

Historic England Research

Discovery, innovation and science in the historic environment



Exploring the landscape of Stonehenge



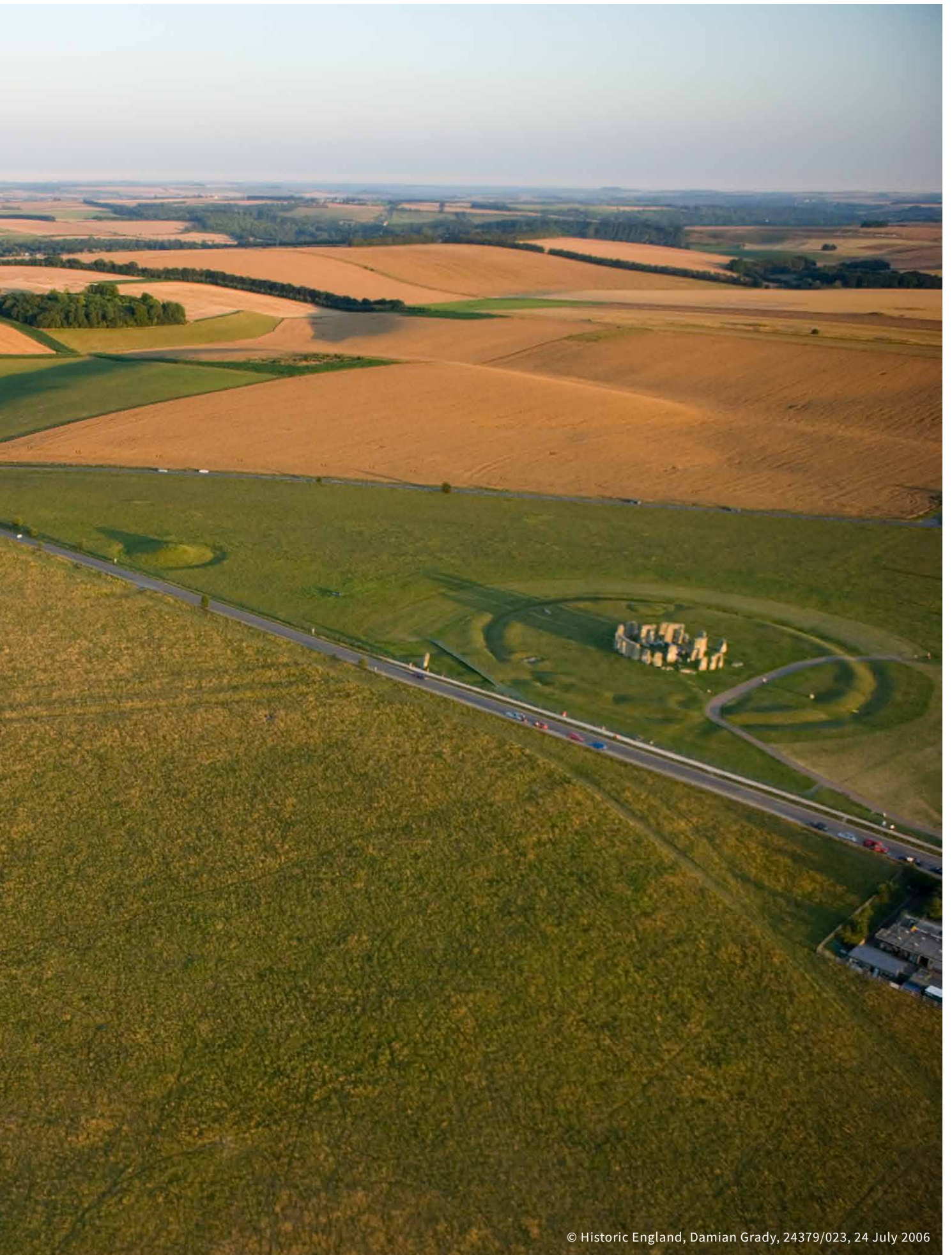
Historic England

Issue 06 | Summer 2017

An aerial photograph of the Stonehenge landscape. The foreground is dominated by a large, green field with some faint tracks. A road, the A303, runs diagonally across the middle ground. In the background, there are rolling hills, some golden-brown fields, and a small town or village. The sky is clear and blue.

The landscape of Stonehenge

This view from Stonehenge across the A303 and part of the Southern WHS project area was taken from a balloon in 2006, marking the centenary of the first aerial photograph of Stonehenge. The photo predates the closure of the A344 and car park next to the stones.



© Historic England, Damian Grady, 24379/023, 24 July 2006

I'm delighted to introduce this, the sixth issue of *Historic England Research*. Given the current, and understandably passionate, debate about how best to manage serious and increasing traffic congestion on the A303 as it crosses the Stonehenge World Heritage Site, the focus on Stonehenge is timely. In this case our focus is not on visitor or traffic management through the site, but instead on how research by Historic England and others is continuing to enhance our understanding and appreciation of the Stonehenge landscape – an important ambition of the [World Heritage Site Management Plan](#).



As recent findings at Durrington Walls and south of the A303 demonstrate, and despite this being one of the most intensively studied archaeological landscapes in the country, continuing investment in research is delivering important new insights and narratives. This, in turn, will create even greater public interest, engagement and enjoyment of a monument and landscape that continue to exercise an unparalleled hold on people's imagination.

I hope you enjoy this latest addition to the series and, indeed, previous issues of the magazine – which are available to download from the [back issues webpage](#).

Duncan Wilson
 Chief Executive, Historic England

In this issue...

New investigations in the Stonehenge World Heritage Site	5	Bronze Age boundaries in the Stonehenge landscape.	25
Aerial Investigation and Mapping	9	Vespasian's Camp.	29
Pigs, curlews and trains: geophysical survey.	14	Visualising our research	34
Neolithic pits near Stonehenge.	19	The Army Basing Programme: new discoveries at Larkhill and Bulford	36
Middle Neolithic farming and food in the Stonehenge landscape	22	Historic England publications	41

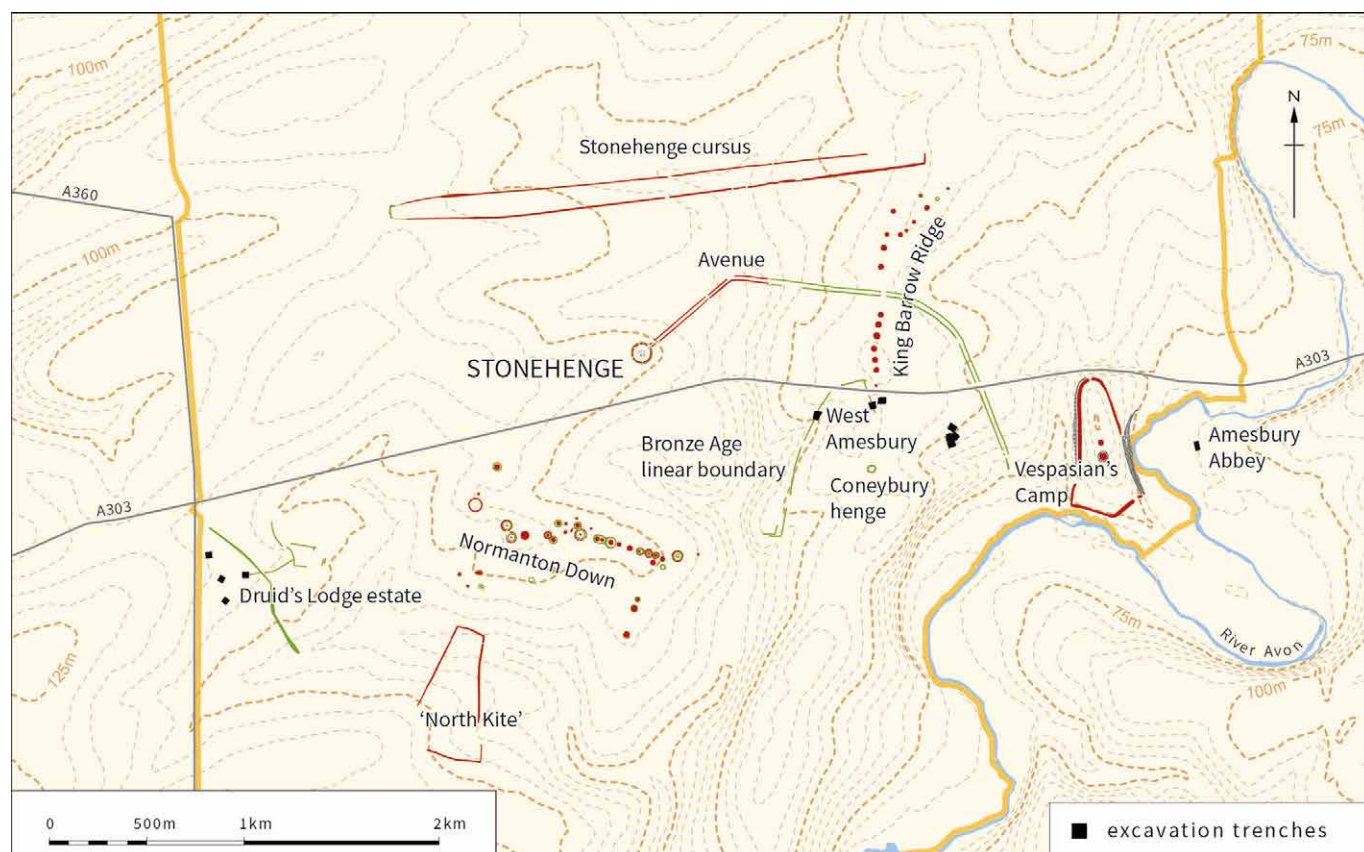
New investigations in the Stonehenge World Heritage Site

A recent Historic England project explores the less well-known parts of one of our most celebrated archaeological landscapes.

Readers of this special issue of *Historic England Research* will be aware that Stonehenge has again been in the news. Managing change of any sort in a historic landscape as sensitive as the World Heritage Site (WHS) requires the best possible knowledge of its historic character and archaeological potential, as recognised by the [research framework for the WHS](#). The Historic England project reported here, known as the Stonehenge Southern WHS Survey, reflects a sense that we know less about the part of the World Heritage Site to the south of the present A303 than that to the north. This is partly a reflection of the known archaeology – most of the major Neolithic monuments lie north of the road – and partly a side-effect of the smaller amount of open-access land in

the southern WHS. The article on [geophysics](#) in this edition outlines some of the challenges of working here. Most of the fieldwork for the Stonehenge Southern WHS Survey Project was carried out in 2015. It is the subject of all but one of the articles here.

While the Historic England project provides a corrective to the balance of recent work in the WHS, it would be unwise to contrast the areas north and south of the road too strongly. For one thing, our understanding of other parts of the Stonehenge landscape is far from complete, as the article on work just outside the WHS in [Larkhill and Bulford](#) shows. And the southern WHS is hardly *terra incognita*: significant monuments are present,



Map of sites in and around the Southern WHS project area.

of which the Normanton Down barrow cemetery, [Vespasian's Camp hillfort](#) and Coneybury Henge are the best known.

Early antiquarian work was largely focused on round barrows, many of which were surveyed and reassessed as part of the previous [Stonehenge WHS Landscape Project](#). There were also a number of 20th-century excavations of barrows, some as a response to plough damage (reflecting the prevalence of arable land in the southern WHS). Areas south of the A303 were subject to fieldwalking as part of the [Stonehenge Environs Project](#) in the 1980s and more recently to geophysical survey as part of the [Stonehenge Hidden Landscapes Project](#). The [Stonehenge Riverside Project](#) also ventured south of the road, discovering a previously unknown henge monument at the southern end of the Stonehenge Avenue in West Amesbury; another recent discovery, the [Mesolithic site at Blick Mead](#), lies between the A303 and Vespasian's Camp.

The potential for unexpected discoveries emphasises the ongoing need to improve our understanding of the

character of the buried archaeology. This is essential if we are to ensure the landscape is properly managed, whether in the context of road schemes or of changes in land use. Most of the work reported here was therefore undertaken with the aim of informing heritage management decisions within the southern part of the WHS. The Historic England project deployed [aerial mapping](#), [geophysical survey](#), [earthwork survey](#) and excavation (with separate articles on [Neolithic](#) and [Bronze Age sites](#) and [Neolithic lifeways](#)). This collection of articles summarises the interim results of the project, along with discussions of [digital presentation](#) and, to provide some important context, [recent development-led work](#) in the vicinity.

The southern WHS project area comprised a strip of land to the south of Stonehenge measuring about 7.5 x 1.5km. The western half of the area is gently undulating downland while the east is more varied, with high points overlooking the river Avon at Coneybury Hill and Vespasian's Camp. The area is dissected by a series of dry valleys, the most pronounced of which is [Stonehenge Bottom](#).



Excavating the flanking ditch of a Neolithic long barrow near Druid's Lodge. © Historic England

Previous work indicates that Mesolithic activity, primarily marked by lithic artefacts, was concentrated close to the river. The earlier Neolithic (4th millennium BC) saw more activity on the downland, however, with the construction of a number of long barrows. The work reported here has confirmed that one previously uncertain cropmark did indeed indicate the site of a [long barrow](#), while a [causewayed enclosure](#) is a new discovery of this period just to the north of the WHS.

Late Neolithic monuments (c 3000-2200 BC) include the two henges at Coneybury and West Amesbury, while it is also likely that some round barrows and ring-ditches originated in this period; survey and excavation have demonstrated the complexity of these monuments across the Stonehenge landscape. To the north of the A303, King Barrow Ridge was probably a significant area throughout the Neolithic, judging by the number of finds incorporated into later round barrows. It is tempting to speculate that an undated square enclosure at the southern end of the ridge, investigated as part of the Historic England project, might also be Neolithic.

As well as the monuments, but less well-known, there is extensive evidence for Neolithic occupation in the form of surface lithic scatters and pits. The Stonehenge Environs Project suggested most surface flint in the WHS is Late Neolithic/Early Bronze Age in date, but though the majority of known pits are indeed associated with [Late Neolithic Grooved Ware pottery](#), there are also earlier examples, most notably the Early Neolithic ‘Coneybury anomaly’ in the east of the study area. However, until the present project, little Peterborough Ware (Middle Neolithic pottery) had been recovered from pits within the Stonehenge landscape, and those south of [King Barrow Ridge](#) thus represent a significant discovery. Although pits are usually seen as settlement features they often contain selected or placed deposits, and (like some monuments) could have marked significant places in the landscape to which people returned, as shown by the human remains which were associated with the pit group.

The majority of upstanding monuments within the project area are Early Bronze Age barrows (c 2200-1500 BC). As well as the extant mounds numerous ring-ditches are



The undated square enclosure at the southern end of King Barrow Ridge. © Historic England

visible as cropmarks on [aerial photographs](#) or through [geophysical survey](#).

