

Institution: University of Bradford		
Unit of Assessment: C15 Archaeology		
Title of case study: Transforming the narrative of Stonehenge by revealing its 'hidden landscape'		
Period when the underpinning research was undertaken: 1 Jan 2010 and 31 Dec 2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Professor Vincent Gaffney	Anniversary Chair in Landscape Archaeology	2014- to date
Professor Christopher Gaffney	Professor of Archaeological Sciences	2007- to date
Thomas Sparrow	Senior Scientist	2011- to date
Period when the claimed impact occurred: 1st August 2013 to 31st December 2020		
Is this case study continued from a case study submitted in 2014? N		
1. Summary of the impact (indicative maximum 100 words)		
<p>The Stonehenge landscape is globally significant, and its monuments are amongst the best studied. Until recently, most space between the monuments remained terra incognita. This situation has been revolutionised by a programme of multisensory, remote sensing surveys, at an unprecedented resolution/scale, across the landscape (2010-2019). The 26.2km² survey provides a near seamless sub-surface and surface map of archaeological structures, transforming the World Heritage Site (WHS) in terms of curation, management and policy. Public policy has been strengthened, particularly regarding the A303 tunnel. Public understanding of the WHS has been altered via our landscape narrative. Fundamentally, novel technology, applied at a unique scale, has resulted in paradigm shift in landscape research.</p>		
2. Underpinning research (indicative maximum 500 words)		
<p>For over 40 years Archaeological Sciences at the University of Bradford has developed novel equipment and methodologies that enhance sustainable approaches to detection of the buried past. During the last decade, our innovative approaches have focussed on the landscape around Stonehenge. The team is led by Professor Vincent Gaffney (Anniversary Chair in Landscape Archaeology, 2014-present), Professor Christopher Gaffney (Professor of Archaeological Sciences, 2007-present) and Thomas Sparrow (Senior Scientist, 2011-present). Stonehenge has been the site of intensive archaeological and antiquarian research over several hundred years, yet much of the Stonehenge landscape remained un-surveyed and effectively terra incognita. Our understanding of the world heritage landscape at Stonehenge was predicated on the absence of evidence for most of the surface area. This has limited our archaeological understanding of the landscape and the ability of national curators to effectively manage this internationally important landscape through a period of major change. The Stonehenge Hidden Landscapes Project (SHLP) challenged our perception and understanding of the landscape through seamless survey of land between and across known monuments using state of the art geophysical and remote sensing survey. As a partner of the LBI ArchPro research programme, SHLP developed, tested and implemented new concepts for efficient and universally applicable tools for spatial, non-invasive archaeology including large scale motorised data collection.</p> <p>The SHLP treats the WHS landscape as undivided three-dimensional space explored via multi-sensor integration. In contrast to previous approaches to this WHS, the SHLP's extensive scale resulted in the discovery of previously unknown features, modified our interpretation of</p>		

previously known monuments and provided spatial data that permitted new linkages between new and known sites/monuments in a manner previously impossible. The survey also allowed us to confirm the value of such an approach to contribute to our understanding of large-scale landscape development during the Neolithic and Bronze Ages and the significance of ancient built environments, and their associated practices, at extensive scales and through time. The outcomes were showcased at the Royal Society Summer Exhibition 2015 and these include:

- Innovation in the use of automated and motorised archaeological prospection which has been successfully adopted and expanded within SHLP. We pioneered GPS data collecting of geophysical data for archaeological purposes (1) and developed novel (4) and scalable approaches to landscapes (2).
- The fundamental contribution to knowledge of the Stonehenge landscape and the associated change in the future interpretations of Stonehenge thanks to the volume of data collected by the SHLP and our discoveries (3).
- New theories of landscape structure have been developed as a consequence of the scale and nature of survey including the massive pits within the Greater Cursus, which incorporate the Cursus and the area of Stonehenge, through a solstitial alignment linked to the area of the Heel Stone (3); the discovery of complex timber monuments underneath existing sites e.g. Amesbury 50 round barrow; the identification of a vast Late Neolithic monument predating the bank and ditch of the Durrington Walls super-henge (5, 6); and the newly discovered pit encirclement of that henge (7).

