Written Scheme of Investigation for the Archaeological Excavation of Barrows 9, 10, 11 & 19 Petersfield Heath, Petersfield, Hampshire

July 2016

Unit 3, Liss Business Centre, Station Road, Liss, Hants., GU33 7AW

NON-TECHNICAL SUMMARY

This document sets out the methodology to be followed by West Sussex Archaeology Ltd in carrying out the archaeological excavation of Barrows 9, 10, 11 & 19, Petersfield Heath, Petersfield, Hampshire. The excavation forms part of a wider project undertaken by Petersfield Museum to investigate the history and prehistory of Petersfield Heath, a project funded by the Heritage Lottery Fund and the South Downs National Park Authority. It is proposed to excavate single trenches into Barrows 9, 10 & 19 in order to create complete or substantial profiles of each barrow's form and recover structural and palaeo-environmental data, and it is also proposed to re-open and extend a previously excavated trench into Barrow 11 in order to complete the excavation of a presumed burial.

PROJECT BACKGROUND

Figure 1 Site location. © Crown copyright. All rights reserved. License number: AL100036068

1. Petersfield Museum has received funding from the Heritage Lottery Fund (HLF) and the South Downs National Park Authority (SDNPA) for a four-year project to understand and conserve the prehistoric barrow cemetery on Petersfield Heath. The museum has appointed Dr. Stuart Needham (independent researcher) and George Anelay (West Sussex Archaeology Ltd (WSA)) to direct the project, which will involve local volunteers in most aspects of the project's fieldwork. The Heath is owned by the Petersfield Heath Trust and managed by Petersfield Town Council.

2. The 21 previously accepted barrows on Petersfield Heath are all Scheduled Monuments and as such Scheduled Monument Consent is needed for any intrusive fieldwork impacting upon them. This Written Scheme of Investigation has been drawn up to accompany and inform an application for Scheduled Monument Consent relating to the excavation of Barrows 9, 10, 11 & 19 (Scheduled Monument Nos. SM32532, SM32534 & SM32538) which will form the fifth of the six excavations planned as part of the wider project.

3. Barrows 9 &10 are both situated on the east side of Petersfield Heath adjacent to the current cricket field, Barrow 11 lies towards its centre, while Barrow 19 is situated to south-east at the extremity of the known cemetery (see Fig.2). The Heath itself lies on the eastern side of the town of Petersfield in Hampshire (see Fig.1). Both Barrows 9 & 10 sit at 57.25m aOD, with the former centred at OS grid reference SU75792305 and the latter SU75832306, Barrow 11 sits at 55m aOD and SU75542301 and Barrow 19 is at 59.5m aOD and SU75562271.

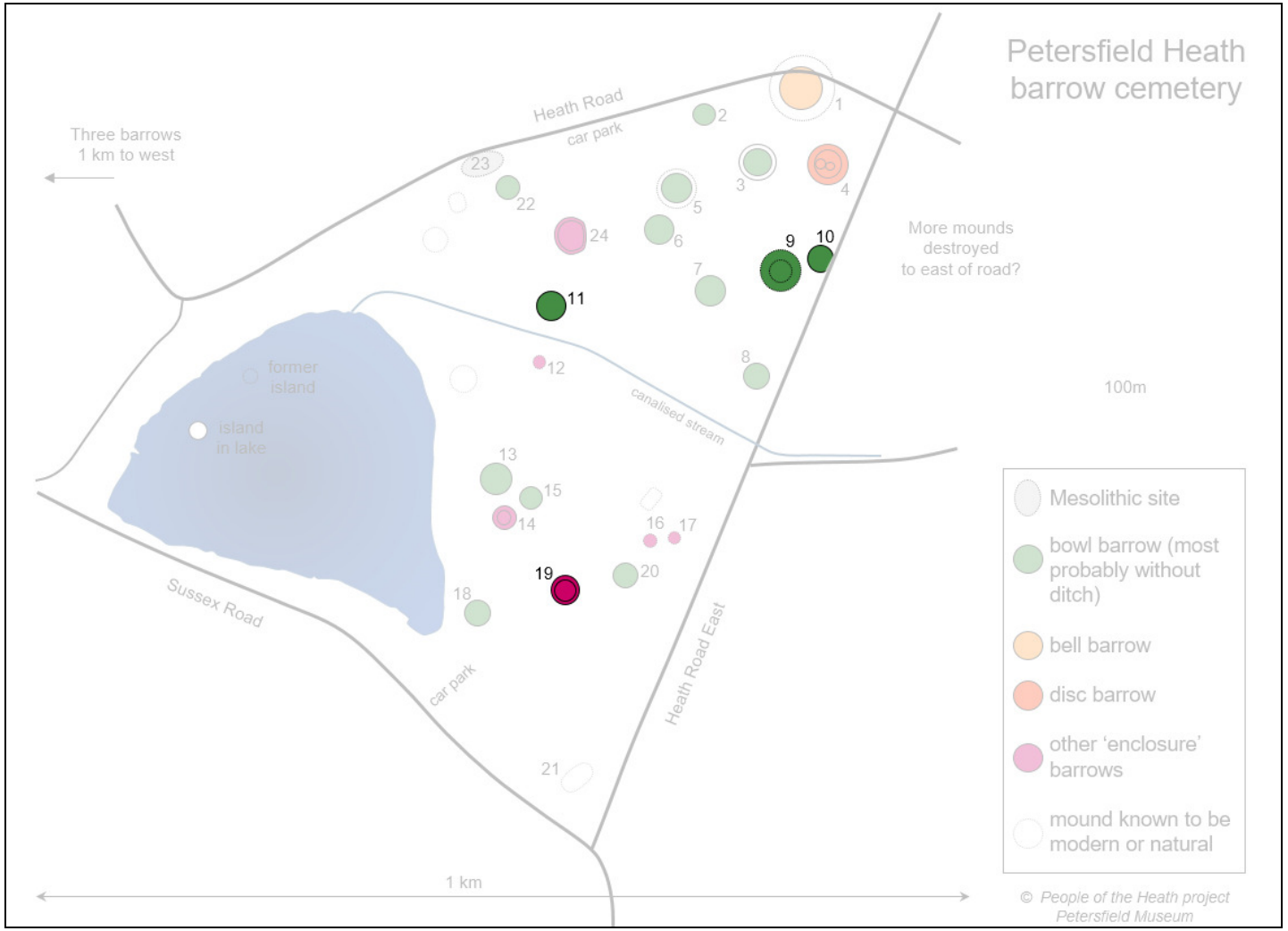

Figure 2 Schematic plan of the barrow cemetery on Petersfield Heath. Barrows 9, 10, 11 & 19 are highlighted

4. The underlying geology of the site is of Folkestone sandstone, Upper Marehill mudstone and Upper Pulborough sandstone, all of the Lower Greensand series. In addition roughly half the Heath is covered by superficial deposits, including a band of Sussex Rother Terrace deposits around its southern and western sides and a block of Head deposits in the area of the lake and its outflow.