At the start of the Middle Bronze Age, around 1500 BC, much of the landscape was transformed into fields and routeways, which in the west of the project area seem to encircle [Normanton Down](#). Boundaries of this period were investigated at each end of the WHS, the most notable discovery being a pair of burials in a ditch near [West Amesbury](#). Particularly in the east, [geophysical survey](#) has revealed many more field boundaries than were previously known.

Also of note are the extensive undated field systems to the west of the A360, beyond the current WHS boundary. These have barely been investigated but a significant component are probably Iron Age and Romano-British, periods that are poorly represented within the project area, with the key exception of [Vespasian's Camp](#).

Anglo-Saxon and medieval finds are focused in the east of the project area, around the historic settlement of Amesbury. The open fields of Amesbury Countess and West Amesbury, extending to King Barrow Ridge and Coneybury, were intensively cultivated, which partly explains the lack of upstanding prehistoric monuments here compared to the downland further west.

A key post-medieval development was the landscaping of [Amesbury Abbey Park](#) in the mid-18th century while twentieth-century military activity represents another relatively recent phase of landscape change, knowledge of which was deepened by the [geophysical](#) and [aerial](#) surveys described here, as well as by the work carried out at [Larkhill](#).

While the fieldwork has enhanced understanding of several known monuments, the most significant outcome of the project is perhaps to emphasise that small or ephemeral features in the landscape may be just as significant as the more obvious sites. Rather than being a collection of monuments with blank spaces between, the WHS is revealed as a seamless prehistoric landscape, in which significant remains can occur anywhere, as recognised by the 'Connected Landscapes' theme of the research framework. This needs to be reflected in any future development-led fieldwork.

Author



Dr Jonathan Last
Landscape Strategy Manager with
Historic England.

Jonathan is an archaeologist specialising in prehistory. He has worked in various roles for Historic England since 2001. He is currently Landscape Strategy Manager in the Historic Places Investigation Team.

Further Reading

Leivers, M and Powell A 2016 *A Research Framework for the Stonehenge, Avebury and Associated Sites World Heritage Site: Research Agenda and Strategy*. Salisbury: Wessex Archaeology, available at: <http://www.stonehengeandaveburywhs.org/world-heritage-site-research-framework/>

Reports on individual components of the Southern World Heritage Site project can be found via the search facility at: <http://services.HistoricEngland.org.uk/rrstonehenge/>

Aerial Investigation and Mapping

Even in an area as well-explored as the Stonehenge landscape, previously unrecognised sites can be discovered through airborne remote sensing.



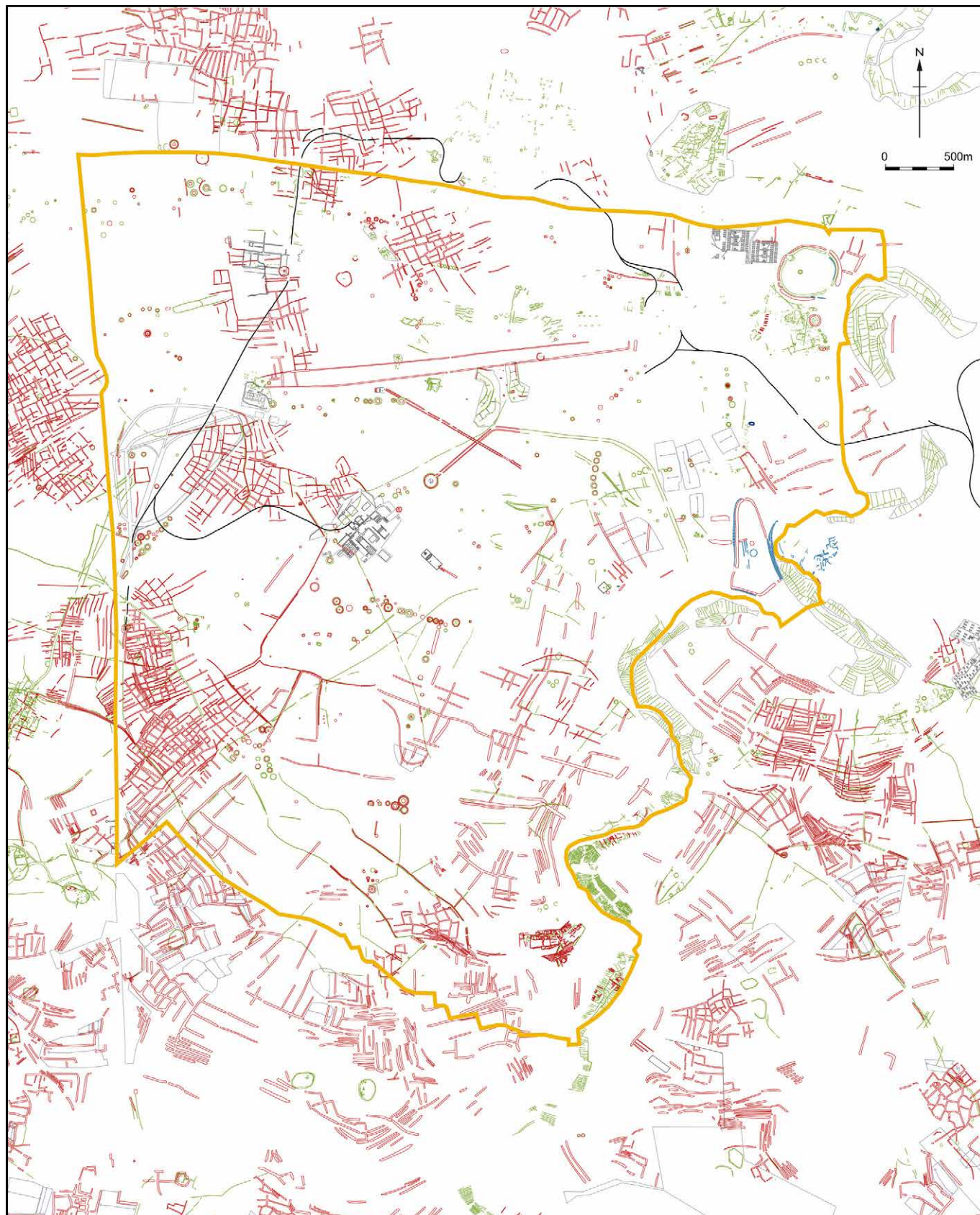
An oblique view looking northwest across Stonehenge Bottom and the A303, the low sunlight emphasising the topographical variation across the landscape. © Historic England, Damian Grady, 26554/035, 30 January 2010

Historic England’s Aerial Investigation and Mapping Team’s recent re-survey of the entire Stonehenge WHS – not only the area south of the A303 – used aerial photographs and lidar, and showed that previously unrecognised sites are just as likely to be spotted on historic photographs as on the latest digital imagery.

The main aim of the 2016 re-survey was to reassess and update the results of an earlier project – the [Stonehenge WHS Mapping Project of 2001](#) – in the light of imagery that has become available since its completion. This chiefly comprised new aerial photographs taken in the course of Historic England’s [annual aerial reconnaissance programme](#), newly accessible aerial photographs taken prior to 2001, and [lidar](#) (airborne laser scanning).

The 2001 survey resulted in a 26 per cent increase in the number of known sites in and around the WHS. Since then, of course, a considerable amount of fieldwork and research has focused on the area. Nonetheless, the 2016 survey identified previously unrecognised features. This point is worth emphasizing – no survey can ever offer the last word on a particular landscape.

None of the features identified in 2016 are particularly spectacular on their own, but together they add considerably to our knowledge of the Stonehenge environs as a whole, enhancing our ability to piece together the long-term history of the landscape. Most of the new detail – which ranges from prehistoric barrows to 20th-century military sites – came from the newly accessible historic photography. No significant features

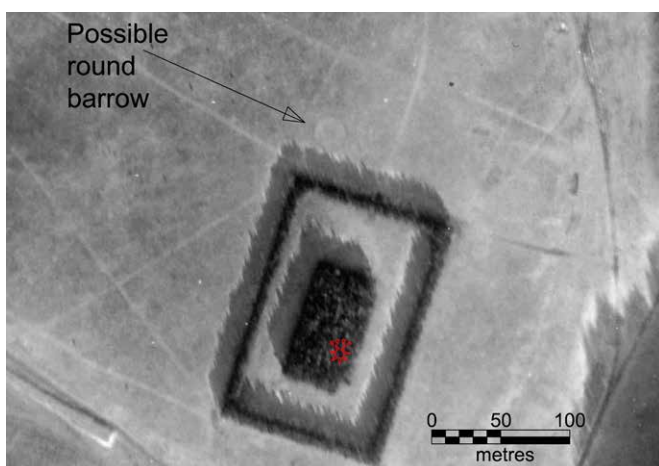


The 2016 update of the mapping of the WHS, highlighting the density of archaeological features identified both from thousands of aerial images dating back as far as 1906, and recent lidar imagery. The yellow line marks the current WHS boundary. © Historic England

were found with the lidar, although this technique contributed useful detail to previously known sites. For example, the slight earthwork traces of low, eroded field banks have added to our knowledge of some of the extensive later prehistoric field systems mapped by earlier surveys, although in too many cases there was little still surviving above ground by the time lidar was first flown in the area. On the whole, this is not the ideal landscape for lidar. Relatively open, it has been subject to a considerable amount of intensive arable agriculture over the years, while more than three centuries of fieldwork mean that hundreds of sites – some no longer visible on the surface – have already been identified. The kind of spectacular results achieved elsewhere, such as on the [South Downs](#) were never going to be matched here.

Newly identified sites

The ‘new’ sites varied considerably in terms of period and type. Particularly noteworthy was the identification of around 20 potential Bronze Age round barrows such as the one illustrated below, which was spotted on a 1943 US Air Force vertical photograph. The rectangular plantation, which is a few hundred metres south-east of Stonehenge, conceals Amesbury 16, a known Bronze Age round barrow. The dark circle just to the north of the plantation may represent the trace of a ditch which once surrounded another such burial mound. Amesbury 16 has been known since at least the beginning of the 19th century, so if there was once a mound within this new feature, it had disappeared by then.



The trace of what may be a previously unknown round barrow south-east of Stonehenge. Extract from US 7PH/GP/LOC/122 1024, 24 December 1943, Historic England USAAF Photography

The value of historic aerial photographs is abundantly clear on examples such as that shown below, an extract from another World War II vertical photograph. The extract shows part of the military camp at Larkhill, located a short distance north of Stonehenge. The low, clear winter sunlight, shining from the south-east, allows even the slightest of features to cast a shadow, thereby enhancing their visibility. Almost all of the upstanding features are military buildings of various ages, sizes, materials and functions; few of them were intended to be permanent, or even long-term, fixtures. In some cases, these photographs may be the only surviving documentary record of a site's existence.

Visible among the standing buildings are the faint surface traces of previous structures, particularly evident from their tendency to conform to the grid layout of the camp, as well as in other regularities of their size, shape and arrangement. Running across the open spaces in the centre of the photograph is a less regular grid-like pattern of slight earthworks following a markedly different alignment. This represents the then-extant remains of a prehistoric field system of Bronze or Iron Age origin. Today there appears to be no surviving surface trace of these features. As well as the prehistoric field system, a series of circular features representing a Bronze Age barrow cemetery can be seen just left of centre. These barrows still survive, and are protected from both military and agricultural activity.



View of Larkhill Camp in 1943; north is approximately to the top. Extract from US/7PH/GP/LOC/122 1063, 24 December 1943, Historic England USAAF Photography



Traces of later prehistoric fields and a much more recent dewpond south of Winterbourne Stoke crossroads. © Historic England, Damian Grady, 27571/030, 13 December 2012

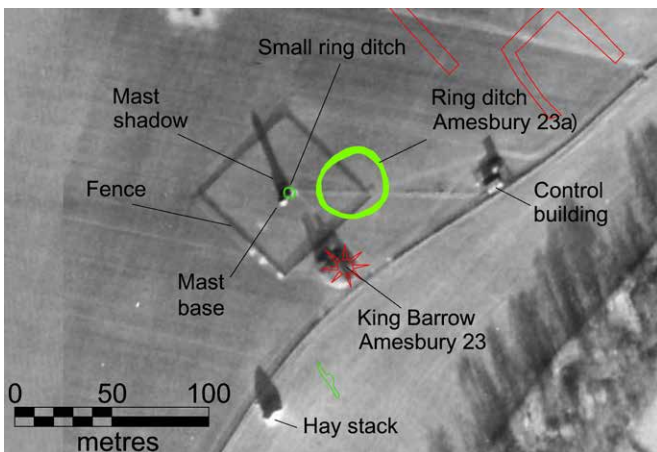
There are several blocks of prehistoric fields, similar to those in the above photograph, located in and around the WHS. In most cases they have suffered considerably from 20th-century ploughing, but there are a few places where there are still hints of above-ground survival. For example, in the photograph above, taken in 2012, slight shadows mark the locations of heavily plough-truncated field boundaries. The photograph shows the area between the A360 (right) and the Diamond Plantation (left), south of the Winterbourne Stoke crossroads (just out of shot to bottom right). In amongst the fields is a circular feature previously recorded as a possible Bronze Age round barrow, though historic aerial photographs show it clearly as a hollow rather than a mound and early maps record a dewpond approximately at this location. The field boundary dividing the pig farm (bottom left) and the wood from the arable fields is an earthwork of later prehistoric origin related to the adjacent field system.

A possible round barrow

Another instance where historic – again, wartime – photographs helped interpret a recently-identified feature also concerns a circular cropmark. Photographs taken during a reconnaissance flight in August 2010 captured traces of a small, dark ring in the grass close to the sites of two known Bronze Age round barrows. In the first image below, the grassy mound is the barrow known as Amesbury 23, and the dark circle beneath it is the ditch of Amesbury 23a. The small dark ring to the right of Amesbury 23a is the feature first seen in 2010 (the circular worn patch on the extreme right is the former site of an animal feeding trough). Could this ‘new’ ring represent a previously unsuspected barrow? In fact the 1943 coverage showed that the location of this feature coincided with the foot of a wartime radio mast, visible on the photograph mainly via the shadow it cast. The mast sat within a square fenced enclosure, with a control building nearby.



Previously unknown small circular feature near round barrow Amesbury 23 and ring-ditch Amesbury 23a. © Historic England, Damian Grady, 26710/044, 16 August 2010



Wartime photograph of the radio mast. Extract from US/7PH/GP/LOC/122, 24 December 1943, Historic England USAAF Photography, overlaid with 2016 mapping by Fiona Small, © Historic England

Overall, the re-survey of the Stonehenge WHS and its environs confirms the complex and varied nature of this landscape's history, as well as emphasizing the fact – perhaps not as fully appreciated as it should be – that there is far more to the landscape than the familiar Neolithic and Bronze Age ceremonial and funerary monuments. A full report is in preparation, and will be made available as part of the Historic England Research Report series.