3. References to the research (indicative maximum of six references)

1. Gaffney, C., et al. 2008. Initial results using GPS navigation with the Foerster magnetometer system at the World Heritage site of Cyrene, Libya. *Archaeological Prospection* 15(2), 151-156 (<https://doi.org/10.1002/arp.330>)
2. Ch'ng, E., et al. 2011. From sites to landscapes: how computing technology is shaping archaeological practice. *Computer* 44, 40-46 (cover feature) (<https://doi.org/10.1109/MC.2011.162>)
3. Gaffney, C., et al. (2012) The Stonehenge Hidden Landscapes Project. *Archaeological Prospection* 19(2), 147-55 (<https://doi.org/10.1002/arp.1422>)
4. De Smedt, et al. (2014) Unveiling the prehistoric landscape at Stonehenge through multi-receiver EMI. *Journal of Archaeological Science*. 50: 16-23. <https://doi.org/10.1016/j.jas.2014.06.020>
5. Parker Pearson, M., et al. (2017) Durrington Walls: was this the start of Britain's Copper Age, *PAST* 86, 3-5 (online) available at: http://www.prehistoricsociety.org/files/PAST_86_for_web.pdf
6. Gaffney, V., et al. (2018) Durrington Walls and the Stonehenge Hidden Landscape Project 2010-2016, *Archaeological Prospection* 25(3), 255-69 <http://hdl.handle.net/10454/16081>
7. Gaffney, V., et al. (2020) A Massive, Late Neolithic Pit Structure associated with Durrington Walls Henge, *Internet Archaeology* 55. <https://doi.org/10.11141/ia.55.4>

Grants

Gaffney, C. BA/Leverhulme Small Research Grants, 01/04/2019 - 02/11/2020 GBP9,000

Awards

[Current Archaeology Awards 2017 Winner: Research Project of the Year: Rethinking Durrington Walls: a long-lost monument revealed](#) (Stonehenge Riverside Project / Stonehenge Hidden Landscapes Project / National Trust).

4. Details of the impact (indicative maximum 750 words)

Impact on policy and planning

The identification of thousands of previously unknown features and monuments has fundamentally altered the way that we understand the Stonehenge landscape through the new categorisation of areas previously referred to by SHLP as “provocatively empty spaces”. The joint World Heritage Centre/ICOMOS advisory mission report on the WHS explicitly recognises the significant contribution of the research findings to its baseline understanding, in addition to the technical and methodological approaches, seen as essential to future planning/development-related field investigation (A). They note that crucial archaeological discoveries within the landscape of the Stonehenge WHS have arisen from the SHLP (H).

This has fundamentally changed the knowledge base upon which decision-making is undertaken, including in relation to the A303 tunnel scheme. The importance of the research resulted in Highways England purchasing SHLP data in advance of publication in order to develop the archaeological evaluation and mitigation strategies for the scheme (E). A written submission from the Consortium of Archaeologists contributing to the A303 road scheme public consultation was mentioned in parliamentary debate and led to the Secretary of State extending the consultation period and asking explicitly for comment on SHLP findings (G). The significance of the SHLP research findings radically changed the response of influential national and international stakeholders (H, I). These include the A303 Heritage Management Advisory Group, and the Highways England road scheme archaeologist and engineers, regional and national curators (E).

Impact on Heritage Management

Research by the SHLP has resulted in significant change in our understanding of both the distribution of new monuments and knowledge relating to previously known monuments. This information has resulted in changes to the heritage management of the WHS. Recognition of the value of the SHLP results to the management of the WHS is made throughout the current Site Management Plan to “improve understanding and to inform management initiatives” and the research was credited in the current WHS Research Framework as “revealing a wealth of previously-unknown sites via remote sensing and geophysical survey” (J). Our research has fed into heritage databases used to inform the future management of the landscape, particularly in relation to planning. This has included a large number of new entries into the Historic Environment Record, maintained by the Wiltshire County Archaeology Service, and the register of Scheduled Ancient Monuments, maintained by Historic England. The National Trust explicitly state that the SHLP have helped in the overall management of the property (C) and there is a significant use of our ongoing discoveries by the NT to ensure positive engagement; this is critical due to military relocation (Army Basing Programme) immediately north of the WHS (C). Furthermore, the work of the SHLP has caused the National Trust to significantly alter the way in which they investigate the whole of their estate – in 2018 they created a remote sensing advisory group that ensures modern strategies developed by the SHLP are used on NT properties and the SHLP was the inspiration (D). This is important as the NT are the 4th largest landowners in the UK.