HISTORICAL BACKGROUND

1. Petersfield Heath is home to one of the most impressive and diverse barrow cemeteries in the South-East of England. The complex is considered to be of national importance and 21 barrows, mainly probably dating to the Bronze Age, have the highest level of state protection as Scheduled Monuments. An additional site (Site 24) has since been dated to the Early Bronze Age by the People of the Heath project, while an early 19th century map suggests that the cemetery once extended to the east of Heath Road East in an area now covered by housing. The barrows comprise a mix of 'styles', some of them specialized forms that are rare outside Wessex. The cemetery has not been studied comprehensively since the 1920s, when archaeologist Stuart Piggott, initially as a student at Churchers College, added several low-profile monuments to the more obvious barrows mapped by the Ordnance Survey and produced an overall plan of the cemetery. His plan was subsequently published by Leslie Grinsell in his overview of Hampshire barrows in the *Proceedings of the Hampshire Field Club* (see Fig.3).

2. Barrow 9 was identified by Piggott as a bowl barrow, at the time completely covered with gorse, so no measurements were taken, although he estimated that it was probably about 100 paces in circumference and c.7 feet high. There is no trace of an encircling ditch, but a linear depression runs along its foot on the eastern side. A topographical survey undertaken as part of the project in 2015 indicated that the barrow was c.1.4m high and c.20m in diameter, although a study of South Downs National Park Lidar data suggests that it may have been heavily truncated to the north and west. A geophysical survey is due to be undertaken, as part of this project, in July 2016.

3. Barrow 10 was identified by Piggott as a bowl barrow, c.90 paces in diameter and c.6ft high. He noted that it had been dug into on its western side and that in addition lumps of both clay and chalk had been brought out by rabbits from the mound itself. A topographical survey undertaken as part of the project in 2015 indicated that the barrow was c.1.3m high and c.20m in diameter, although apparently truncated on both its western and eastern sides. The linear depression which passes to the east of Barrow 9 continues northwards to pass Barrow 10 on its western side. A geophysical survey is due to be undertaken, as part of this project, in July 2016.

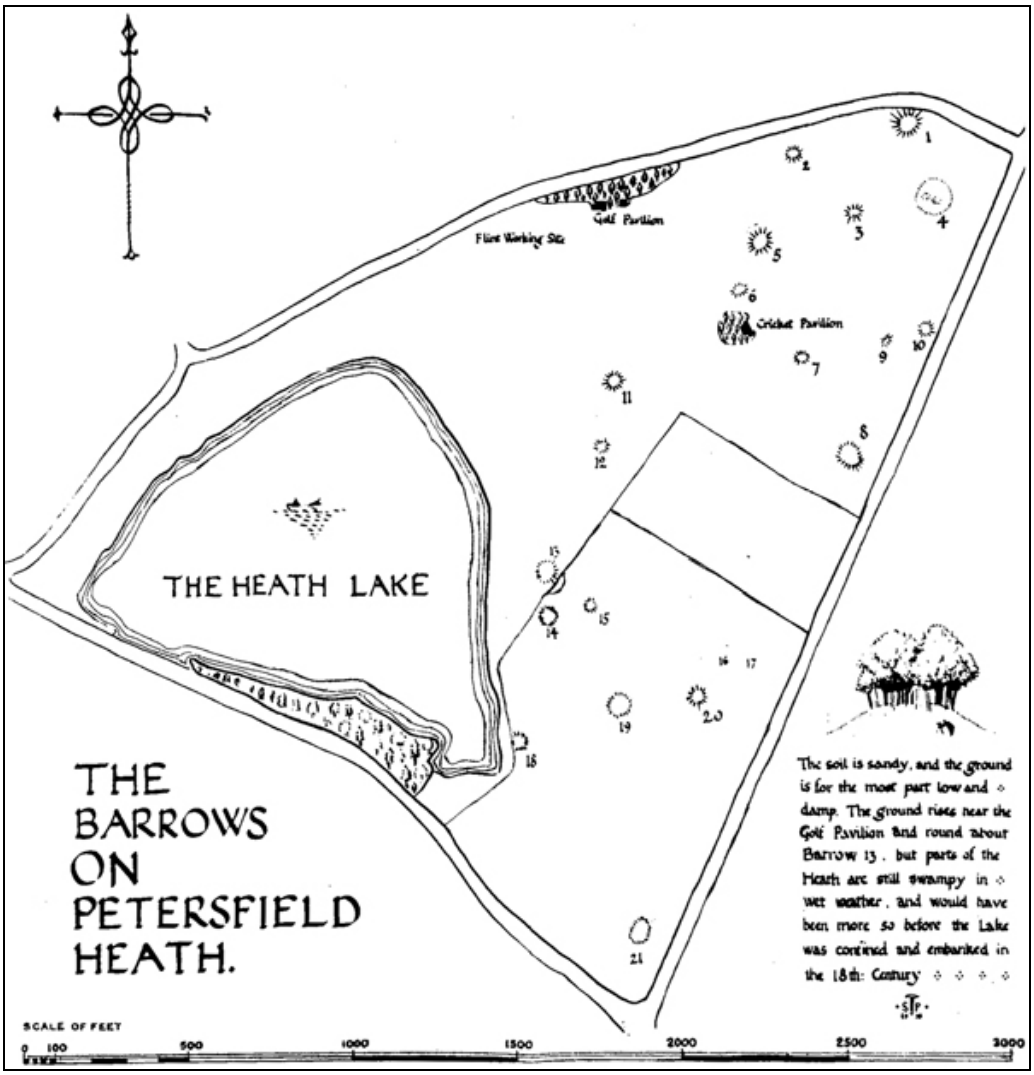

Figure 3 Piggott's plan of the barrows on Petersfield Heath.