Authors



Martyn Barber Senior Investigator with Historic England.

Martyn has worked in Historic England and its predecessors since 1990, moving to the aerial survey team in 2002. Most recently he has worked on the (recently published) Stonehenge Landscape Project. He is a Senior Investigator in the Historic Places Investigation Team.



Fiona Small Investigator with Historic England.

Fiona is an Investigator in the Aerial Investigation & Mapping section of the Historic Places Investigation Team. She has worked for the organisation and its predecessors since 1992, trained as an air photograph interpreter, and subsequently worked as an aerial investigator. She has been involved in a number of major National Mapping Programme multidisciplinary and multi-period projects. Fiona has particular interests in 20th-century military archaeology, and in the contribution aerial archaeology can make to understanding historic landscapes and the evidence for the continuity of human activity through time.

Pigs, curlews and trains: geophysical survey

New surveys south of the A303 extend the very effective existing coverage to the north.



ATV-towed caesium magnetometer array at Boreland Farm in the WHS.

Geophysical survey has proved highly effective throughout the Stonehenge WHS, but the physical separation of the northern and southern parts of the site is to some extent reflected in the current distribution of survey coverage. The A303 marks a transition from the accessible and predominantly pastoral land surrounding Stonehenge itself to the more varied regime in the south, with its arable land, pig farming, and RSPB stone curlew reserve. Physical access to the southern WHS for geophysical survey can be difficult, given the need to work around agricultural constraints and the breeding season of the ground-nesting birds.

Despite these restrictions the southern WHS is a rich archaeological landscape, in which the many fascinating known monuments pose a series of questions about how sites interrelate and the completeness of our knowledge of the landscape as a whole. While some specific monuments and areas have been targeted in the past there is clearly much to be obtained by ensuring there is detailed geophysical coverage of the entire WHS. For the current project the authors embarked on a four-week programme of fieldwork, timed to make best use of limited access to part of the pig farm and the bird reserve over the winter. A combination of

vehicle-towed geophysical instruments was deployed, resulting in coverage of 137ha of land with a high-sensitivity caesium magnetometer array and 48ha with high density, multi-channel ground penetrating radar (GPR). Measurements were taken at very small intervals – just a few centimetres apart in the case of the GPR – to ensure high resolution datasets, and co-mounted Global Navigation Satellite System receivers were used to ensure each reading was accurately positioned. All of this data needed to be rapidly processed, interpreted and reported so that targeted excavation of any significant anomalies could follow immediately.

Invisible sites

Many such anomalies relate to known monuments or cropmarks identified from aerial photographs. Geophysical survey is able to confirm the location and survival of these archaeological remains, which may not be regularly visible from the air owing to crop rotation and changing climatic conditions, and provide additional information by seeing beneath the soil to detect details not visible on the surface. For example, aerial photography had suggested the possible existence of a series of closely-spaced or interlocking sub-circular ring-ditches within a group of three scheduled bowl barrows on the western side of the WHS.



Sub-circular ring-ditches, ditch terminal and a possible henge (Winterbourne Stoke 74). © Crown Copyright and database right 2017, all rights reserved. Ordnance Survey licence number 100024900

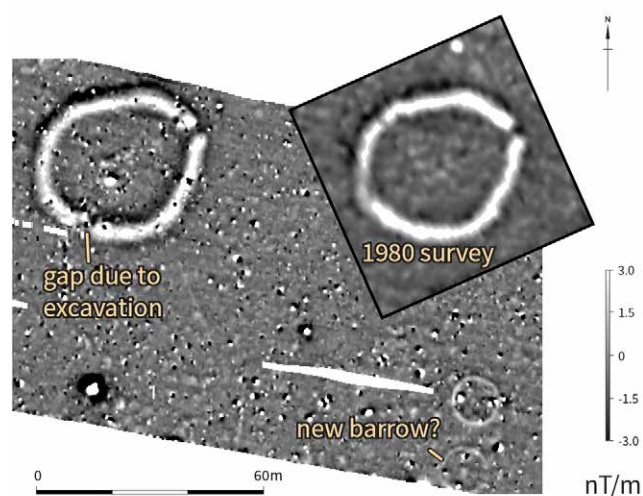
A brief window of access to one of the fields used by the pig farm in this area allowed a magnetic survey to take place. Although such subtle archaeology often struggles to survive, the geophysics established the number of ring-ditches present, enhanced our knowledge of their form and revealed a more strongly magnetised linear ditch section nearby. The ditch crossed a modern field boundary into an adjacent field where it appeared to terminate without apparent explanation, making it an intriguing target for [subsequent excavation](#).

The more recent history of the WHS is reflected in the path of the military light railway seen in the figure above, running parallel with the A360 and passing through the circular ditch of a possible henge monument first identified in a geophysical survey of the 1990s. Here, and despite the interference from the railway, the 2015 survey found good evidence for an entrance gap to the north-east, but no indication of internal activity. However, a group of pits was identified immediately to the north, and considered to possibly be associated with the ring-ditch.

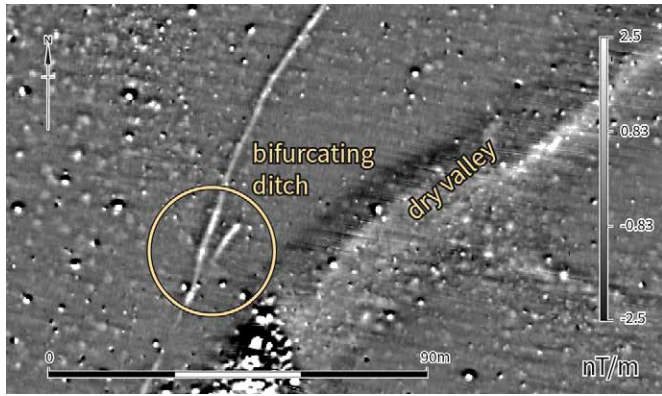
The survey also covered the site of Coneybury Henge to the east of the WHS. Here a survey had been conducted in 1980 prior to the partial excavation of the monument, and it was possible to make a useful comparison with the results of a new survey using modern techniques. The 1980 survey used fluxgate gradiometer technology; the 2015 one high-sensitivity caesium coverage. The figure to the right shows that the new data replicates the previously recorded curvilinear anomalies over the henge ditch, with an equal magnitude of response

and a similar entrance gap to the north-east. A less pronounced break in the ditch to the south, absent from the original survey data, marks the location of an excavation trench. The presence of intense internal magnetic anomalies, only mapped by the current survey, also seems most likely to have a more recent origin, possibly the excavation itself.

The eastern side of the WHS also produced a wealth of linear anomalies in both the magnetic and GPR datasets. These appear to indicate a network of ditches not fully represented in aerial photography. One of these, shown in the figure on the next page, featured a bifurcation that was especially interesting given its location on high ground overlooking Stonehenge about 1km away. Subsequent excavation of this ditch proved



Caesium survey of Coneybury Henge (left), compared with the 1980 survey (right).

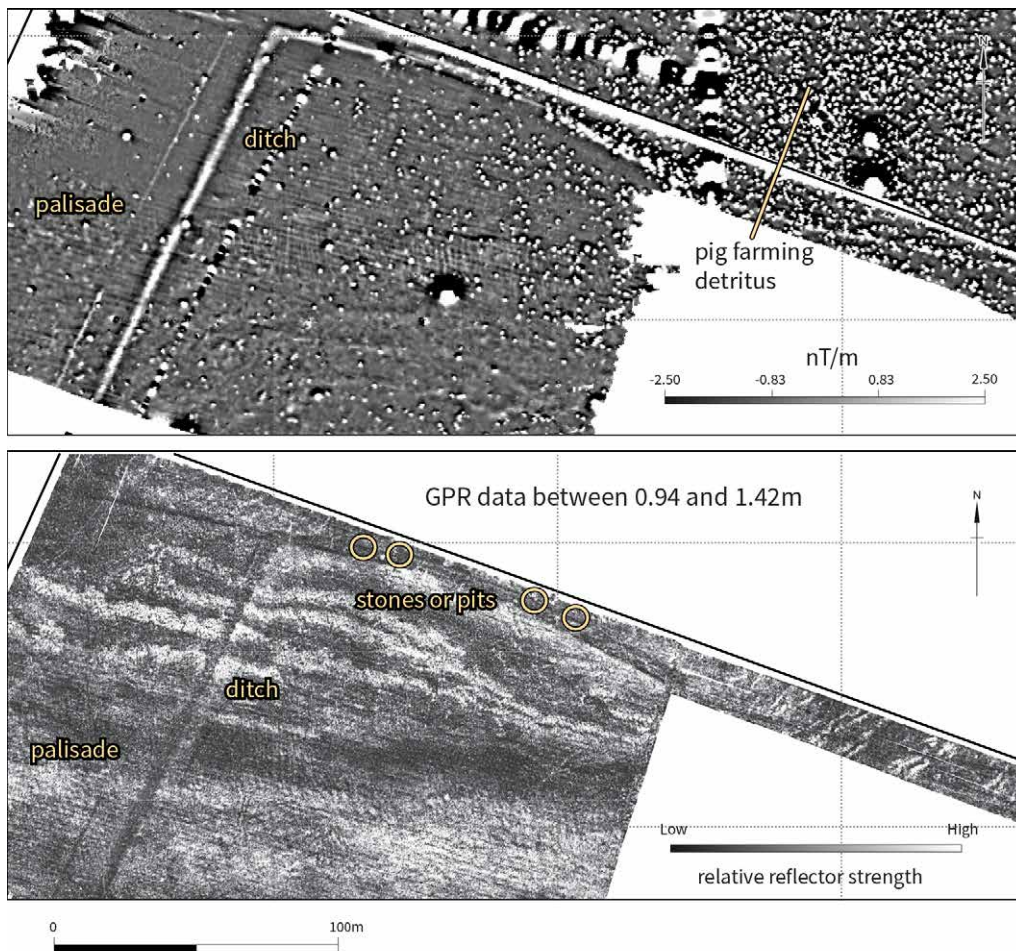


Bifurcating ditch anomaly at West Amesbury Farm.

particularly fruitful, revealing two **Middle Bronze Age burials** and suggesting that these linear anomalies, some represented by quite subtle responses in the GPR data, define a network of boundaries demarcating the prehistoric landscape.

New detail on the North Kite

The survey also investigated the barrows and other large earthwork monuments found across Normanton Down, taking advantage of the opportunity for out-of-season access to the RSPB nature reserve. Although access was partially limited by such features as the remains of outdoor pig-rearing units, some new insights were revealed into the so-called North Kite, an area of well-preserved Bronze Age linear earthworks. The figure below shows a broad linear magnetic anomaly following the known course of the North Kite ditch, together with a more subtle response running parallel to it, possibly representing an outer palisade. The northern segment of the North Kite ditch appears to be incorporated into an approximately east-west ditch anomaly which has been traced by aerial photography across the wider landscape and is thought to form a boundary around the Normanton Down barrow group.



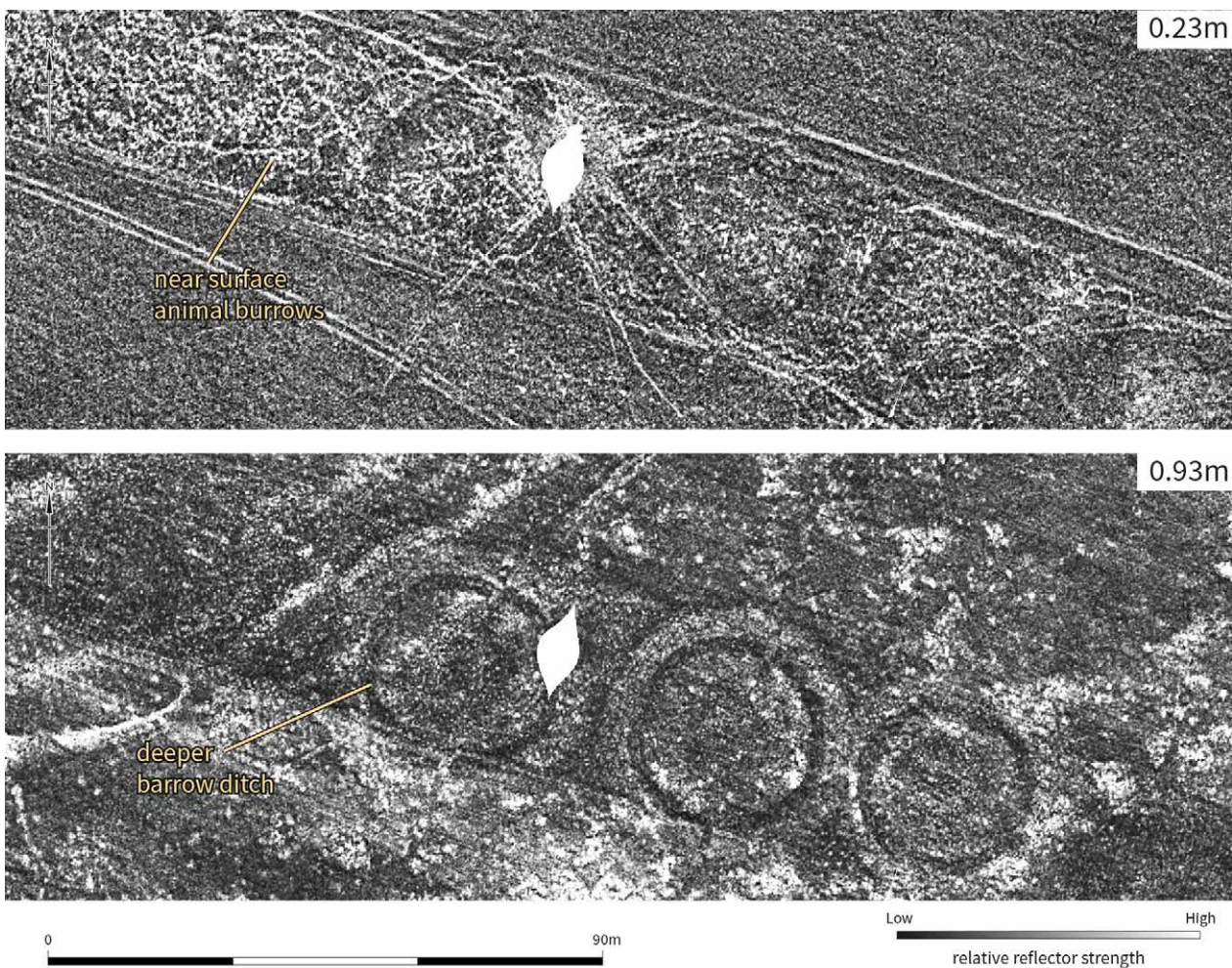
Magnetometer (upper) and GPR (lower) surveys over the North Kite monument. © Crown Copyright and database right 2017, all rights reserved. Ordnance Survey licence number 100024900

The GPR data replicates the magnetic responses to both the North Kite ditch and the palisade, and, in places where the magnetic data has been obscured by ferrous detritus, provides some improved definition of the linear earthworks. Greater complexity is also revealed within the northern arc of the Kite, where a series of evenly spaced buried stones or pits have been detected which cannot be entirely explained by the more recent activity shown on aerial photographs.

