

The National Mapping Programme

New Forest Remembers

Results of NMP Mapping



Historic Environment (Projects)

New Forest Remembers Mapping Project

Results of NMP Mapping

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The views and recommendations expressed in this report are those of Historic Environment Projects and are presented in good faith on the basis of professional judgement and on information currently available.

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Cover illustration

Ashley Walk Bombing Range, Godshill. Photograph: RAF CPE/UK/2038 Frame 4140 27th April 1947 English Heritage RAF photography

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Abbreviations

ADS	Archaeology Data Service
AerSI	Aerial Survey and Investigation, English Heritage
AHBR	Archaeology and Historic Building Record
ALGAO	Association of Local Government Archaeological Officers
ALSF	Aggregate Levy Sustainability Fund
AMIE	English Heritage Archives and Monuments in England Database
CC	Cornwall Council
CUCAP	Cambridge University Committee for Aerial Photography
DSM	Digital Surface Model
DTM	Digital Terrain Model
EA	Environment Agency
EH	English Heritage
EHA	English Heritage Archive
GIS	Geographical Information System
HBSMR	Historic Buildings and Site and Monuments Record
HCC	Hampshire County Council
HER	Historic Environment Record
HLC	Historic Landscape Character

LIDAR	Light Detection and Ranging
MOD	Ministry of Defence
MPP	Monuments Protection Programme
NFNP	New Forest National Park
NFNPA	New Forest National Park Authority
NFR	New Forest Remembers
NMP	National Mapping Programme
NRHE	National Record for the historic Environment
OASIS	On-line Access to the Index of Archaeological Investigations
OS	Ordnance Survey
PDF	Portable Document Format
PGA	Pan Government Agreement
RCHME	Royal Commission on the Historical Monuments of England
RCZA	Rapid Coastal Zone Assessment
UID	Unique Project Identifier
ULM	Cambridge University Unit for Landscape Modelling
WCC	Wiltshire County Council

1 Summary

Created as a Royal Forest by William I soon after the Norman Conquest, the New Forest today includes the largest remaining tracts of unenclosed pasture land, heath and forest in south-east England, covering south-west Hampshire and extending into south-east Wiltshire.

This report outlines the results of an archaeological survey involving the systematic interpretation, mapping and recording of archaeological sites from aerial photographs and lidar data across 400 square kilometres within the New Forest National Park (NFPN). The analytical aerial survey was carried out using English Heritage's National Mapping Programme (NMP) methodology (AerSI 2010). Historic Environment, Cornwall Council carried out the project between January 2012 and November 2012. The project was commissioned by the New Forest National Park Authority (NFPNA) as part of the New Forest Remembers Project and funded through the National Lottery Heritage Lottery Fund.

The primary aims of the project were to produce an NMP standard geo-referenced digital transcription of the form and extent of all archaeological features visible on aerial photographs and lidar data; to create NMP standard monument records of all archaeological sites mapped and to supply the above in a form suitable for use in the NFPNA project database, the county Historic Environment Records (HER) (Hampshire Archaeology and Historic Buildings Record (AHBR) and the Wiltshire Historic Buildings Sites and Monuments Record (HBSMR)) and the English Heritage (EH) national database (AMIE).

The project provided a significant enhancement to existing baseline data through the mapping, interpretation and recording of 4316 archaeological sites of which 3823 (89%) were new sites, previously unrecorded in the HERs or AMIE. Ninety four percent of all sites mapped were recorded as earthworks or partially extant earthworks and extant structures. This is a very high proportion and is related to the availability of blanket lidar cover for the project area: it is estimated that over 90% of sites plotted were visible or partially visible on the lidar.

No of Neolithic or earlier date were identified. Bronze Age round barrows were the most common type of prehistoric monument encountered with 226 being recorded, 25 of which were new to the record. The most significant new discovery was a group of eight barrows under trees at Horse Down, Redlynch. The barrows, which range from 5m to 9m across, were only visible on the lidar digital terrain models (DTM).

Sixty six sites were assigned an Iron Age, Prehistoric or Roman date of which 40% were new to the record. Types of new sites attributed to these periods included six field systems, nine groups of field boundaries and four enclosures.

The early medieval period is still poorly understood with only five potential sites identified during the mapping all of which had been previously recorded. The later medieval period is however more richly represented with 56 sites allocated a specifically medieval date. Significant new sites include the identification of a possible hunting lodge at East Boldre. Of the seven deserted or shrunken villages identified, three were previously unrecorded in the county HERs.

The greatest numbers of sites recorded were post medieval with 1865 sites attributed to this period. This is a period that has, up until recently, had comparatively less archaeological survey and field investigation than other periods. The current project is perhaps first to systematically record post medieval and early twentieth century sites; this is reflected in the fact that 96% of sites attributed to this period encountered were new to the record.

The recording of twentieth century military sites, particularly using the RAF vertical photographs taken during and soon after the Second World War, proved highly informative with many significant sites being recorded for the first time. Given its role as a training area and its strategic location on the south coast, the New Forest played a significant role in both World Wars and the extensive remains of military installations have been recorded throughout the area.

This report describes the extent of the project area; the methodology used and gives an illustrative overview of the results of the aerial survey on a period by period basis.

2 Background to the New Forest Remembers Project

2.1 Circumstances of and reasons for the project

Whilst the New Forest is recognised for its wildlife and heritage landscape, the important role it played in World War II is less well-known. Being relatively unpopulated and with wide tracts of both open heathland and forestry, it provided an ideal location for military training. Its strategic position close to the south coast made it crucial in a range of military operations and home to a wide range of military installations as well as the storage of supplies and equipment. Whilst some of the installations are still visible today, many were of only a temporary nature and were removed within only a few years of the war ending or they have since been obscured or destroyed by subsequent land management activities.

It was recognised by the NFNPA that “...that the current archaeological records provide details of only a small proportion of the actual sites and artefacts that are present in the Forest. Similarly, at present there is a wealth of untapped information about the World War II activities in the memories of those who were living in the New Forest at the time, whether they be evacuees, local residents, or military personnel either from this country or from abroad. These people are now reaching their 80s and 90s and so it is critical to capture these memories during the next few years, to ensure that they can inform the understanding of future generations” (NFNPA, 2012).

The New Forest Remembers (NFR) project was set up to address the lack of survey work, knowledge and understanding about the New Forest's role in the Second World War. It aims to bring the war years alive for a wide range of people including residents, visitors, school children and community groups, offering a wide range of volunteering opportunities for those who might wish to be further involved. In addition, data from the project will address the current lack of information in the Hampshire AHBR relating to the military use of the NFNP.

The NFR project is proceeding in four phases. Phase 1 comprised a desk-based assessment of the New Forest area as a precursor to the larger field survey element of the project. This NMP project formed a key element of the Phase 1 assessment. The methodology required for the review of aerial imagery is that currently used by English Heritage's NMP (AerSI 2010), modified where necessary to meet the specific needs of the NFR project.

Although the NFR project is specifically concerned with the Second World War heritage of the New Forest, the remit of the NMP includes all archaeological and historic sites dating from the Neolithic period to the mid-twentieth century. This NMP project therefore involved the mapping and recording of all visible archaeological features from this wide date range and thereby meets the specific needs of the NFR project as well as fulfilling the requirements of the wider NMP in England.

The NMP element is only one part of the NFR Phase 1 work and as such this report is a stand-alone document as required by English Heritage for all NMP projects. It provides a brief summary of the results of the aerial survey and mapping but does not include data from other desk-based elements as used in Phase 1 of the wider NFR project.

2.2 Overview of NMP methodology

The NMP was initiated by the Royal Commission on the Historical Monuments of England (RCHME) in 1992. The aim of the NMP is ‘to enhance our understanding about past human settlement, by providing information and syntheses for all archaeological sites and landscapes (visible on aerial photographs) from the

Neolithic period to the twentieth century' (Bewley 2001, 78). To achieve this aim a methodology was developed from previous selective approaches to mapping from aerial photographs (e.g. Benson and Miles 1974). The guiding principle of the methodology is 'to map, describe and classify all archaeological sites recorded by aerial photography in England to a consistent standard' (English Heritage 2010).

The NMP applies a systematic methodology to the interpretation and mapping of archaeological features visible on aerial photographs (English Heritage 2010). This includes not only recording sites visible as cropmarks and earthworks but also structures, such as those relating to twentieth century military activities. This comprehensive synthesis of the archaeological information available on aerial photographs is intended to assist research, planning and protection of the historic environment.

The New Forest Remembers Mapping Project followed standard NMP methodology and involved the systematic examination of all easily accessible aerial photographs from the English Heritage Archive (EHA), and HCC. Lidar data recently commissioned by the NFNPA formed a primary source for the project; large areas of the National Park being under tree-cover and therefore the ground surface not being visible on conventional aerial photographs. Archaeological features were digitally transcribed using the AERIAL (Version 5.29) rectification programme and AutoCAD Version Map3D 2012. Each archaeological site was recorded in Cornwall Council's NMP Sites and Monuments Record (HBSMR) database.

Full details of the project methodology are contained in Appendix 1.

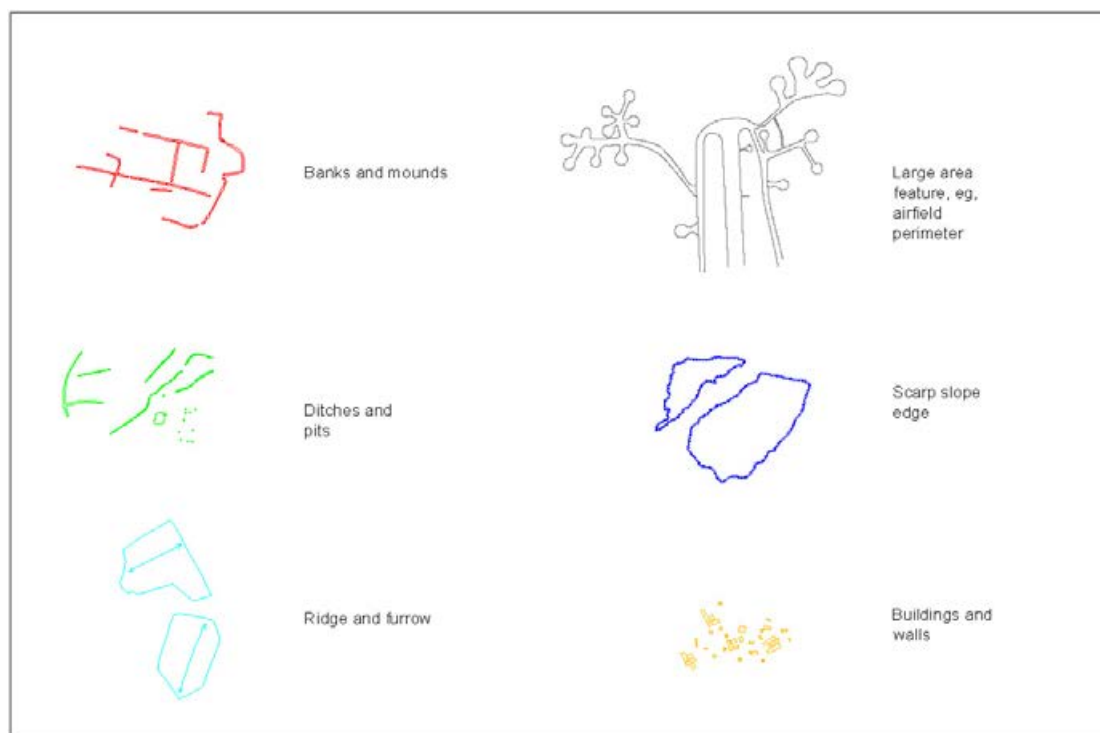


Figure 1. Conventions used on New Forest Remembers NMP maps.

3 Aims and objectives

The overarching aim of the National Mapping Programme is

'to enhance our understanding about past human settlement, by providing information and syntheses for all archaeological sites and landscapes (visible on aerial photographs) from the Neolithic period to the twentieth century' (Bewley, 2001, 78).

Further aims and objectives specific to this project are set out below:

1. To produce an NMP standard geo-referenced digital transcription of the form and extent of all archaeological features visible on aerial photographs and lidar data for the project area.
2. To create NMP standard monument records with the location, indexed classification, archaeological description and analysis, and main sources of all archaeological sites visible on aerial photographs and lidar data for the project area.
3. To incorporate or supply the above NMP data in a form suitable for use in the NFNPA project database, the Hampshire AHBR, the Wiltshire HBSMR and the National Record for the Historic Environment (NRHE)
4. To provide a report on the NMP mapping of the project area with an overview of methodology, sources, and archaeological highlights to assist the assessment of the wider NFR project area and inform future NMP projects.

3.1 Objectives

These aims were achieved through the following objectives

1. Digital mapping of the archaeological landscape within the New Forest to current standards adopted by NMP.
2. Production of baseline data and its incorporation into New Forest Remembers desk-based assessment project database and GIS.
3. Incorporation of the baseline data into the Hampshire AHBR and Wiltshire HBSMR to inform strategic and management decisions.
4. Publication and dissemination of the results of the project to raise awareness of the historic environment.
5. Integration of the data resulting from the project into the NRHE database (AMIE – Archives and Monuments in England).

4 The project area

The New Forest National Park was constituted in 2005 and covers an area of 570 square kilometres. A small portion of the National Park lies in southern Wiltshire; otherwise it is contained within the county of Hampshire.

NMP mapping had already been carried out in parts of the National Park – along its coastal areas and its western fringes – as part of Archaeological Resource Assessments funded through the Aggregates Levy Sustainability Fund (ALSF). The results of these projects (Young 2008; Trevarthen 2010) demonstrate that there is much potential for further archaeological survey.

Mapping of complete 1:10,000 OS quarter map sheets is desirable for NMP projects but not mandatory. Therefore in the case of the NFR, the project area included all those parts of the NFNP not already mapped plus a buffer zone comprising complete OS one kilometre squares. Taking account of the areas of the National Park already mapped, the NMP project area amounted to 400 square kilometres, including 363 within Hampshire and 37 in Wiltshire (Figure 2). This was the equivalent of 16 1:10,000 OS quarter map sheets.

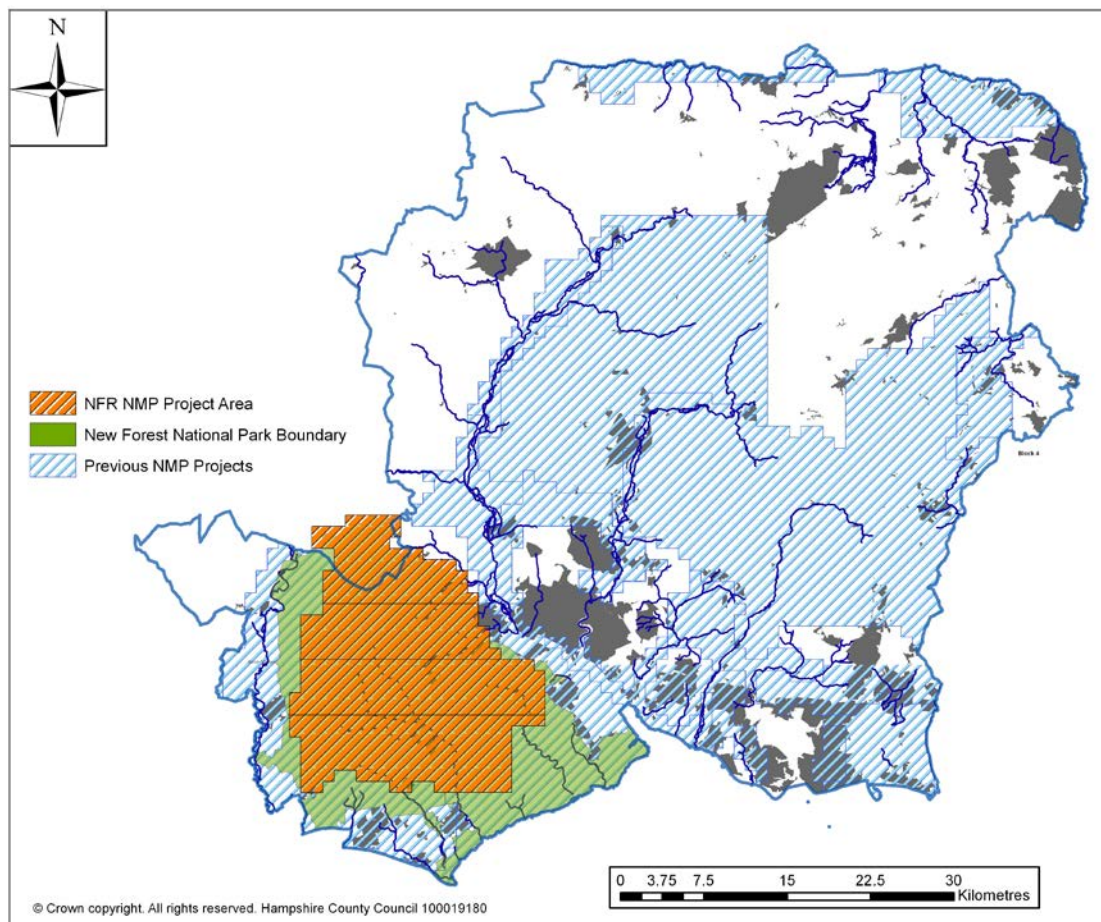


Figure 2. Map of Hampshire showing the NFR NMP project area and the extent of previous NMP projects.