4. Barrow 11 was identified by Piggott as a bowl barrow, c.8 feet high and c.100 paces in circumference, with no visible ditch. A topographical survey, undertaken as part of the project in 2014, indicated that the barrow was situated on a very low natural rise with its diameter measuring c.25m and its height c.1.75m. A geophysical survey undertaken as part of the project also in 2014 likewise found no clear evidence for an encircling ditch. This barrow was the subject of the first excavation carried out as part of this project (for a summary of the results see para.6 below).

5. Barrow 19 was described by Piggott as an intermediate between a disc and a saucer barrow. He recorded its bank as measuring 26 paces in diameter with an external ditch and remains of an internal tump. A topographical survey undertaken as part of the project in 2015 indicated that the bank was c.20m in diameter, with the external ditch

giving an overall measurement of c.25m. A rectangular depression noted within the circle of the bank is considered to be probably modern in date, and indeed disturbance in the centre can be seen on aerial photographs back to the 1920s, although as mentioned above Piggott thought a tump was present. A geophysical survey undertaken in 2014, as part of this project, had already clearly indicated the bank, ditch and central depression.

6. The first excavation carried out as part of this current project was undertaken in September 2014 and included the cutting of a single trench into Barrow 11. This trench ran from the centre of the barrow to beyond its outer edge, and it revealed that the barrow was entirely of turf construction with no surrounding ditch. An artefact assemblage recovered from close to the centre of the barrow was almost certainly related to a burial, although no human remains were encountered, and the feature within which they were found extended beyond the excavated trench. A radiocarbon date of 1885 - 1690 cal BC (95% probability) was obtained from charcoal associated with the assemblage (WSA 2015).

7. The second excavation was undertaken in June 2015 and involved the cutting of a trench into each of Barrows 18 and 21. The “L”-shaped trench excavated into Barrow 18, which ran from the centre of the barrow to beyond its outer edges, revealed that the barrow was of turf construction with no surrounding ditch. No features or artefacts associated with the barrow were recovered from within the trench save for a single ferruginous sandstone block from within its turf stack. The trench excavated into Barrow 21, which ran across the monument and beyond its outer edges, revealed it to be a natural sand mound (WSA 2016).

8. The third excavation was undertaken in September 2015 and involved the cutting of trenches into Barrows 12, 13 & 14. A sewer-main trench previously dug through the site of Barrow 12 was re-opened and its sections fully recorded. The barrow ditch was found to survive to either side, buried under a thin overburden. Small areas of excavation explored the ditch and two other features. No internal mound was evident and the former external bank had largely been levelled. A single trench was excavated into Barrow 13, running from the centre of the barrow to beyond its outer edge, which revealed that the barrow was of turf construction with an encircling ditch, dug after the turf stack had been formed. A burial pit was excavated from close to the centre of the barrow containing a cremation, probably contained within a fabric bag with a wooden handle, and an associated artefact assemblage. A single trench was excavated into Barrow 14, running across the centre of the monument and beyond its outer edges, which revealed that it consisted of a single ditch and external bank, with no internal mound. An oval pit and a post-hole were excavated close to the centre of the monument, the former containing a significant quantity of charcoal.

9. The fourth excavation was undertaken in April/May 2016 and involved the cutting of trenches into Barrows 8, 16 & 17. Barrow 8, initially thought to be a possible oval barrow or two conjoined bowl barrows, was revealed to be a single low bowl barrow placed upon a natural ridge. It was again of turf construction, with no encircling ditch. Under the turf stack, and probably to the north-west of its centre, a Collared Urn was found, placed within a pit only slightly larger than the urn itself. To the north of this a spread of burnt wood was found, also sealed beneath the barrow stack, which extended beyond the limits of the excavation. Barrows 16 & 17 were of similar dimensions and construction to one another, both consisting of a circular ditch of small diameter with low external bank and no internal mound. No features were found within the circle of their ditches, save for two shallow semi-circular scoops cut into the internal sides of the ditch of Barrow 17 and one in a similar location in Barrow 16. All three of these features contained a layer of charcoal at their base and, in addition, there was a significant quantity of further charcoal spread along the base of the ditch in Barrow 17.

OBJECTIVES

1. The overarching archaeological objectives of this project fall into four main categories: first, to clarify better the spatial extent of individual monuments; secondly to understand better their condition and the risks they are subjected to; thirdly to establish the constructional character and date of a variety of the monuments, including all of the five or six different types present; fourthly to piece together as full and as long as possible a palaeo-environmental history for their immediate environs and the local catchment. The recovery of burial deposits is not a primary objective of this project. However, we will be ready at all times to deal appropriately and responsibly with such remains should they be encountered in our excavations (see p.12 para. 6 below).

2. With specific reference to Barrows 9, 10 & 19 regarding the first objective, the excavation aims to clarify how much of the current profile of the monuments are a result of more recent slumping or damage and to establish their earlier form, in particular to determine whether Barrows 9 & 10 have indeed been significantly truncated and to establish the exact form of Barrow 19, about which Piggott himself was uncertain.

3. Barrows have frequently suffered past disturbance as a result of tree growth, animal damage and human action. The fact that these three factors can have a significant impact upon the monuments on the Heath has already been demonstrated in the case of all the bowl barrows excavated so far as part of this project (Barrows 8, 11, 14 & 18). Barrows 9 & 10 have probably suffered from more than just the growth of large trees on them. Barrow 9 lies on the edge of the cricket

pitch and it is probable that its north-western side has been significantly re-modelled. Barrow 10 appears to have been clipped by the road on the east side and has a stepped profile on the cricket-ground side. Barrow 19, like the other low ring-bank barrows located on the Heath, has been a victim of neglect and human disturbances. Whereas in the cases of Barrows 12, 16 and 17 this led to their almost complete disappearance, for Barrow 19 we suspect with more subtle modifications to its form. It is hoped that establishing its full dimensions, in particular the circuit of the ditch, which is currently the route of a footpath on two of its sides, will lead to improved management of its surviving sub-surface features. In addition, evidence will be sought for any former central tump.

4. Thirdly the constructional character and date of Barrows 10 & 19, and to a lesser extent 9, will be established by the cutting of continuous sections into or across the monuments. This will ensure not only that all the main structural components have been exposed for recording, but will also give prospects for the recovery of material for radiocarbon dating from key deposits. In addition, such sections will seek to meet the fourth objective by enabling the collection of a comprehensive series of palaeo-environmental samples from each of the barrow deposits.