Between the known monuments the survey has revealed a plethora of small, discrete anomalies related to pits and tree throws. While these may not all be of archaeological significance, recent excavations within the WHS have demonstrated that such features can preserve important information about past activity in the Stonehenge landscape. Detailed analysis of the combined geophysical data

may make it possible to further enhance interpretation of these results. The GPR data has also revealed new insights into the underlying geomorphology, particularly weathering bands within the chalk and the accumulation of sediments within dry valleys.

Landscape-scale geophysical survey is increasingly recognised as an important research and management tool within the WHS. For example, as shown below, it can determine the scale of animal burrows within barrows. Whether it is used to discover individual monuments, or to determine relationships between sites across the landscape, the new survey data serves as a useful contribution to a long hoped-for aim: complete coverage of the WHS using remote sensing survey techniques.



Network of animal burrows in the Normanton barrow cemetery mounds.

Authors



Paul Linford MSc
Geophysics Manager with
Historic England.

Paul has worked as an archaeological scientist for English Heritage and Historic

England since the mid-1980s and is head of the Geophysics Team. He has particular interests in archaeomagnetic dating and in developing the team's caesium magnetometer array. Paul is also Treasurer of the International Society for Archaeological Prospection and a member of the Geological Society's Near-Surface Geophysics Group committee.

Andy Payne

Geophysicist with Historic England.

Andy has specialised in the practice of archaeological geophysics since the early 1990s, working widely across England and occasionally in France, Spain and the Channel Islands. He has contributed to numerous reports and publications including, in 1995, the first published detailed geophysical investigations of Stonehenge and its immediate landscape setting (Payne 1995). His archaeological career has also included working on excavations in Orkney and the site of the Roman amphitheatre in London.

Neil Linford PhD

Senior Geophysicist with Historic England.

Neil has been an archaeological geophysicist for over 25 years, and has experience across a wide range of applied techniques. Whilst his PhD focused on the magnetic properties of archaeological sediments, he also has expertise in all aspects of the use of GPR. He is an editor of the journal *Archaeological Prospection* and chair of the NERC Geophysical Equipment and Geodesy Facility steering committee.

Further reading

Linford, N, Linford, P and Payne, A 2015 *Stonehenge Southern WHS Survey, Diamonds Field, Boreland Farm, Wiltshire: Report on Geophysical Surveys, August 2015*. Historic England Research Report **93/2015**, available at: <http://research.HistoricEngland.org.uk/Results.aspx?p=1&n=10&rn=93&ry=2015&ns=1>

Linford, N, Linford, P and Payne, A 2015 *Stonehenge Southern WHS Survey, Diamonds Field, Druid's Lodge, Wiltshire: Report on Geophysical Surveys, October 2015*. Historic England Research Report **94/2015**, available at: <http://research.HistoricEngland.org.uk/>

Linford, N, Linford, P and Payne, A 2015 *Stonehenge Southern WHS Survey, Normanton Down, Wiltshire: Report on Geophysical Surveys, October and November 2015*. Historic England Research Report **96/2015**, available at: <http://research.HistoricEngland.org.uk/>

Linford, N, Linford, P and Payne, A 2015 *Stonehenge Southern WHS Survey, West Amesbury, Wiltshire: Report on Geophysical Surveys, October 2015*. Historic England Research Report **95/2015**, available at: <http://research.HistoricEngland.org.uk/>

Linford, N, Linford, P and Payne, A 2015 'Chasing aeroplanes: developing a vehicle-towed caesium magnetometer array to complement aerial photography'. *Research News* **21**, 20–3, available at: <https://HistoricEngland.org.uk/images-books/publications/research-news-21/>

Payne, A 1995 'Geophysical surveys at Stonehenge 1993–4' in Cleal, M J, Walker, K E and Montague, R (eds) *Stonehenge in its Landscape: Twentieth-century excavations* (Archaeological Report **10**). London: English Heritage, 495-510

Neolithic pits near Stonehenge

Excavation of five pits only a little older than the first phase of construction at Stonehenge.

As part of the Stonehenge Southern WHS Survey Project, Historic England carried out a series of excavations targeting features mapped through aerial photography and geophysical survey. The aims were to characterise these features and to understand their significance. This article discusses the most significant discovery from these excavations, a new group of Neolithic pits 1.5km south-east of Stonehenge.

Much previous work in the Stonehenge WHS has focused on large monuments such as Durrington Walls, Woodhenge and Stonehenge itself. When selecting features for excavation as part of the southern WHS project, as well as looking at [ditches and enclosures](#), we targeted a group of pit-like anomalies visible on geophysical survey results from the fields sloping southwards from [King Barrow Ridge](#). These features were chosen for excavation because there are large numbers of similar anomalies across the fields, and we hoped to understand the wider landscape by sampling a small number of them. In the past archaeologists have often been wary of committing resources to look at such features, which have often turned out to be tree throws, the disturbed ground left when a tree falls naturally. However, previous work has shown that King Barrow Ridge was used for pit digging and deposition

throughout the Neolithic (Richards 1990) and it was thus possible that the features shown on the geophysical survey could represent the same type of activity, especially as a Late Neolithic Grooved Ware pit had previously been found in the same field.

Two areas of excavation targeted the pit-like anomalies shown in the geophysical survey. The first, quite high up the ridge, revealed several tree throws, but no pits. The second, further downslope to the south-east, revealed several further tree throws, but also five pits. It quickly became apparent that these pits contained a vast amount of Middle Neolithic material culture, including Peterborough Ware pottery, a style that was widespread across Britain during the later fourth and early third millennia BC.

Deposition patterns

The five pits were of similar size, roughly circular in plan and around 0.6m to 0.8m deep. In the base of each pit was a substantial grey silty layer, deposited either immediately or shortly after the pit was dug, and in every case this contained the majority of the finds. Following the deposition of this layer the pits appear to have been at least partly deliberately infilled, incorporating additional material culture.



The Middle Neolithic pits during excavation. © Historic England



Section through a Neolithic pit. © Historic England



Part of a Peterborough Ware vessel. © Historic England

The finds from the pits included sherds from over 50 Peterborough Ware vessels, but only a small proportion of each pot was present. Sherds of the same vessel which join but show different degrees of burning demonstrate that the pieces had been through different processes after they were broken. The fragments deposited in the pits, then, had been selected from material that had first been deposited in separate places elsewhere. They may have come from a midden or fire-pit, or simply been dispersed across open ground. The pits then were deliberately infilled after a short period of being open to the elements.

The pits also contained a remarkable assemblage of worked flint, comprising nearly 14,000 pieces, including over 8,000 pieces of micro-debitage (waste products from flint knapping) and 149 retouched implements including arrowheads, burins (engraving tools), piercers, scrapers and serrated tools. Analysis of these artefacts indicates that they include elements of both earlier and later Neolithic flint-working techniques, and as such they shed important light on the transition from the blade-based knapping technology of the Early Neolithic to the less regular flaking techniques of the Late Neolithic.

By careful sampling of the pits to collect bone and plant evidence we have been able to examine both the diets and the farming practices of the people who deposited material in them, as well as

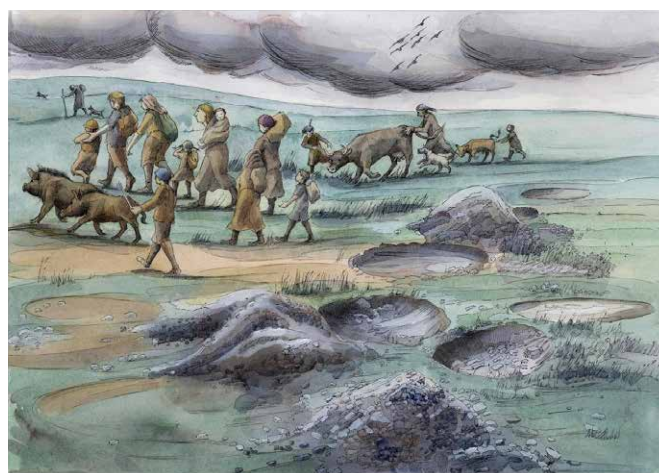


Flints from the Neolithic pits. © Historic England

the local environment in which they lived; these are discussed in a [separate contribution](#).

Radiocarbon dates and a significant burial

Other finds from the pits included beads of cowrie shell and shale (along with the debris left by shale working), all of which must have been imported from the coast; a worked sarsen object; and a carved piece of chalk. Hazelnuts and animal bones from the pits have been radiocarbon dated, and the results tell us that deposition in these pits took place sometime between 3300 and 3200 cal BC, although the actual length of time over which the pits were used may be considerably shorter than this range. This is 200 to 300 years before the construction of the first enclosure ditch at Stonehenge.



Reconstruction of the Middle Neolithic activity. © Historic England, Judith Dobie

These small-scale excavations provide a window into the activities people were undertaking in the Stonehenge landscape in the centuries before the monument was constructed. These people appear to have lived a pastoral lifestyle, with food also gathered from wild resources. They used sophisticated worked flint technology and wore decorative beads. The pits are of course only one part of the round of activities taking place in this landscape in the Middle Neolithic. They have survived as they are below the depth reached by modern ploughing, which has removed most evidence left by prehistoric people on the surface of the site (although some flints survive in the ploughsoil). At a similar time as people were using the pits a large badger sett was active in an area of woodland immediately to the west: perhaps these trees provided a landmark and a resource for the Neolithic inhabitants?

There is one more part of this story: during one episode of activity in the Middle Neolithic, people returned to the site and placed a human skull and some limb bones in a grave amongst the pits. Analysis of the bones, which is ongoing, should throw light on aspects of this person's origin and life and add significantly to our understanding of what was happening around Stonehenge in the period before its construction.



The badger sett. © Historic England

- This research has been undertaken by a wide range of Historic England specialists and external colleagues. Thanks are due to the National Trust and the tenant farmer for allowing access to the land. The full results of the excavations will be published later in 2017, in open-access articles in academic journals. Full details of the radiocarbon determinations and modelling will be given in these academic publications.

Author



David Roberts PhD, MCiFA
Archaeologist with Historic England.

David completed his doctorate on Roman interactions with the natural world in Wessex and Provence at

the University of York in 2015. Since 2013 he has worked as an archaeologist for Historic England's Excavation and Analysis Team, managing research projects and excavations, predominantly in Wiltshire on prehistoric and Roman sites and landscapes.

Further reading

Linford N, Linford, P and Payne, A 2015 *Stonehenge Southern WHS Survey, West Amesbury, Wiltshire: Report on Geophysical Surveys, October 2015*. Historic England Research Report **95/2015**, available at: <http://research.HistoricEngland.org.uk/>

Richards, J 1990 *The Stonehenge Environs Project*. London: English Heritage; available at: http://archaeologydataservice.ac.uk/archives/view/eh_monographs_2014/contents.cfm?mono=1089075

Middle Neolithic farming and food in the Stonehenge landscape

Neolithic pits provide evidence for the reconstruction of diet, food processing and farming techniques.

The centuries between the Early Neolithic, with its communal burial mounds and causewayed enclosures, and the Late Neolithic, with its henges and stone circles, are not only sketchily represented in terms of monument archaeology; they also lack evidence for lifestyle, including diet. Middle Neolithic pits are, however, increasingly being recognised through the presence of Peterborough Ware pottery and struck flint, and a seemingly consistent pattern of animal bone and plant debris deposition. At Stonehenge, the group of five pits excavated by Historic England at [West Amesbury Farm](#) is providing much sought-after evidence for the reconstruction of diet, food processing and farming at this time. This is one of twelve Peterborough Ware pits and pit groups known so far from Wiltshire, mostly clustered around Salisbury and Amesbury. Further recently excavated pits may yet prove to be contemporary.

The reconstruction of diet relies largely on the collection, identification and analysis of animal bones discarded during the preparation or consumption of meat; plant remains preserved through charring in fires; and chemical evidence retained in human remains. At West Amesbury Farm we were able to ensure thorough collection of even the smallest plant and vertebrate remains through the archaeological techniques of flotation and sieving of the pit fills. We were also fortunate enough to encounter a rare [Neolithic partial inhumation](#), inserted between two of the pits.

Middle Neolithic farmers?

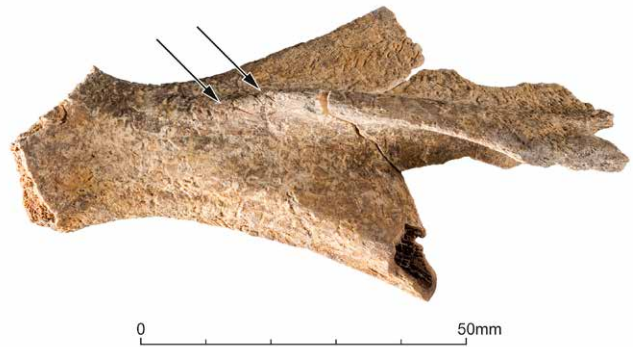
Cereal grains are well represented in the Early Neolithic of Wiltshire (from shortly after 4000 BC) but they seem to have disappeared from the archaeological record by the

Middle Neolithic, not to return until the Bronze Age. This decline in cereal cultivation is also seemingly reflected in the archaeological distribution of saddle querns, which are unknown in Wiltshire during the Middle and Late Neolithic. Cereal grains and pulses were present in a number of pits at West Amesbury Farm, but all are likely to be intrusive, as all those grains that we have radiocarbon dated were medieval or post-medieval in origin. The presence of intrusive grains is a pattern that is repeated across sites of this period in the region and across much of southern Britain.

The lack of Middle Neolithic cereals might be related to a failure of arable agriculture (after initial success) due to climatic deterioration, the arrival of insect or other pathogens, or a change in behaviour resulting in an absence of grain deposition in pits. This latter explanation would seem unlikely given the rate at which cereals were accidentally burnt and incorporated into archaeological sites in earlier and later periods.