New Forest National Park area shown in green

4.1 Archaeology of the New Forest

The New Forest is a unique and nationally important landscape. Important assemblages of archaeology reflect the evolution of this landscape and there are 155 scheduled monuments in the New Forest Crown Lands.

Palaeoenvironmental evidence suggests that the formation of the New Forest heaths began as early as the Mesolithic period, but was accelerated by woodland clearance and agriculture during the Bronze Age (Smith 1999, 6). However, although the project area is known to contain a large number of Bronze Age barrows and numerous boiling/burnt mounds, there is currently little trace of settlement from this period.

The northwest part of the project area is the location for the nationally important Roman pottery industry, but apart from this few Roman sites have been identified. Little is known from the Iron Age other than a handful of hillforts, and few sites are known from pre-Bronze Age prehistory.

The New Forest was established as the King's hunting forest shortly after the Norman Conquest in 1066. Its history as a Royal Forest is evidenced by the remains of park pales, hunting lodges and numerous woodland management features such as boundary and coppice banks. In the post medieval period woodland and heathland exploitation has produced the characteristic remains of Inclosure earthworks and bee gardens (small stock-proof enclosures protecting groups of hives).

The New Forest was an important location during both the First and Second World Wars. Although many features associated with these conflicts do survive, few were recorded in Hampshire's AHBR or the Wiltshire HBSMR prior to this current project or through the Defence of Britain Project.

In conclusion, despite its unique assortment of woodland features and a number of sites of national importance the archaeological resource of much of the New Forest is, for some periods, poorly researched and understood, certainly when compared with other parts of Hampshire and Wiltshire.

4.2 Previous work

A major programme of field survey carried out by the RCHME in the late 1990s focused primarily on known earthwork sites, although a number of previously unmapped sites were surveyed (Smith 1999, 2-3). Most other recent work in the New Forest has focused on the Roman pottery industry and on the Bronze Age barrows as part of English Heritage's Monuments Protection Programme (MPP).

Previous NMP mapping has been carried within the New Forest funded by English Heritage under Objective 2 of the Aggregates Levy Sustainability Fund. The eastern banks of the Avon Valley and New Forest coastal plain up to Lymington were mapped between March 2006 and March 2008 as part of the Aggregate Landscape of Hampshire NMP project (EH Project Number 4766) (Young 2008). The coastal plain east of Lymington and the western banks of Southampton Water were mapped in 2009 during the Hampshire Aggregate Resource Assessment (EH Project Number 5783) (Trevarthen 2010) which fed into the Rapid Coastal Zone Assessment (RCZA).

4.3 Working blocks

To facilitate project management the area was divided into four 'blocks' each consisting of a number of whole or partial OS quarter map sheets. For simplicity the blocks were defined as four east - west transects shown in Figure 2.

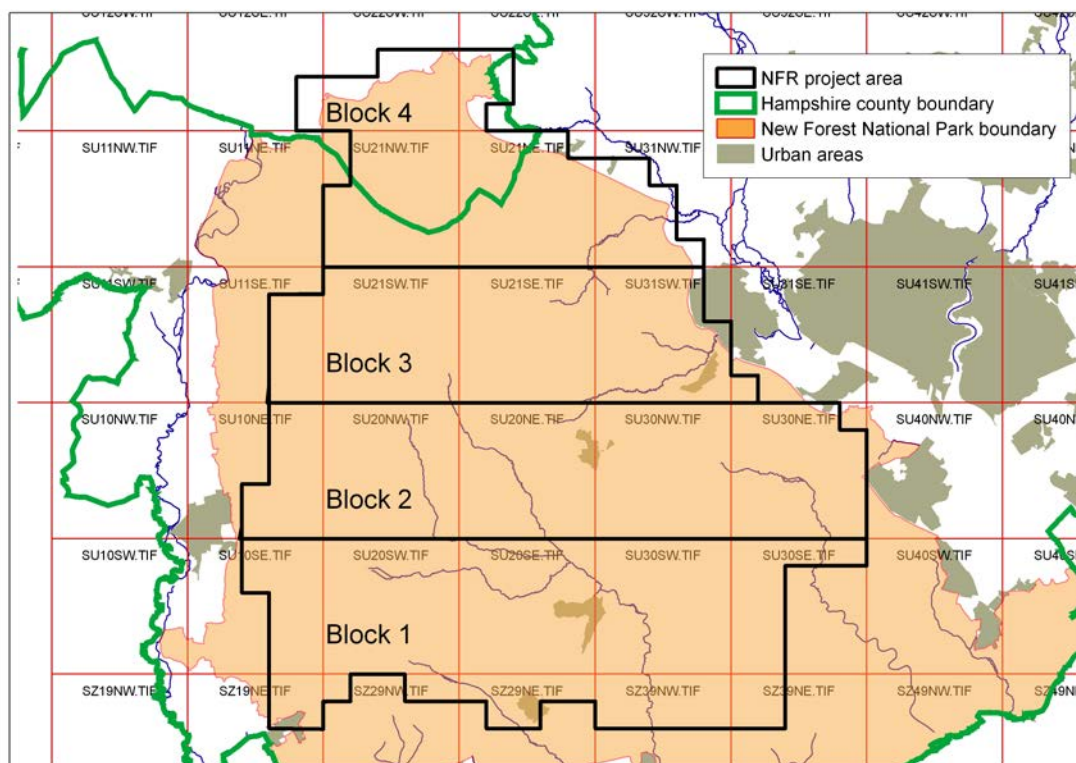


Figure 3. Map of the project area showing the four working blocks.

Block 1. Bransgore, Burley, Brockenhurst and East Boldre

Block 1 is the largest of the four, covering 128 square kilometres. It includes the settlement of Brockenhurst and is dissected by the River Lymington and its major tributaries. It includes three complete OS 1:10,000 quarter map sheets – SU20SW, SU20SE, and SU30SW as well as parts of seven other map sheets – SU10SE, SU30SE, SZ19NE, SZ29NW, SZ29NE, SZ39NW and SZ39NE.

Block 2. Denny Lodge, Lyndhurst, Ellingham, Harbridge and Ibsley

Block 2 covers 111 square kilometres and includes the settlement of Lyndhurst. It includes three complete OS 1:10,000 quarter map sheets – SU20NW, SU20NE and SU30NW as well as parts of two other map sheets – SU10NE and SU30NE.

Block 3. Hyde, Minstead and Ashurst

Block 3 is the smallest block. It covers 79 square kilometres and includes the settlement of Ashurst. It includes two complete OS 1:10,000 quarter map sheets – SU21SW and SU21SE as well as parts of two other map sheets – SU11SE and SU31SW.

Block 4. Coptthorne, Bramshaw and South Wiltshire

Block 4 covers 82 square kilometres and includes part of south Wiltshire. It includes no complete OS 1:10,000 OS quarter map sheets but does include parts of six map sheets – SU21NW, SU21NE, SU31NW, SU12SE, SU22SW and SU22SE.

4.4 Landscape and Geology of the project area

The NFNPA covers 566km², within which the New Forest SSSI covers almost 300km². Its unique landscape of ancient woodland, modern plantation, heathlands, valley bog and grassland is the largest remaining of lowland heath in Europe (NFNPA, 2012a). The Forest lies mainly in south west Hampshire, between the River Avon to the east

and Southampton Water to the west. It stretches from the Solent coast in the south and as far north as the southern edge of the Wiltshire chalk downs.

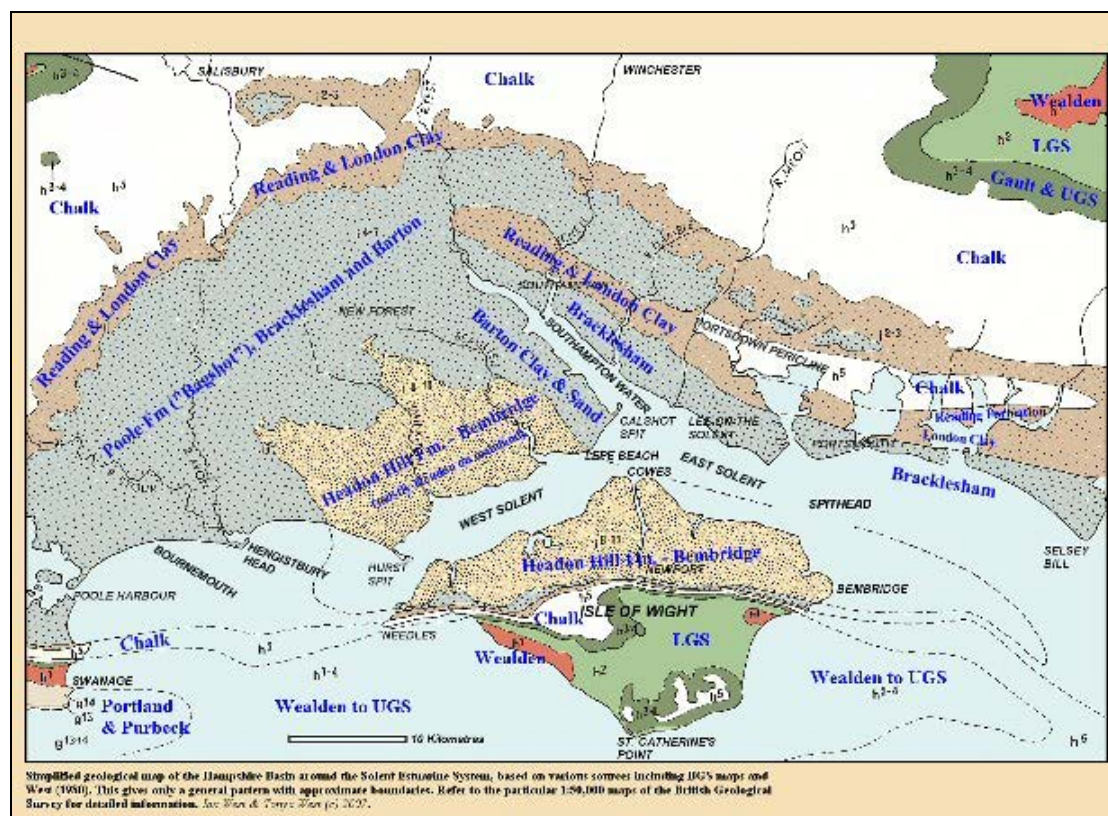


Figure 4. Map showing the simplified geology of the Hampshire Basin (Map produced by West and West, 2007).

The forest is drained by three rivers, the rivers Lymington, Beaulieu and Avon Water and to the west by Latchmoor Brook.

In terms of geology, this whole area of southern England and the Isle of Wight is underlain by Upper Cretaceous Chalk forming a basin which was filled during the Eocene with sediments from seas lakes and rivers. These gravels, sands and clays were lifted and tilted towards the Solent Coast so that today there is a progression of strata from north to south. These Eocene sands and clays are overlain in many areas by a 3m deep spread of Pleistocene flint river gravel (West 2010).

The oldest deposits are the Cretaceous chalks lying at the north edge of the project area and forming the Wiltshire Downs. These are overlain by Reading and London clays. Further south is a wide band of Bagshot sands and clays with Barton clays and sands around Southampton Water. The south-eastern portion of the Forest is rather different, the carbonate content of the underlying Bembridge (Headon) beds being relatively high and regarded as marls. The more calcareous strata makes good farmland, and the valuable estates of the Beaulieu area are mainly on the loamy clay and marine shell marls of the Headon Beds, (*ibid*).

The following summary is based on *The Hampshire Landscape: a Strategy for the Future* (Hampshire County Council 2000).

The open unenclosed forest consists of a complex mosaic of open heaths, ancient woodlands with clearings and glades merging gently with regenerating scrub woodland and grasslands, valley mires, bogs and streams. Throughout the open forest the commoners exercise their traditional rights to graze their ponies and cattle, pigs and sheep. Within these areas, there are also numerous fenced Inclosures of

forestry plantations. The enclosed forest lies within and around the open forest and has a different character: this is a small-scale highly-enclosed landscape consisting of small secluded fields mainly of unintensive grazing land, numerous paddocks and many small settlements, in a well-wooded setting with oak hedgerows and narrow lanes.

The underlying geology of sands, gravels and clay give rise to grades three, four and five agricultural land with a range of soils varying from loamy permeable soils to seasonally waterlogged heavy soils, or very acid uncultivated soils. There are small areas of arable crops on the more loamy soils, otherwise grazing/traditional communing predominates including in pasture woodland in the unenclosed forest. There is also unintensive grazing including many paddocks often with ranch fencing, and occasional riding schools in enclosed landscape mostly on former heathland.

5 Overview of the aerial photographs

Over eighty years of aerial reconnaissance has taken place in Hampshire and ensured that there is generally extensive aerial photographic cover of the county. Available aerial photographs comprise specialist oblique photography, the earliest taken by OGS Crawford in the 1920s and 30s. Extensive programmes of vertical photography were carried out by the Ministry of Defence in the years during and after the Second World War. Blanket vertical cover has continued up until the present day, initially by the Ordnance Survey in the 1960s and later from the 1970s onwards by HCC, the more recent sorties resulting in digital colour images. Due to extensive tree cover relatively few specialist oblique photographs have been taken of the forest in recent years, those that are available taken by Cambridge University and English Heritage.

Details of available photographs are contained in Appendix 1.

5.1 Specialist oblique photography

The earliest oblique aerial photographs consulted during the project were from the Crawford collection. Whilst exact dates are not available for many of these prints, many flights were undertaken in Southern England in the 1920s and 1930s and several of the prints originate from those early flights. The earliest dated print was taken on 3rd May 1924.

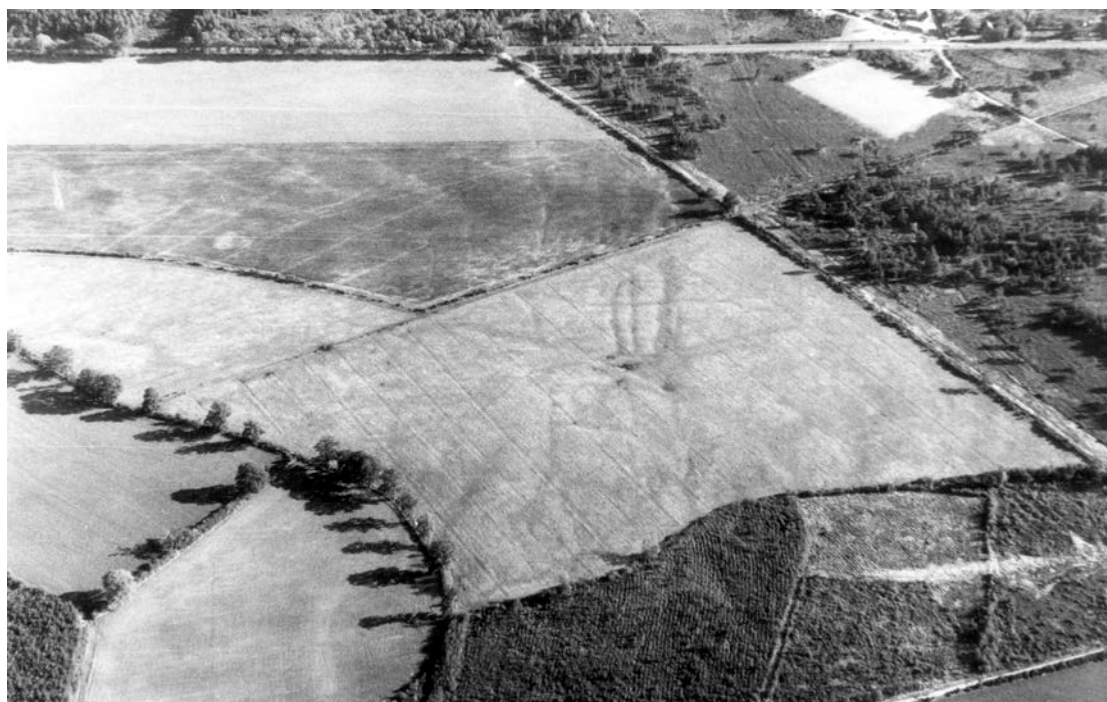


Figure 5. Early Crawford oblique photograph taken in 1935. Trackways of uncertain date are clearly visible cutting across the modern landscape at Larks Lease Copse, Copythorne. (MKM7096). Photograph: CCC 47/131 (NMR SU3115/1/131) 2nd May 1935. © English Heritage (Crawford Collection).

The Cambridge University Committee for Aerial Photography (CUCAP) has undertaken an aerial reconnaissance programme since 1947 but unfortunately due to temporary closure of their archive facility, there was no access to that collection for much of the project. It was decided that for consistency and due to pressures of time, the CUCAP collection would not be consulted for the later mapping blocks once the collection was reopened. A small number of duplicate prints from the collection were available via the EHA.

A systematic programme of reconnaissance has been carried out by the NMR since the 1970s and photographs from this collection provided the bulk of the oblique coverage; the majority of sites mapped from obliques were transcribed from these NMR photographs. Oblique photographs taken in slanting sunlight (either during the winter months or in the early morning or late evenings of summer) are an ideal medium for defining earthwork monuments. The low earthworks of the medieval settlement of More (Figure 6) provide a good example.



Figure 6. Low earthwork banks and hollows associated with the deserted medieval settlement of More. The site which is clearly picked out in low sunlight was recorded as part of ongoing aerial reconnaissance by the English Heritage Aerial Survey team. (MKM5865). Photograph: NMR 18687/1, 02 February 2000. © English Heritage.