Impact on heritage presentation, public understanding and creative media

Technical innovation and new understanding of the Stonehenge landscape feed directly into changing public understanding and generating economic impact through the press, creative media (museum and TV), and through changes to public engagement at Stonehenge itself. The new research findings have attracted significant interest with all aspects of the media leading to extensive international reach. Significantly, a two-part BBC2 mini-series about the Stonehenge Hidden Landscapes Project was broadcast several times – and was seen by 7.6 million people in the UK. It was then screened by broadcasters in Spain, Italy, Greece, Cyprus, Bulgaria,

Russia, Poland, Finland, Norway, China, Hong Kong, Thailand, Australia, the USA and other countries, and was therefore seen by many millions of additional viewers (L). The Bradford research generated worldwide media publicity that enabled literally hundreds of millions of people worldwide to understand for the first time the extraordinary organisational prowess and religious/communal dedication of prehistoric people (L). Notably over 300 newspapers and other news outlets used the SHLP discovery at Durrington Walls to inform people virtually everywhere on earth (from China, Korea and Japan to Brazil, Argentina, Mexico, Greece, Turkey, Russia, Israel, Australia, and the USA) about prehistory and archaeology. The research was so strong that it was able to reach far beyond normal news audiences, being covered in football and technology magazines to mobile phone and science fiction publications (L). The importance of this media campaign is that c. 75% of the SVC visitors are international. Our research keeps the Stonehenge story in the public eye, and promotes economic activity, particularly important in the Covid period (B).

Nationally, reach has been extended through a dedicated stand presented at the Royal Society Summer Science Exhibition in 2015. Internationally, SHLP reach has been achieved through the installation of an SHLP exhibition at MAMUZ museum in Mistelbach, Austria in 2017; during the event there were 160,000 visitors within the two years, making it their most successful exhibition (F). The Governor of Lower Austria noted that “this facility gave impetus for tourism and economic policy for the entire region” through the exhibition (K).

Within the Stonehenge landscape, staff from the National Trust (NT) and English Heritage (EH), in addition to enhanced volunteer guiding (C), now present an enriched interpretation to visitors using SHLP research. The Stonehenge Visitor Centre (SVC) uses SHLP information to tell the landscape story; our discovery of a complex timber monument underneath the Amesbury 50 round barrow helped to inform reconstructions and audio-visually of round barrows in the SVC exhibition. Opening in December 2013, over 9 million visitors have experienced these displays: used in the exhibition, the guidebook, on graphic display panels at Stonehenge and online (B). The guidebook (published in 10 languages) sells 57-58,000 copies a year. The EH webpages containing SHLP research has been viewed over 1 million times – this expands the reach of the research and pushes visitors to the physical site. Increasing the public understanding has been facilitated by SHLP seminars for EH and NT staff and volunteers. SHLP discoveries (cursus pits, Amesbury 50 and the palisaded enclosure at Durrington Walls) feature prominently in new landscape tours by EH and NT (B, C). EH indicate that our research continues to provide significant revision of the interpretation at the Stonehenge visitor centre and online (B).

5. Sources to corroborate the impact (indicative maximum of 10 references)

A. [UNESCO - Report on The Joint World Heritage Centre/ ICOMOS Advisory Mission To Stonehenge, Avebury And Associated Sites](#) ‘The mission wishes to underline the very high quality of research produced around Stonehenge ...including such projects as the "Stonehenge Hidden Landscape"... These have led to a substantial increase in our understanding of the monuments and the landscape, also resulting in significant publications for both professional readership and public outreach. Pages 14 & 18.