While the Middle Neolithic pit-diggers were not arable farmers, the pits consistently provide evidence for animal husbandry through the deposition of groups of bones. Remains of both pigs and cattle are common in the pits, including very young calves, along with some sheep or goats (the bones of which cannot always be distinguished), and less frequently dog bones. Chickens and horses, the other farm animals common today, were unknown in Middle Neolithic Britain; chickens had not yet been domesticated at the time the pits were dug (Best, Feider and Pitt 2016). Isotope analysis of their teeth suggests that the pigs and cattle in the West Amesbury Farm pits were reared locally. Many of the bones themselves were burnt, and a mixture of burnt and unburnt bone waste was put into the pits.

The West Amesbury Farm animals had been butchered, and cuts made by the flint tools used to fillet meat can be seen on some bones, while several pits show that a consistent butchery technique was used to process pigs' heads. The range of bones identified suggests that once butchered, large parts of the animals were taken elsewhere. Fat residues absorbed into the pottery from the pits confirm that the vessels were used in the processing of ruminant (cattle, sheep or goat) meat and possibly pork, as well as milk products.



A butchered pig shoulder bone from West Amesbury Farm. Arrows highlight butchery marks made by flint tools. © Historic England

The Wiltshire pit groups also included a small number of wild animal remains: aurochs (large wild cattle), red and roe deer, wildcat, rodent, mustelid (probably pine marten), bird and fox bones. Few other game animals were present at the time in Wiltshire. The smaller mammals and birds found at West Amesbury Farm may have been naturally incorporated into the pits and not hunted by people. Many of the Middle Neolithic pits in Wiltshire, including three at West Amesbury Farm, also contain tools made from red deer antler; these were often scorched, perhaps during their manufacture.



Red deer antler from West Amesbury Farm. © Historic England

Despite the apparent absence of cereal cultivation, the Middle Neolithic diet was not restricted to animal products. All twelve groups of pits have produced evidence for gathered wild food plants, including fairly large quantities of charred hazelnut shell fragments. The burnt remains of sloe stones and crab apple pips have also been identified. This poses two questions: what was the significance of hazelnuts in Neolithic pits, and were the Middle Neolithic population of Wiltshire eating any other plant foods?



Charred hazelnut shell fragments from a Neolithic pit. The background grid squares are 1mm across. © Historic England

Less archaeologically visible plant foods could have been consumed, including flavoursome leafy vegetables such as fat hen, wild garlic, sorrel and nettles, or even emerging bracken fronds. Wild fruits such as bilberry, juniper, rowan, hawthorn and wild strawberry would have been available, although many would require processing to render them edible. Edible tubers or roots include wild parsnip, pignut and lesser celandine. Many wild flowers, for instance mustards and the carrot family, produce seeds which could add flavour, although some common examples known today, such as wild fennel, were not introduced until the Roman period. Fungi represent a very significant group of protein-rich

plant foods, but have been completely invisible in the archaeobotanical record until the recent recovery of fungi remains from mineralised Neanderthal dental plaque (Weyrich *et al* 2017).

The repeated deposition of meat production waste, nut shells and antler tools with other cultural material suggests that the choice of what went into the pits was not random. The presence of charred fragments of hazelnut shell and bone in the pit deposits indicates deliberate deposition of burnt material, though general fire debris such as charcoal is rare. Hazelnuts are best stored in their shells and need to be kept dry and warm. Roasting may have been used to aid storage, although the nuts become inedible if burnt. It is more likely that nut shells were burnt as a fuel source, or perhaps as an offering.

There is still much to establish concerning the diet of Middle Neolithic Wiltshire. It is possible that some new scientific techniques will aid this process. Study of carbon and nitrogen stable isotope ratios in human skeletal remains helps shed light on sources of protein in human diets. Biomolecular and microscopic studies of human dental calculus potentially provide evidence both for foods consumed and methods used in food preparation. Archaeological scientists from Historic England and the University of York have taken the samples which could yield such information.

- We would like to thank Dr Richard Madgwick and Dr Jane Evans for strontium isotope analysis of pig and cattle teeth and Dr Julie Dunne and Professor Richard Evershed for organic residue analysis of pottery.

Authors



Ruth Pelling PhD
Archaeobotanist with
Historic England.

Ruth is an archaeobotanist within Historic England's Excavation and Analysis Team and an Honorary Research Fellow at the University of Nottingham. Her background is in UK commercial archaeobotany.

She sits on the [Finds Group Committee for the Chartered Institute of Field Archaeologists \(CIfA\)](#). Ruth's research interests include the tracing of changing cultural expression through food and farming (particularly in the Bronze Age and Saxon periods); African archaeobotany, and the non-food use of plants.



Fay Worley PhD
Zooarchaeologist with
Historic England.

Fay is a zooarchaeologist with Historic England's Excavation and Analysis Team, an Honorary Research Fellow at the University of Nottingham and Secretary for the [Association of Environmental Archaeology](#). She is a co-author of [Animal Bones and Archaeology: Guidelines for Best Practice](#) (Historic England 2014). Fay's research interests focus on UK animal bone assemblages, but span the Holocene. In recent years she has focused on Neolithic assemblages.

Further reading

- Best, J, Feider, M and Pitt, J 2016 'Introducing chickens – arrival, uptake and use in prehistoric Britain'. *Past* **84**, available at: http://www.prehistoricsociety.org/files/PAST_84_for_web.pdf
- Campbell, G, Moffett, L and Straker, V 2011 *Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-Excavation*, 2 edn. Swindon: English Heritage, available at: <https://HistoricEngland.org.uk/images-books/publications/environmental-archaeology-2nd/>
- Canti M, Campbell, G and Greaney, S (eds) 2013 *Stonehenge World Heritage Site Synthesis: Prehistoric Landscape, Environment and Economy*. English Heritage Research Report **45/2013**, available at: <http://research.HistoricEngland.org.uk/>

Weyrich, L S *et al* 2017 'Neanderthal behaviour, diet, and disease inferred from ancient DNA in dental calculus'. *Nature* **544**, 357-61, available at: <http://www.nature.com/nature/journal/vaop/ncurrent/full/nature21674.html>

Bronze Age boundaries in the Stonehenge landscape

Historic England investigation of early field systems.

As well as the work on the [Neolithic pits south-west of Stonehenge](#), Historic England carried out excavation and analysis relating to the Bronze Age field systems of the southern WHS. Here we consider their implications for our understanding of how the Stonehenge landscape changed in the Middle Bronze Age.

On the eastern side of the WHS, at West Amesbury Farm, parts of an extensive system of linear ditches and enclosures were excavated in four separate trenches. A series of ephemeral anomalies picked up by [GPR survey](#) appeared to form several fragmentary enclosures across the field, and small ditches relating to these were excavated in several places. Whilst datable

material was limited to worked flint that could only be assigned a later prehistoric date, two of the ditches were stratigraphically earlier than a major Middle Bronze Age linear ditch, and another was earlier than a Bronze Age pit. As such, it appears that these shallow-ditched enclosures date to the early part of the Middle Bronze Age, perhaps around 1500 BC.

A stratigraphy of enclosures

The ditches are too shallow to have been useful for keeping animals penned, and the enclosures are very different in form to field systems of this period found nearby on Salisbury Plain. Characterising activity within these enclosures, and further refining their dating, would be a very worthwhile aim for future research.



Bronze Age ditch at West Amesbury Farm, prior to excavation. © Historic England

These enclosures were succeeded by a less complex system of land division, based around a long curvilinear boundary that has been mapped from aerial photography and extends from near the Stonehenge Avenue across King Barrow Ridge to the western side of Coneybury Hill, terminating just south of Luxenborough Plantation (Bowden *et al* 2015). Various linear ditches have also been mapped; they appear as broadly perpendicular offshoots from this main ditch, predominantly on its southern side.

One of these was sampled by excavation, revealing a narrow, shallow linear ditch which produced significant quantities of grain, radiocarbon dated to the post-medieval period. The date of the ditch remains in question, however, as it is likely that this material is intrusive.

Where the major ditch itself was excavated, dating evidence was much clearer. A long stretch was revealed in the western part of the field, and sectioned several

times. At the base of one section were the skeletons of two adult males who had been interred in graves cut shortly after the digging of the ditch, before secondary fills had formed. They must thus be associated with the laying out of this new division of the landscape. The remains were radiocarbon dated, which suggests that they were interred in relatively quick succession between around 1450 and 1300 cal BC. This places the burials in the first half of the Middle Bronze Age, a time when there are strong suggestions from previous research that the WHS landscape was being substantially reorganised (Bowden *et al* 2015). A bone from a large red deer found in the uppermost fill of the ditch was also radiocarbon dated to the late 1st millennium cal BC. As well as showing the continued presence of large wild animals in the Stonehenge landscape, this indicates that the ditch remained an active boundary and open feature in the landscape until the later Iron Age, more than twelve centuries after the interments of two members of the community which built it.



Major Bronze Age boundary near King Barrow Ridge. © Historic England

High palisade

In the western part of the WHS, in a field to the south-east of the Winterbourne Stoke roundabout, we excavated a selection of features revealed by [geophysical survey](#). One of these was a ditch that formed part of a partial enclosure to the east of long barrow Wilsford 34. The trench covered c 5m of the ditch up to its south-western terminus. Two sections were excavated, one at the terminus and one further along the ditch. Both showed evidence that posts had been placed in the base of the ditch; this strongly suggests that the ditch held a palisade. The posts were

around 0.3m in diameter, and were buried around 1m deep in the ditch, suggesting (based on the usual ratios for estimating the height of post supports) that up to 4m of each post would have been visible above ground, forming a significant structure in the landscape. The posts were removed from the ditch which was then infilled, again during the Middle Bronze Age. We can date this activity through the remains of a perinatal infant deposited in the infill material, radiocarbon dated to the 15th to 13th centuries cal BC, and a sherd of Deverel-Rimbury urn.



Reconstruction of a burial in the Bronze Age boundary ditch. © Historic England, Judith Dobie

It is unclear why the palisade was removed and the ditch filled in at this time, but it may be related to the establishment of a major linear ditch, which cuts the palisade ditch to the east, and an extensive field system on its western side. This major ditch is similar to the one excavated at West Amesbury Farm on the other side of the WHS, and it is notable that the radiocarbon dates for the infilling of the palisade ditch and the establishment of the linear ditch at West Amesbury are broadly contemporary. It is becoming clear, by combining this research with previous work, that the Middle Bronze Age saw major changes in how the landscape around Stonehenge was divided. Changes in land division imply alterations in how the landscape was used and perceived by the people who lived in it, and thus hint at significant social as well as economic changes.

Thanks are due to the Druids Lodge Estate and the National Trust for allowing access to the land to undertake this research, which was the work of a wide range of Historic England specialists and external colleagues. As with the Neolithic evidence, the full results of these excavations will be published later in 2017 in open access articles in academic journals. Full details of the radiocarbon determinations and modelling will be given in these academic publications.

Author



David Roberts PhD, MCiFA
Archaeologist with
Historic England.

David completed his doctorate on Roman interactions with the natural world in Wessex and Provence at the University of York in 2015. Since 2013 he has worked as an archaeologist for Historic England's Excavation and Analysis Team, managing research projects and excavations, predominantly in Wiltshire on prehistoric and Roman sites and landscapes.

Further reading

Bowden, M, Soutar, S, Field, D and Barber M 2015 *The Stonehenge Landscape: Analysing the Stonehenge World Heritage Site*. Swindon: Historic England; available at: <https://www.HistoricEngland.org.uk/images-books/publications/stonehenge-landscape>

Linford, N, Linford, P and Payne, A 2015 *Stonehenge Southern WHS Survey, West Amesbury, Wiltshire: Report on Geophysical Surveys, October 2015*. Historic England Research Report **95/2015**, available at: <http://research.HistoricEngland.org.uk/>

Vespasian's Camp

Investigation of the only major Iron Age monument within the World Heritage Site.



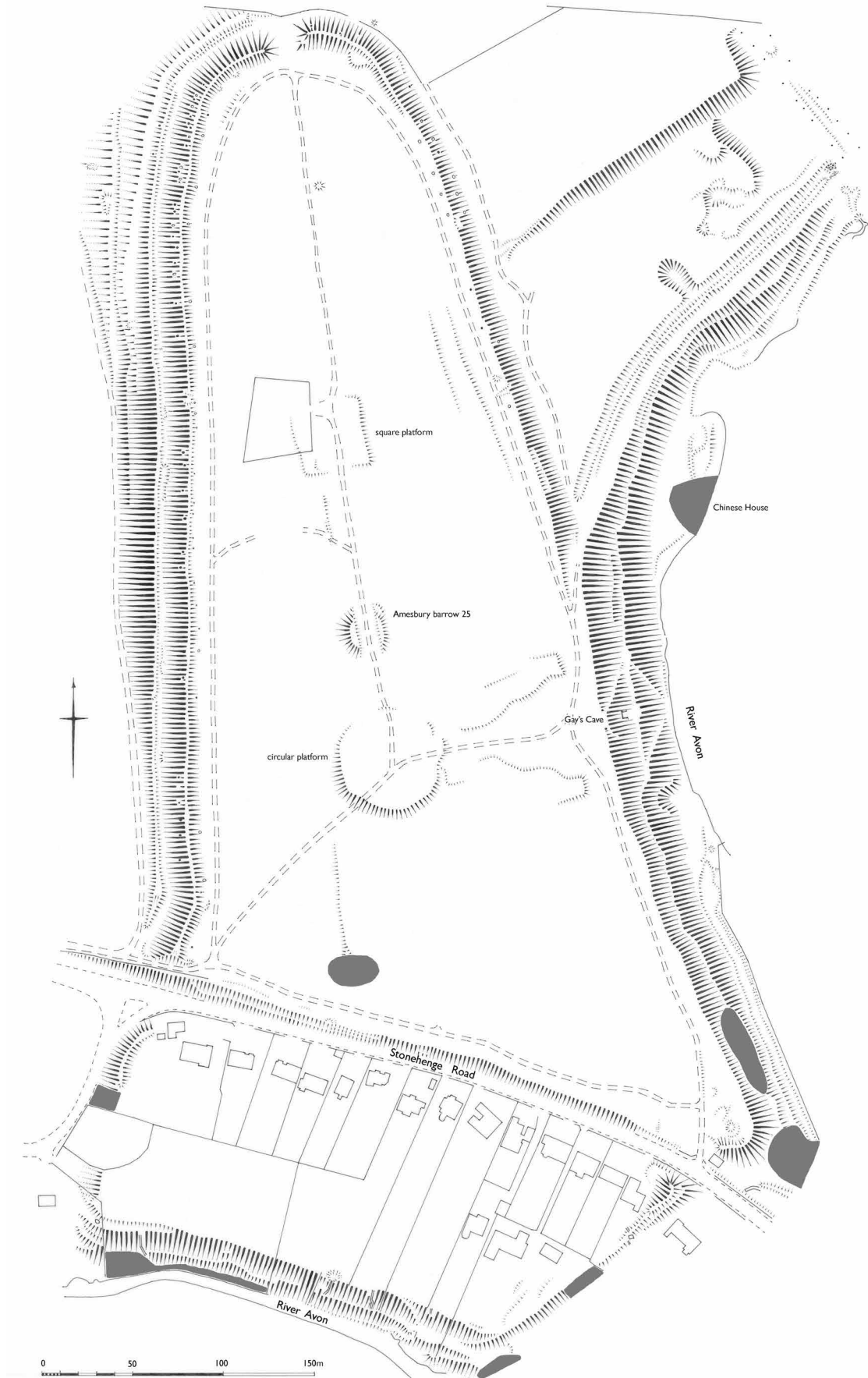
Aerial photograph looking east in December 2012, showing Stonehenge (bottom right), Vespasian's Camp (wooded area at top left) and flooded water meadows in the Avon valley. © Historic England, Damian Grady, 27569-041

Largely covered in dense woodland, Vespasian's Camp is one of the least known monuments in the Stonehenge landscape. In the winter of 2015-16 we were fortunate enough to obtain permission to survey the site. Though it had been well mapped by the Ordnance Survey and limited geophysical survey was carried out in 1995, no modern archaeological survey had previously been undertaken.