Very few specialist oblique photographs were available of the project area. This is due to a number of factors: the landscape of open heath, grassland and woodlands along with the underlying geology of sands, clays and gravels is not conducive to the formation of cropmarks and many earthwork sites are hidden under woodland or scrub. Most of the specialist obliques were of upstanding scheduled monuments in cleared headland and grassland.

5.2 Vertical Photographs

Vertical photographs provide coverage of all parts of the project area and have been taken at regular intervals from the early 1940s onwards. As part of the routine NMP process all readily available vertical aerial photographs (with the exception of the digital cover) were examined with a hand-held stereoscope. Viewing prints with a stereoscope provides a three dimensional view of the landscape, including any extant archaeological features. The advantage of vertical photography is that large areas are usually surveyed; a potential disadvantage is that they are not always taken at the most favourable times of day or year to maximise the visibility of archaeological features. Nonetheless the value of vertical photography to the project cannot be overstated.

A good range of sources of vertical photography were available to the project, and as a result a wide variety of archaeological site types were recorded. RAF vertical photographs from the 1940s to the early 1960s were an important source of information, particularly for sites relating to early twentieth century military features.



Figure 7. Second World War anti landing obstacles on Bratley Plain, Ellingham. Photograph: RAF 106G/UK/522 Frame 4179, taken, 17th June 1945. English Heritage RAF Photography.

The provision of a wide variety of sorties in addition to the RAF coverage (the HCC digital aerial photo tiles, the OS and the Meridian Airmaps collections), ensured that coverage from vertical photography was extremely good. In addition those up-to-date images available online through Google and Bing were consulted.

5.3 Lidar

Light Detection and Ranging (lidar) is an airborne mapping technique which uses a laser to measure the distance between the aircraft and the ground. The technique allows the identification and recording of extant earthwork features on the ground to sub-metre accuracy. The benefits of using lidar for archaeological recording have been recognised and have been tested by the EH Aerial Survey Team (Bewley *et al* 2005 and Devereux *et al* 2005). Data generated by this current project has further proved the value of lidar as an archaeological survey tool.

Due to the restrictions of conventional photography for archaeological survey in areas under woodland and scrub, the NFR project included a full lidar survey of the national park. The central portion of the NFNP had previously been surveyed by Cambridge University Technical Services in 2011 as part of the Crownlands survey. This survey was flown during winter 2011, when the broadleaf trees were devoid of leaf cover and the understory vegetation at a minimum. The data was captured at a minimum of 2 laser hits per square metre (between 2 and 6 hits per metre expected), using a maximum half scan angle of 15 degrees and a swath overlap of 65%. The survey altitude was no greater than 1000m A.G.L.

The remaining peripheral areas were commissioned and flown by Geomatics in 2012 as part of the wider NFR project (Figure 8). Data was captured using the following modified survey parameters: flying height of 800m, scan half angle of 14 degrees, scan repetition rate of 100khz. An approximate 30-40% overlap was used.

All data was provided to the project mapping team as geo-referenced digital surface models (DSM) and as digital terrain models (DTM) with the vegetation removed. The lidar data was loaded into AutoCAD Map 3D map as a 3D grid surface which allowed manipulation of the data in terms of direction and angle of sun settings and vertical exaggeration. In addition, static captured images (unrectified jpegs) were provided by Peter Crow of Forest Research which were multi-lit from all four cardinal points and could be used in exactly the same way as conventional aerial photographs.

At the start of the project, it was anticipated that the lidar had the potential to locate 90% of sites including a large number of previously unrecorded sites (NFNPA 2011, 8). Although not possible to fully quantify the results in this way, the lidar data almost certainly provided data for at least 90% of all sites mapped and recorded.

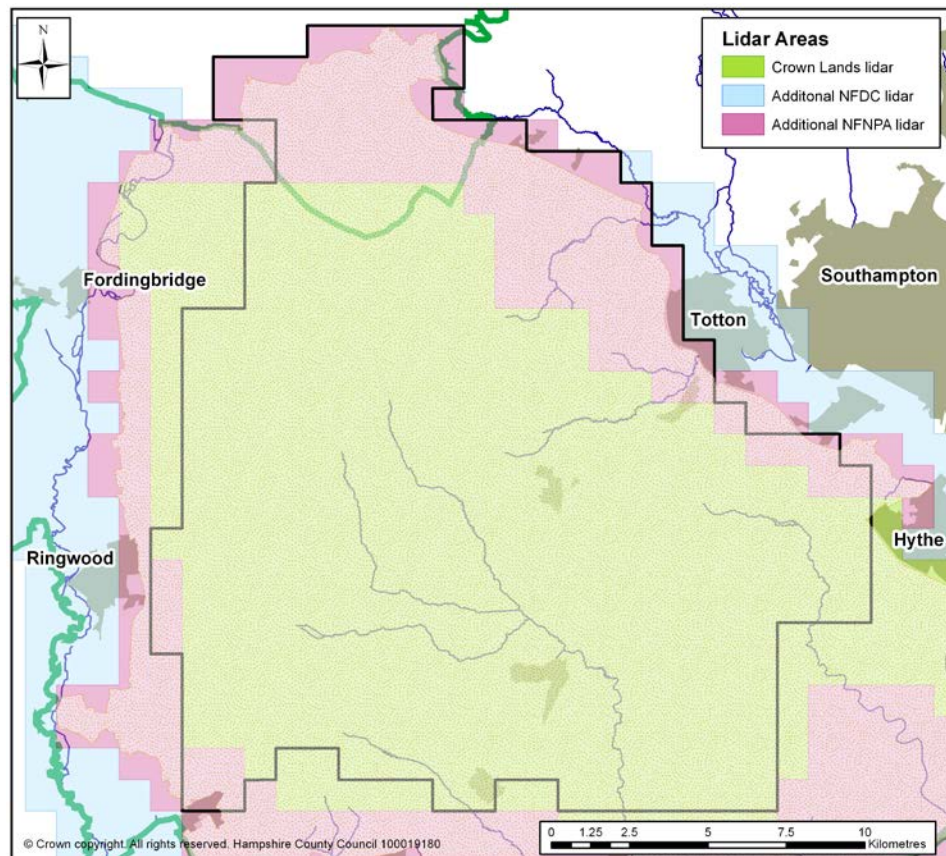


Figure 8. Project area showing lidar survey coverage.

Figure 9 clearly demonstrates the value of lidar survey in areas of vegetation cover. Here at Fir Pound, the site of a probable medieval or post medieval pound or tree enclosure ring and Bronze Age barrow lie hidden under low tree cover. Neither site had previously been recorded although both are clearly visible on the lidar DTMs with the tree cover removed.

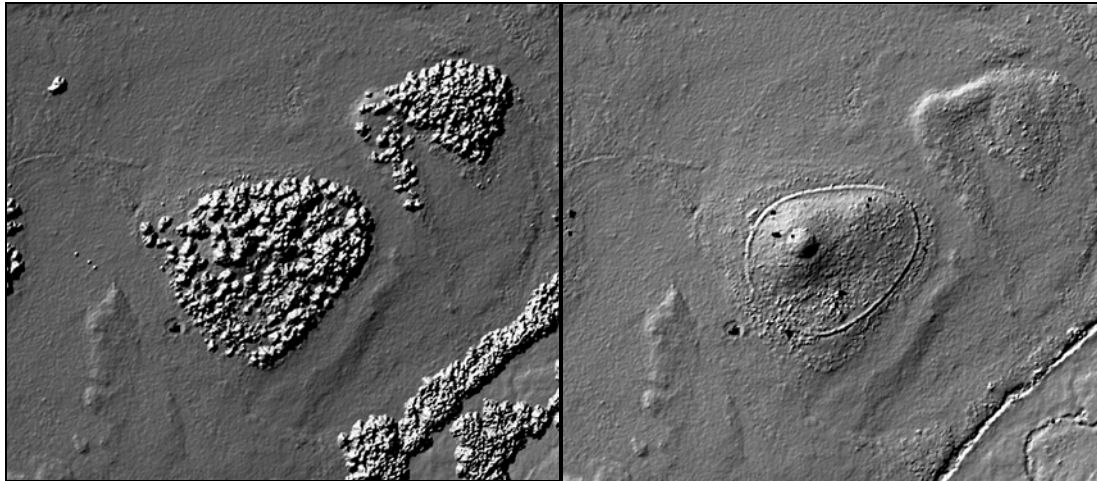


Figure 9. Bronze Age round barrow and medieval or later pound under trees at Fir Pound, Hyde. (MKM7334 and MKM8789). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

6 Results of NMP mapping

6.1 Overview of results

In general terms the nature of archaeological evidence available from aerial photographs determines the types of site recorded as part of NMP. Usually these are relatively substantial ditched or banked features either visible above ground as earthworks, or as cropmarks of sub-surface features. Historic photography also provides details of earthworks and structures which have been denuded or levelled by ploughing, or otherwise destroyed or removed in the last 70 years.

All sites mapped were recorded in the project HBSMR database which automatically generated unique project record numbers prefixed MKM. All sites discussed in this report are referenced using this MKM number.

6.1.1 Numbers of sites in the project area

Prior to the mapping, the Hampshire AHBR contained 829 records for archaeological sites within the project area. All but five were for sites potentially visible on aerial photographs such as cropmarks and earthworks as well as structures and subsurface features (including excavated features) within the NMP Remit.

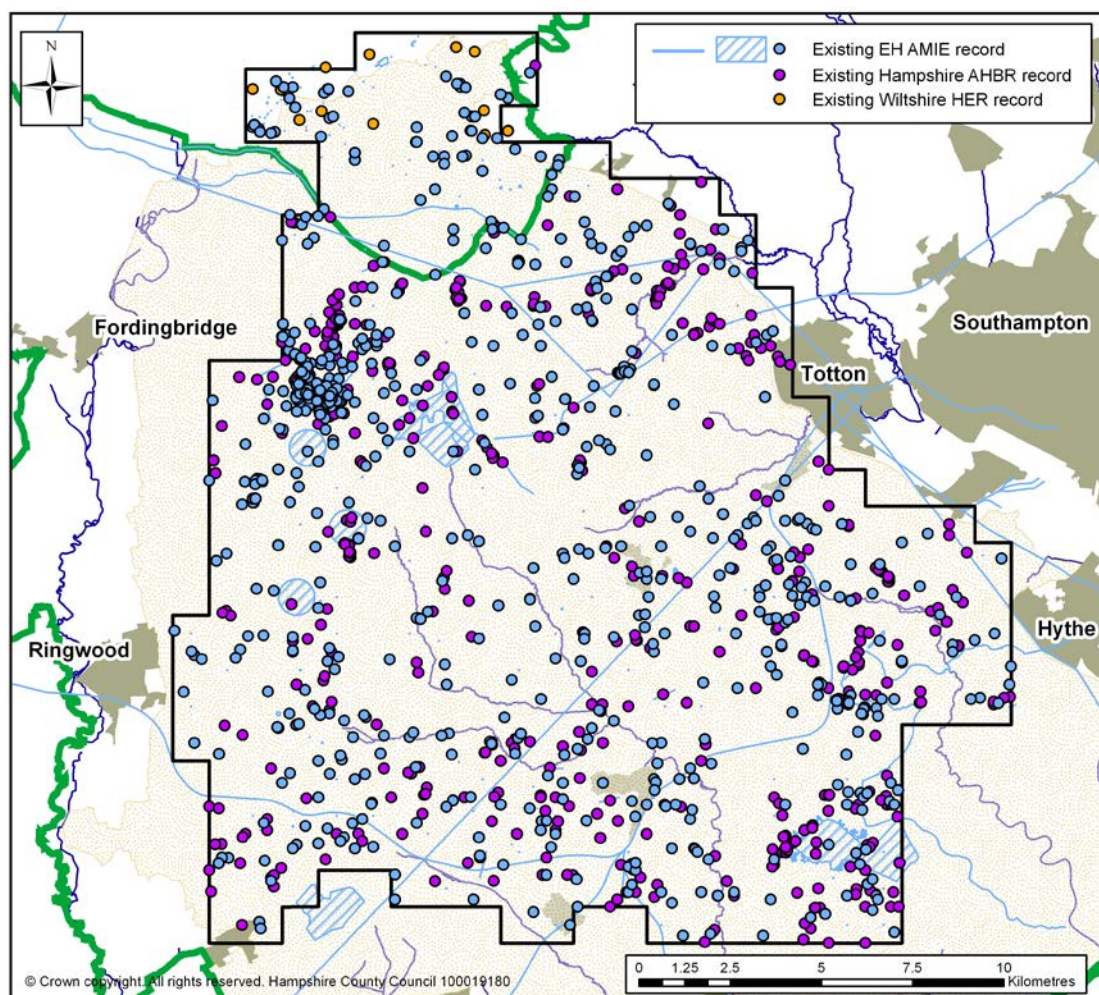


Figure 10. Distribution of all monuments recorded in the Hampshire AHBR prior to the NMP project.

In addition, the Wiltshire HBSMR database contained 26 sites within the project area and the EH AMIE database, 1120. Figure 10 shows the distribution of those Monument records existing prior to the NMP project.

All sites mapped were recorded in the project HBSMR database which automatically generated unique project record numbers prefixed MKM. All sites discussed in this report will be referenced using this MKM number.

In terms of data recording, a site was either assessed as New or Updated (See Table 1 below). New sites were those not previously listed in either HER (Hampshire AHBR/Wiltshire HBSMR) or the EH AMIE databases. For the purposes of this report, reference to 'new sites' or 'previously unrecorded sites' refers to those not recorded in the county HER's or AMIE, it does not take into account sites recorded in other databases.

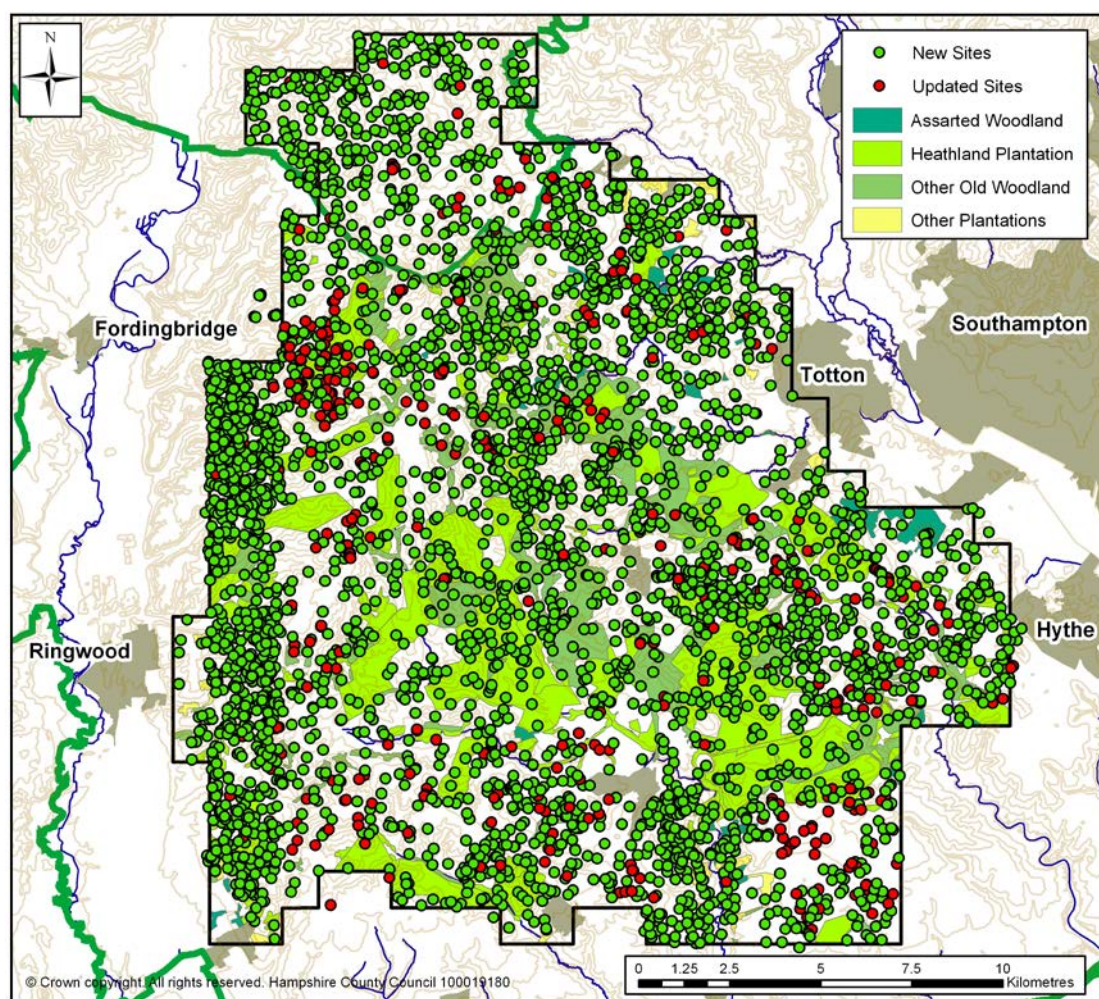


Figure 11. Distribution of all monuments recorded during the NMP project.