5. In the case of Barrow 11 it is proposed to complete the excavation of the presumed burial found during the course of the first excavation; this could not be undertaken at the time given the agreed SMC and time constraints. By excavating the remaining parts of this nationally important burial context, we stand to be in a considerably better position regarding its interpretation.

EXCAVATION METHOD STATEMENT

Excavation

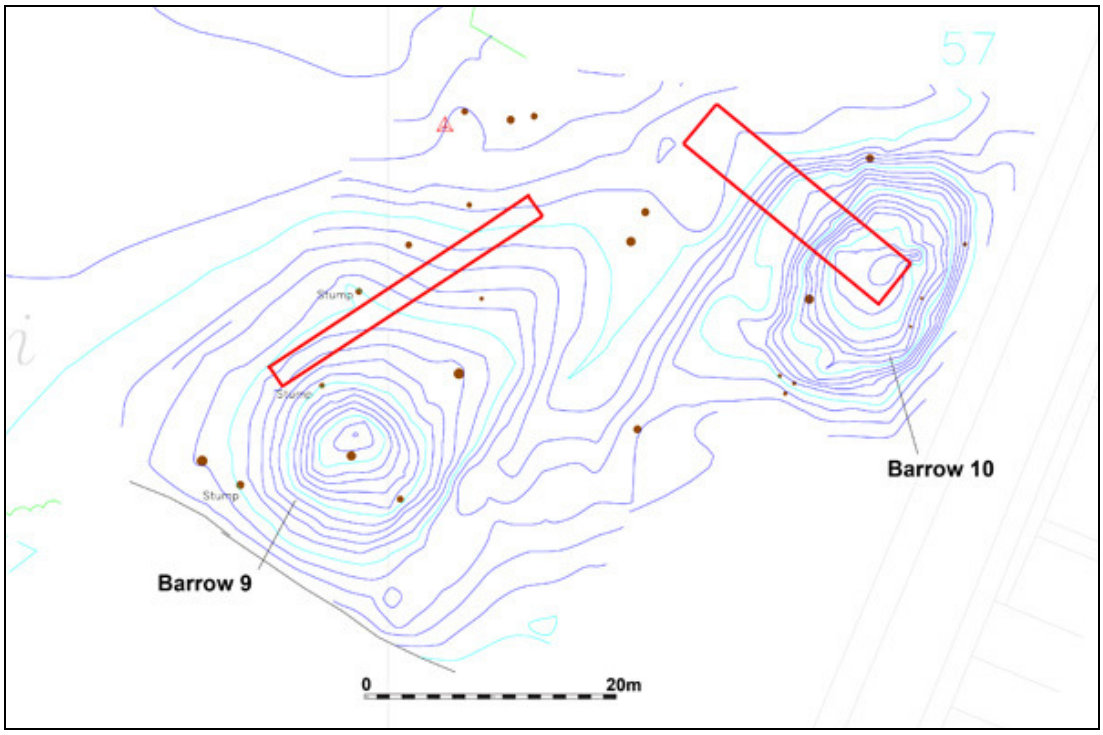

Figure 4 Plan of Barrows 9 & 10 showing the location of the excavation trenches in red, overlying the topographical survey. North is to the top of the image.

1. **Barrows 9 & 10**- In order to achieve the objectives set out above, two trenches will be archaeologically excavated, one into each monument. That into Barrow 9, being 25m long and 2m wide, has been positioned on the north-west side of the existing mound and extends to the outer limits of a low mound upon which it sits, to determine whether it has been truncated at this point. The trench into Barrow 10 will be 20m long and 4m wide, narrowing to 2m wide when/if a step is required due to depth, such that the sides of the trench will at no point exceed 1.2m deep. The position of this trench has been chosen in order to investigate the truncation on this side of the barrow, together with the linear depression which runs past both Barrows 9 & 10. A further contingency of 2m² of extra excavation will be allowed for both trenches, should a burial or other significant feature be exposed in either barrow which lies partially beyond the limits of the original trench. The dimensions of the trenches have been determined to give the best prospects for safety and manageability, to allow at the same time the observation of most annular features, and to keep the destruction of *in situ* deposits to a modest scale.

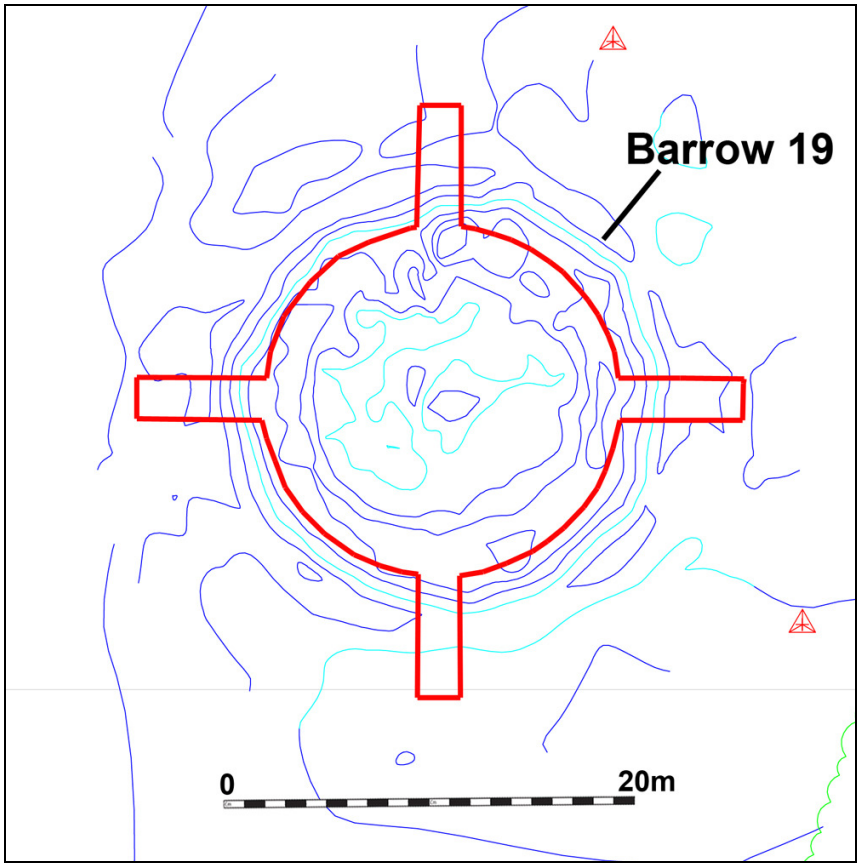

Figure 5 Plan of Barrow 19 showing the location of the excavation trenches in red, overlying the topographical survey. North is to the top of the image.