B. Testimonial - English Heritage – Senior Properties Historian at Stonehenge

‘Throughout the lifetime of the visitor centre, the SHLP has provided new and important information that has allowed English Heritage to refine and tell the narrative of the Stonehenge landscape...The press coverage of the SHLP’s research has helped to promote Stonehenge, keeping this special landscape in public interest, to the benefit of English Heritage in terms of visitor numbers. During lockdown in 2020, the international coverage has provided much needed visibility that will be valuable as we enter the post-Covid period.’

C. Testimonial - National Trust – Archaeologist (Stonehenge & Avebury WHS)

Stonehenge and its landscape have been subject to intensive antiquarian and archaeological investigation for more than four hundred years. Despite that the Hidden Landscapes Project’s discoveries have brought about a sea-change in our understanding of the density and complexity of monuments in the Stonehenge WHS, and our ability to map and appropriately care

for and conserve these sites. It has enabled...put in place appropriate mitigation to ensure their protection for future generations.'

D. Testimonial - National Trust (Head of Archaeology)

'...your research...has revolutionised, and been instrumental in, our understanding of a landscape many assumed had been comprehensively mapped. How wrong we were. Your use of new and cutting-edge technology has directly inputted into the interpretation the visitors see, allowing them to share in the wonder of the place...your part in the discovery of the outlying pit circle orbiting the Durrington Walls henge impacted on the assessment of the Highways Agency's proposals for the A303 upgrade (where the Trust is a significant lead on the archaeological statement). It is highly significant that the National Trust now has a Remote Sensing Group. My founding of this Group was directly inspired by exposure to the new technology being utilised and developed by the Stonehenge Hidden Landscape Project.'

E. Highways England – [A303 Amesbury to Berwick Down TR010025 October 2018 Heritage Impact Assessment](#) – throughout, particularly p. 70, 101, 154, 298, 300, 362.

F. Testimonials from Exhibition organisers – 'Our event attracted ca. 160.000 visitors within the two years, making it the most successful exhibition they ever had. There were of course, many beneficiaries including the economic lift to the local area...'

G. [Written Ministerial Statement - Minister of State at the Department for Transport](#)

'Following notification of a recent archaeological find within the World Heritage Site, the deadline for the decision is to be further extended to 13 November 2020 (an extension of 4 months) to enable further consultation on and consideration of this matter before determination of the application by the Secretary of State.'

H. A303 Stonehenge: Response by Icomos-UK To A Request for Comments And Further Information On The Hidden Landscapes Project Report - Report From Icomos To the Rt Hon Grant Shapps, MP Secretary of State for Transport

I. Highways England's Application for a DCO for the A303 between Amesbury and Berwick Down. Secretary of State's Request for Comments on the Hidden Landscapes Project Report and Representations Relating to it at the World Heritage Site and its Implications for the Application Council for British Archaeology – comments throughout.

J. Stonehenge, Avebury and Associated Sites World Heritage Site Management Plan

'Recent geophysical research such as the Hidden Landscape Project have revealed a substantial number of previously unknown or poorly understood features hidden within the landscape of the WHS' p 36, 53, 142, 180, 183.

K. [Press Release Office of the Lower Austrian State Government](#) '...the MAMUZ (museum) has not only a cultural policy but also a regional political significance, says Pröll, because this institution provided "tourist and economic policy impulses for the entire region". The MAMUZ also underpins the museum strategy of the state of Lower Austria, the governor added.'

L. Testimonial from Journalist '...few have had the sort of cultural, educational and philosophical impact that the Stonehenge Hidden Landscapes Project has had.' 'Over the past several years, SHLP has ... literally transformed global public knowledge about the world's most famous prehistoric landscape.' 'The Bradford-led operation generated worldwide media publicity that enabled literally hundreds of millions of people worldwide to understand for the first time the extraordinary organisational prowess and religious/communal dedication of prehistoric people.' '... the story was so strong that it was able to reach far beyond normal news audiences. The discovery was, for instance, covered in everything from football and technology magazines to mobile phone and science fiction publications worldwide.' 'Above all, the Stonehenge Hidden Landscapes Project has taught people around the world about the unique strengths and contributions of archaeology'