During the project 4316 monument records were created in the project data base of which 3823 (89%) were for sites previously unrecorded. These sites are shown in the distribution map (Figure 11 above). The map shows that in terms of overall distribution, sites were mapped right across the study area. As would be expected, greater concentrations of sites were encountered on the open heaths such as Matley and Yew Tree Heaths to the west of Hythe and Hinchleslea Moor to the south; however the use of historic photographs predating modern plantations plus blanket lidar cover (particularly the DTMs with vegetation removed) meant that large numbers of sites were also recorded within the plantations and woodland.

The most obvious concentration of sites runs in a north-south band down the western edge of the project area. This reflects the high numbers of post medieval or early 20th century trackways running into the park as well as spread groups of bomb craters and extractive sites.

The numbers of sites recorded by period are listed in Table 1 below.

One site has been firmly dated to the early medieval period. However four others have been double indexed as early medieval or later in date, possibly relating to the early medieval earthwork of Cedric's First Enclosure; these sites are described in the early medieval section (6.6; page 47) although having medieval or historic indexing.

Period	Updated Sites	Sites New to County HERs and AMIE databases	Total
Bronze Age	205	25	230
Iron Age	8	0	8
Prehistoric/Roman	12	24	36
Roman	20	2	22
Early medieval	5	0	5
Medieval	28	28	56
Post medieval	73	1792	1865
Historic	89	767	856
Modern	31	793	824
Undated	22	392	414
Total	493	3823	4316

Table 1. Numbers of sites recorded in the project database.

6.1.2 Form and survival of sites

The form and survival of each site was recorded in the project database. At the direction of the EHA, the form recorded was the last known form of the site (e.g. as visible on the latest Google Earth images or on the lidar) and not necessarily the form of the site on the photographs from which it was plotted. For example, if a site was visible as an earthwork on early RAF 1940s photographs but was later plough-levelled and now only visible as cropmarks on the latest photography, then the site was recorded in the database as a cropmark. Similarly, if a site was not visible at all (neither as earthworks nor cropmarks) on the latest imagery but had been plotted as an earthwork from early photographs, it would be recorded in the database as Levelled Earthwork. A summary of the form and survival of sites recorded is set out in Table 2 below.

Form	No: Sites	% of total
Earthworks (including those with additional extant structures)	4012	93
Partially levelled earthworks (including those with additional extant structures)	41	0.9
Cropmarks/levelled earthworks	49	1.1
Extant structures	9	0.2
Sites with no visible trace remaining (including levelled earthworks and demolished structures)	205	4.8
Total	4316	100

Table 2. Form and survival of sites recorded in the project database.

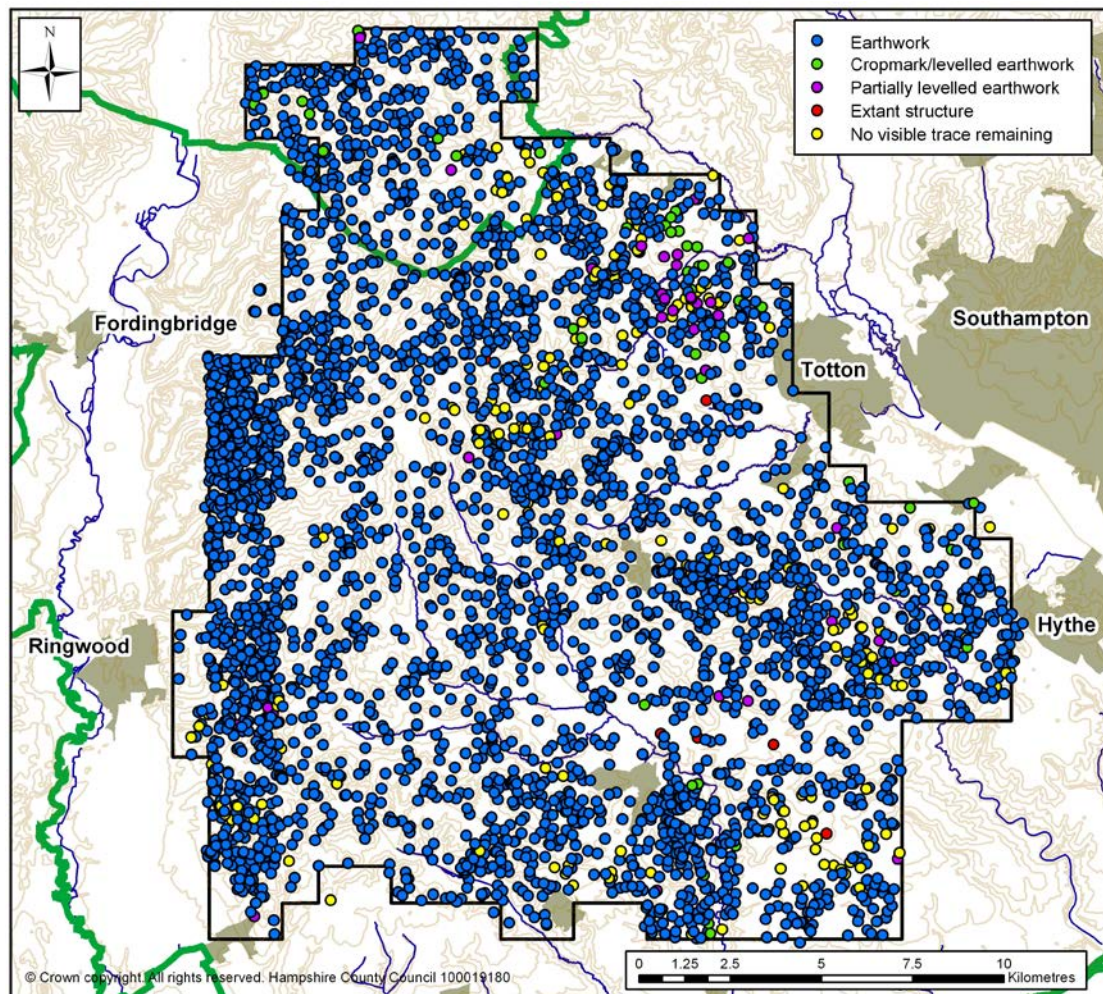


Figure 12. Distribution of sites recorded as earthworks, levelled earthworks, cropmarks and structures within the study area.

Of the 4316 sites recorded during the mapping project, 4013 (93%) were visible as upstanding earthworks on the latest imagery (generally lidar), these are shown in

blue in Figure 12 above. In addition, a further 41 sites had been partially levelled since first photographed but were still surviving in part as earthworks. A further 205 sites had originally been visible as earthworks or upstanding structures of which no trace was remaining on the latest imagery.

Forty nine sites were completely levelled and showing only as cropmarks. The map clearly demonstrates that these cropmark sites and those partially levelled earthworks (green and purple on Figure 12) are generally restricted to the northeast edge of the study area, where there is more of an arable farming regime. The largest concentration of these sites lies to the northwest of Totton.

6.2 NMP results: Bronze Age (2,200- 800BC)

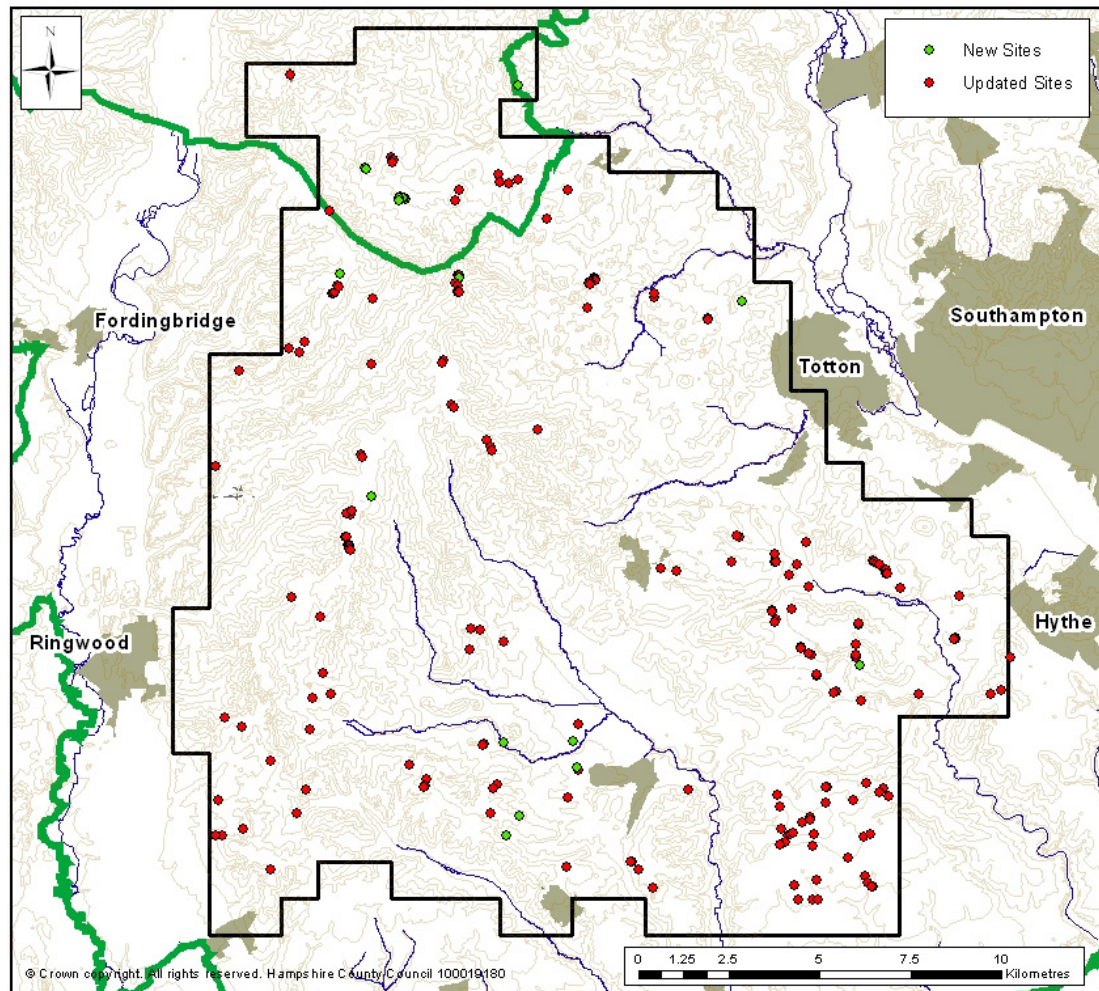


Figure 13. Distribution of Bronze Age Sites.

During the mapping project, no sites were attributed to the Neolithic or earlier periods.

230 Bronze Age monuments were recorded, the majority of which (99%) were round barrows although two field boundaries and a possible burnt mound were also plotted. Of these Bronze Age sites, 25 (12%) were new to the County HERs or the AMIE database. All but ten sites were still surviving as upstanding earthworks.

Site Type	No: Sites
Burnt Mound	1
Field Boundary	2
Round Barrow	226
Total	230

Table 3. Bronze Age Site Types

6.2.1 Round barrows

Barrows were by far the most common type of prehistoric monument identified during the project, in all 226 being recorded. As Figure 13 shows Bronze Age round barrows are widely distributed across the project area; there is a tendency for these sites to be sited on the higher ridges and plateaus with loose groups of barrows situated on Beaulieu Heath, Yew Tree and Matley Heaths and along the ridge running south from Ocknall Plain to Picket Plain.

The majority (96%) of these important ceremonial monuments still survive as extant earthworks and of the ten sites which have been levelled, eight lie on Hachet Moor, Beaulieu Heath and two on Ocknall Plain. The levelled Beaulieu Heath sites lie in the vicinity of the Second World War airfield and are likely to have been destroyed during the airfield's construction.

Second World War excavations on Beaulieu Heath.

With the outbreak of the Second World War in 1939, a number of important archaeological sites came under threat from the construction and expansion of many military installations connected with the war effort. The construction of new airfields required the complete levelling of the surface and no archaeological sites near or on the lines of runways was deemed safe (O'Neil 1948).

Where possible excavation of known monuments was undertaken, after which a site could be consigned to destruction. Despite the urgency of military expansion and the speed of construction of new airfields, nearly all known archaeological sites were scientifically examined prior to their potential destruction although many of the excavations were not published at the time due to shortages of paper (*ibid*).

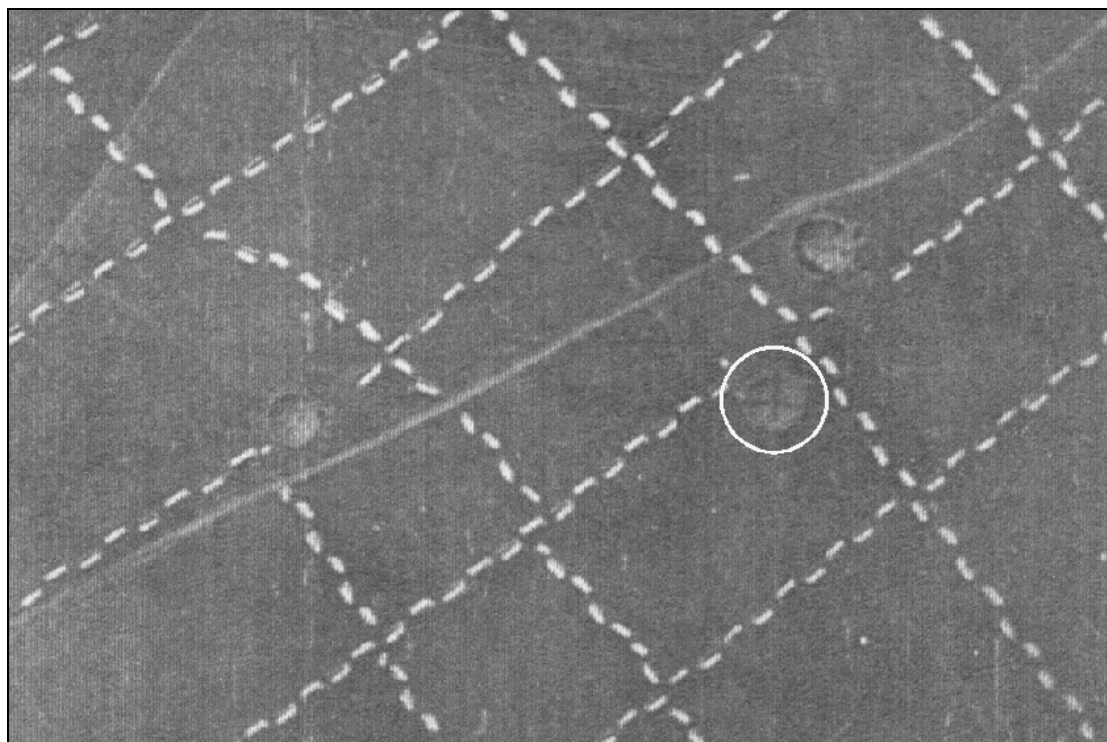


Figure 14. Bronze Age round barrows on Beaulieu Heath. The excavation trenches are visible on the ringed barrow (MKM3016). Photograph: RAF HLA 314 IPRU Frame 948, taken, 29th September 1941. English Heritage RAF Photography.

On Beaulieu Heath, ten barrows were excavated in the autumn and winter of 1941-2 by C M Piggott (Piggott 1943). All excavated sites were earmarked for destruction and due to pressures of time none were fully examined. It is possible to make out

the excavation trenches on a number of these barrows on photographs taken in 1941 (Figure 14).

A small number of the excavated sites were not totally destroyed and the trenches remain clearly visible on lidar data taken in 2011. An example is the barrow known as Wise's Cold Pixie's Cave which lies immediately to the south of the B3055. The barrow was excavated by C M Piggott (Beaulieu Barrow VI) when a Wessex type amber necklace was recovered although the primary burial was not found (Piggott 1943, 14 and Pl. vii). The north-south east-west trenches are clearly visible on lidar data (Figure 15) and the barrow remains protected by scheduling (Legacy No: 20240).



Figure 15. Excavation trenches dating to the 1940s are clearly visible on lidar data at Wise's Cold Pixie's Cave, Beaulieu Heath (MKM2935). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

New Barrows.

The sites of 25 new potential Bronze Age barrows were identified during the project, many under trees and not visible on conventional photographs. One example of this is the barrow within the possible medieval pound at Fir Pound Hyde. The sites of the barrow and pound are both clearly visible on images using the lidar DTM (Figure 9) but neither had been previously recorded in the EH AMIE or Hampshire AHBR databases.

Perhaps the most significant new discovery was a group of eight possible barrows under trees at Horse Down, Redlynch (Figure 16). None had previously been recorded and again, the series of small mounds, which range from 5m to 9m across, were only visible on the lidar DTMs. This potential barrow cemetery lies a kilometre to the south of the Scheduled cemetery at Bury Hill Plantation and two further potential new barrows were also identified on the lidar 700m to the west of Bury Hill in Pimplico Firs.