2. **Barrows 19** – Previous excavations into the ring-bank barrows carried as part of this project have found only a little evidence for internal activity within them. Altogether there are six sites which may fall within this category (Barrows 4, 12, 14, 16, 17 & 19), of which four have been investigated to date (Barrows 12, 14, 16 & 17), with only a handful of internal features recorded, none of which included any evidence for burials. It is possible, therefore, that this category of monument performed some other role than that of a burial site. In order to test this hypothesis it is necessary expose the entire Bronze Age ground surface within at least one of the ring-bank monuments in order to establish that there is indeed no burial, or likely burial pit, present. It is therefore proposed that the trench over Barrow 19 encompass the entire area within its defining bank and ditch, resulting in a trench of c.17m in diameter, with four extensions projecting 6m beyond this at the four cardinal compass points in order to provide sections across both bank and ditch (see Fig.7). These extensions will be 2m wide. The trench will be excavated in two phases, with two opposing quadrants of the circle taken down to the Bronze Age ground surface first, in order to provide two recordable sections across the monument, before the other two quadrants are removed and any revealed features excavated.

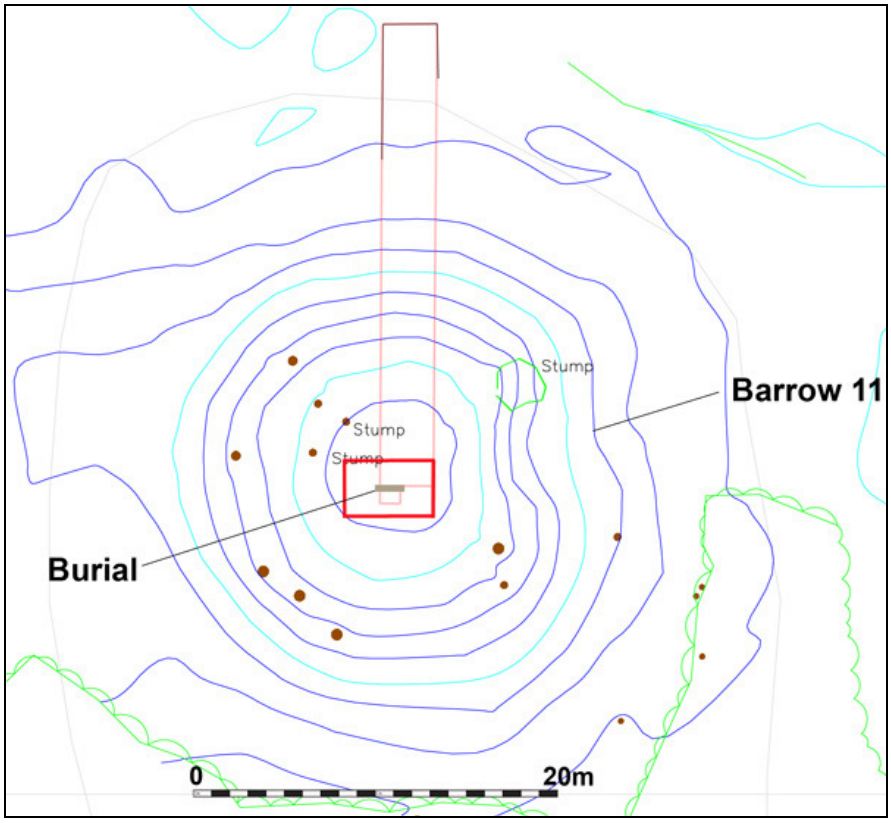

Figure 6 Plan of Barrow 11 showing the location of the excavation trench in red, overlying the topographical survey. The excavation trench from 2014 is shown in pink, with the location of the presumed burial context in brown. North is to the top of the image.

3. **Barrow 11** – The September 2014 excavation into Barrow 11 exposed an artefact assemblage recovered from the close to the centre of the barrow which is almost certainly related to a burial, although no human remains were encountered in the trench. Due to the fact that this discovery was made towards the very end of the excavation it was not possible to extend the trench beyond a limited addition of 1m², and therefore only part of the feature within which the artefacts were found could be investigated. It is therefore proposed to return and complete the excavation of the feature as a whole. In order to achieve this in a manner which makes due provision for the health and safety of those involved in its excavation, it is proposed to remove the top 0.7m of the barrow mound in an area 4m east-west and 3m north-south, this area incorporating part of the southern end of the former trench (see Fig.6). This will provide a step, at least 0.75m wide, between the edge of the feature and the trench baulk in all directions. For safety's sake, the step formed will not itself be used in the course of excavation, ingress and egress instead being via a ramp at 30° to the horizontal cut northwards into the backfill of the 2014 trench. The September 2014 excavations demonstrated that this upper 0.7m of the barrow mound material has been so disturbed by rooting, leaching and previously dug holes that the original mound is extremely fragmentary and its constituent turves almost invisible. The supposed burial feature was shown to be no more than 1.1m in depth below this level.

4. All excavation will be undertaken by hand by volunteers under the direction of George Anelay of West Sussex Archaeology Ltd, and the supervision of Ken Mordle and Stuart Needham. Re-instatement of the barrows following the completion of the excavation will be carried out by machine, ensuring that the current contours are retained.

5. All archaeological features within the trenches will be planned, recorded and fully excavated.

Recording

1. Details of the nature, extent and date (where possible) of archaeological contexts will be recorded upon sheets provided by West Sussex Archaeology Ltd.

2. Measured drawings (plans normally at 1:20, sections normally at 1:10) will be made ensuring that each context recorded is shown in at least one section and/or plan, including at least one section of each individual feature excavated. Special contexts such as a burial will be planned to larger scale (1:10 or 1:5).All trenches and drawings will be accurately related to the Ordnance Survey National Grid.

3. All non-modern artefacts will be recorded in 3D where their exact location is key to their understanding, for example where they have been deliberately deposited upon a buried surface or are in relationship with other significant artefacts or contexts.

