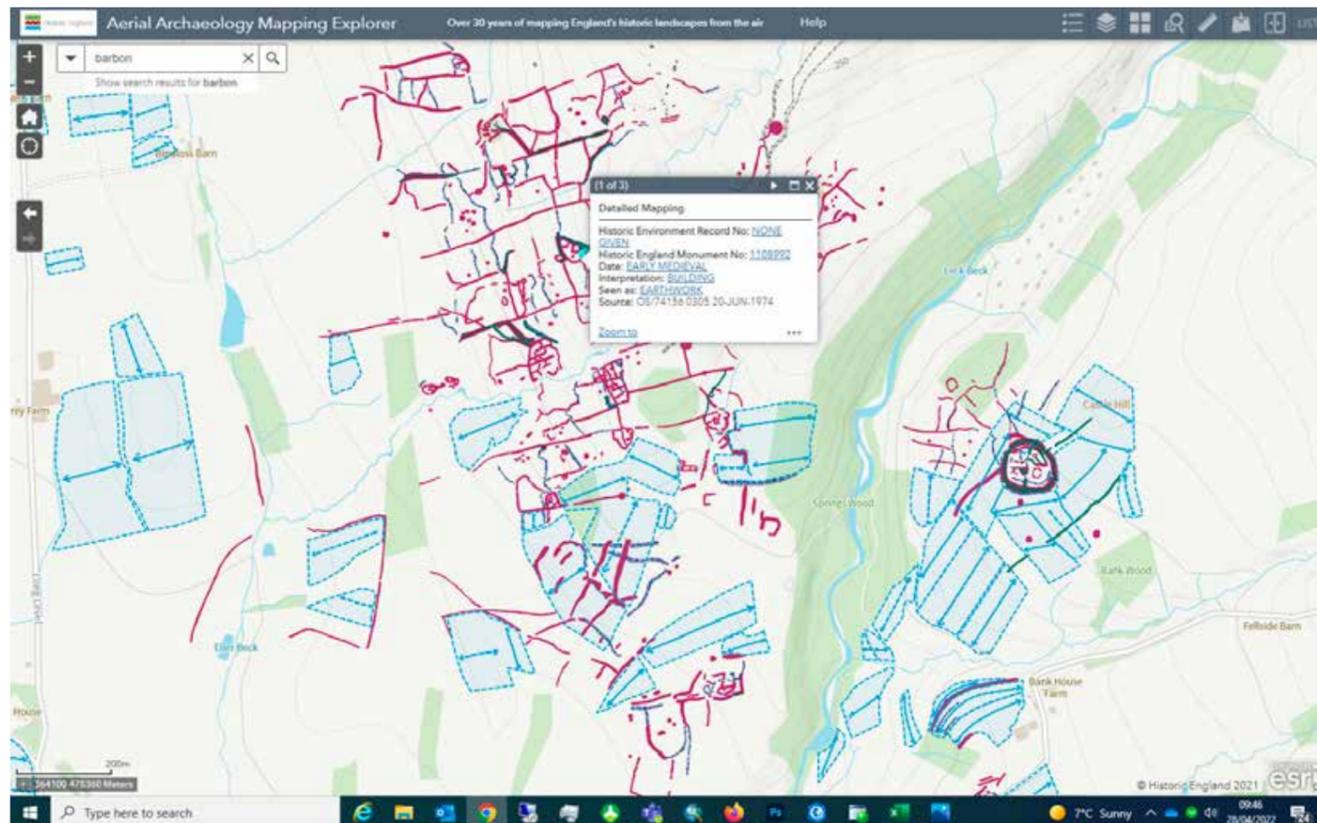


Fig 7: Screenshot from AAME showing the maximum level of detail for an area of extensive prehistoric and later settlement activity around High Park in the North Pennines.

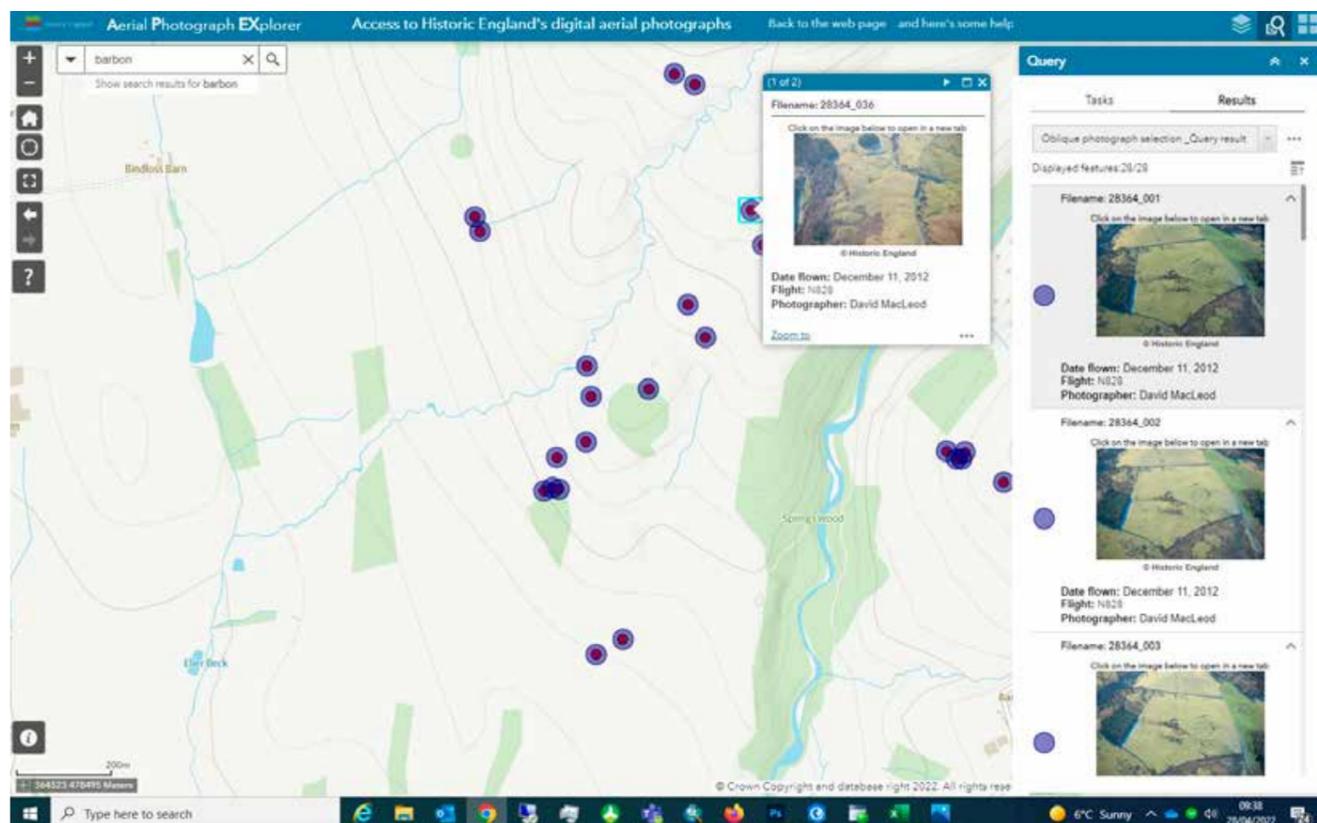


Fig 8: The same area as shown in Fig 7 as seen in APEX. The image in the pop-up covers roughly the area highlighted in the previous figure.



Fig 9: The full size image seen in the filmstrip from image Fig 8. A late prehistoric enclosure surviving as an earthwork on Castle Hill above Leck in the North Pennines, and photographed in winter 2012, taking advantage of the long shadows. © Historic England 11/12/2012, image reference 28364\_001

## Impact

The two Explorer tools have shown how the aerial viewpoint can be used to engage people with all aspects of the historic environment. The launch days for both tools saw the highest ever number of visits to the Historic England website, stimulating significant increases in views of other content such as list entries and Research Reports. Press coverage for the Aerial Photograph Explorer alone had an estimated audience reach of over 250 million people.

Since launch these resources have received hundreds of thousands of visits and continue to be visited over 7,000 times a day at time of writing.

## Future

Both tools will continue to develop over the coming months and years. New photography taken by the Historic England aerial reconnaissance team will be added to the Aerial Photograph Explorer. Furthermore, the Historic England Archive plans to

gradually add more of their 6 million historic prints as they are digitised.

As for the mapping of archaeology, Historic England and our partners will continue to carry out aerial mapping projects and the results of these will be uploaded to the Aerial Archaeology Mapping Explorer as they are completed. We also hope to improve the usability of early hand-drawn mapping data by providing links to records hosted on Heritage Gateway. Enhancements to functionality are also being explored, particularly making the data available in a format that others will be able not just to view and query, but also to incorporate into their own applications ■

## Acknowledgements

The authors would like to thank the many people who made this possible – the Historic England Archive and others who supplied the crucial aerial sources to allow our work to happen, all the aerial archaeologists who took the photos and/or created the mapping and interpretations, and all those who supported our work programme, from the Historic England Grants team to the many partners we have worked with over the years.