The hillfort occupies a locally dominant position at the southern end of a ridge on the west bank of the River Avon. Two or more Bronze Age barrows are known to have existed on this ridge and the mutilated mound of one of them (Amesbury 25) survives. The hillfort itself has ramparts over 7m high on its western side, though on the eastern and southern sides it is less well preserved; here the ramparts have largely been levelled and survive only as outward-facing scarps above the river cliff. Excavations by Kurt Hunter-Mann in the 1980s

confirmed that the ramparts were built in two phases, but that the hillfort flourished for a relatively short time in the 5th and 4th centuries BC. Its misleading name derives from the 16th and 17th centuries, when the hillfort was believed to be a Roman fort.

Though it is difficult to be certain about the original form of Vespasian's Camp because of the later mutilation of its eastern ramparts, the way in which it presents its very high, straight ramparts to the west – towards Stonehenge – is remarkable, and echoes the relationship of Oldbury hillfort to the megalithic monuments at Avebury. This must reflect the beliefs of the inhabitants during much of the Iron Age, when Stonehenge and its immediate surroundings were apparently avoided: apart from one burial, very few finds or monuments of this period are known close to Stonehenge, though contemporary settlements are widespread elsewhere in the region. Curiously, the



Plan of Vespasian's Camp, surveyed in 2015-16. Areas in grey tone were inaccessible at the time of survey due to dense undergrowth. © Historic England, Deborah Cunliffe and Mark Bowden



Rebecca Pullen and Olaf Bayer measuring the internal face of the rampart on the western side of the hillfort just north of Stonehenge Road, December 2015. © Historic England, Mark Bowden

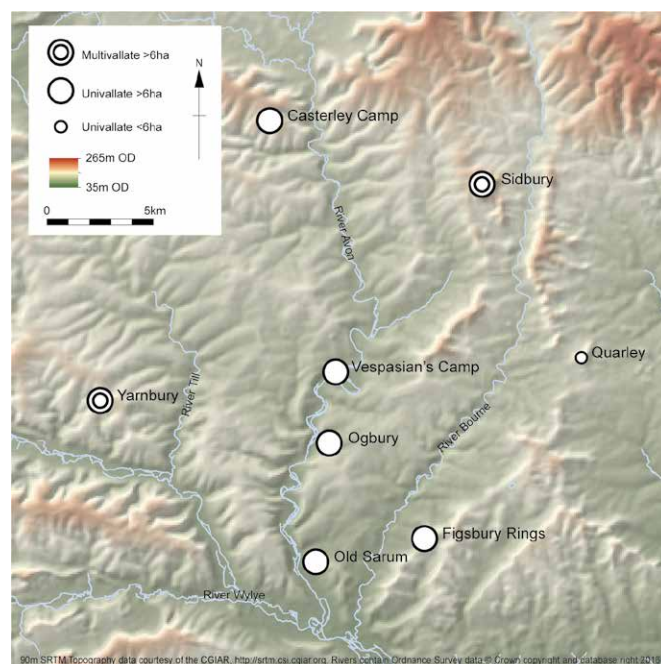
boundary of the WHS approximately mirrors this gap in the local pattern of Iron Age activity.

The camp in context

Vespasian's Camp is one of a number of hillforts on the southern part of Salisbury Plain. Many of these are placed in locally dominant positions along the valley of the Avon and its tributaries; the significance of the river as a conduit for people, material and ideas throughout later prehistory is increasingly appreciated. The nearest neighbour is Ogbury on the east bank to the south; with Casterley Camp and Sidbury to the north; Yarnbury and Quarley Hill to west and east respectively; and Figsbury Ring and Old Sarum to the south.

All of these sites share the defining characteristics of hillforts – an area of high ground surrounded by ramparts and ditches in the Early to Middle Iron Age –

but differ from each other in positioning and form; they are not all necessarily strictly contemporary with each other, and seem to be the constructions of separate local communities rather than part of a wider regional system. Though all are on relatively high ground in their locality they generally avoid the highest hills, with most occupying positions along river valleys. Some have slight, single ramparts; some have much more substantial defences; some occupy hilltops, while others are quite deliberately tilted down into the valley; some occupy large areas while others are small; no two are alike. Yarnbury and Sidbury have been identified as long-used hillforts, 'preferred locations' throughout the early and middle parts of the Iron Age, like Danebury, Maiden Castle and South Cadbury; Vespasian's Camp, by contrast, and despite the effort that went into creating its substantial ramparts, seems to have been relatively short-lived. These sites all show signs of activity in earlier periods – barrows, enclosures, linear ditches – and have been said to 're-emphasise locations of ancestral activity' (McOmish *et al* 2002, 160). They also nearly all show signs of later activity – Late Iron Age, Roman, medieval and post-medieval – but in different forms; only Yarnbury and Old Sarum have evidence for extensive Roman occupation, though a few finds of Romano-British pottery at Vespasian's Camp attest to some activity there.



Map of hillforts neighbouring Vespasian's Camp. © Historic England, Olaf Bayer

Changes in the historic era

The interior of Vespasian's Camp is known to have been under cultivation in the medieval period; this continued until about 1740. It is also known that Stonehenge Road was established on its current line by the end of the 14th century, cutting the hillfort into two unequal parts. In the 1740s the northern part of the hillfort was acquired by the Duke and Duchess of Queensberry and incorporated within their park at Amesbury Abbey, where they were employing the celebrated landscape gardener Charles Bridgeman to lay out their grounds in a formal manner, some remains of which are visible as earthworks. Bridgeman laid out the hillfort interior on two main axes at right angles to each other, meeting at a large circular platform near the centre. To the east of this platform, facing the formal gardens around the house, were planting lines and an artificial grotto known as 'Gay's Cave'. The grotto was cut into the river cliff below the ramparts and surrounded by a 'diamond' of paths leading down to the river edge. To the north of the circular platform, a carriage drive was cut through the mound of barrow Amesbury 25, leading to a square platform and the northern entrance of the hillfort, which was widened.

The stiff formality of this landscape was not maintained for long; documentary and map evidence shows that the straight edges of the planting were soon softened. The earthworks of the planting lines seem to reflect this, as they are far from symmetrical. Another carriage drive was engineered down the



Cara Pearce surveying the circular platform, the central feature of the 18th-century landscaping. © Historic England, Mark Bowden



Veteran trees on the western rampart of the hillfort, part of a 19th-century planting scheme. © Historic England, Mark Bowden

steep slope to the east of the monument, leading to the valley floor where a 'Chinese House' was built on a bridge over a channel of the river; a large drainage ditch was constructed alongside this carriage drive, which must always have been wet and slippery.

It was almost certainly in the 1740s, during this landscaping, that two Bronze Age daggers and a pin were found in two barrows at the hillfort, one of them almost certainly Amesbury 25. These finds seem to have gone into the Duke's (or Duchess's) cabinet of curiosities; they were not exhibited in public until 1771, when they were shown to the Society of Antiquaries of London. Thomas Pownall sketched them in the Society's Minute Book on that occasion, but their whereabouts is now unknown.

Meanwhile the portion of the hillfort to the south of Stonehenge Road continued in agricultural use until, in the early years of the 20th century, it began to be sold off for building plots. There are now about a dozen houses within this part of the monument.

Surveying the monument proved to be a challenge. Dense woodland to the north of Stonehenge Road and nine separate private gardens and paddocks to the south had to be negotiated, all incorporating steep slopes. We are extremely grateful to all the owners for their ready permission to undertake this work. The survey framework consisted of a ring traverse and three spur traverses totalling 84 stations, measured with a Trimble 5600 total station theodolite.

Author



Mark Bowden MCifA FSA
Senior Investigator with
Historic England.

Mark is a Senior Investigator, and Manager of Historic Places Investigation Team West. Mark studied archaeology at Reading University and has worked for many years as an Investigator for Historic England and its predecessors. His most recent publication is *The Stonehenge Landscape: analysing the Stonehenge World Heritage Site* (Swindon, 2015). The research for this article was undertaken with Olaf Bayer, Rebecca Lane, Cara Pearce and Rebecca Pullen.

Further reading

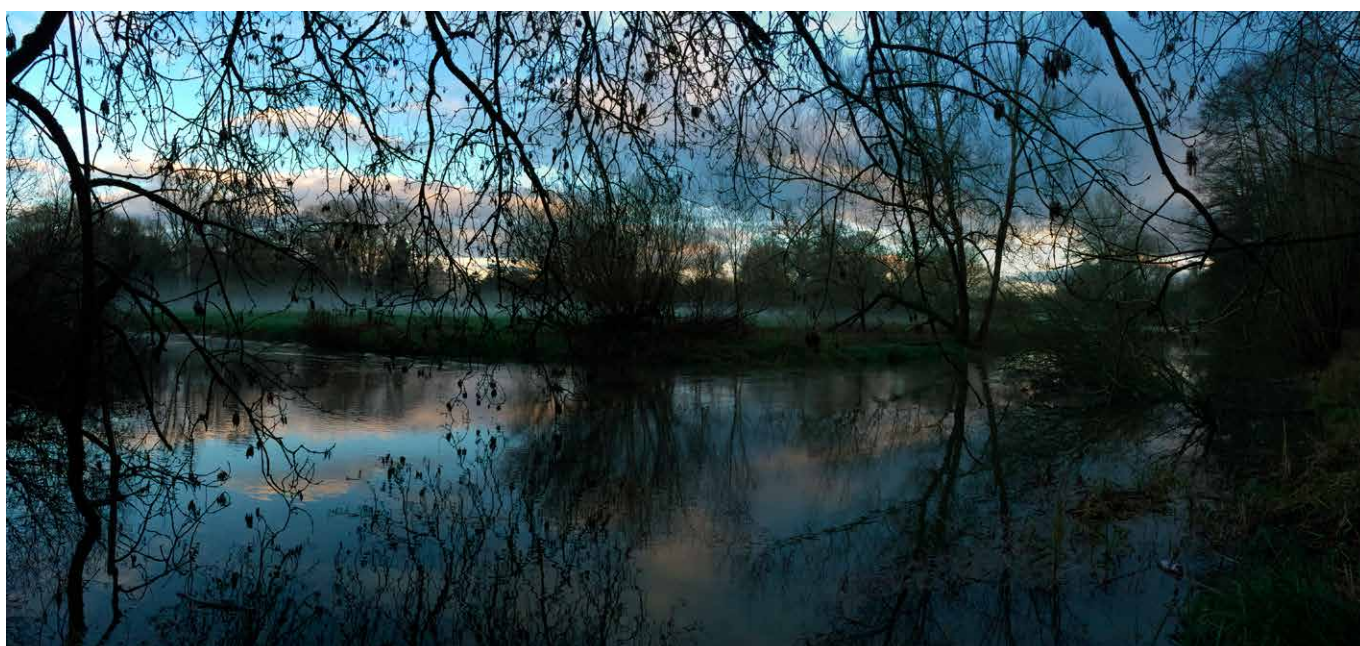
Bowden, M, Soutar, S, Barber, M and Field, D 2015 *The Stonehenge Landscape: analysing the Stonehenge World Heritage Site*. Swindon: Historic England

McOmish, D, Field, D and Brown, G 2002 *The Field Archaeology of the Salisbury Plain Training Area*. Swindon: English Heritage



Surveying the steep slopes of the hillfort amongst a dense planting of box and other shrubs and trees. © Historic England, Mark Bowden

Bowden, M 2016 *Stonehenge Southern WHS Project: Vespasian's Camp, Amesbury, Wiltshire: analytical earthwork survey*. Historic England Research Report **49/2016**, available at: <http://research.HistoricEngland.org.uk/>



The Avon below Vespasian's Camp at dusk, January 2016. © Historic England, Olaf Bayer

Visualising our research

Historic England's Imaging Team helps engage the widest possible audience in the stories of the Stonehenge landscape.

The Imaging Team creates beautiful, informative images in a variety of forms, from traditional archaeological reconstruction drawings to three-dimensional representations of sites and an interactive digital map. This 'Story Map' acts as a portal to our research reports for the WHS. Other recent work has been in response to requests from the Stonehenge Southern WHS Survey Project.

Landscapes re-created

A request for illustrations of the development of a long barrow resulted in images that use a combination of conventional and digital drawing techniques. Excavations at Druids Lodge for the southern WHS project had confirmed that the supposed Neolithic long barrow known as Winterbourne Stoke 71 was just that. Previously, the site had only been recorded from the cropmarks of two parallel ditches seen on aerial photographs but the excavations suggested that the long barrow had been ploughed out centuries ago, perhaps even in prehistory.

As well as a reconstruction drawing of the long barrow as it might have been in the Neolithic period, Ellie Winter, a ClfA placement with Historic England's

Graphics Team, was asked to create an illustration of the long barrow being ploughed away. Ellie modeled the terrain in SketchUp three-dimensional modeling software and visited both the long barrow site and St Catherine's Hill, Hampshire, to get a feel for chalk downland. She then created the textures for the trees and plants by hand. Once scanned, these were layered in Photoshop together with Ellie's hand drawings of Manx Loaghtan sheep from Butser Ancient Farm and people in various poses. Ellie added other detail by painting digitally in the software. As well as developing her own artistic style, Ellie's work shows how even requests for 'traditional' reconstruction drawings are opportunities to develop methodologies, as it is becoming easier to work hand-drawn elements into a digital product.