4. Levels will be taken ensuring that each context recorded is related to Ordnance Datum.

5. Digital photographs will be taken in RAW format, showing a suitable scale, ensuring that each context recorded is shown in at least one image. All digital images will be stored on a CD-ROM and placed within the project archive, together with colour copies of all the images critical to archive interpretation printed on high quality photo paper in a stable format.

6. Should human remains be encountered during the course of this project, such remains will be left *in situ* until the Historic England Inspector of Monuments has been informed and been given the opportunity for a site visit to discuss and agree upon their treatment. A Ministry of Justice Licence has already been obtained for the removal of any such remains.

7. Any recovered artefacts falling within the scope of the Treasure Act 1996, and its extension of 2003, will be dealt with in accordance with its terms and reported to the Coroner within the time period specified.

Artefact Sampling

1. Artefacts will be retained where considered necessary in the light of their context and/or importance and until they have been assessed by a suitably qualified specialist. Where artefacts are discarded a record will be kept of their quantity and nature.

2. All artefacts recovered during the excavation will be processed according to current UKIC/Rescue guidelines as set out in First Aid for Finds, 1998, and to the standards of the museum with which they will be deposited.

3. All retained artefacts will be quantified by number and where appropriate by weight.

4. All retained artefacts, except those excluded on the grounds of size/material, will be marked with the site code.

5. All retained artefacts will be bagged and boxed in containers approved by the museum and sympathetic to their condition.

6. In cases where a more detailed analysis and/or conservation of finds is required for the understanding of individual contexts and the site as a whole, this will be carried out by staff from the Hampshire Cultural Trust, or by other suitably qualified specialists.

7. Should sensitive or fragile artefacts be revealed on site that require specialist treatment before they are lifted from the context within which they are found, such work will be carried out by or undertaken according to the advice of conservation specialists from Hampshire Cultural Trust, or by other suitably qualified specialists.

Environmental Sampling

Geoarchaeology (Dr Matthew Canti, Historic England)

1. A description of the palaeosol (buried land surface) and pedo-sedimentary sequence (barrow mound) using standard procedures within soil science will be made (e.g. Brady 1990).

2. Contiguous 1cm thick small bulk samples (50g each) will be obtained from an archaeological section from the base of the stratigraphic sequence underneath each barrow, including the buried land surface (palaeosols) to the top of the barrow mound (including turfs). These samples will be returned to the University of Reading and subject to organic matter, particle size, mineral chemistry and soil geochemistry:

3. **Organic matter content**. The organic matter content is determined by standard procedures involving: (1) drying the sub-sample at 110^{o}C for

12 hours to remove excess moisture; (2) placing the sub-sample in a muffle furnace at 550°C for 2 hours to remove organic matter (thermal oxidation), and (3) re-weighing the sub-sample to obtain the 'loss-on-ignition' value (see Bengtsson and Enell 1986).

4. **Particle size analysis**. Prior to particle size distribution analysis by laser granulometry (range 0.01-2000 microns) a representative sample is gathered from the main sample. This is then mixed with a spatula to form a homogenous 'paste'. A subsample is placed on a plastic watchglass and a weak dispersant solution (c. 0.5ml 3.3% Calgon) is added in order to aid dispersion of the material (Blott *et al* 2004). Physical disaggregation on a clean watchglass with a rubber pestle is carried out. Any particles observed to be greater than 2mm are removed. The sample is then washed with distilled water into the analyser. Particle size distribution measurements for particles falling within the size range 0.01 to 2000 microns is measured by laser granulometry using a Malven Mastersizer 3000.

5. **Mineral chemistry.** Sub-samples are taken and air dried at 40°C to remove moisture content, this is then crushed to pieces of roughly 3mm in size using a pestle and mortar. The crushed sample is then ground in an agate mill. Randomly oriented sample mounts are prepared from the powder by the method of front-faced riffle packing into plastic cavity holders (plastic squares with a raised circular rim 25mm diameter, 2mm deep cavity). A small amount of powder is placed in the cavity and a glass slide held at 45 degrees to the vertical is used to repeatedly cut down on the surface, to create a 'riffle'. The surface is riffled 10-12 times while rotating the cavity mount to produce a cake of powder in the cavity with loose material on top and around it. Some of the loose material is then tapped off with the cavity mount held vertically. The riffling and tapping off is repeated as necessary, reducing the amount of extra material on the surface of the powder cake until it is a flat, level cake of powder. Mineral identification is undertaken on the XRD patterns produced, with reference to the ICDD Powder Diffraction File, to determine the significant x-ray crystalline mineral phases present in the sample. The ICDD is the International Centre for Diffraction Data - http://www.icdd.com/ - the main body that collates and publishes x-ray diffraction data from a wide range of mineralogical and standards groups. The data is published as a searchable electronic database and as search and match and alphabetical indexes in book form. Quantification of the relative mass percentages of the identified x-ray crystalline mineral phases is done using the method of H-factors (Hooton and Giorgetta, 1977) to give approximate relative mass percentages of the x-ray crystalline minerals identified.

6. **Soil chemistry.** Samples are air dried at 40°C and sieved with a 2mm mesh to remove large gravel clasts. Prior to acid digestion, the samples are ground in an agate bowl mill for ten minutes to homogenise the sediment and obtain a fine powder. 1.5g of material from each sample,

one certified reference material and three blanks are digested in Aqua Regia, to BS Standard, using the following summarised method: (1) transfer the samples to a 100ml Kjeldahl digestion tube and add 4 glass balls to each tube; (2) add 10.5ml of concentrated AnalaR hydrochloric acid to each tube, followed by 3.5ml concentrated AnalaR nitric acid; (3) ensure the acid and soil are mixed, fit a glass bubble to each tube and leave to stand overnight in a fume cupboard; (4) place the tubes in the digestion block and heat cautiously to 50°C, once any reaction has subsided gradually increase the temperature to 140°C, digest the samples at this temperature for 2-2.5 hours; (5) prewash no. 540 12.5cm diameter filter papers with a few ml of 0.5M nitric acid and discard that filtrate; (6) wash each glass bubble into the digestion tube with a few ml of 0.5M nitric acid, transfer the digest to a prewashed filter paper and filter into a 100ml volumetric flask; (7) once the solution has filtered, rinse the digestion tube with a few ml of 0.5M nitric acid and transfer the washing to the filter paper; (8) allow to filter into the flask; (9) repeat this rinsing of the digestion tube several times and also ensure that the filter paper is well washed; (10) make each volumetric flask up to the mark with 0.5M nitric acid; (11) the solution is diluted with ultra-pure water before running them on the ICP. Major elements are determined using an ICP-OES Perkin Elmer Optima 7300, trace elements are determined using an ICP-MS Thermo scientific ICAP-Q. The results of the multi-element analysis are expressed in mg M/kg soil.