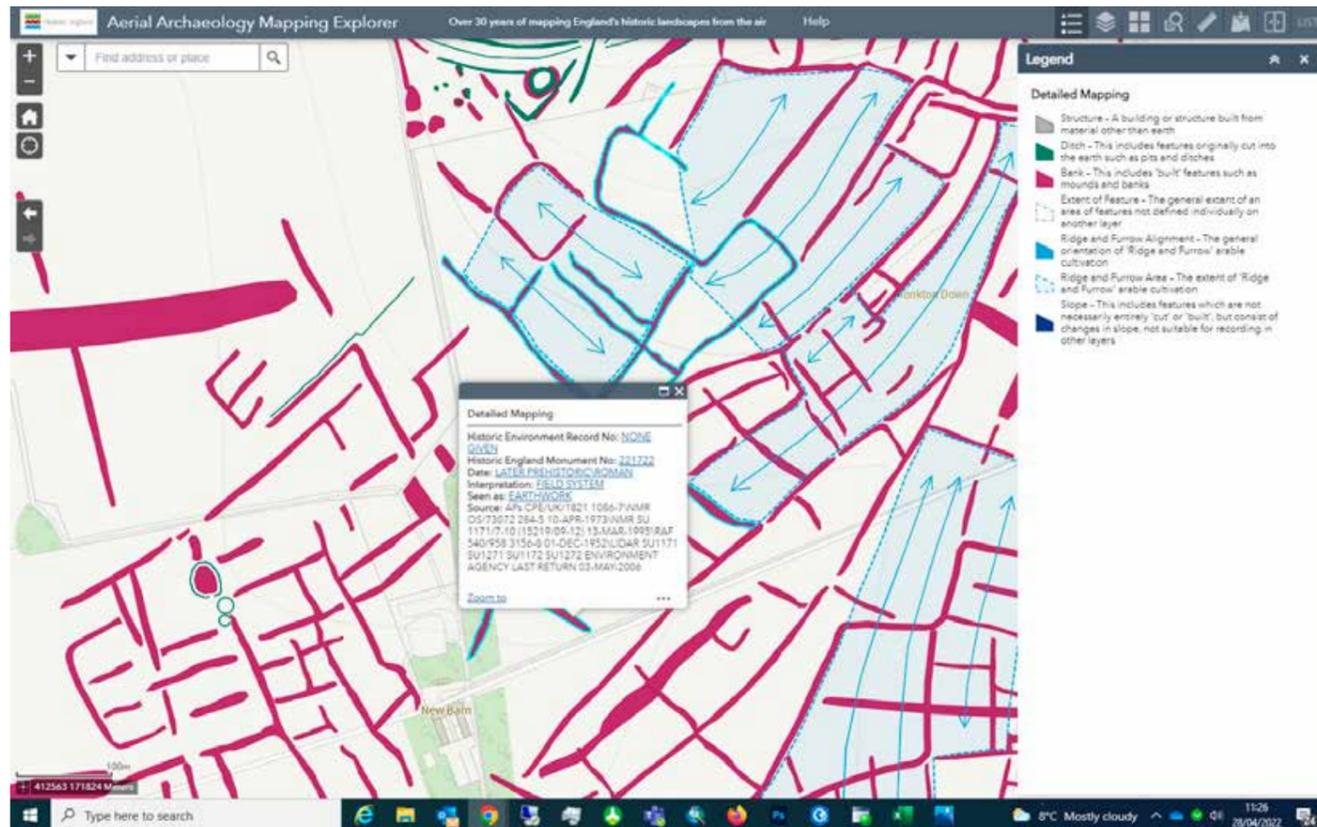


Fig 10: Screenshot from AAME showing the maximum level of detail for an area of extensive prehistoric and later settlement and farming activity in Winterbourne Monkton, Wiltshire.

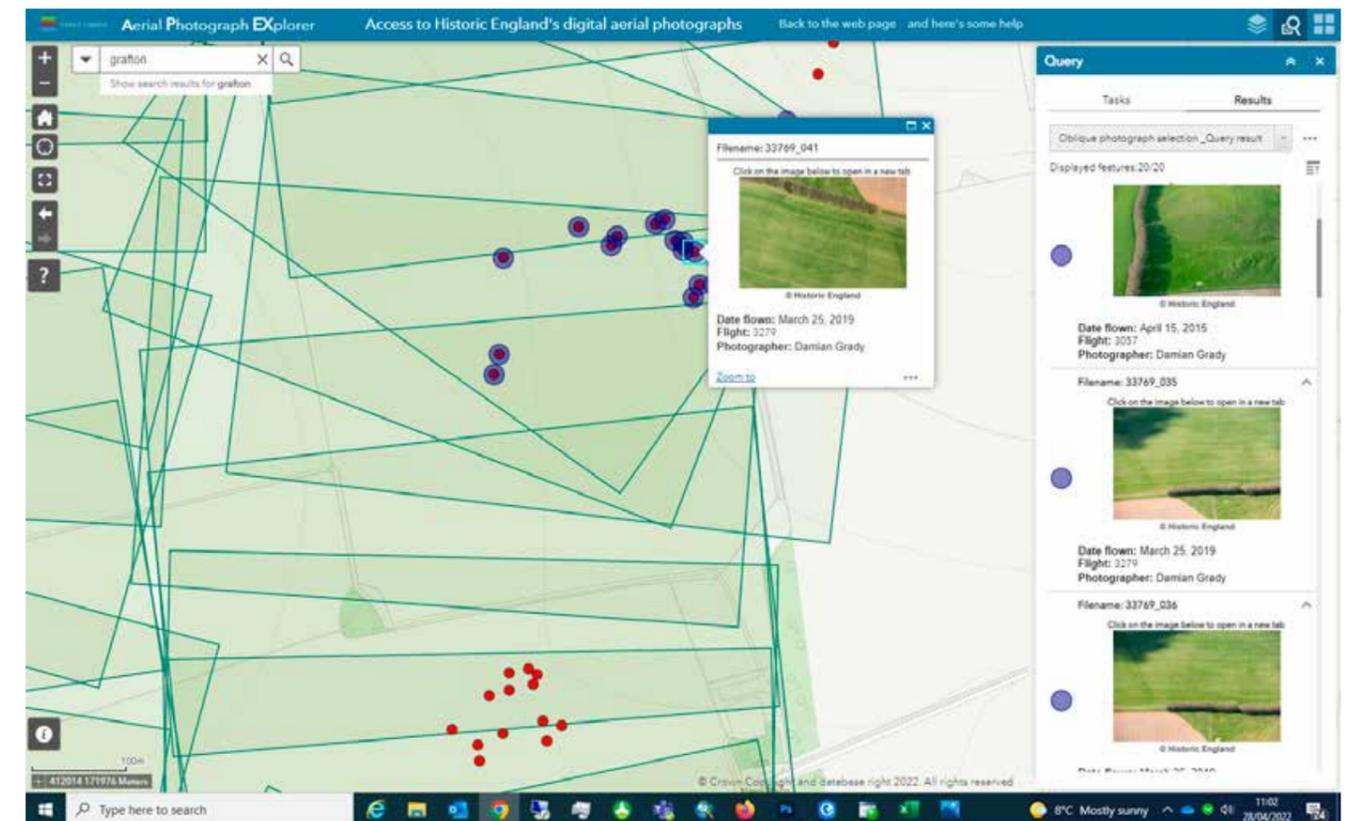


Fig 11: The same area as shown in Fig 10 as seen in APEX. The image in the pop-up covers part of the area highlighted in the previous figure but shows a previously undiscovered settlement enclosure.

## The authors

**Damian Grady**  
National Aerial Reconnaissance Manager with Historic England.



Damian joined the Royal Commission on the Historical Monuments of England in 1990 to map archaeology from aerial photographs and from 1998 became responsible for managing the aerial reconnaissance programme.

**Simon Crutchley**  
Remote Sensing Development Manager with Historic England.



Simon is a landscape archaeologist and air photo interpreter with over 20 years' experience of mapping and interpreting features of archaeological and historical interest visible on aerial photos and other aerial imagery.

## Further information

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

<https://historicengland.org.uk/research/results/aerial-archaeology-mapping-explorer/>

<https://historicengland.org.uk/research/methods/airborne-remote-sensing/>



Fig 12: The full size image seen in the pop-up from image Fig 11. An Iron Age enclosure with numerous pits and Bronze Age Barrows discovered in March 2019 after the dry winter that followed the hot summer of 2018 in Winterbourne Monkton, Wiltshire, just outside the Avebury World Heritage Site. © Historic England 25/03/2019, image reference 33769\_041



Belas Knap Long Barrow, Sudeley, Gloucestershire, 19 July 1958. Excavated in 1863-65 and 1928, this Neolithic funerary monument was restored by the Ministry of Works in 1929-31. © Historic England Archive. Harold Wingham Collection. HAW/9388/02

# Celebrating the Harold Wingham Collection through Active Participation

A collaborative project remembers the work of Harold Wingham, an unsung hero of aerial photography.

The recent death of aerial photographer Harold Wingham has motivated a collaboration between some of his former associates and the Historic England Archive.

In November 2021 the Historic England Archive, responsible for the curation of major collections of national importance covering archaeology, architecture, social and local history, learned of the recent death of Harold Wingham, a 'shy, modest and self-effacing man' who had 'made a unique contribution to the archaeology of Gloucestershire and far beyond.' (Private correspondence).

To commemorate his work, the Historic England Archive is collaborating with some of his friends and associates to create online galleries of images from the [Harold Wingham Collection of Aerial Photographs \(HAW01\)](#). A selection of images from the collection accompany this article.

### Harold Wingham

Harold Wingham was born at Calmore in the New Forest in 1924. During the Second World War he served in the Royal Air Force as a wireless operator and trainee navigator. After the war, Harold compiled weather reports for the Ministry of Civil Aviation in Gloucester and later worked for the Gloster Aircraft Corporation.