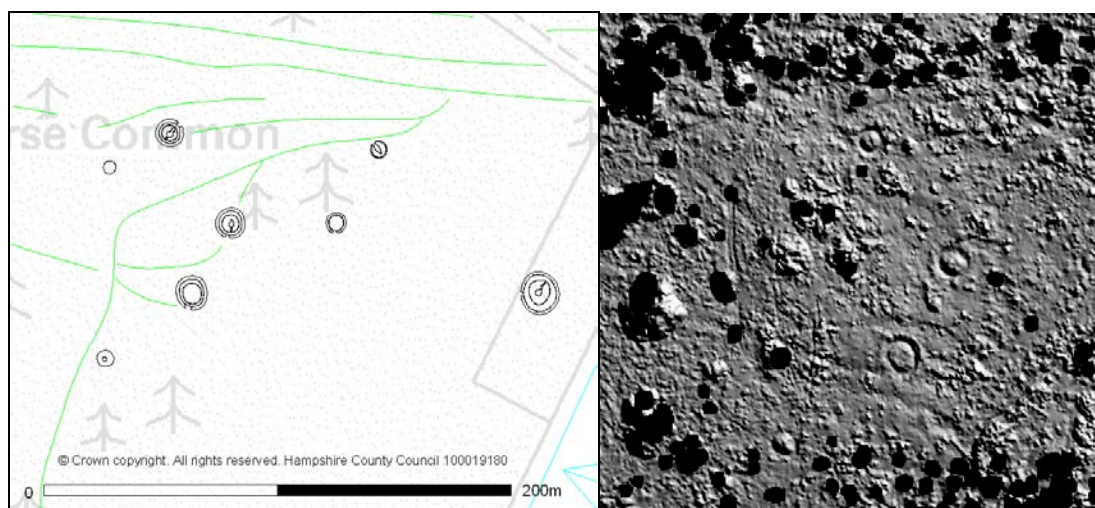


Figure 16. Potential new barrow cemetery at Horse Common visible under trees on lidar DTMs. (MKM7298-301 and MKM7476-9). NMP Mapping © English Heritage. Lidar: © Cornwall Council 2013 based on Geomatics and New Forest National Park Authority data 2012.

6.2.2 Burnt Mounds.

Burnt mounds are generally dated to the Bronze Age period and comprise a pile of shattered burnt stones intermixed with deposits of ash. They are often located close to a water source and when excavated have associated adjacent hearths and troughs capable of holding water. Their purpose is uncertain and interpretations have ranged from sauna baths, cooking sites, dyeing or associated with hide processing (EH 2011).

A number of burnt mounds have been identified across the New Forest; most have little or no surviving earthworks. One site was identified as a possible burnt mound during the mapping - at Rock Hills (MKM4411), where a concentration of calcined and worked flints had previously been identified during fieldwork and was thought to represent a burnt mound (EH AMIE UID 222558). However, given the recorded size of the mapped circular feature at 26m across, it is more probably a natural mound.

6.2.3 Field boundaries

Two field boundaries mapped within East Boldre parish were given a specific Bronze Age date. The first lies to the east of the Bishop of Winchester's Purlieu and was identified as Bronze Age in date during fieldwork in 1991 (MKM2948). The second field boundary, at Peaked Hill (MKM3014), appears to have been overlain by a Bronze Age barrow, suggesting an earlier date.

6.3 NMP results: Iron Age sites (800BC – 42AD)

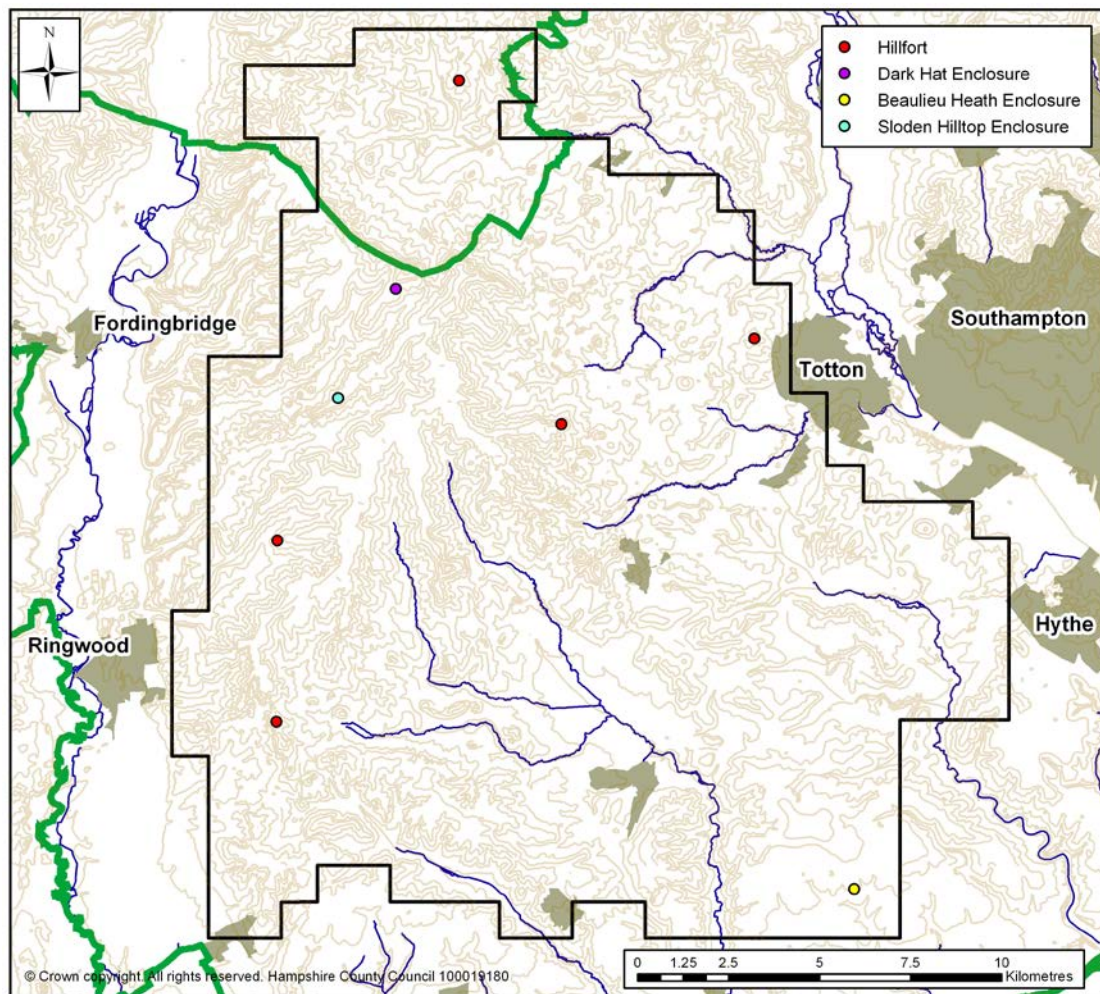


Figure 17. Distribution of Iron Age Sites.

Eight sites of a specifically Iron Age date were mapped during the project, all of which had previously been recorded in the Hampshire AHBR or EH AMIE databases. All eight sites were visible as upstanding earthworks on the lidar. A number of other potentially Iron Age sites were mapped but as their date was uncertain they were assigned a generic Prehistoric date and are described in section 6.5 (page 42) below.

Site Type	No: Sites
Enclosure	2
Hillfort	6
Total	8

Table 4. Iron Age site types

The Iron Age sites are mainly located in the north western half of the project area with a single enclosure on Beaulieu Heath (MKM3043) in the southeast corner. Six of the eight sites have been indexed in the project database as hillforts and the remaining two as enclosures.

The hillforts are either slight univallate hillforts or small multivallate hillforts, ranging from 1.1 ha to 3.5 ha in size.

Of the two hill-top enclosures; the size, shape and positioning in the landscape of the Sloden Inclosure site (Figure19) on the crest of a prominent ridge, make it a suitable candidate to be classed as a hillfort although it may be of earlier Bronze Age origin (see discussion below).

Conversely, the enclosure on Beaulieu Heath was indexed in the AHBR as a hillfort, although as Figure 18 below clearly shows, it is considerably smaller than the others at 0.12ha. The site was excavated between 1964-6 by the New Forest Section of the Hampshire Field Club and Archaeological Society (Pasmore and Fortescue 1979) when a small amount of Iron Age and Romano-British pottery was recovered from its V-shaped ditch. The enclosure is therefore better considered to be the site of an Iron Age settlement enclosure and not a hillfort.

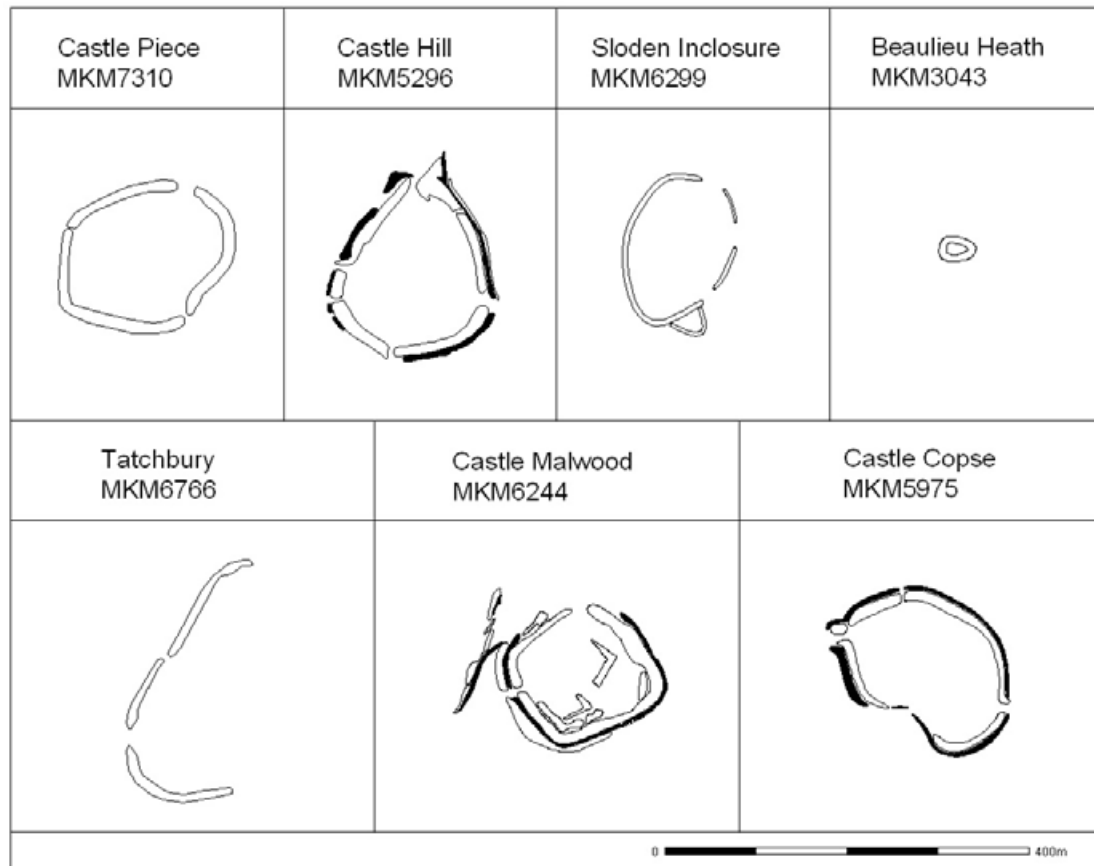


Figure 18. Iron Age hillforts and enclosures. NMP Mapping © English Heritage

All the hillforts and enclosures lie in prominent locations close to the heads of tributary streams but only three occupy true hill-top or ridge-top locations. Tatchbury lies on the summit of a small hill adjacent to several tributaries of the River Test and although only one line of earthworks was visible on the available imagery due to the dense vegetation cover, the hillfort is considered to be multivallate. The Castle Hill site (MKM5296) lies on the crest of a prominent gravel ridge at the head of a tributary stream of the River Avon and as previously mentioned, the Sloden Inclosure site also occupies the crest of a prominent sand and gravel ridge between the Latchmore Brook and Dockens Water.

The other five sites are on west and south facing slopes: the Castle Piece enclosure (MKM7310) lies on a west facing slope above Linford Brook - another Avon tributary stream, Castle Copse (MKM5975) on a southern slope close to the head of a tributary of the River Blackwater, Dark Hat on a southern slope above the Latchmore

Brook and Castle Malwood (MKM6244) on a south west slope at the head of a tributary of Bartley Water.

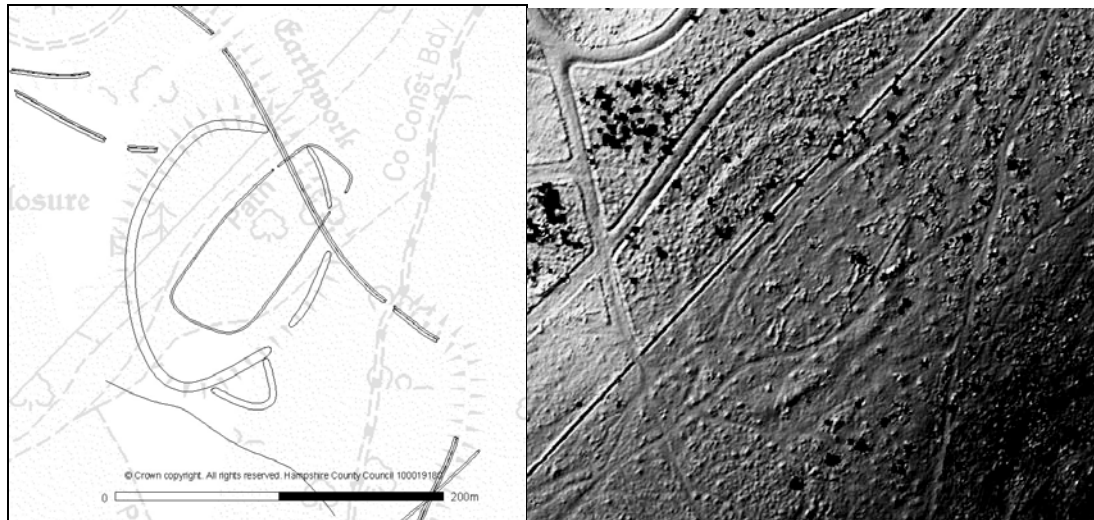


Figure 19. The slight earthworks of an oval enclosure at Sloden Inclosure are likely to be the remains of a much denuded Iron Age hillfort. (MKM6299). NMP Mapping © English Heritage; Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

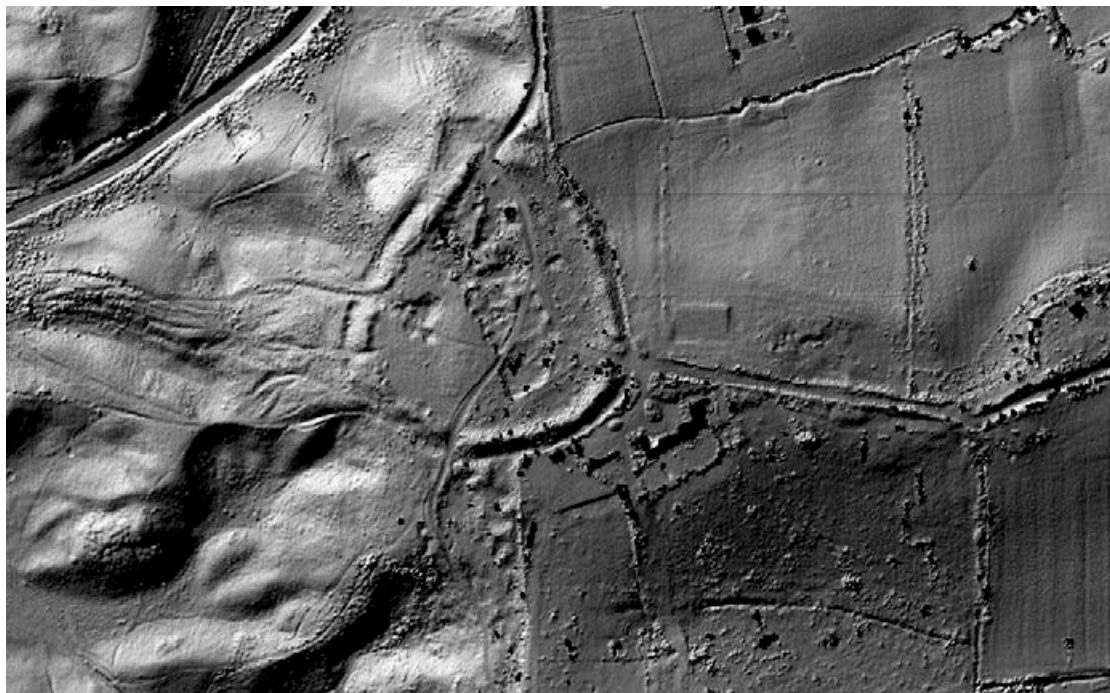


Figure 20. Post medieval gravel pits are clearly visible on lidar within Castle Hill hillfort, Burley. (MKM5296). NMP Mapping © English Heritage. Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

The simplicity of their design is possibly indicative of an early date; some similar excavated examples have been dated to the later Bronze Age and early Iron Age (EH 3013). The oval enclosure at Sloden Inclosure has been dated to the Iron Age on the basis of its morphology and the presence of Roman pottery in the later phases

of the ditch silts when excavated (Smith 1999, Pasmore 1994). The excavators considered the earthworks to have been of considerable age prior to the establishment of an adjacent Roman pottery kiln and there is reason to suggest that the enclosure may date to the later Bronze Age period.

The tendency for many of the New Forest hillforts to have been sited on gravel topped locations and therefore be vulnerable to quarrying has previously been identified (Smith, 1999, 9). This is clearly demonstrated at Castle Hill where gravel quarrying is visible on the lidar imagery (Figure 20).