7. **Soil micromorphology.** Samples for soil micromorphology (Kubiena tins) will be obtained from an archaeological section from the base of the stratigraphic sequence underneath each barrow, including the buried land surface (palaeosols) to the top of the barrow mound (including turfs). The procedure followed is the University of Reading standard protocol for thin section preparation. Samples are oven-dried to remove all moisture and then impregnated with epoxy resin while under vacuum. The impregnated samples are then left overnight so that the resin can enter all of the pores. The samples are then placed in an oven to dry for 18 hours at 70˚C before they are clamped and cut to create a 1cm slice through the sample. The surface of the 1cm slice is flattened and polished by grinding on the Brot. The prepared surface of the 1cm slice is then mounted onto a frosted slide and left to cure. This is followed by cutting off the excess sample, so the sample is down to a thickness of 1-2 mm. The mounted sample is ground down to approximately 100 µm in thickness using the BROT. This 100 µm section is then lapped on a Logitech LP30 precision lapping machine to the standard geological thickness of 30 µm. The samples are then cover slipped ready for analysis. Micromorphological investigation is carried out using a Leica DMLP polarising microscope at magnifications of x40 - x400 under Plane Polarised Light (PPL), Crossed Polarised Light (XPL), and where appropriate Oblique Incident Light (OIL). Thin-section description is conducted using the identification and quantification criteria set out by Bullock *et al* (1985)

and Stoops (2003), with reference to Courty *et al* (1989) for the related distribution and microstructure, Mackenzie & Adams (1994) and Mackenzie & Guilford (1980) for rock and mineral identification, and Fitzpatrick (1993) for further identification of features such as clay coatings. Tables of results use the descriptions, inclusions and interpretations format used by Matthews (2000) and Simpson (1998). Micropictographs were taken using a Leica camera attached to the Leica DMLP microscope. Micromorphology enables the following properties to be examined at magnifications of x40 - x400 under PPL, XPL and OIL: thickness, bedding, particle size, sorting, coarse:fine ratio, composition of the fine material, groundmass, colour, related distribution, microstructure, orientation and distribution of inclusions, the shape of inclusions, and finally the inclusions to be identified and quantified. In addition, post-depositional alterations can be identified and quantified such as: effects on the microstructure by mesofaunal bioturbation and cracking due to shrink-swell of clays or trampling; translocation of clays and iron; chemical alteration such as the neoformation of minerals such as vivianite and manganese; organic staining as a result of decayed plant material; and excremental pedofeatures such as insect casts and earthworm granules.

Palynology (Dr Nicholas Branch)

1. Contiguous 1cm thick small bulk samples (50g each) will be obtained from an archaeological section from the base of the stratigraphic sequence underneath each barrow, including the buried land surface (palaeosols) to the top of the barrow mound (including turfs). These samples will be returned to the University of Reading and subject to pollen, microscopic charred particle (MCP) and non-pollen palynomorph (NPP) analysis.

2. Initially sixteen samples will be analysed to produce a skeleton pollen (counts of 300-500 total land pollen (trees, shrubs and herbs)), MCP and NPP (counts of 100-150 spores) diagram.

3. The pollen, MCP and NPP will be extracted using standard laboratory methods employed at the University of Reading, namely adding *Lycopodium* spores of a known concentration, dispersion in 1% sodium pyrophosphate, sieving through 10µm and 150µm, acetolysis to remove unwanted organic matter, and flotation using sodium polytungstate (2g/cm^3) to remove mineral matter (Branch et al., 2005). Identifications will be made using Moore et al (1991) and Reille (1992); plant taxonomy follows Stace (1997). The pollen, NPP and microscopic charred particle data will be presented as a %, concentration (grains/cm^3) and influx (grains/cm^2/year), and zonation and data mining assisted with the use of CONISS and PCA/DCA (Juggins, 2003).

Project Archive

1. The project archive will be prepared according to the standards set out in the following documents:

    - Historic England's *MoRPHE Project Planning Note 3: Archaeological Excavation*. Appendix 1.
    - Chartered Institute for Archaeologists' *Standard and Guidance for Archaeological Excavation*.
    - Hampshire County Council's Museums & Archives Service Archaeology Section's *Depositing Archaeological Archives*

2. The project archive shall be deposited with Hampshire Museum Cultural Trust, with title transferred to the Museum subject to the agreement of the landowner. An accession number will be obtained from the Trust.

Project Report

1. An interim report will be written on the excavation detailing what was found, with appropriate illustrations, and analysing the remains in relation to the stated aims of the project, according to the standards set out in the following documents:

    - Historic England's *MoRPHE Project Planning Note 3: Archaeological Excavation*.
    - Chartered Institute for Archaeologists' *Standard and Guidance for Archaeological Excavation*.

2. Copies of this interim report will be distributed to the project's Advisory Committee, which includes representatives from Chichester District Council's Archaeological Service, Historic England, Hampshire County Council's Archaeological Service, Hampshire Museum Cultural Trust and the South Downs National Park.

3. A final report on the excavation will be included with the published monograph to be produced at the end of the project in 2018.

Monitoring

1. The project will be monitored by the David Wilkinson, Inspector of Ancient Monuments, Historic England, or his nominated representative, who will ensure that the objectives and methodology laid out in this document are met. The timing of this monitoring will be agreed with David Wilkinson.

Resources

1. This project will be directed by George Anelay of West Sussex Archaeology Ltd, with expert advice being provided by Dr. Stuart Needham, using ten local volunteers in each trench. In addition an experienced supervisor, Ken Mordle, will be present to carry out the day-to-day instruction and supervision of the volunteers alongside George Anelay.

2. The following specialists shall be used:
   - Prehistoric ceramics & metal artefacts – Dr. Stuart Needham
   - Palaeoenvironmental sampling – Nick Branch, University of Reading & Matt Canti, English Heritage
   - Worked flint – Anthony Haskins

3. All equipment necessary for the carrying out of this project will be provided by West Sussex Archaeology Ltd.

4. West Sussex Archaeology Ltd. holds up to date certificates for all the necessary insurances for the carrying out of this project, including £5m public liability insurance and £2m professional indemnity insurance.