He took flying lessons and learned photography, paving the way for him to become 'one of the unsung heroes' of aerial photography (Hall 1997).

Harold took encouragement from the archaeologist Osbert Guy Stanhope (OGS) Crawford, pioneer in the use of aerial photography for archaeology. Harold acquired government surplus camera equipment and film and began recording the archaeology and architecture of the West Country, covering sites in Cornwall, Devon, Gloucestershire, Herefordshire, Worcestershire and Wiltshire.

Sadly, Harold's commitment to taking photographs from the air came to an end in 1963 after he witnessed an air crash that killed his pilot, a close friend. However, this didn't curtail a passion Harold had for airships, which he promoted as a more stable platform for aerial photography and archaeological survey. Harold conceived a design for a two-man airship, which he worked on from 1961 until the project came to an end in the mid-1970s.

Harold retained a keen interest in archaeology and was a founder member of the Gloucester and District Archaeological Research Group (GADARG), later Gloucestershire Archaeology. It was through his associations with the group and the Cranham Local History Society that the Historic England Archive learned of Harold's death. We are now working closely with his friends and associates to commemorate Harold by working together to create online displays of his aerial photography. >>

**Top right:** British Camp Iron Age hillfort, Colwall, Herefordshire, 16 August 1958. Also known as Herefordshire Beacon Camp, excavations have revealed Iron Age and Roman pottery and a 10th century golden coronet. © Historic England Archive. Harold Wingham Collection. HAW/9389/26



**Bottom right:** Restormel Castle, Lostwithiel, Cornwall, 24 July 1959. Dating from circa 1100, Restormel is a well-preserved motte and bailey castle, which became the principal residence of the Earls of Cornwall in the later 13th century. © Historic England Archive. Harold Wingham Collection. HAW/9398/05



He took flying lessons and learned photography, paving the way for him to become 'one of the unsung heroes' of aerial photography (Hall 1997).

## The Collection

The Harold Wingham Collection of Aerial Photographs (HAW01) is celebrated because of the quality of the imagery and because of its mix of architectural, archaeological and industrial subjects, and its views of villages and towns in the early post-war period.

The collection comprises almost 2,000 photographic negatives and corresponding photographic prints. It is divided into eighty-six flights, which were flown between April 1951 and July 1963. Harold used hand-held Williamson F24 and Fairchild K20 aerial reconnaissance cameras, which could produce images with excellent resolution, hence the quality of detail captured in the photographs.

Writing from Cheltenham Aero Club, Harold first contacted the National Buildings Record (NBR), one of the Historic England Archive's predecessors, in 1957, following a recommendation from OGS Crawford. The offer of aerial photographs of 'big houses, castles and similar subjects' was initially met positively by the NBR and a set of samples sent by Harold the following year were described as 'excellent'. Consequently, a request for fifty-one of Harold's prints was made and the collection initiated.

Around the same time, Harold contacted Paul Popper Ltd Photographic Agency, who also described his photographs as 'excellent' and who were keen to build up a collection of Harold's views of country houses, castles, towns and archaeological sites. Harold was to receive 50 % of any fees received and Popper would also make contributions to flying costs.

In January 1970 the Royal Commission on the Historical Monuments of England (RCHME), which had merged with the NBR in 1963, renewed its acquaintance with Harold. John Hampton, Air Photographs Officer in the RCHME's Air Photographs Unit, wrote to Harold to request that copies of more of Harold's photographs be obtained to enhance the RCHME's Air Photographs Library.

Over the course of the next few years, the RCHME made copies of around 1,700 of Harold's photographs and donations of negatives were made to the RCHME in 1991 and 1998. In 1996 Harold gave the RCHME camera equipment that had recently been on display to the public at the National Monuments Record Centre in Swindon. >>



The Harold Wingham Collection of Aerial Photographs (HAW01) is celebrated because of the quality of the imagery and because of its mix of architectural, archaeological and industrial subjects, and its views of villages and towns in the early post-war period.

**Top left:** The Pool and Harbour, Mevagissey, Cornwall, 30 July 1959. The harbour piers and quays are listed Grade II\*. The inner piers were built between 1770 and 1773 and the outer piers in the 1860s. Copyright Historic England Archive. Harold Wingham Collection. HAW/9399/42

**Bottom left:** Avon Tyre Factory, Melksham, Wiltshire, 24 May 1960. Rubber product manufacturing in Wiltshire took advantage of former mill buildings and workforces. Avon moved to Melksham in 1890, making pneumatic tyres for bicycles before advertising their first car tyres in 1906. Copyright Historic England Archive. Harold Wingham Collection. HAW/9404/32

**Top right:** Royal Shakespeare Theatre, Stratford-upon-Avon, Warwickshire, 21 May 1951. Elisabeth Scott's theatre was the first large public building in England designed by a woman. Built 1928-32, it incorporates the surviving part of the 1877-79 theatre that was largely destroyed by fire in 1926. Copyright Historic England Archive. Harold Wingham Collection. HAW/9414/33

**Bottom right:** Ragley Hall, Arrow with Weethley, Warwickshire, 11 September 1951. Ragley was built between 1680 and 1683 for the Earl of Conway. The grounds were landscaped by 'Capability' Brown in the 1750s. Copyright Historic England Archive. Harold Wingham Collection. HAW/9422/46

## Collaboration with others to shape projects, to exchange stories, and to involve people with different skills and perspectives.

**Below left:** Great Malvern, Worcestershire, 26 November 1951. Famed for its scenery, fresh air and healing waters, Malvern evolved as a high-class health resort during the second half of the 19th century. The town grew to provide attractive infrastructure including hotels, large villas, shops and gardens. © Historic England Archive. Harold Wingham Collection. HAW/9424/19

### Co-creating an exhibition through Active Participation

A consequence of the contact made between associates of Harold Wingham and the Historic England Archive is the planned co-creation of online displays of images from the Wingham Collection and the production of a feature page for the collection on the Historic England website.

Historic England's [Future Strategy 2021](#) outlines three areas of focus, one of which is Active Participation, which aims to work together with more people to champion the historic environment.

The strategy encourages collaboration with others to shape projects, to exchange stories, and to involve people with different skills and perspectives. The decision to commemorate Harold's work online has given us the opportunity to put this into practice.

Co-creation works like this in the project: one party, the Archive, is providing information, resources and access to an online platform, whilst Harold's friends and associates are proposing display themes, selecting images to illustrate each theme and

providing text for the captions. We are also hoping to utilise some more personal anecdotes to give the content a more intimate touch – something that only close friends and associates can offer.

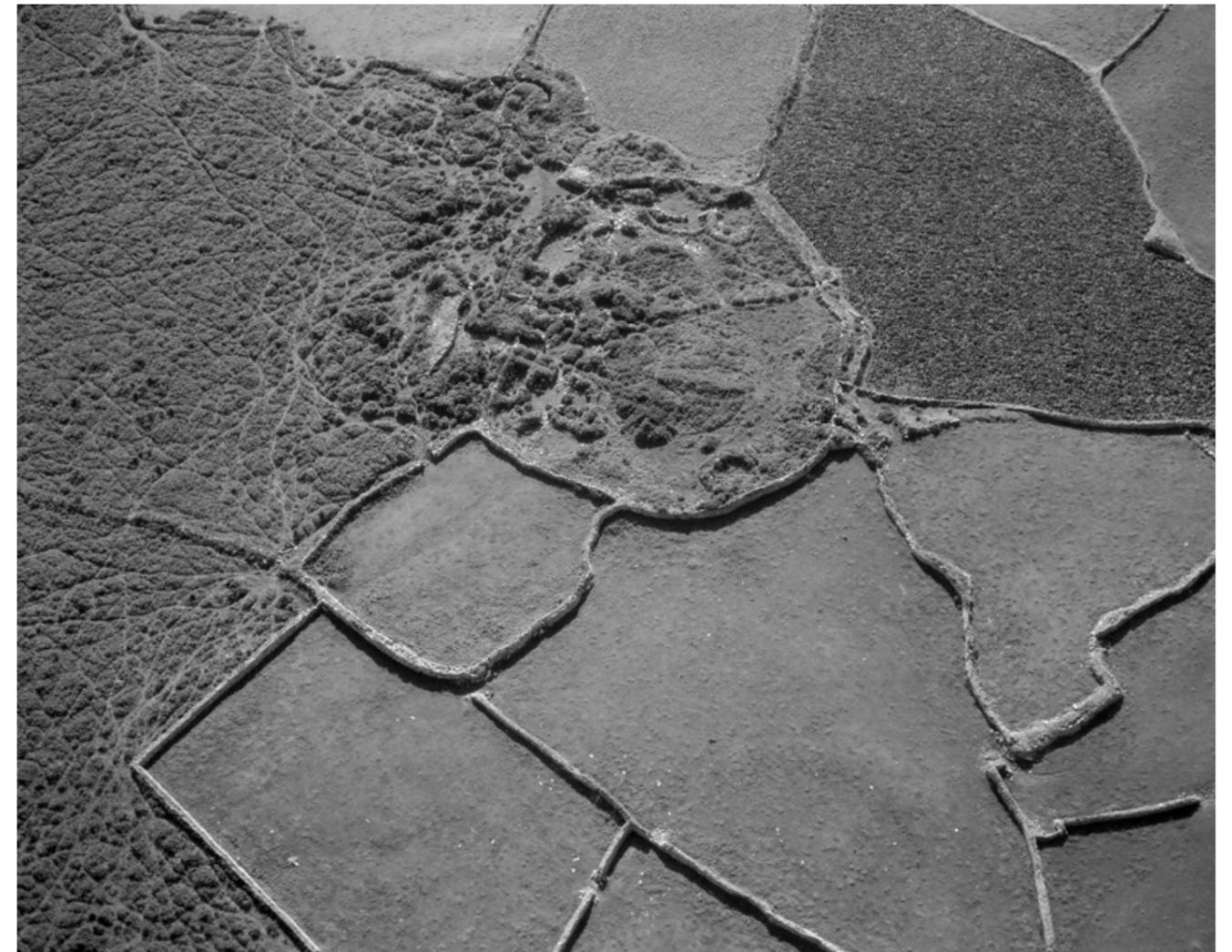
### Google Arts & Culture

For several years, Historic England has had a presence on the [Google Arts & Culture](#) platform, which showcases the collections of some of the world's most well-known cultural organisations. It was decided that this would be a suitable place to create an online display of Harold's work.