At Dark Hat, the site of a rectilinear banked enclosure lies on a gravel-topped ridge known as Homy Ridge. It is the southern of three overlying enclosures and is approximately 0.9 ha in size. Its south eastern boundary was excavated in 1988 by the New Forest Section of the Hampshire Field Club and Archaeological Society (Pasmore and Fortescue 1989) when 1st century AD pottery was recovered from its external v-shaped ditch. It remains unclear whether the three enclosures are contemporary with one another or represent several phases of construction and reuse. Pollen analysis of soil samples taken during the excavation have given Middle Bronze Age to early Iron Age dates (Reynolds and Catt 1987) although the northern features may be medieval or later coppice enclosures.

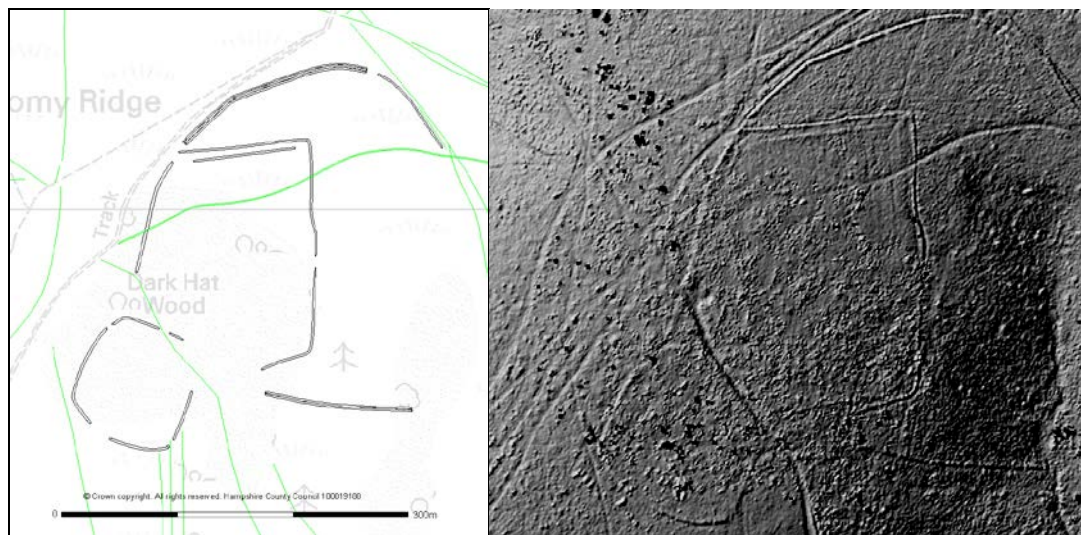


Figure 21. Later Prehistoric enclosures with potentially later historic wood banks at Dark Hat Wood, Bramshaw. (MKM7442, MKM7443 and MKM7444 NMP Mapping © English Heritage. Lidar: 2012 © Cornwall Council based on Geomatics and New Forest National Park Authority.

6.4 NMP results: Roman sites (AD43 – AD409)

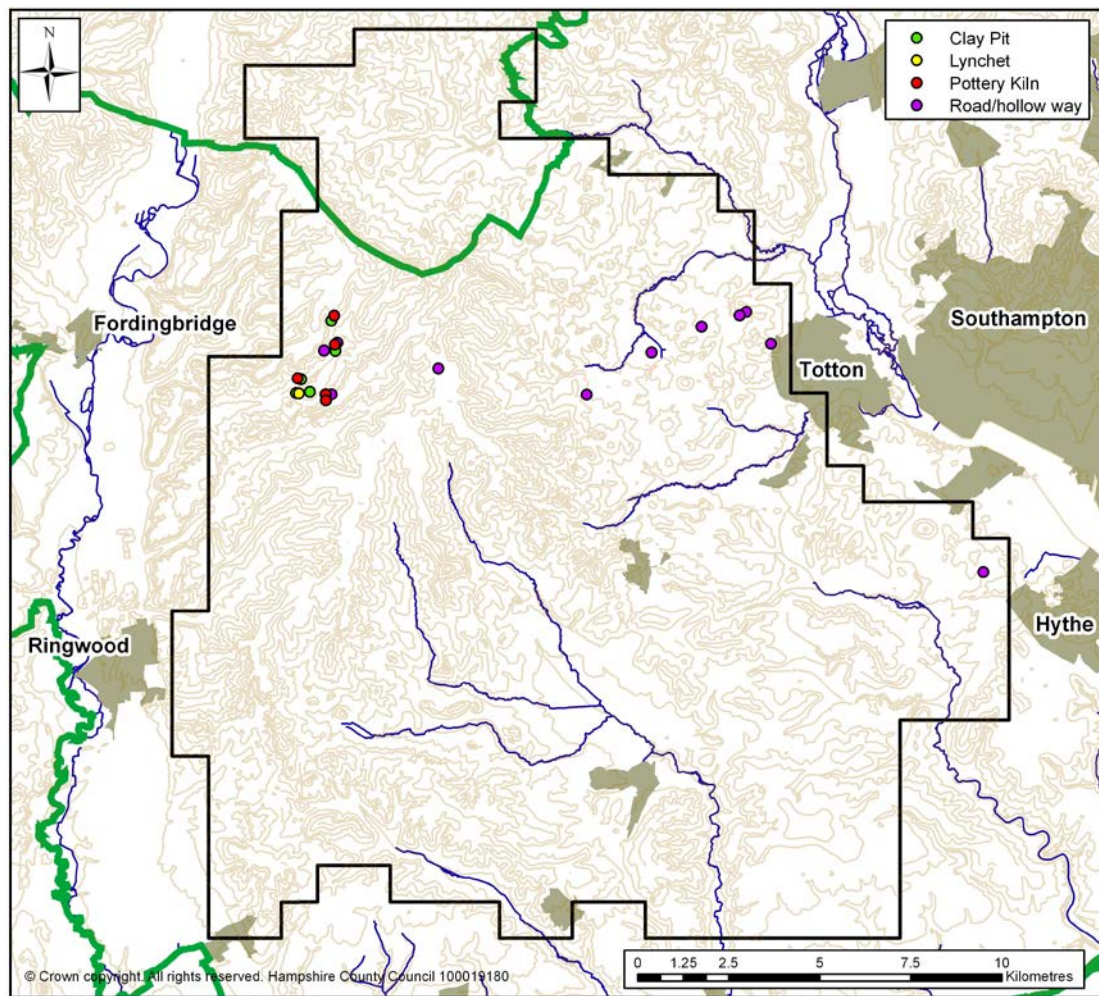


Figure 22. Distribution of Roman Sites.

Twenty two sites were mapped during the project and allocated a specifically Roman date, of these 2 were new to the county HERs or AMIE. As Figure 22 above shows, all bar one site lies in an east west band across the project area running from Totton to Fordingbridge. All sites were visible as extant earthworks on lidar.

Site Type	No: Sites
Clay Pit	5
Hollow Way	3
Lynchet	1
Kiln	5
Total	22

Table 5. Roman Site Types

6.4.1 Roman roads and hollow ways

Two known major Roman roads run through the project area: RR422 from Otterbourne to Stoney Cross which runs westward to the north of Totton and RR423 which runs north-west south-east parallel with the western shore of Southampton Water. Small sections of both these roads were identified on the aerial photographs and lidar.

The line of the Otterbourne to Stoney Cross Roman road was visible in a number of different locations on lidar and conventional photography. Immediately to the north of the Iron Age hill fort of Castle Malwood, three sections were recorded (MKM6242). Figure 23 shows the line of the road as a clear earthwork running westwards before meeting the modern A31 trunk road. The linear earthwork visible to the west of the road has been recorded separately as a section of medieval or later wood bank although it being a continuation of the Roman road seems more probable.

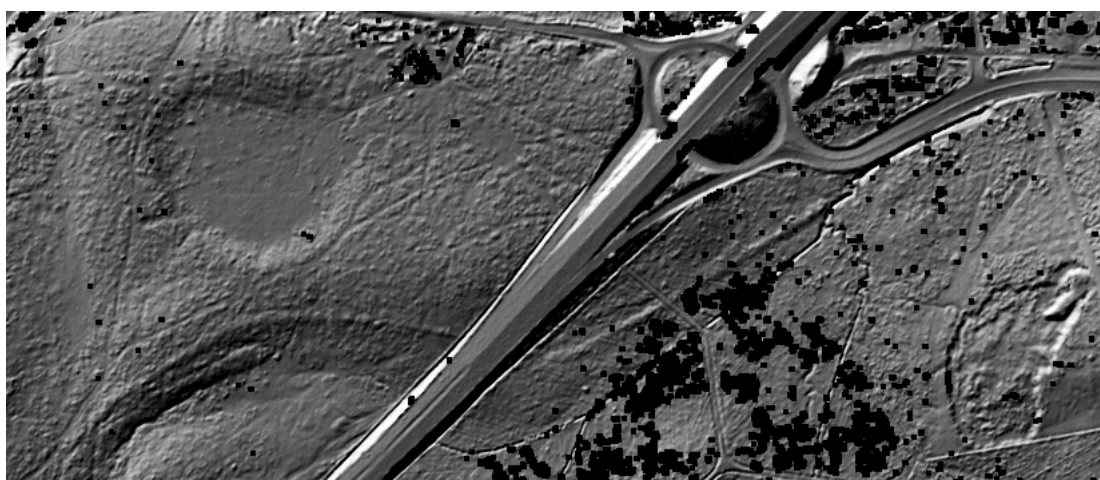


Figure 23. The Roman road from Otterbourne to Stoney Cross is clearly visible on lidar cut by the modern A31 within Shave Green Inclosure, Minstead. (MKM6242). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

In addition to the two known Roman Roads, sections of other stretches of possible road were identified. It has previously been mentioned that the Roman road network may have been far more intricate than traditionally supposed with minor roads and tracks for specific purposes such as moving livestock or moving pottery and tiles from kilns to markets (Johnston 1981).

One such site, possibly servicing the New Forest Roman pottery kiln sites lies on Janesmoor Plain, Bramshaw, where part of a possible road was identified as a linear earthwork on lidar running north south for over 230m. Excavations on the site in 1989 (Johnston 1983) had proved inconclusive although previously it had been suggested that the feature continued for over 4km southwards towards Fritham (EH AMIE record 952428).

6.4.2 Roman pottery kilns

By the late third century AD, a thriving pottery industry was established in the New Forest. New Forest wares dominated Wessex during the Roman period with a considerable range of vessel types and decorations, (Cunliffe 1993). Pottery styles included coarse wares for the local market as well as a range of finer wares for wider distribution.

Fourteen sites relating to the pottery industry were identified to either side of the Latchmoor Brook within Sloden, Alderhill and Islands Thorns Inclosures. The sites include five pottery kiln sites, five clay pits associated with the pottery industry and four sets of hollow ways and lynchets. All were identified from the lidar and four were new to the record.



Figure 23. Site of a Roman pottery kiln with associated clay pits and hollow ways are visible as low earthworks underlying more recent road and drainage features at Fritham Bridge, Islands Thorns Inclosure. (MKM6046, MKM6047 and MKM6063). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

6.5 NMP results: Prehistoric sites (4000BC –AD409)

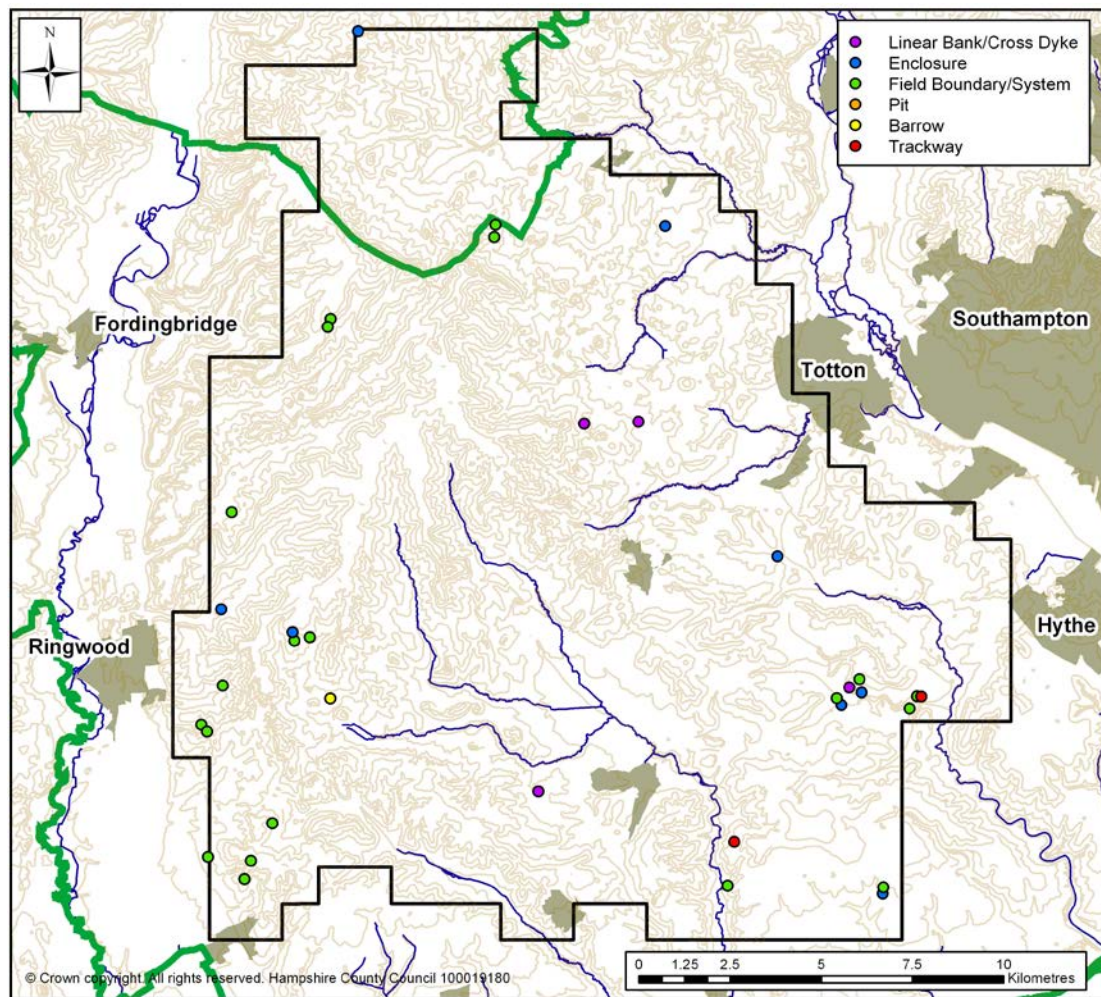


Figure 24. Distribution of prehistoric sites.

In addition to the specifically dated sites described in the previous sections, 36 sites plotted during the project were ascribed a generic prehistoric or prehistoric/Roman date in the project HBSMR database. Twenty three sites (64%) were new to the county HERs or AMIE. Three sites were more specifically dated to the Iron Age/Romano-British period. For the purposes of this report, these sites are referred to as 'prehistoric' in the following section even though some may have been in use into the Roman period. Many more potentially prehistoric sites were mapped although the difficulty of distinguishing between prehistoric and medieval earthworks in the Forest meant that most were given a broad potential date range and are therefore included in section 6.11 (page 96) below.

Of the 36 sites, 32 (89%) still had extant earthworks and generally were visible on lidar: only four sites had been completely levelled.

Site Type	No: Sites
Bank (Earthwork)	2
Cross Dyke	2
Enclosure	7
Field Boundary	10
Field System	10
Lynchet	1
Pit	1
Trackway	3
Total	36

Table 6. Prehistoric Site Types

6.5.1 Prehistoric field systems

The extensive field systems and boundaries of later prehistoric or Roman date found elsewhere in Southern England are rare in the New Forest (Smith 1999, 16). Paleoenvironmental evidence has suggested that by the mid to later Bronze Age the New Forest heathlands were used for cattle and horse grazing and not fertile enough for extensive cultivation. Several complexes of enclosures have however been identified which may represent prehistoric or Roman field systems. In all 21 field systems, field boundaries and lynchets of a probable prehistoric date were mapped, 14 of which were new to the record.

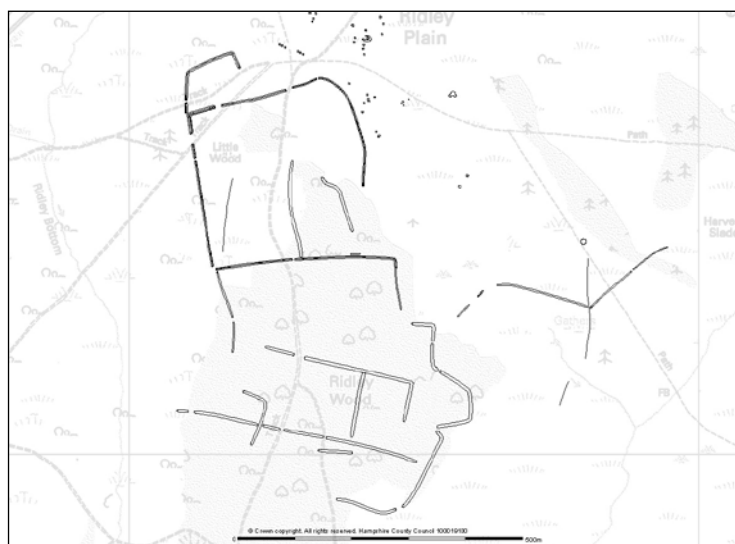


Figure 25. Later Prehistoric field system and enclosures on Ridley Plain, Burley. MKM5169 and MKM5171 NMP Mapping © English Heritage. Lidar: Geomatics data 2012 © Geomatics and New Forest National Park Authority.