5. All staff of West Sussex Archaeology Ltd. shall at all times observe the requirements of the relevant by-laws of the Institute of Field Archaeologists.

6. All statements and opinions are offered in good faith; but West Sussex Archaeology Ltd. cannot accept responsibility for errors of fact or opinion resulting from data supplied by a third party, or for any loss or other consequence arising from decisions or actions made upon the basis of facts or opinions expressed in this document.

7. All parties shall agree to the terms of this Written Scheme of Investigation in writing before the commencement of any fieldwork.

Timetable

1. The excavation of these trenches will take place over a period of 5 weeks from Monday 28th August – Friday 30th September 2016. The interim report will be completed within four calendar months of the completion of the fieldwork.

2. The programme given above shall be adhered to as closely as possible, but West Sussex Archaeology Ltd. accepts no responsibility for delays caused by another party or by adverse weather conditions which can reasonably be proven to have rendered the continuation of works unfeasible.

Health and Safety

1. All staff of West Sussex Archaeology Ltd. shall at all times observe the requirements of the relevant Health and Safety Acts, Regulations and Codes of Practice applying to their particular activity.

2. Should it prove necessary under such laws and regulations, Risk Assessments will be drawn up in advance of any fieldwork commencing.

3. The need for the shoring, battering back or stepping of the sides of the trenches will be determined by George Anelay (deemed to be the "competent person") taking into account ground conditions, groundwater conditions, weather conditions, nature of work to be undertaken, how long the work will take and adjacent structures. However should the depth of trenching exceed 1.2 metres there is a presumption that the trench sides will need to be shored, battered back to a suitable angle or the trench sides 'stepped' to allow for a working area at the base which is safe to work. It is anticipated that the trench into Barrows 10 & 11 will be stepped on the ratio that for every metre depth a 1m wide step will be required.

4. Should such measures need to be taken then they will carried out in accordance with The Construction (Design and Management) Regulations 2015 (Part 4 Section 22 - Excavations) and HSG 150 (Health & Safety in Construction, paras 341-365 – Excavations).

5. No volunteer will enter the trench/area if it is declared unsafe by the competent person until suitable safety measures have been put in place.

6. Should shoring be required then it will be constructed of timbering and props, with guard rails to prevent falls, with extended vertical timbers to act as toe boards. Safe access will be provided by a tied ladder should this be necessary. Such shoring will be inspected by the competent person at the beginning of each day or after any event which may have affected the strength of the shoring, or any unintentional falls of material or equipment.

BIBLIOGRAPHY

Bengtsson, L. & Enell, M. (1986) Chemical Analysis. In (Berglund, B.E. ed.) *Handbook of Holocene palaeoecology and palaeohydrology,* 423-451. Chichester: John Wiley and Sons.

Blott, S, Croft, D.J, Pye, K, Sayene, S.E, and Wilson, H.E. (2004) Particle Size Analysis by Laser Diffraction. *Forensic Geoscience: Principles, Techniques and Applications* **232**, 63-73.

Brady, N.C. (1990) *The Nature and Properties of Soils.* New York: Macmillan.

Branch, N.P., Canti, M.G., Clark, P. and Turney, C.S.M. (2005) *Environmental Archaeology, Theoretical and Practical Approaches*. London: Arnold.

Bullock, P., Fedoroff, N., Jongerius, A., Stoops, G. and Tursina, T. (1985) *Handbook for thin section description.* Wolverhampton: Waine Reasearch.

Courty, M.A., Goldberg, P. and Macphail, R. (1989) *Soils and micromorphology in archaeology.* Cambridge: Cambridge University Press.

English Heritage. 2008. *MoRPHE Project Planning Note 3: Archaeological Excavation*.

FitzPatrick, E.A. (1993) *Soil microscopy and micromorphology*. Chichester : Wiley

Grinsell, L.V., (1939) Hampshire Barrows: part II. *Proceedings of the Hampshire Field Club and Archaeological Society* **14**, 195-229

Hooton, D.H. & Giorgetta, N.A. (1977) Quantitative X-Ray Diffraction Analysis by a Direct Calculation Method. *X-Ray Spectrometry* **6(1)**, 2-5.

Institute of Field Archaeologists. 1999. *Standard and Guidance for Archaeological Excavation*. IFA.

Institute of Field Archaeology. 1997. *Code of Conduct*. IFA.

Juggins, S. (2003) *C2 user guide. Software for ecological and palaeoecological data analysis and visualisation.* University of Newcastle, Newcastle upon Tyne.

Mackenzie, W.S. and Adams, A.E. (1994) *A Colour Atlas of Rocks and Minerals in Thin Section.* New York: John Wiley and Sons.

Mackenzie, W.S. and Guilford, C. (1980) *Atlas of Rock Forming Minerals.* Harlow: Longman Group Ltd.

Matthews, W. (2000) Micromorphology of occupation sequences. In R. Matthews and J.N. Postgate (eds), *Contextual analysis of use of space at two Bronze Age sites.* http://ads.ahds.ac.uk/catalogue

Moore, P.D., Webb, J.A. and Collinson, M.E. (1991) *Pollen Analysis*. Oxford: Blackwell Science.

Reille, M. (1992) *Pollen et Spores d'Europe et d'Afrique du Nord.* Marseille: Laboratoire de Botanique Historique et Palynologie.

Simpson, I. (1998) Early Land Management at Tofts Ness, Sanday, Orkney: the evidence of thin section micromorphology. In C.M. Mills and G. Coles (eds.), *Life on The Edge: human settlement and marginality.* Oxford: Oxbow.

Stace, C. (1997) *New Flora of the British Isles*. Cambridge: Cambridge University Press.

Stoops, G. (2003) *Guidelines for Analysis and Description of Soil Thin Sections.* Madison: Soil Science Society of America.

Watkinson, D. & Neal, V. 1998. *First Aid For Finds*. Rescue/UKIC.

West Sussex Archaeology Ltd 2015 *Report on the Archaeological Excavation of Barrow 11, Petersfield Heath, Petersfield, Hampshire.* Unpublished.

West Sussex Archaeology Ltd 2016 *Report on the Archaeological Excavation of Barrows 12, 13, 14, 18 & 21, Petersfield Heath, Petersfield, Hampshire*. Unpublished.