During the process of image investigation, three broad themes have been identified, each roughly equating to around one third of the content of the collection: earthworks, architecture and industrial. The aim now is to produce three Google Arts & Culture stories so that the collection and Harold's work can be better represented.

Work is now under way to make a final selection of images and to draft text using the specialist knowledge of a wider group of people in the Gloucestershire archaeology community. >>

**Below right:** Porthmeor Courtyard House, Zennor, Cornwall, 23 September 1960. The courtyard house developed as a building form in the 2nd to 3rd centuries. They take the form of rooms, storage chambers and courtyard surrounded by an oval or curvilinear stone wall. Copyright Historic England Archive. Harold Wingham Collection. HAW/9406/32





**Above left:** Chun Castle, Madron, Cornwall. 23 September 1960. Chun Castle is a multivallate Iron Age hillfort. Excavations uncovered pottery dated to the 4th century BC, suggesting that it was built on a much older structure. © Historic England Archive. Harold Wingham Collection. HAW/9406/15

### The future of the Collection

All 1,983 photographs in the Harold Wingham Aerial Photography Collection have been digitised and catalogued. It is hoped that in the near future, all will be made available to view online and be added to Historic England's new [Aerial Photography Explorer](#) application.

Our project to celebrate the Harold Wingham Collection demonstrates

some of the core principles of Active Participation – inviting people to shape projects; connecting people by exchanging stories, knowledge and ideas; involving people with different skills, and equipping people with information and resources.

We hope that the results of our co-creation and collaboration will be a fitting tribute to Harold Wingham and his outstanding photography ■

We hope that the results of our co-creation and collaboration will be a fitting tribute to Harold Wingham and his outstanding photography.



**Above right:** Portrait of Harold Wingham standing beside a light aircraft. © Historic England Archive. Harold Wingham Collection. HAW01/02/01

### The author

Gary Winter  
*Archive Engagement and Content Officer with Historic England.*



Gary has worked for Historic England and its predecessors for over twenty years. Working in various teams and departments, Gary has worked on projects to record prisons, law courts and the seaside, and to create exhibitions based on Archive collections. Gary has recently returned to the Historic England Archive to promote its collections and create content for a variety of audiences.

### Further information

Hall, G, 1997 'Harold Wingham: pioneer aerial photographer' in *AARGnews* 15 (September 1997), 9-11

Luffman, C, 2013 'The Gloster Story: A Tale of Two Airships That Were One' in *Dirigible: The Journal of the Airship Heritage Trust*, No. 70 (Autumn 2013), 18-21, available at: [https://www.airshipsonline.com/dirigible/pdf\\_copies/No.%2070%20-%20Autumn%202013/No.%2070%20-%20Autumn%202013.pdf](https://www.airshipsonline.com/dirigible/pdf_copies/No.%2070%20-%20Autumn%202013/No.%2070%20-%20Autumn%202013.pdf)

Wingham, H, 1970 'Airships and Archaeology' in *GLEVENSIS The Gloucester and District Archaeological Research Group Review*, No. 5, 2-7

# The Historic England Research Reports database: introducing an important resource for researchers

The Historic England Research Report Series (RRS) includes thousands of reports from over 60 years of research and our online database makes them available to you at a keystroke.



**Above:** Whitley Castle Roman fort and vicus, Northumberland featured in a report from 2009  
© Historic England Archive. Image reference NMR\\_20677\\_043

## Content

From a single-page type-written table on archaeological finds of charcoal to multi-volume reports on post-war schools, the RRS database contains a wealth of information on buildings, archaeological sites, scientific dating, identifying, scanning, surveying and reviewing elements of the historic environment.

Until 2005, the database consisted of the Ancient Monument Laboratory reports and the Centre for Archaeology series, but these were subsequently joined by reports from Archaeological Survey, Aerial Survey and Architectural Survey, together with work from contractors commissioned by Historic England to carry out targeted applied research.

The RRS database contains a wealth of information on buildings, archaeological sites, scientific dating, identifying, scanning, surveying and reviewing elements of the historic environment.

Recent reports are now full-colour, high-quality publications available to download free from our database and accessible to researchers all over the world.

In 2012 we ran a project to digitise all the research reports that had previously only been available in paper form, uploading them to our online database and creating an invaluable resource for students and academics interested in not only our

current work but the past catalogue of our research.

There are now over 7,000 reports available and every year we add more than 100 new reports, with 2021 bringing such diverse subjects as a geophysical survey on works on the Stockton and Darlington Railway, a topographic analysis of a medieval town and the identification of grain excavated in York. >>

There are now over 7,000 reports available and every year we add more than 100 new reports.

In the future, we are hoping to continue our promotion of the RRS at professional conferences, such as those held by conservators, conservationists, environmentalists and more.

### Outreach

We are always looking for ways to increase access to our reports and bring new audiences to our work. For example, in 2014, we took our promotional material to a major Science Fiction convention in London, an unlikely venue, perhaps, but one which allowed us both to connect with people eager to see the science behind the fiction and to publicise the value of our research material to LARPs (Live Action Role Players) and historical re-enactors, keen to bring authenticity to their work.

In the future, we are hoping to continue our promotion of the RRS at professional conferences, such as those held by conservators, conservationists, environmentalists and more, while also reaching out to historical interest and local study groups. We continue to identify specific places and events that can showcase our work, for example [Wordsworth's Dove's Cottage](#) and the [Capability Brown tri-centennial](#).

**Below left:** Beverley Minster was the subject of a 2022 report on dendrochronological dating of timbers. © Historic England Archive. Image reference DP072503



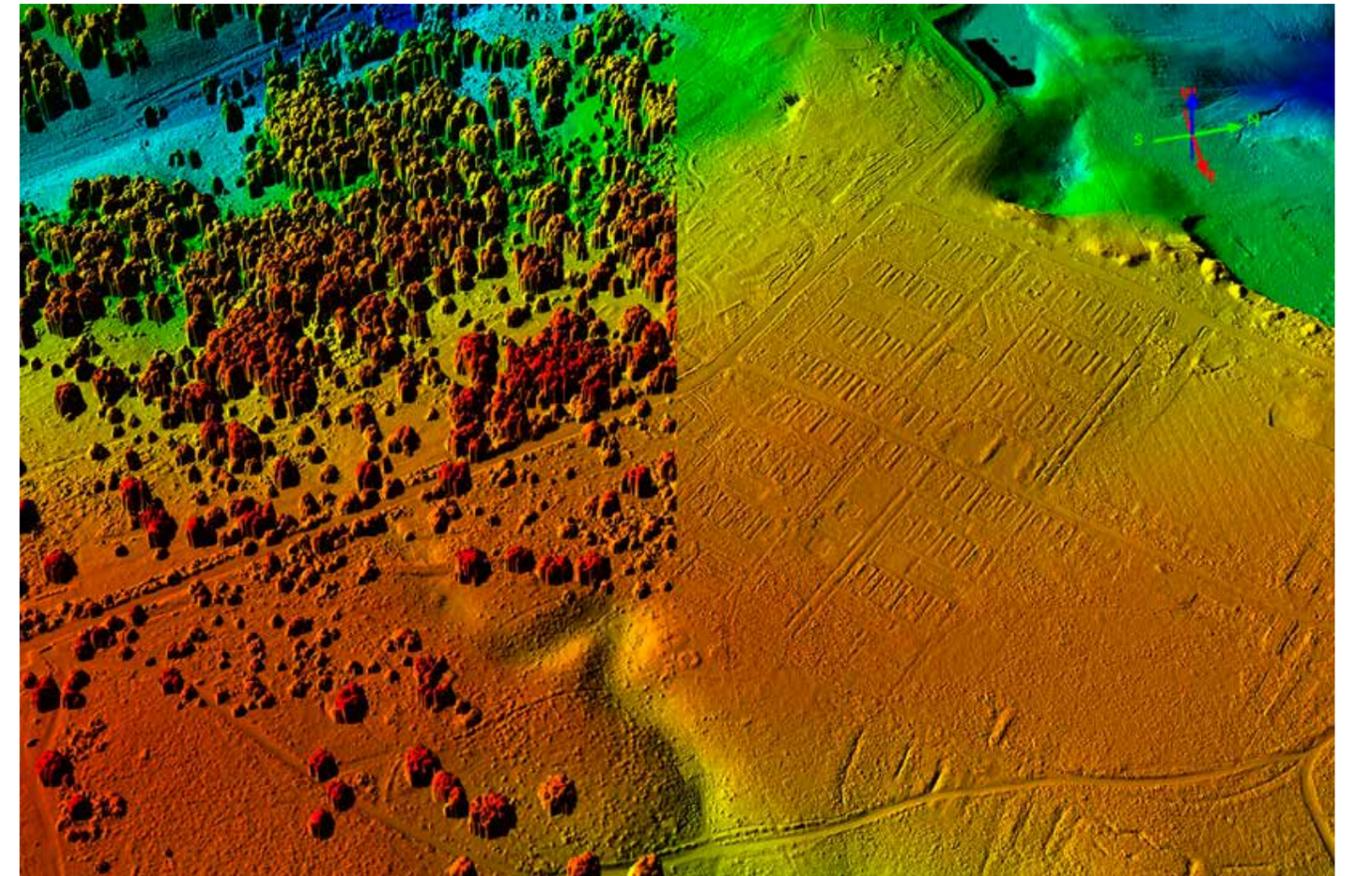
It is important to us that as many people can benefit from and use the decades of knowledge they have at their fingertips.