The system of field boundaries on Ridley Plain has been previously identified as of prehistoric origin (*ibid*). The field system is partially located in modern woodland and partially in open heath. It consists of a series of rectilinear fields spread over an area of approximately 35 hectares (Figure 25) and fieldwork had previously noted that the banks are preserved to up to 2m in height. Its similarities to prehistoric cohesive field systems were noted by Smith (1999, 16) who has tentatively dated the earliest phase

to the prehistoric period: the field banks are cut by Ridley coppice bank which dates to at least 1590 (Flower 1980, 188).

Fragments of similar field systems were identified at a number of other sites within the project area including Woodside Bottom (MKM7682), Furzy Brow (MKM4480) and Culverly (MKM2941-2).

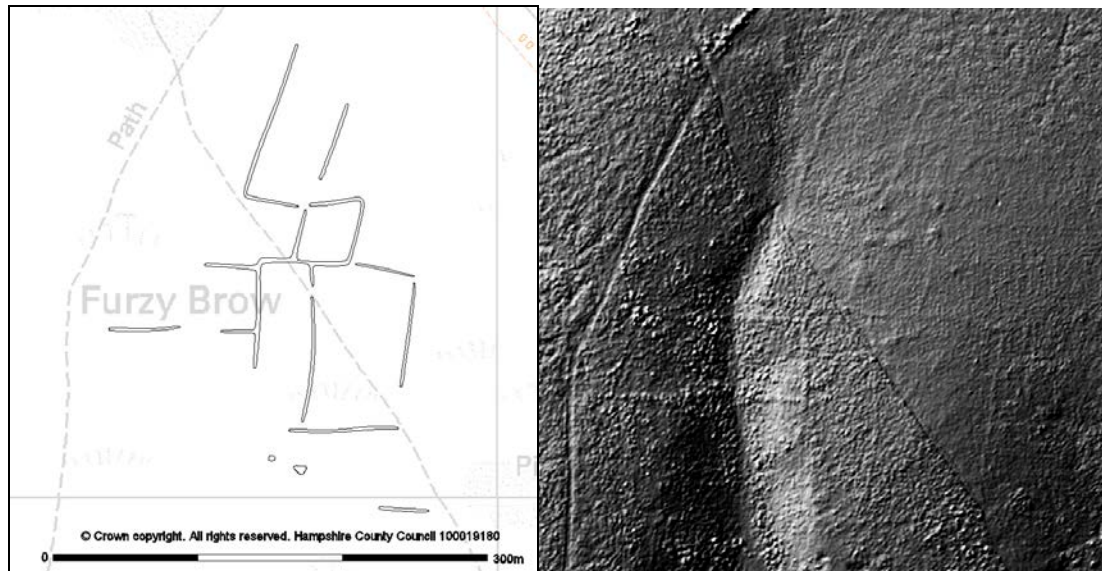


Figure 26. Later Prehistoric field system at Furzy Brow, Burley. MKM4480 NMP Mapping © English Heritage. Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

6.5.2 Prehistoric enclosures

Seven enclosures of prehistoric or Roman origin were identified during the mapping, of which five were new to the record.

Little Linford Inclosure MKM7308	Longwater Lawn MKM5570	Furzy Brow MKM2955	Bishop of Winchester's Purlieu MKM2958
			
0 400m			

Figure 27. Prehistoric enclosures. NMP Mapping © English Heritage.

Previously recorded sites include a sub-circular enclosure at Longwater Lawn (Figures 27 and 28). Whilst relatively small, (the internal enclosed area is 0.2ha), the enclosure is enclosed by a substantial ditch and bank. Whilst much denuded, the earthworks are clearly visible on lidar to the south of Ashurst Lodge. The enclosure is situated in a slightly elevated position immediately to south of the Beaulieu River on the slightly drier land just off the boggy valley floor. Whilst too small to be a hillfort, it

is likely to be of late Bronze Age or Iron Age date, possibly the site of a defended settlement or stock enclosure. It has been suggested that the southern rampart may have been relatively recently recut (Smith 1999, 14), perhaps the result of activity associated with the nearby First World War trench mortar school and artillery range.



Figure 28. Later prehistoric enclosure on Longwater Lawn. (MKM5570). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.



Figure 29. Potential sites of two later prehistoric enclosures adjacent to the medieval park pale of Bishop of Winchester's Purlieu, Denny Lodge. (MKM2955 (right) and MKM2958 (left)). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

Three potential prehistoric enclosures lie in the immediate vicinity of the eastern end of the medieval park pale enclosure known as Bishop of Winchester's Purlieu, Denny Lodge (see section 6.7 page 54) (Figure 29)). MKM2958 lies within the park pale itself and consists of a sub-oval bank and ditched enclosure of approximately 0.4ha.

MKM2955 comprises two conjoined enclosures lying immediately to the north of the park pale. The larger of the two encloses 0.47 ha with a later wood bank cutting through its northern end. The second smaller enclosure (0.26ha) abuts its southwest side. Both sites were previously unrecorded prior to the project and may have been used for the corralling of stock.

6.5.3 Prehistoric linear earthworks or cross dykes.



Figure 30. Potential site of a prehistoric cross dyke cut by the later medieval park pale of Bishop of Winchester's Purlieu, Furzy Brow, Denny Lodge. (MKM2964 and MKM2967). Photograph: RAF 106G/UK/1930 Frame 3124, 17th Jan 1947. English Heritage RAF Photography. Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

Prior to the project two prehistoric cross dykes or linear earthworks were previously known at Red Hill (MKM4257) and Furzy Brow (MKM2964).

The Red Hill site comprises a substantial bank up to 2.3m high with flanking ditches. The feature runs east-west across a small ridge known as Red Hill towards White Moor and is primarily considered to be prehistoric in origin on the basis of its defensive proportions. The second site, at Furzy Brow, is a triple bank and ditched feature which has been cut by the medieval park pale of Bishop of Winchester's Purlieu (Figure 30).

In addition, two further potential sites of prehistoric banks were identified at Shave Green Inclosure (MKM5982) and French's Bushes (MKM5983), these may be parts of linear earthwork dykes or field boundaries.

6.6 NMP results: Early medieval sites (AD410 – AD1065)

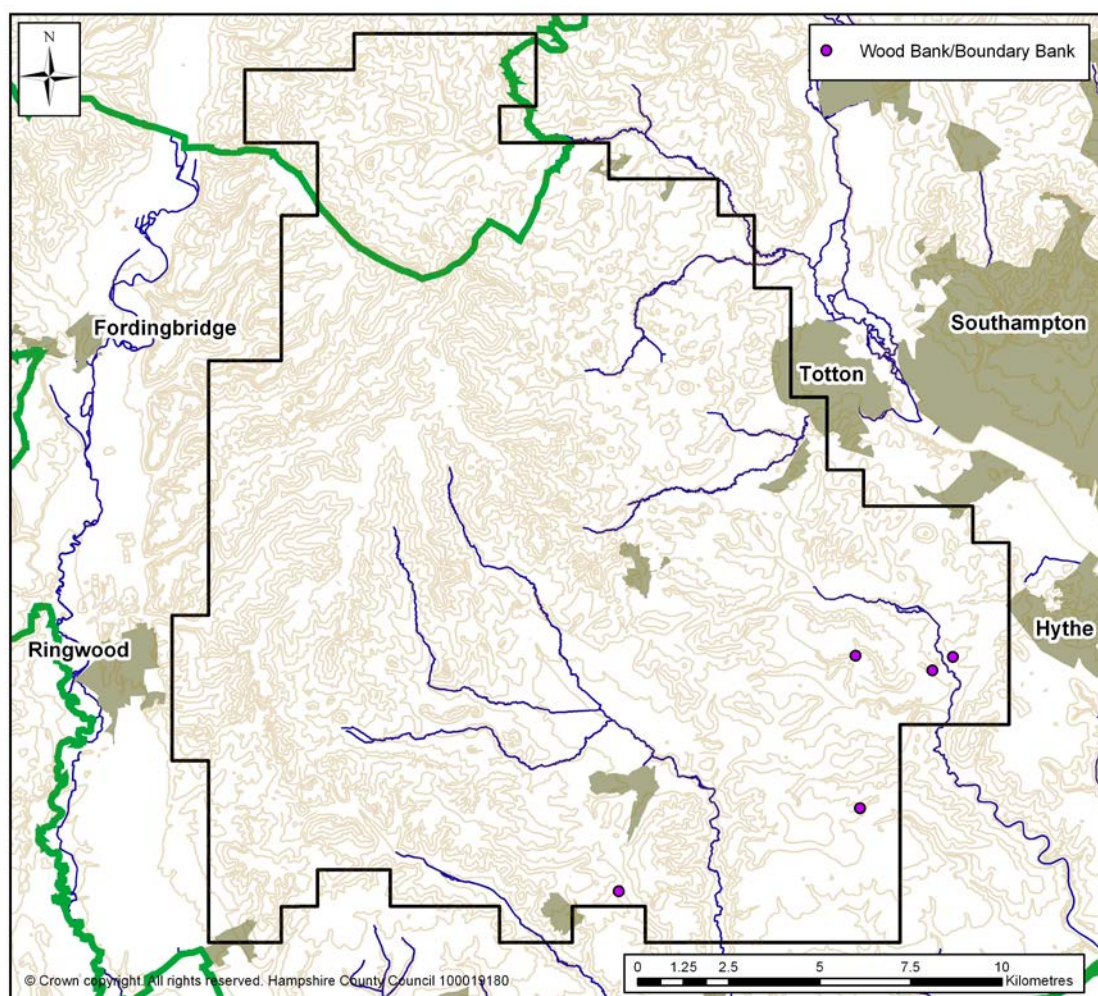


Figure 31. Distribution of possible early medieval sites.

Five sites were recorded with potentially Saxon origins. These are all linear boundary earthworks situated towards the southwest of the project area.

Four of the earthworks are on the proposed line of an early medieval defensive boundary known as Cerdic's First Enclosure or Enclave (MKM2993, MKM4514, MKM4515 and MKM4524). The linear earthworks were originally identified by Crawford as forming parts of a once continuous defensive earthwork although this supposition was based on projections of relatively short stretches of earthwork (Crawford 1952). Excavations carried out by Piggot in 1941 produced no diagnostic material and a medieval origin for the features cannot be ruled out (Piggot 1947).

Four sections of this proposed Saxon defensive boundary were identified on the lidar. The fifth section of linear boundary was identified at Three Beech Bottom (Figure 32). Here a multivallate linear earthwork runs for over 1.5km towards Sway (MKM3939). Similarities to those linear earthworks considered to form part of Cerdic's "First Enclave" may be indicative an early medieval origin although it may alternatively be part of a medieval park pale.

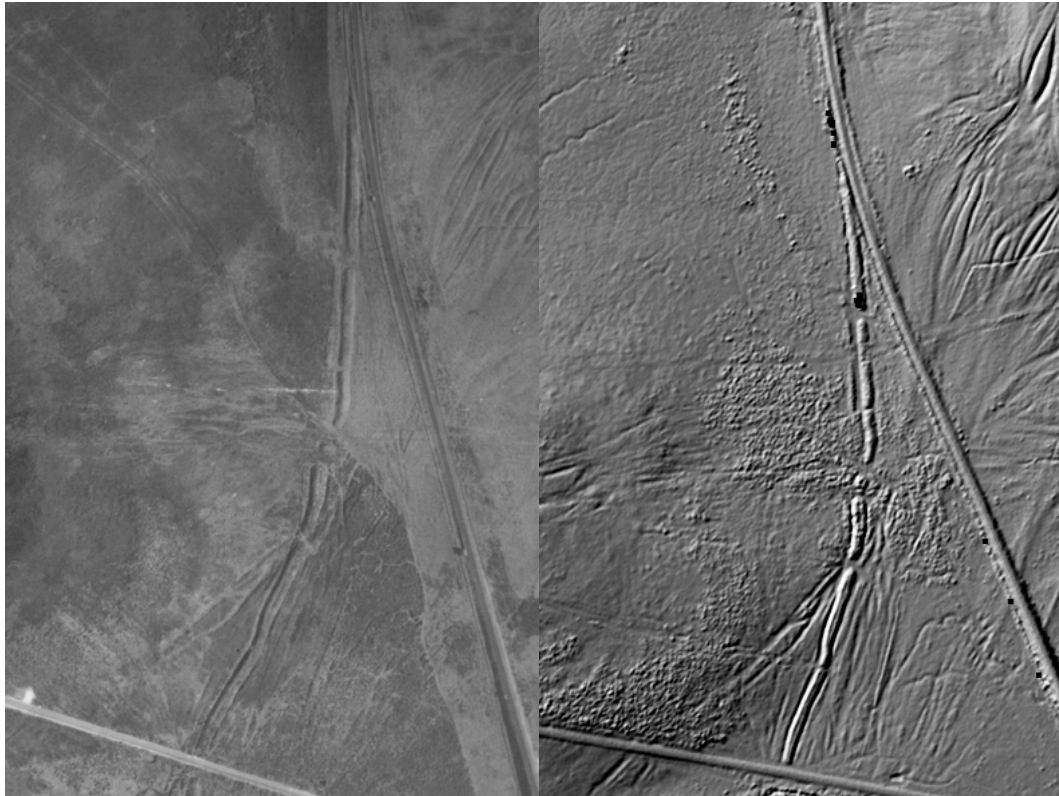


Figure 32. Potential site of an early medieval linear boundary at Three Beech Bottom, Sway. (MKM3939). Photograph: RAF 3G/TUD/UK/163 PTii Frame 5141, 30th Apr 1946. English Heritage RAF Photography. Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority Data 2011.

6.7 NMP results: Medieval sites (AD1066 – AD1539)

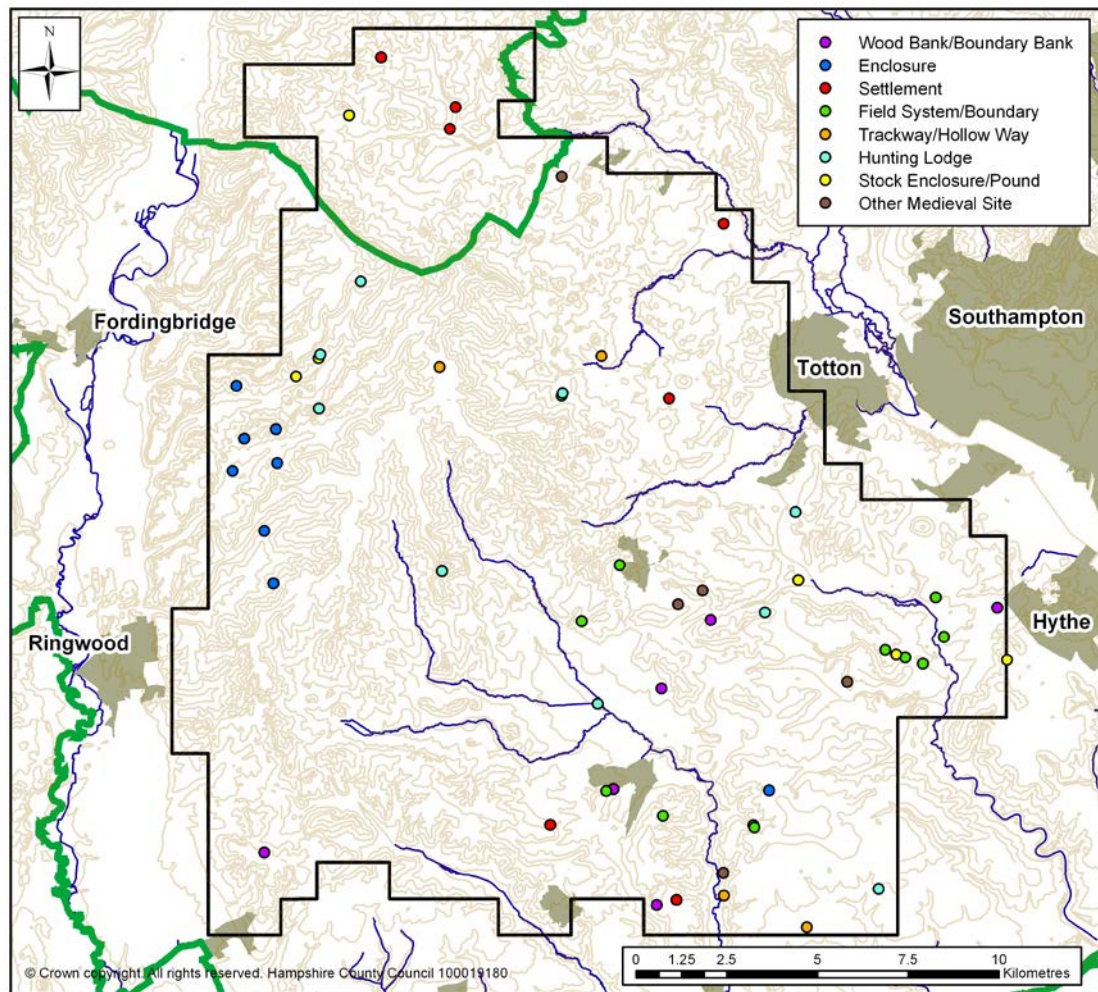


Figure 33. Distribution of medieval sites.