Burials brought together

Further east, at West Amesbury, Historic England excavations uncovered two separate burials cut into the [Bronze Age linear boundary ditch](#). Due to the sequencing of the fieldwork one burial was discovered, recorded and the bones lifted before the trench was extended and the second burial found. This posed a problem: how to visualise both burials together when they had not actually been seen that way when they



Ellie Winter's illustration of Winterbourne Stoke 71 being ploughed away, set in later prehistory. © Historic England



Extracts from [three-dimensional model](#) showing the process undertaken in the software. © Historic England

were in the ground? Luckily, the digging team had taken just enough photographs of the first burial to have something to work with when they asked Jon Bedford, Senior Geospatial Imaging Analyst, for help.

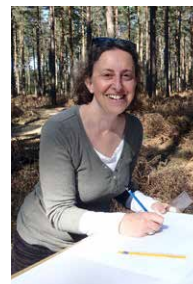
By taking even more photographs of the second burial and using Structure from Motion, a photogrammetric technique for estimating the form of three-dimensional structures from two-dimensional images, Jon was able to create a three-dimensional model of the whole trench showing how both burials were inserted.

A digital map

Given the iconic status of Stonehenge it is hardly surprising that there are a number of Historic England research reports relating to the henge, stone circle and surrounding area. They range from detailed earthwork surveys carried out as part of the [Stonehenge WHS Landscape Project](#), through various geophysical surveys, to assessments of the human remains. Making use of our ESRI ArcGIS on-line facility for sharing spatial data, I developed the interactive [Stonehenge Research Reports Story Map](#) to encourage direct access to research reports in a more immediate and engaging way. Anyone looking at the map can move it around, zoom in and out, and choose which sites they wish to know more about. Small 'pop-ups' give a short summary of each report with the picture used on the front cover, and a simple link takes the user straight to the on-line report.

When it was launched in January 2016 the Story Map created a distinct spike in views of the Historic England research webpages. It clearly demonstrates the potential for web mapping to engage our audience and provide easy access to information about the historic places we champion.

Author



Sharon Soutar MSc ACA

Graphics Officer with
Historic England.

Sharon is a GIS and survey specialist in the Investigation and Analysis Graphics Team. Combining skillsets as a landscape archaeologist and graphic designer, Sharon has spent over 20 years working in various parts of Historic England.

The Army Basing Programme: new discoveries at Larkhill and Bulford

Investigations by Wessex Archaeology ahead of development for the Army Basing Programme have revealed a plethora of prehistoric remains.

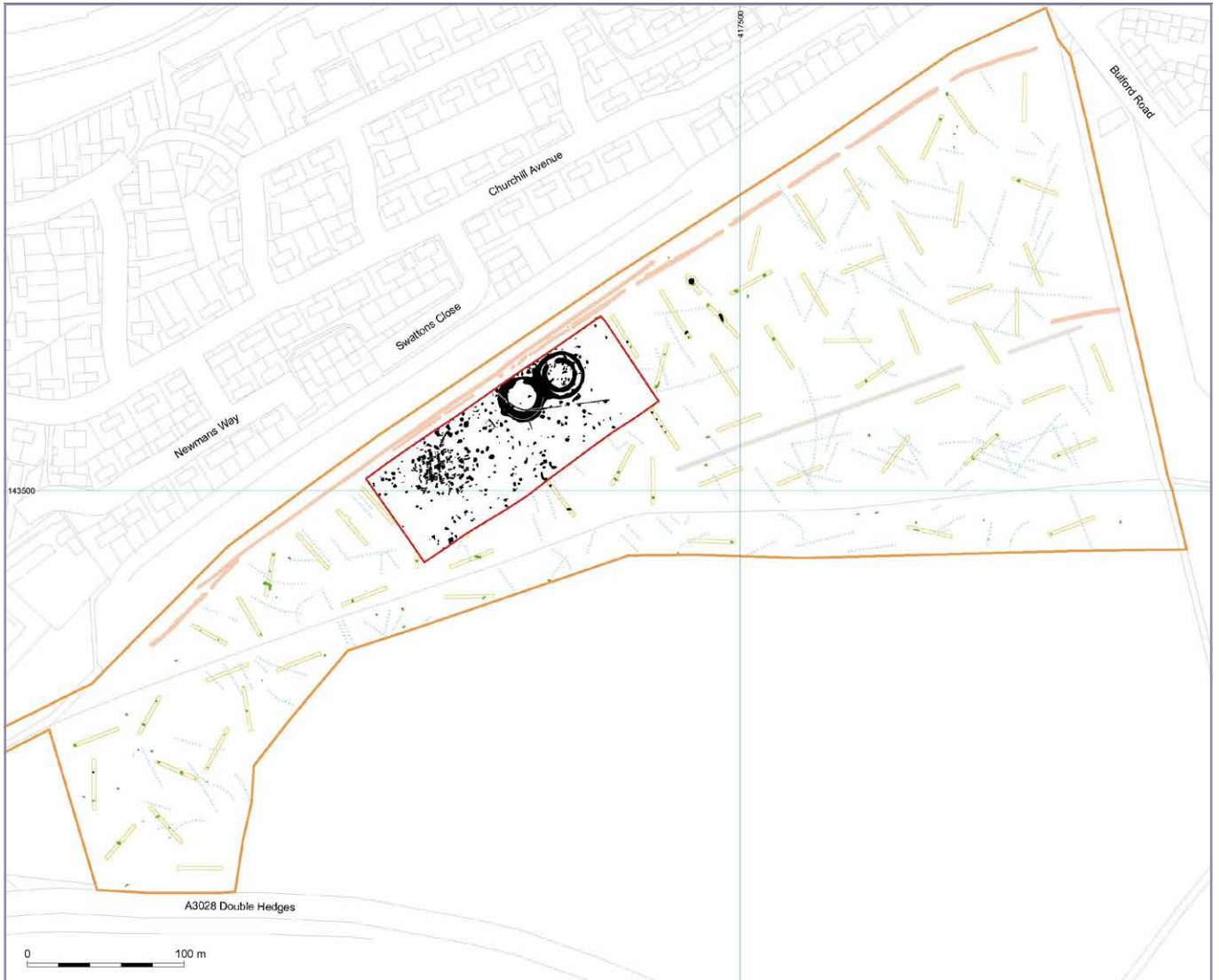
Wessex Archaeology was commissioned by consultants WYG on behalf of the Defence Infrastructure Organisation to carry out archaeological investigations ahead of development for the Army Basing Programme. These works, which collectively involve an ambitious project to accommodate the 4,000 additional service personnel and their families who will be based on and around Salisbury Plain by 2019, required excavations to the east of Larkhill Camp and on land to the south of Bulford between 2015 and 2017 (see [page 5](#)).

Ring-ditches and pits

The site at Bulford is located on a spur of the north-west facing slope of the Nine Mile River valley (a tributary of the River Avon), just to the north of the barrow cemetery at Double Hedges. The work confirmed the presence of two ring-ditches known from aerial photography, and revealed a large number of Neolithic pits, Beaker period features and a cemetery of Anglo-Saxon date. Drone photography indicated that the ring-ditches were rather more complex than had previously been apparent. Limited excavation was undertaken to inform decisions about the preservation and scheduling of the site.



The location of sites and excavations in the wider landscape. Yellow – WHS boundary; red – work by Historic England; blue – work by Wessex Archaeology; green – other sites mentioned in the text. © Historic England

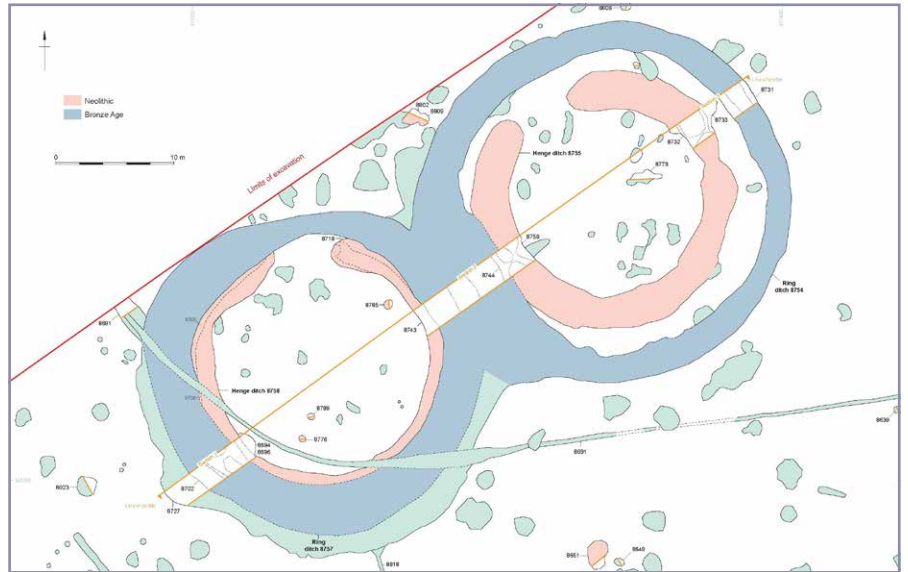


The location of the site at Bulford. © Wessex Archaeology



The drone survey showing the ring-ditches, cemetery and pits. © Wessex Archaeology

Both ring-ditches began as segmented hengiform enclosures with single entrances on the northern side. Deposits from the ditches included Late Neolithic Grooved Ware of Durrington Walls type, struck flint, and animal bone (including the skull from a large dog or wolf). Once the original segmented ditches had filled, both were surrounded by continuous barrow ditches of probable Early Bronze Age date. Both monuments had evidence of a central mound, while the western ring-ditch also appeared to have an external bank.

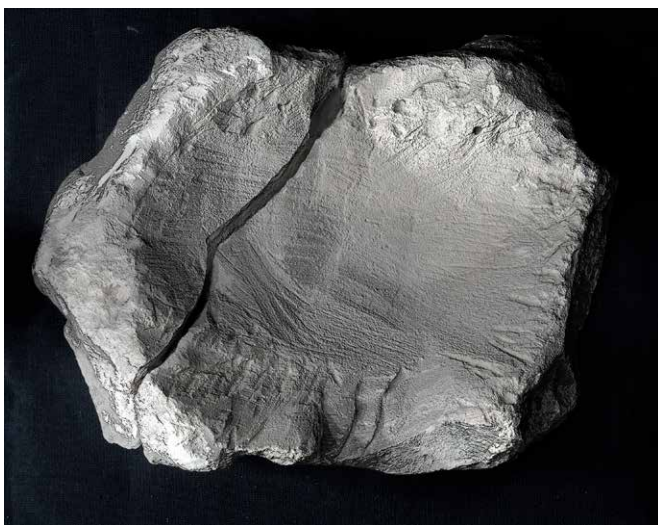


The henges and ring-ditches. © Wessex Archaeology

The area to the east, south and west of the ring-ditches contained numerous pits of Late Neolithic date, from which extensive deposits of cultural material were recovered. The pits were mainly located in a linear band extending from east to west below the southern crest of the spur and extending around its eastern tip, although some lay to the north of the ring-ditches, and some were within them. Most of the pits contained bone, Grooved Ware of Woodlands type, flint knapping debris and charcoal. Many pits also contained 'exotic' objects including carved chalk, spherical flint nodules, flint and

stone axes or fragments, a discoidal knife, antlers and aurochs bones, and – in one instance – claws from a large bird, probably a corvid.

Slightly further to the east, on the slopes of the dry coombe below the spur, further pits contained Early Neolithic ceramics and lithics. Similar material came from a spread of colluvium in the valley floor, suggesting occupation.



Reflectance transformation imaging of one of the chalk bowls. This digital photographic technique allows the viewer to change the way they see the image so that otherwise invisible or hard-to-detect features are revealed. © Wessex Archaeology



A polished discoidal knife – a very rare find from a Late Neolithic pit. © Wessex Archaeology

A new causewayed enclosure

The site at Larkhill, less than 1km north-west of Durrington Walls and 3km north-east of Stonehenge, was previously thought to be free of significant archaeological remains. Evaluation trenching revealed a 'Wessex Linear' and other ditches which were considered to be parts of later Bronze Age and Iron Age field systems; an undated unaccompanied inhumation burial; a sub-rectangular Iron Age enclosure; lynchets and terraces of probable Romano-British date; and military remains. The results were of sufficient interest and in an area of sufficient archaeological sensitivity for Wiltshire Council Archaeology Service to require full excavation of the area. Stripping commenced in July 2016.

Excavation revealed a Beaker inhumation, a Middle Bronze Age cremation cemetery, a very small ring-ditch, and the extensive remains of military practice trench systems, mainly from the World War I. However, the most notable prehistoric discovery was a series of seven ditch segments against the site's southern boundary,



The causewayed enclosure ditches revealed within the excavations at Larkhill. © Adam Stanford

forming 117m of an arc of an Early Neolithic causewayed enclosure approximately 210m in diameter.

The ditch segments varied in length, width and depth. While some of these differences may have resulted from variations in the natural chalk, some of them seem to have been deliberate choices. In many segments, individual episodes of cutting and recutting could be seen, with later cuts both deeper and shorter than the originals.

The two easternmost ditch segments were separated by an unusually wide causeway of 13.5m, which may have been an entrance. Placed centrally within this gap was a shallow oval stepped pit containing Early Neolithic pottery.

Other ditch segments contained ceramics of varying types. The primary fills contained fragments of Decorated Bowl pottery, most of which were of a stylistically local type (Windmill Hill ware), but which also included forms that were more typical of the south-west peninsula (Hembury ware).

Other material recovered from the excavated ditch segments included large quantities of flint debitage and some tools (arrowheads, scrapers), animal bone (predominantly cattle), fragments of a human skull, and a large sarsen saddle quern. Fills higher in the sequence contained small and abraded quantities of Grooved



Pottery of South-Western type from the enclosure ditch.
© Wessex Archaeology



A large saddle quern recovered from a World War I feature cutting the enclosure. © Wessex Archaeology

Ware and Beaker pottery, and a complete Collared Urn had been placed into the almost completely silted segment at the western end. Cattle bone from the base of the ditch was radiocarbon dated to 3780-3650 cal BC.

Only a single line of ditch segments was encountered. Since many causewayed enclosures consist of multiple circuits of ditch one inside the other, further arcs may exist inside the area defined by the excavated segments (there are none outside it, on the north side at least). The projected diameter compares well with that of the well-known causewayed enclosure at Robin Hood's Ball, 4km to the west-north-west, perhaps suggesting that an inner ditch circuit could be expected.