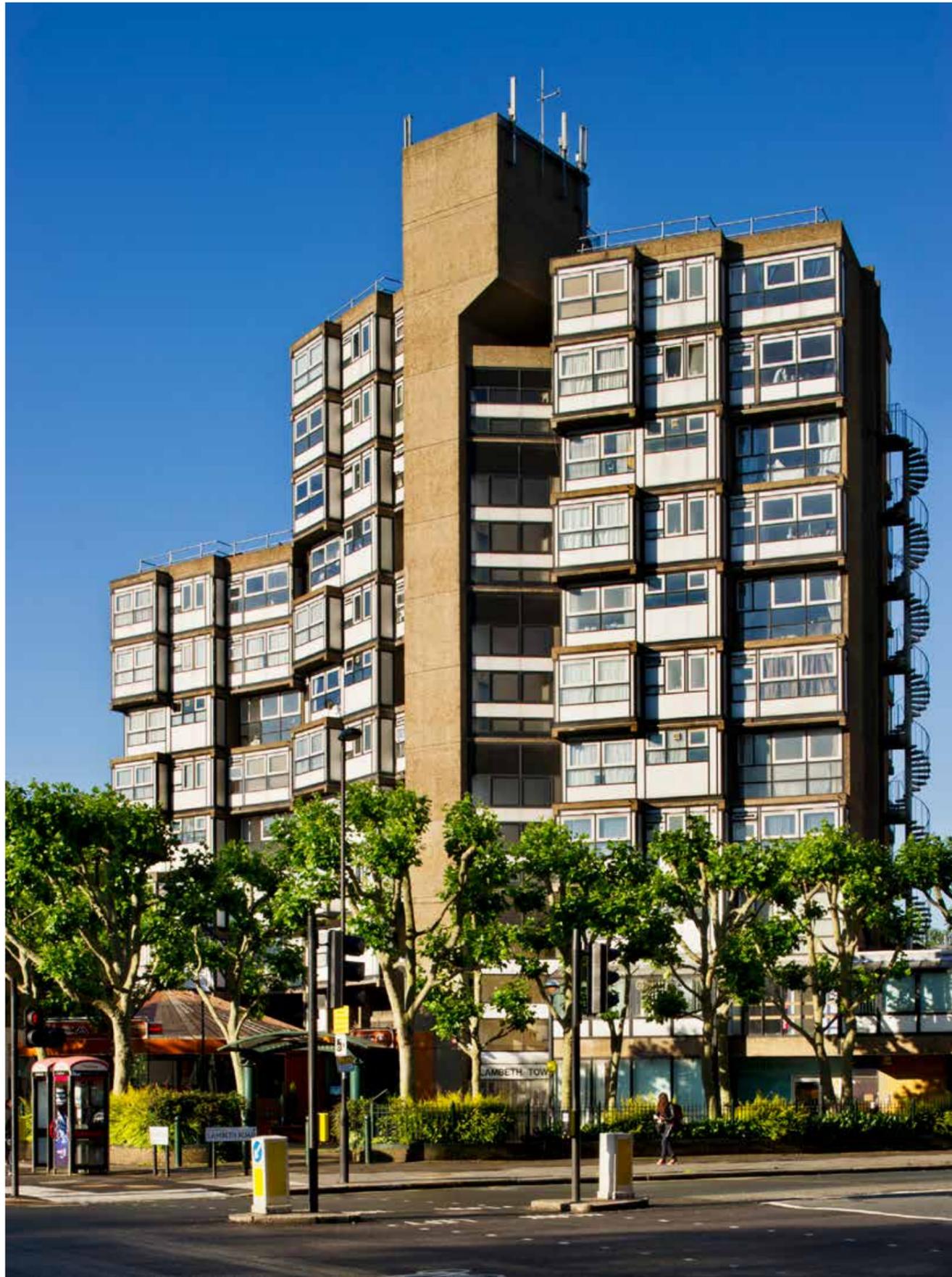
### Online Access

We are also keen to provide improved access to our material online and are implementing changes to make it easier to find and use our wealth of reports. We have therefore integrated the [search facility](#) into our main Historic England website. It is important to us that as many people can benefit from and use the decades of knowledge they have at their fingertips.

The database is now supported by an online map, which uses a GIS application to pin down all RRS reports that have a specific location. Users can, virtually, roam the country seeking places of interest and related research. This is a great way to find out what is in your own area, or any others of particular interest. >>

**Below right:** From a report featuring survey of First World War training camps at Cannock Chase, this lidar image depicts the surface model on the left, and terrain model on the right, where the vegetation has been stripped away. Lidar DSM and DTM 04-MAY-2016 © Historic England; source Staffordshire County Council/Fugro BV Geospatial





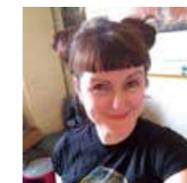
**Above left:** Lambeth Towers (designed about 1964-65, completed 1971, main job architect George Finch). The database contains a wealth of information of buildings including those of the post-war period. © Historic England Archive. Image reference DP158436

The Research Report Series will continue to provide knowledge and inspiration to future researchers all over the world.

From major sites, such as Stonehenge, to Cold War bunkers, to tiny fragments of grain and seeds, the Research Report Series will continue to provide knowledge and inspiration to future researchers all over the world, and provide a place for world-class research to be published and easily accessed by our growing and enthusiastic audience ■

**The author**

Kirsty Stonell Walker  
*Research Reports Manager with Historic England.*



Kirsty has worked for English Heritage and Historic England at Fort Cumberland for 20 years, managing the Research Report Series and its associated database, together with the legacy series that preceded it.

**Further information**

Find out more and search the [database](#).



**Above right:** We have published a number of reports on botanical remains, including a regional-based review of evidence. © Historic England Archive. Image reference DP188646



**Above:** A dendrochronologist taking a sample of wood for analysis. The database includes a great resource on scientific dating. © Historic England Archive. Image reference DP301101

# Historic England and Liverpool University Press

A publishing partnership.



In order to achieve Historic England’s wider objectives, it is essential the right content be provided to the most relevant people, in the best way possible.

Creating and sharing inspiring content is a crucial part of Historic England’s role in helping people care for, enjoy and celebrate England’s spectacular historic environment. In order to achieve Historic England’s wider objectives, it is essential the right content be provided to the most relevant people, in the best way possible.

Publishing is one of the many ways that Historic England shares important information and in July 2019 Historic England entered into a **publishing partnership** with Liverpool University Press (LUP) for the long-term running of its publishing. Whilst the commissioning, production and marketing processes are managed by LUP, this is all within established Historic England frameworks and guidance, and all titles are published under the Historic England imprint.

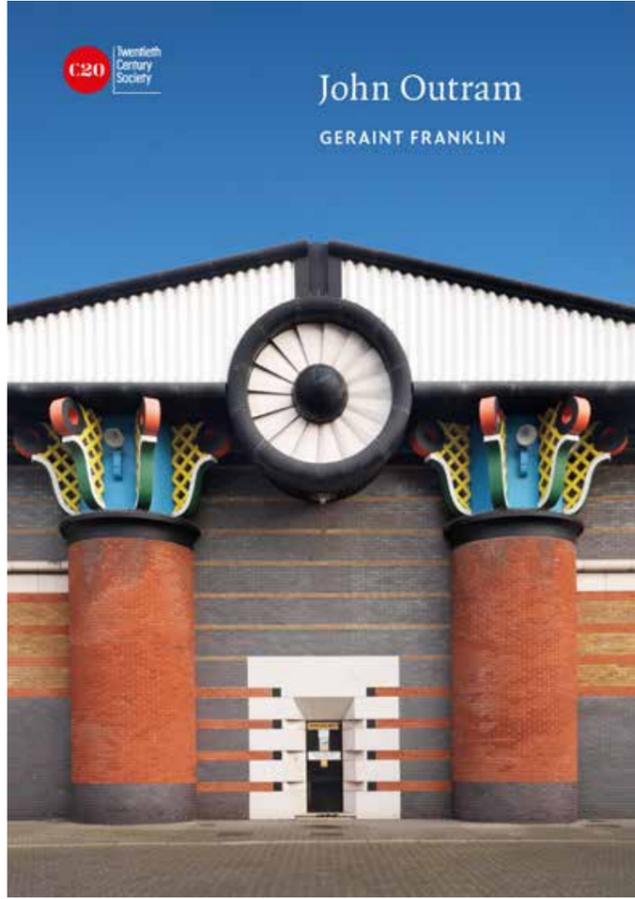
## How can publishing help research?

Titles published under the Historic England imprint are closely related to research, whether it is undertaken within or external to the organisation. There are currently over 300 titles in the Historic England portfolio, many of which bring to light previously hidden, under-researched, or secret histories related to England’s historic environment.

There is perhaps a misconception among some audiences that heritage research deals singularly with, and focuses upon, the past. In fact, in line with the organisation’s Research Agenda, many of the imprint’s titles present studies and findings will benefit future generations, such as the social and economic value of heritage, optimising the sustainable performance of historic buildings in relation to the challenges posed by our climate crisis, and disseminating future learnings for the built environment in our rural, coastal, and urban areas.

Historic England’s publishing programme aims to disseminate world-class research in ways that can inform, engage, and inspire a range of audiences, from academics and heritage professionals to fans of popular heritage TV dramas.

However, it is not a one-way relationship. Publishing can also stimulate, give focus and create new audience channels to research institutions, as well as allowing untapped subjects to come to light and prospective new researchers to see themselves how they can play a substantive role, whether specialist or general interest, in the heritage sector. >>



Above left: *John Outram* by Geraint Franklin.

### Recently published books

Liverpool University Press continues to publish in partnership with many of the groups and societies who have worked with Historic England in the past. The imprint proudly continues the brilliant *Twentieth Century Architects series* in partnership with the *Twentieth Century Society*, and maintains a detailed, localised focus through the *Informed Conservation series* as well as stunning stand-alone books on individual sites such as Wanstead House, Dover Castle, and Chiswick House Gardens. Recent publications include:

*Warrior Treasure, The Staffordshire Hoard in Anglo-Saxon England* by Chris Fern and Jenni Butterworth (May, 2022)

The Staffordshire Hoard is one of the great discoveries of British archaeology, a treasure of the early Anglo-Saxon period. It was discovered by chance in summer 2009 and an extensive archaeological excavation has helped us to understand why this trove of warriors and kings was buried, and what part it played in shaping early England.

*John Outram* by Geraint Franklin (April, 2022)

This is the first major study of this inspiring architect, whose colourful yet elemental buildings communicate myths and metaphysics. Outram launched into practice in 1974, securing a reputation for innovative, creative and monumental architecture including The New House at Wadhurst, the Isle of Dogs Pumping Station and the Judge Institute in Cambridge.

*Chiswick House Gardens: 300 years of creation and re-creation* by David Jacques (March, 2022)

Few gardens have attracted more praise and debate over three centuries than those at Chiswick House. These were the gardens of the famous Lord Burlington and then the Dukes of Devonshire, where the English landscape garden had its genesis and where ground-breaking restorations have made it a truly multi-layered place.

### Got an idea for a heritage title?

Commissioning for Historic England books is currently active and submissions are warmly invited, particularly those concerned with the organisation's *Research Agenda* and *Future Strategy*. The Historic England Submission Form and Submission Guidelines can be found on [LUP's website](#) and if you have questions about submitting a book proposal or about the publishing partnership, then please contact Alison Welsby at LUP ([a.welsby@liverpool.ac.uk](mailto:a.welsby@liverpool.ac.uk)) ■

### The author

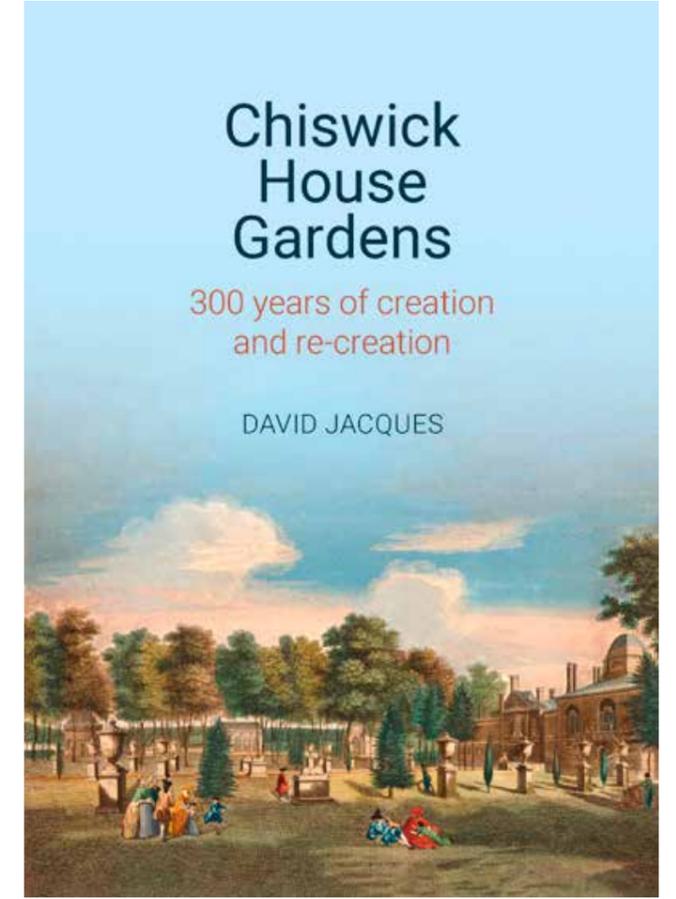
Alison Welsby  
*Editorial Director and Senior Commissioning Editor at Liverpool University Press.*



Alison manages the Historic England imprint as well as other LUP series and collections, and can be contacted to discuss proposals at [a.welsby@liverpool.ac.uk](mailto:a.welsby@liverpool.ac.uk).

### Further information

[Browse the full collection of Historic England books on the Liverpool University Press website.](#)



Above right: *Chiswick House Gardens: 300 years of creation and re-creation* by David Jacques.

# Daylight harvesting and historic buildings

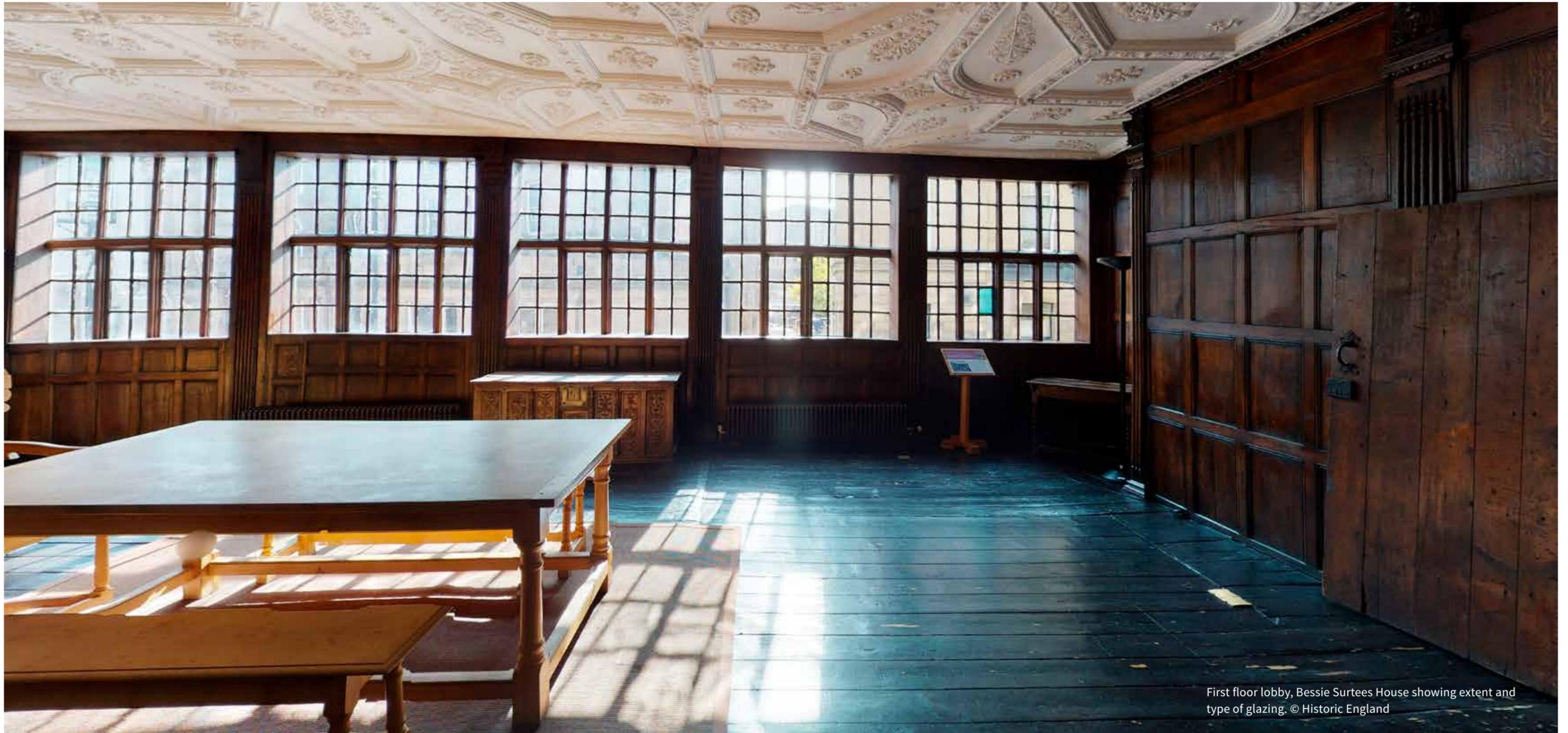
Saving energy and therefore carbon is becoming ever more critical.