The enclosure and its associated features represent a major new discovery in the Stonehenge landscape. It sits just below the brow of the low hill occupied by Larkhill Camp, commanding broad views to the north-east across the valley of the river Avon towards Barrow Clump and Sidbury. While most of the enclosure remains uninvestigated within the camp, projections of its size suggest that its entire circuit lies on the northern side of the hill, and therefore looks out across the Avon valley rather than south and south-west towards Stonehenge. The excavated part lies only 300m outside the northern boundary of the WHS.

The Larkhill enclosure adds a very significant architectural element to the Early Neolithic landscape north of the WHS. Known sites of this date are situated on the ridge of high ground running east-south-east from Robin Hood's Ball and the cluster of long and oval barrows to its east and north-east. The ridge takes in the summit occupied by the Knighton Long Barrow and the oval barrow south of it, adjacent to the Packway, and continues on to end at the scarp above Durrington Walls. The Larkhill enclosure sits on a low eminence east of the Packway barrow, and may be the focal point for both it and the Knighton barrow. Geophysical survey has revealed what may be the remains of a further ploughed-down long barrow 600m to the north, suggesting that further elements of the Early Neolithic landscape await discovery..

- Excavations were undertaken by a team from Wessex Archaeology directed by Steve Thompson and managed by Si Cleggett. Martin Brown managed the project for WYG on behalf of Defence Infrastructure Organisation. Wessex Archaeology would like to thank Adam Stanford of Aerial Cam for his work at very short notice.

Author



Matt Leivers PhD ACIfA
Senior Specialist Services Manager
with Wessex Archaeology.

Matt is Senior Specialist Services Manager at Wessex Archaeology. His most recent publication is *A Research Framework for the Stonehenge, Avebury and Associated Sites World Heritage Site* (Leivers and Powell 2016).

Further reading

Leivers, M and Powell A 2016 *A Research Framework for the Stonehenge, Avebury and Associated Sites World Heritage Site: Research Agenda and Strategy*. Salisbury: Wessex Archaeology, available at <http://www.stonehengeandaveburywhs.org/world-heritage-site-research-framework/>

Historic England publications

Stonehenge is arguably the greatest prehistoric monument in Western Europe, and it sits at the heart of a landscape rich in Neolithic and Bronze Age monuments. In this Stonehenge-themed issue we are pleased to announce a new edition of Julian Richards's *Stonehenge: The Story so Far*, and to offer you a chance to catch up with other Stonehenge books that you may have missed.

Visit the [Historic England Bookshop](#) to discover a huge variety of books on archaeology, architectural history, sporting heritage and heritage conservation.

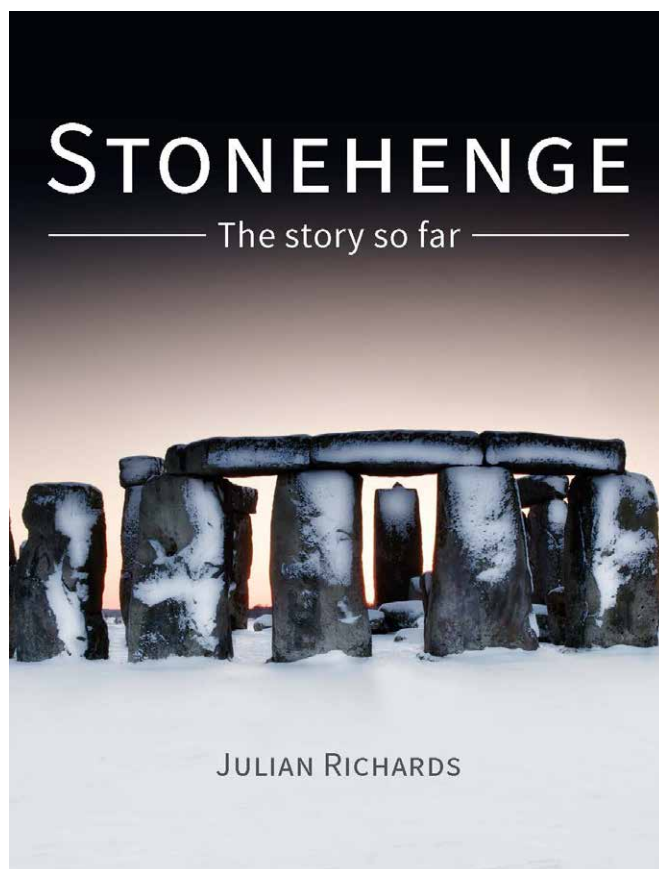
Readers of *Historic England Research* can get **20 per cent discount** on all books sold through the online shop with **free postage and packaging** on orders where the catalogue price is £20 and over.

Enter discount code **HERES17** on the basket page before you checkout.

Stonehenge: The Story so Far Julian Richards

Stonehenge is our most famous prehistoric monument: massive, enduring, its iconic stones recognised around the world. It has also been an object of curiosity for centuries, the subject of speculation and investigation, the source of a thousand theories.

In this book archaeologist Julian Richards sets out to tell its fascinating story. Starting with a clear explanation of the structures of earth and stone that go to make up this enigmatic monument, the book charts the ways that Stonehenge has been visited, seen, explored and understood since medieval times. Giants, wizards, Druids, burials adorned with gold and the birth of archaeology all figure in this evolving story. The excavations of the 20th century – part triumph, part disaster – are explained in detail as



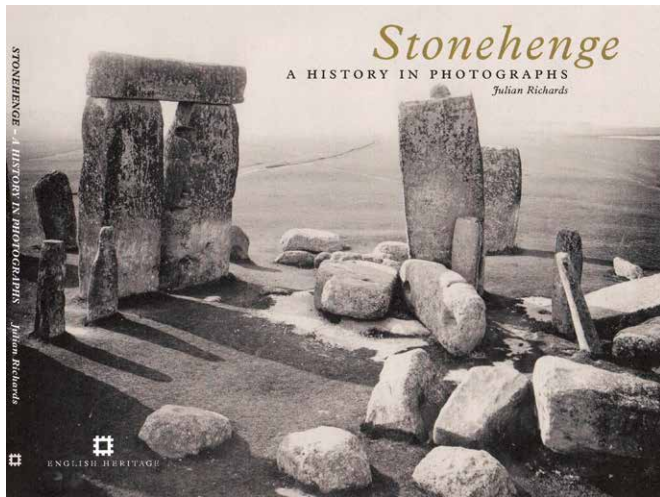
they form the foundation of our understanding of Stonehenge's origins and development.

This book then goes on to tackle the big questions: Who built Stonehenge? How was it built? And – perhaps the most difficult – why was it built? These chapters take a practical and critical look at some of the current ideas, trying to get into the minds and world of our prehistoric ancestors. Finally all that has been explained is woven with imagination into a narrative chapter simply entitled: 'Stonehenge – the story so far'.

£25.00 : September 2017 : 978-1-84802-100-6 : Hardback
: 352pp : 246x189mm : 300 illustrations : **SECOND EDITION**

<https://retail.HistoricEnglandservices.org.uk/stonehenge.html>

Stonehenge: A History in Photographs Julian Richards



Using images from Historic England's unique photographic archive, this earlier volume from Julian Richards charts the last 150 years in the life of this extraordinary site. The images touch on various moments in Stonehenge's history, from the leisurely tourism in the last years of Victoria's reign to the monument of today. The book is a celebration of Stonehenge, in fascinating and very human images.

£20.00 : 2014 : 978-1-8402-265-2 : Paperback : 118pp :
220x280mm : 123 illustrations

<https://retail.HistoricEnglandservices.org.uk/stonehenge-5afe.html>

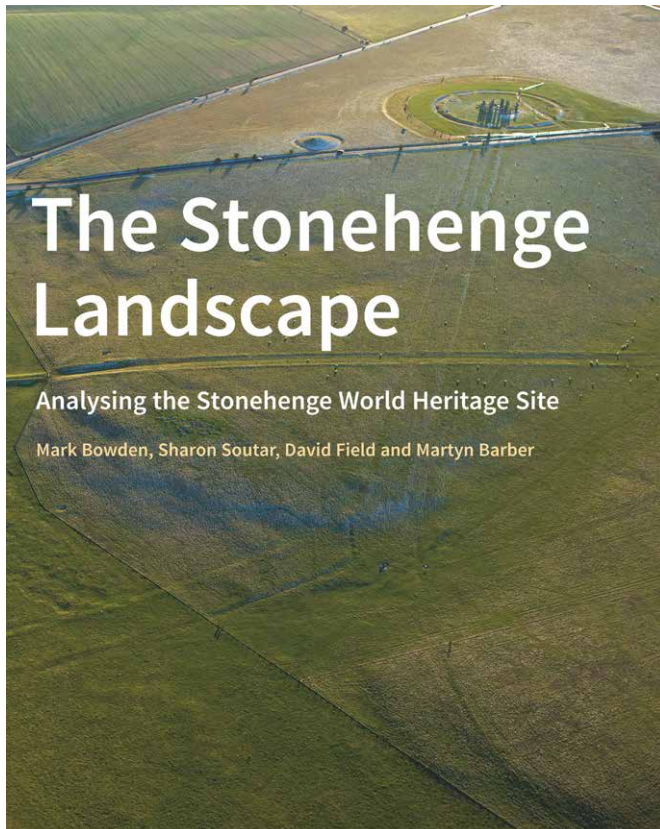
The Stonehenge Landscape: Analysing the Stonehenge World Heritage Site Mark Bowden, Sharon Soutar, David Field and Martyn Barber

“... It is a significant new addition to scholarship. ... on-the-ground understanding shines from every page.”
British Archaeology

“The challenge that the authors of *The Stonehenge Landscape* faced was the need to treat all aspects of the archaeology and historic landscape equally and this they have done admirably ... an excellent study of a whole landscape ... extremely impressive.”
Medieval Archaeology

“... A volume of meticulous fieldwork, beautifully illustrated, documenting the physical evidence in the landscape of earthworks, aerial photography and geophysical survey. ... *The Stonehenge Landscape* is an admirable piece of work. Gorgeous photographs accompany the most beautiful, subtle maps that will retain their value for generations. ... If the illustrations are the glory of this book, the text and the up-to-date summary of Stonehenge and its surrounding monuments are admirably clear and succinct. If you are interested in Stonehenge this publication is a must-buy. If you are interested in the historic landscape, ditto. If you like beautiful books this one will grace your library.”
Minerva

Recent research within the Stonehenge World Heritage Site has led to the identification of previously unknown sites and, perhaps even more importantly, the re-interpretation of known ones, including Stonehenge itself.



This book, which the critics loved, presents the most significant findings of the English Heritage and Historic England research and shows how it integrates with the results of work undertaken by colleagues in other research bodies. It traces human influence on the landscape from prehistoric times to the very recent past.

£30.00 : 2015 : 978-1-84802-116-7 : Paperback : 176pp : 276x219mm : 112 illustrations

<https://retail.HistoricEnglandservices.org.uk/the-stonehenge-landscape.html>

Stonehenge and Avebury: Exploring the World Heritage Site 1:10 000 scale map

The Stonehenge and Avebury World Heritage Site is internationally important for its outstanding prehistoric monuments. Stonehenge is the most architecturally sophisticated prehistoric stone circle in the world, while Avebury is the largest. Around them lie numerous other monuments and sites, which

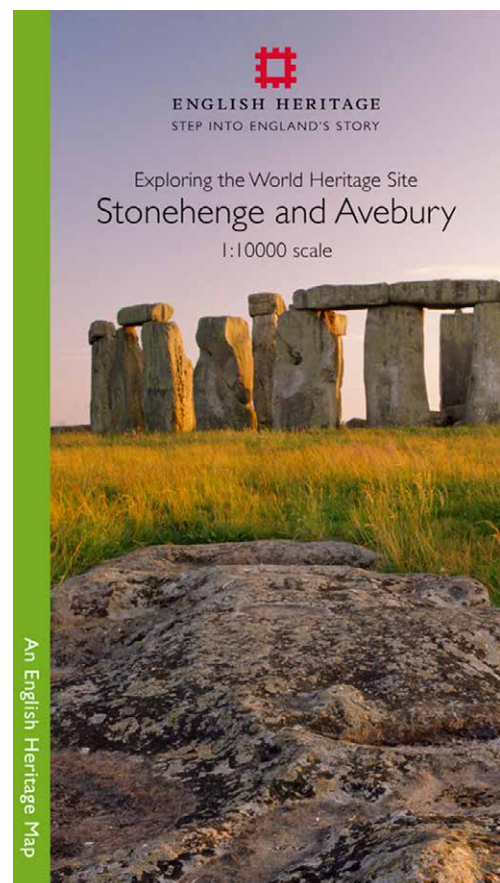
demonstrate over 2,000 years of continuous use. Together they form a unique prehistoric landscape. Our map of Stonehenge and Avebury is the perfect companion for visitor and armchair traveller alike.

This map is ideal for walkers and others wishing to explore the fascinating landscape of the two areas of the World Heritage Site. The map uses an Ordnance Survey 1:10 000 base and draws upon information from the Historic England Archive and recent archaeological investigations. With Stonehenge on one side and Avebury on the other, the map shows and describes both visible and hidden remains, with information about where you can find out more.

The map is divided into two parts and printed on a durable, double-sided, water-resistant sheet.

£9.99 : 2013 : 978-1-8402-126-6 : 240x133mm (folded) : 123 illustrations

<https://retail.HistoricEnglandservices.org.uk/stonehenge-and-avebury-1-10000-map.html>





Historic England

We are the public body that looks after England's historic environment.

We champion historic places, helping people understand, value and care for them.

Heritage Calling blog

The Heritage Calling blog provides short articles from our specialist teams who champion historic places and advise Government and others.

Read and subscribe to the Heritage Calling blog:
heritagecalling.com

Historic England newsletter

Sign up to our newsletter to keep up to date with our latest news, advice and listings:

www.HistoricEngland.org.uk/newsletter

Heritage Online Debate

Our themed heritage debates are published online four times a year and cover the topics uppermost in the minds of conservation and heritage experts. They replace our twice-yearly print publication *Conservation Bulletin*.

Follow Historic England

On twitter [@HistoricEngland](https://twitter.com/HistoricEngland)

Edited by

Jon Cannon, Paul Backhouse and Jonathan Last

Design and layout

Vincent Griffin

Historic England Research can be viewed online at:

www.HistoricEngland.org.uk/images-books/periodicals/historic-england-research/historic-england-research-back-issues/

ISSN: 2058-1858

Product Code: 52061

Copyright

© the authors or their employing institutions (text) and Historic England 2017. The views expressed are those of individual contributors and not necessarily those of Historic England.

For any further information and questions please email Research@HistoricEngland.org.uk

If you would like this document in a different format, please contact our customer service department on:

Telephone: 0370 333 0607

Textphone: 01793 015 0174

Email: customers@HistoricEngland.org.uk