This article explores how energy can be saved by utilising and controlling daylight and reducing our reliance on artificial lighting.

## Why is daylight so important?

Humans are diurnal animals; we are awake during the day and daylight has an enormous impact on our health and wellbeing. Sunlight supports our biological requirements by triggering our circadian rhythms (a natural, internal process that regulates the sleep-wake

cycle and repeats roughly every 24 hours, sometimes called our 'body clock') via non-visual receptors in the eye. By increasing daylight within our working environments, we can create better, healthier and more productive spaces as well as saving energy. The Chartered Institution of Building Services Engineers (CIBSE) has produced Technical Memorandum 40: 2020 '[Health and wellbeing in building services](#)' to demonstrate how this, along with other performance parameters, can impact our health. >>



First floor lobby, Bessie Surtees House showing extent and type of glazing. © Historic England

## A pilot research project to investigate lighting conditions in Historic England offices

With the drive towards 'net-zero' we were interested to see what energy saving outcomes some of our office buildings could achieve with historic glazing designs. We modelled the principles of 'daylight harvesting' for parts of two of Historic England's offices. Daylight harvesting uses daylight to offset the amount of electric lighting needed to light a space, thereby reducing the

energy consumed. It also uses lighting control systems that are able to dim or switch electric lighting in response to changing daylight availability.

For the studies [Bessie Surtees House \(grade I\)](#) in Newcastle and the [Engine House \(grade II\)](#) in Swindon were chosen.

The first office comprises two linked merchant's houses, one (Bessie Surtees House) timber-framed and

sixteenth century in date, the other (Millbank House) a brick building of the seventeenth century. The rooms picked for the analysis are architecturally typical of the periods and are both on the main south-east facing façade.

The room and window proportions vary substantially, with the room in Bessie Surtees House having a higher ceiling but deeper footprint than the office in Millbank House. In addition, the window designs are greatly different.

The rooms chosen for study in the Engine House were very different. The building was originally the offices of the Great Western Railway Company. It was built in the 1840's, extended in the 1870's and again in 1903-08. Today it provides extensive open-plan offices on four levels. We chose two rooms, one on each of the second and third floors.

### Setting up the parameters and identifying targets: the Newcastle office

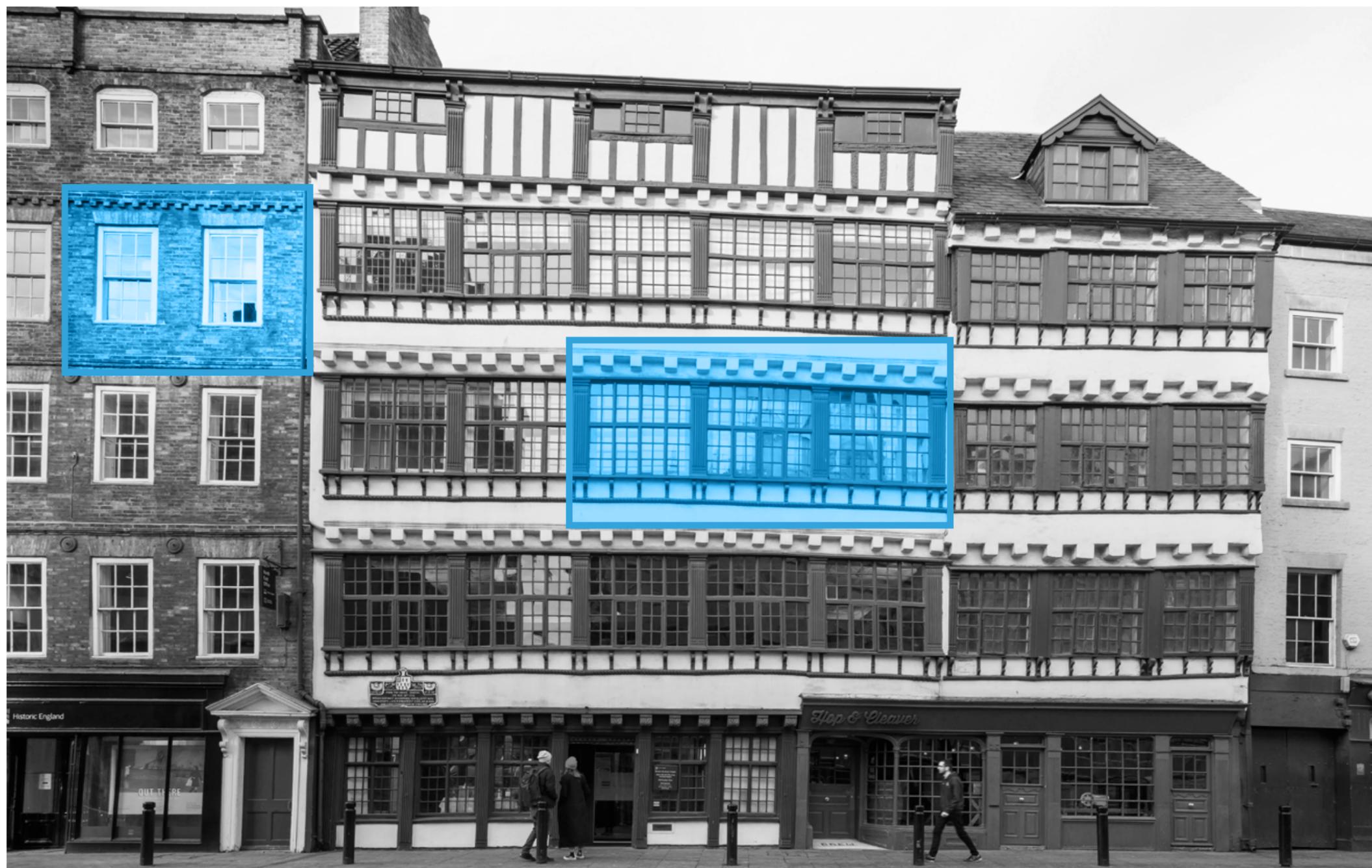
Using specialist software, a computer model was created for each of the rooms. The model took account of any overshadowing from neighbouring buildings and to give accurate results 3D camera scans, listing records, details of the existing lighting, the use of the spaces and current desk layouts were incorporated.

The first part of the analysis looked at the internal daylight in relation to current best practice standards and the second looked at the potential for energy savings with daylight dimming incorporated into the rooms' lighting controls. The controls would utilise a light level sensor or photo-cell that measures the light level against a pre-set value and then to achieve that the control system either dims, switches off or lowers blinds, to adjust the light levels within the space to the desired level.

For the purpose of the analysis, it was assumed that both rooms in the Newcastle office had the same light reflectance values (the percentage of light a surface reflects) and the same Climate Based Daylight Modelling (CBDM) data (daylight conditions derived from standard meteorological datasets).

We wanted to discover whether the rooms could achieve a given illuminance level, as measured in 'lux'. We took 300 lux at desk height by daylight alone as an adequate standard, and studied for what percentage of the occupied hours the rooms could do this for. This value is known as Spatial Daylight Autonomy (sDA). A good standard is if 55% of a space achieves 300 lux for 50% of the occupied hours and an excellent standard is if 75% of the space achieves the same.

An analysis of the annual lighting energy consumption was carried out based on an energy consumption density figure of 13 watts per square metre ( $W/m^2$ ) for fluorescent lamps which is the predominant form of lighting used in these offices. >>



Above left: Elevation and windows of Bessie Surtees House showing the windows of the rooms assessed in the study, with Millbank House on the left and Surtees House on the right. © Michael Brooks / Alamy Stock

### The results for Bessie Surtees House

This room achieved a sDA of 37.9% which means it falls below the 55% target for a good standard. Although this room is south-east facing and has ample glazing, it is challenged by the depth of the room relative to the size of the window, its lower floor-to-ceiling height and its location on the second floor, which makes it susceptible to overshadowing from nearby buildings.

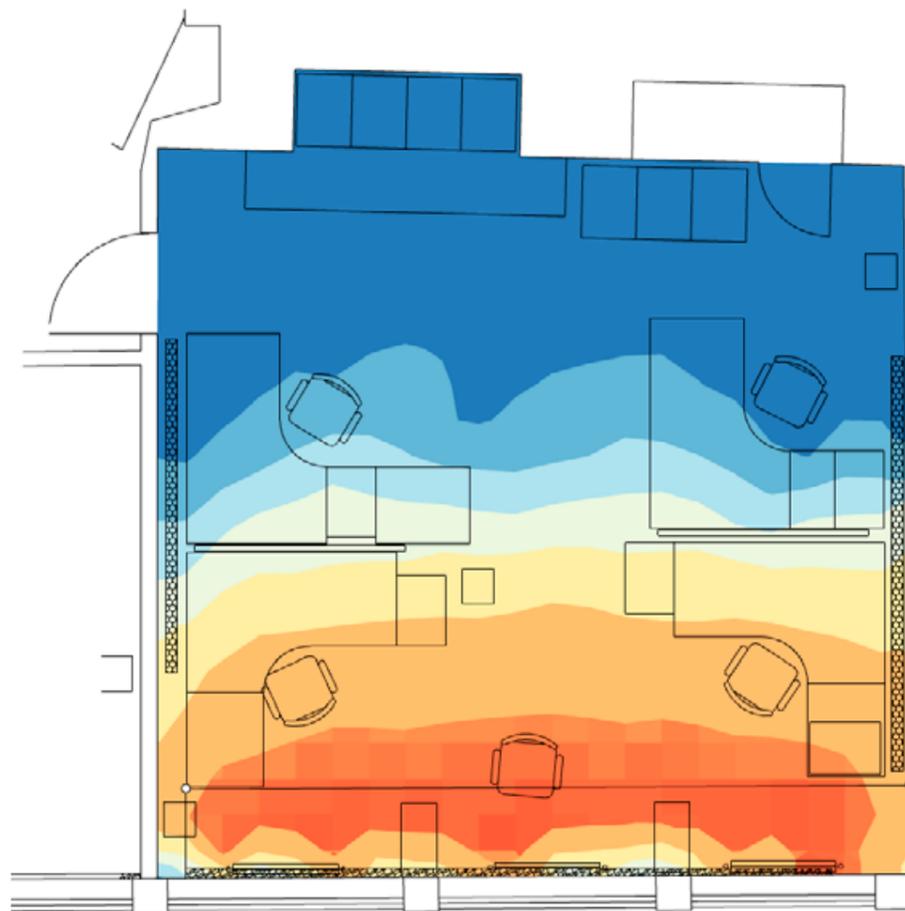
The total annual energy consumption with no daylight dimming was calculated at 1184 kilo-watt hours (kWh) per year. However, with daylight-linked controls this reduces to 602 kWh – a saving of 582kWh. This equates to a total saving across the year of £95.00 and 136 kg.CO<sub>2</sub> (1kg of CO<sub>2</sub> = 0.27kg of carbon) based on an average cost of electricity of 16.3p/kWh and a carbon factor of 0.233kg.CO<sub>2</sub>/kW.

### The results for Millbank House

This room achieved a sDA of 62.5% which exceeds the minimum for a good standard but does not reach that for excellent. The height of the room in relation to its depth is favourable for daylighting and its elevated position on the third floor makes it less susceptible to overshadowing.

The results for this room indicate that the total annual energy consumption with no daylight-linked controls is 619kWh per year. With daylight linking it reduces to 316kWh, a saving of 303kWh. This equates to around £50 saving per year for this room and would reduce carbon emissions by 71kg.CO<sub>2</sub>

**These results demonstrate that even with a low sDA result, such as that for Bessie Surtees House, significant savings can still be made by incorporating daylight-linked controls.**



Above left: Daylight autonomy results for Bessie Surtees House.

### Setting up the parameters and identifying targets: the Swindon office

This second study involved two typical office areas on the second and third floors of this mid-19th century office. This was more detailed analysis than the first and included the use of additional metrics, including Useful Daylight Illuminance (UDI), which is the percentage of the occupied time that a space can achieve useful daylight illuminances within a given range. The range chosen was 300 – 3000 lux on the horizontal plane 0.85 metres above floor level. Any lux level above that was considered excessive and under that range as needing supplementary lighting.

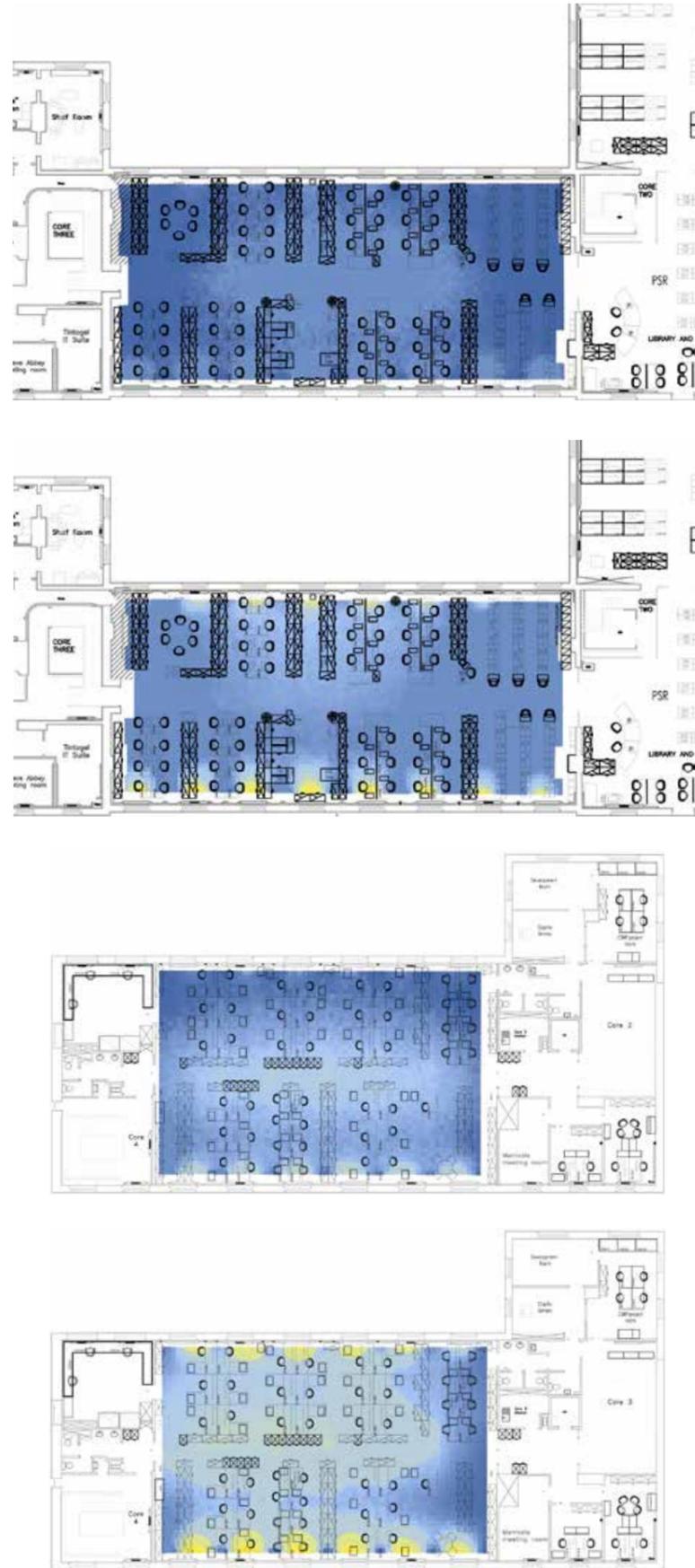
Other metrics included Temporal Analysis, which was used to identify times of the day and year when glare (difficulty seeing in the presence of bright light) would likely be a problem and Annual Daylight Glare Probability (DPG) analysis

which helped to understand the proportion of the occupied hours that different desk locations in the space would experience glare. The offices were chosen for their orientation and the skylights, both of which give a greater potential for glare.

Again, we were able to utilise information such as desk layouts and plans to ensure an accurate result. All outcomes were calculated based on illuminance values with and without blinds. As expected, without blinds the third floor, where the skylights are located, had a consistent level of excessive UDI, that is, illuminances above 3000 lux on the task plane. Predictably when simulating the use of sensor-controlled blinds on the third floor there was an increase in the levels of acceptable UDI. The reverse was seen on the second floor, where if the blinds are used there is a decrease in acceptable UDI, which equates to the lights being switched on. >>



Above right: Aerial view of 'the Engine House' and the Historic England Archive, Swindon.



**Above left:** Daylight analysis of Engine House 2nd and 3rd floors with and without blinds; from the top, level 02 with blinds, level 02 without blinds, level 03 with blinds and level 03 without blinds.

The areas of the office likely to experience glare were established by the working plane being adjusted to 1.2 metres from finished floor level, that is, to a height where most people's eye level would be when seated at their desk. Both levels 2 and 3 receive high levels of direct sunlight along the south-west façade throughout the year and it is here that occupants are likely to experience glare. Employing Temporal Analysis, it was established when during the day and year this would occur.

The results for the Engine House were calculated using a lower lighting energy consumption density of 3 W/m<sup>2</sup> because the existing installation has been retrofitted with LED lamps. This indicated that without daylight linking the lighting would consume 4,211 kWh per year, but with it the total energy consumption would fall to 1941 kWh, a saving of 2270 kWh. Using the same unit price of electricity as before, this equates to financial savings of £370 per year just for the level 2 area: for both floors in the study this increased to around £640 per annum, with a carbon emissions reduction of 930 kg.CO<sub>2</sub> per year ■

### The author

Geraldine O'Farrell

*Chartered Engineer with Historic England.*



Geraldine has over 45 years' experience working as a Chartered Engineer and has worked for Historic England and its predecessor English Heritage for over 22 years. She specialises in all forms of lighting design, fire alarms, lightning and surge protection and has written Historic England's advice on these topics along with producing associated webinars, magazine articles and talks.

### Further information

Historic England webinar recording on this can be found at <https://historicengland.org.uk/services-skills/training-skills/online-training/webinars/recordings/webinar-on-climate-change-adaptation-saving-energy-through-daylight-harvesting/>

Historic England internal lighting guidance webpages can be found at <https://historicengland.org.uk/advice/technical-advice/building-services-engineering/internal-lighting-in-historic-buildings/designing-installing-and-maintaining-internal-lighting/>

ILP (Institution of Lighting Professionals) Magazine article on daylight harvesting can be found at <https://historicengland.org.uk/content/documents/advice/daylight-harvesting-lighting-journal-oct21/>