The New Forest was established as a royal hunting ground by William I in 1079, primarily for deer. In this context, the word ‘forest’ describes an area prescribed under law and designated as a land used for royal privileges. Afforested land had very strict Forest Laws which prohibited any interference of wildlife and deer by local commoners. In practice this meant that fencing off of land was forbidden as this would have inhibited the passage of free running deer and boar. In return grazing rights were given to commoners for their own ponies, cattle and pigs on the open forest (Carpenter 2013).

In practice therefore, the creation of the Forest has resulted in parts of the ancient landscape remaining largely unchanged since the medieval period. Several medieval villages and hamlets were gradually abandoned with the creation of the Forest and in their stead, monuments associated with the use of the hunting grounds such as park pales, hunting lodges and wood banks were established.

Fifty six sites dating to the medieval period were mapped and recorded; all of these were recorded as earthworks on lidar and 28 (50%) were new sites to the county HERs or AMIE.

Site Type	No: Sites
Boundary Bank	3
Deserted Settlement	3
Enclosure	7
Field Boundary	10
Field System	1
Hollow Way	1
Hunting Lodge	9
Moat	1
Park Pale	3
Pillow Mound	1
Fish Pond	1
Pound	4
Ridge and Furrow	1
Shrunken Settlement	4
Stock Enclosure	2
Trackway	3
Wood Bank	2
Total	56

Table 7. Medieval Site Types

6.7.1 Settlements

Features associated with the potential sites of seven shrunken or deserted medieval settlements were identified during the mapping, three of which were previously unrecorded. Sites include the village of Moor (MKM5865 – Figure 6) which covers an area of over 5 acres immediately to the east of the present Moor Farm. The desertion of this village was not abrupt and therefore unlikely to have been as a direct result of the creation of the royal forest. It was described as a hamlet in 1338 and 1428 but described as a single farm by 1675 (Taylor 1968).

New sites include Landford Lodge (MKM5969) where a complex of field boundaries and small enclosures associated with parallel cultivation marks are clearly visible on lidar and considered by the interpreter to be of potentially medieval origin (Figure 34).



Figure 34. Potential site of a deserted medieval village at Landford Lodge, Landford. (MKM5969). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority Data 2011.

At Battramsley two areas of possible house platforms are set within a series of sunken pathways or roads (MKM3510). The earthworks are again visible on lidar imagery to the east of Southampton Road and may represent a former medieval settlement (Figure 35).



Figure 35. Potential medieval earthworks at Battramsley, Boldre. (MKM3510). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority Data 2011.

6.7.2 Hunting lodges

The sites of nine medieval hunting lodges associated with the king's sport were identified in the project area, of which one was new to the record. The lodges were generally situated in areas of permanent afforestation away from settlement and often on ridge-tops within woodland (Smith 1999, 23). Eight lodges were previously known in the project area, all comprising square or sub square embanked enclosures. The internal areas typically range from 35m to 55m across although one site at Amberwood is significantly larger at 120m (Figure 36).

Amberwood Inclosure MKM6131	Canterton Green MKM6235	Churchplace Inclosure MKM5575	Church Place MKM5571
			
Queen Bower MKM4185	Sloden Inclosure MKM6327	Studley Castle MKM7375	Bolderwood Grounds MKM5123
			
0 400m			

Figure 36. Medieval hunting lodges. NMP Mapping © English Heritage.

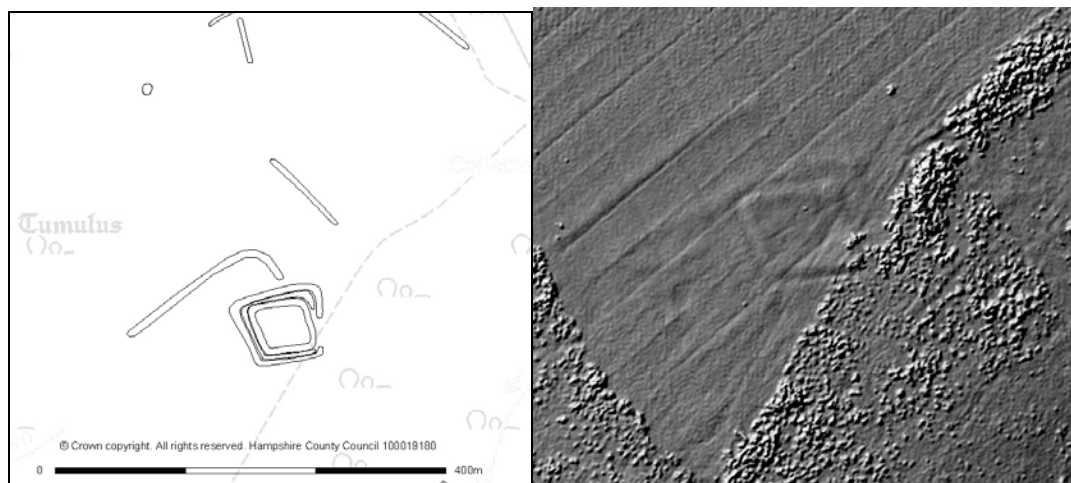


Figure 37. Potential site of a medieval hunting lodge at East Boldre. (MKM3069). NMP Mapping © English Heritage. Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority. Data 2011.

Most of the New Forest hunting lodges were maintained until the 15th century after which time their function may have changed to woodmen's lodges.. Smith (*ibid*, 26) has suggested that this may explain why several New Forest examples lie in close proximity to coppice enclosures such as at Sloden and Queens Bower.

The much denuded earthworks of a rectilinear enclosure were visible on lidar to the south east of Peaked Hill, East Boldre MKM3069. The rectilinear enclosure is approximately 30m across and enclosed by a double banked rampart. The site was originally interpreted as later prehistoric due in part to its close proximity to a number of possible prehistoric field boundaries immediately to the north (MKM3070). However it is morphologically similar to the other New Forest medieval hunting lodges and therefore it is considered most likely to be a similar medieval site (Figure 37).

Two other potential medieval hunting lodge candidates are situated at Matley Holms and Shearwood Copse (see section 6.7.4; page 55 below).

6.7.3 Park Pales

Deer parks, like royal forests, were established by the Norman aristocracy; they were areas of land set aside for the management and hunting of deer and other wild animals (EH 2013). Deer parks usually included both woodland and grassland, providing a protected area for woodland management and a sustainable supply of food for grazing throughout the year. In order to create a deer-proof boundary, the parks were surrounded by substantial earthworks comprising a bank with adjacent ditches and a wooden park pale on the top of the bank. The ditch was often on the inside of the bank in order to allow deer entry into the park but prevent their exit.

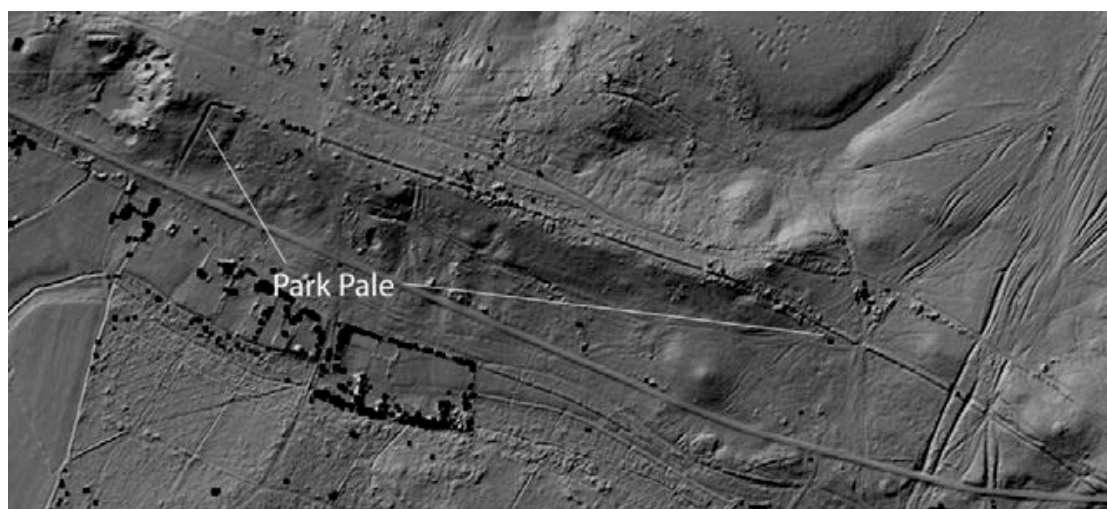


Figure 38. Park pale associated with Lyndhurst deer park. (MKM5501). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority Data 2013.

Deer parks are usually located in open countryside, either on marginal land or adjacent to a manor house or castle: those of the New Forest are unusual, lying within a royal forest. Deer were usually hunted on horse back across the open forest but as the numbers declined in the New Forest during the 13th century they were increasingly reared in protected parks and then released into the open forest for the hunt (Bond 1994).

Perhaps the best documented deer park in the New Forest is that at Lyndhurst which was originally enclosed by Edward I in 1291 and extended in the 14th century. Much

of the park pale has been fossilised in the modern field boundaries and was therefore not included in the NMP remit. However the northern section of the park pale, known as The Ridge, was clearly visible as a substantial earthwork and plotted from the lidar (Figure 38, MKM5501).

A second earthwork, known as Bishop's Dyke or The Bishop of Winchester's Purlieu, lies at Denny Lodge MKM2967. It forms a complete enclosure 175ha in size, roughly following the contours and enclosing the heads of the valleys of Shepton Water and a tributary stream of the Lymington River. The enclosure is likely to be a medieval hunting park enclosure (Figure 39)

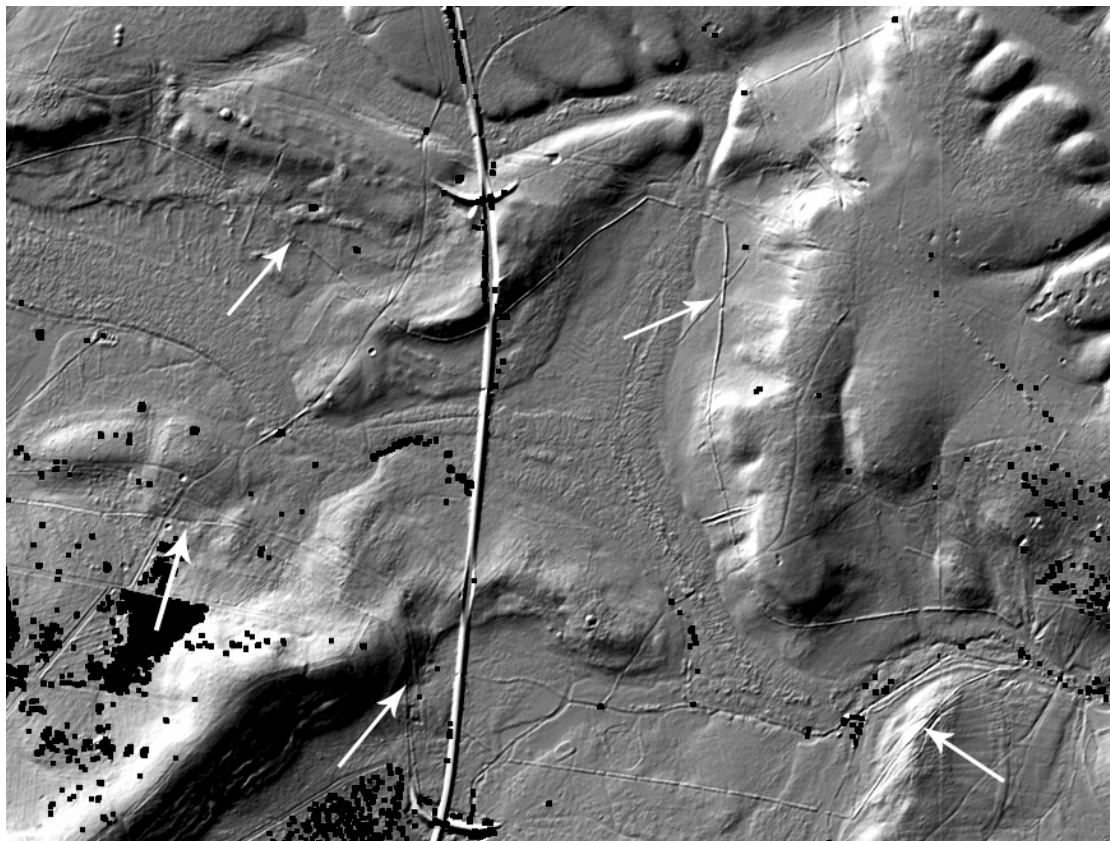


Figure 39. Possible medieval park pale of Bishop's Dyke, Denny Lodge. (MKM2967). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

6.7.4 Enclosures and pounds

Ogden's Purlieu MKM7340	Amberwood Inclosure MKM6130	Akercome Bottom MKM7309	Castle Piece MKM7322	Thompsons Castle MKM7457
0 200m				

Figure 40. Rectilinear medieval enclosures. NMP Mapping © English Heritage.

Thirteen enclosures and pounds were mapped and recorded as of probable medieval origin, five of which were new sites (Figures 40 and 41). The enclosures are rectilinear and curvilinear in form and range in size from 11m to 130m across.

At Ferny Crofts, Denny Lodge (MKM4512), a curvilinear enclosure 110m across has previously been suggested to be medieval in origin. It contains a small circular pound and may be the site of eight acres at 'la Ferncroft' which were granted to Beaulieu Abbey in 1324 and to be enclosed by a small dyke and low hedge (Passmore 1965). The Ferny Croft site is similar to another curvilinear enclosure at Fir Pound (MKM7334) which encircles a low hillock within Ogden's Purlicue, Hyde. The feature is clearly in use as a coppice enclosure but may have had medieval origins. The probable site of a Bronze Age round barrow lies on the top of the hillock and both features are clearly visible on lidar (Figure 41).

Two rectilinear enclosures, at Matley Holms (MKM5738) and Shearwood Copse (MKM5572), are between 30m and 60m across and enclosed by a defensive rampart comprising a bank with outer ditch. They are morphologically similar to the medieval hunting lodges described in 5.10.2 above and may be previously unrecognised examples.

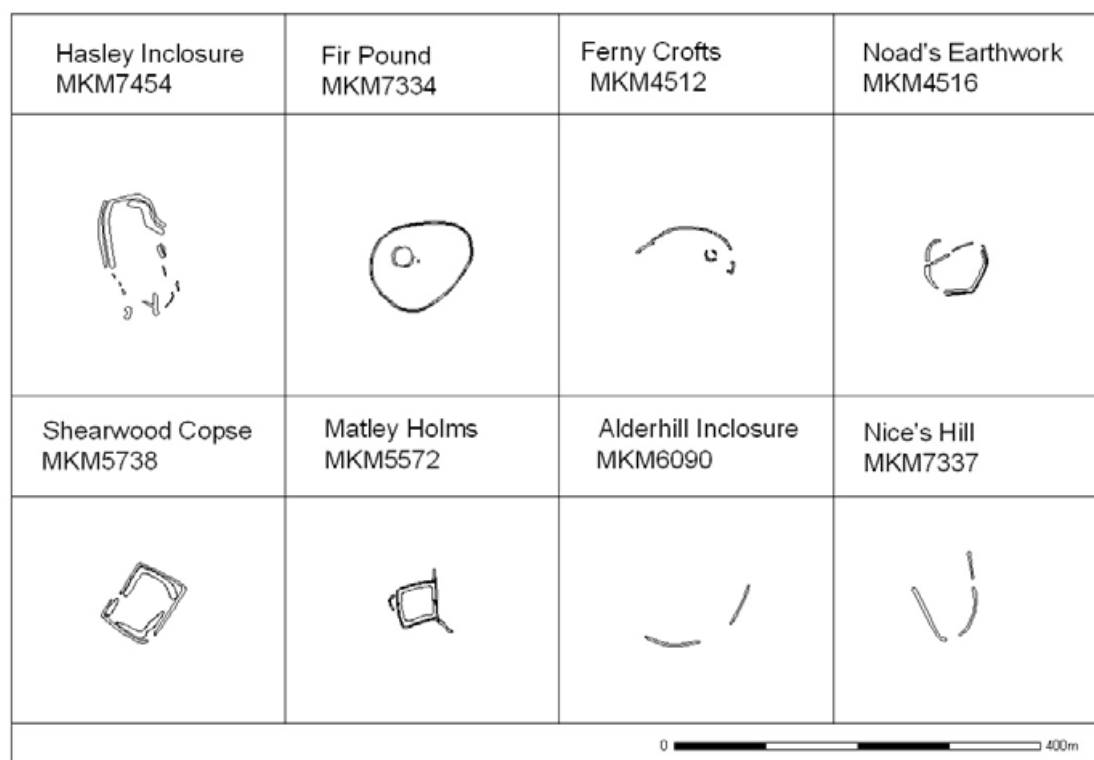


Figure 41. Medieval enclosures. NMP Mapping © English Heritage.

6.7.5 Other medieval sites

Additional medieval sites include earthworks associated with the medieval settlement and vaccary of Ipley Manor (MKM4518), fish ponds at Pondhead Inclosure (MKM5089) and a rectilinear bank, 60m long by 8m at Plaitford Common (MKM7678) considered to be the potential site of a medieval pillow mound.

Very little evidence for medieval cultivation was identified during the project although a small number of sites associated with medieval agriculture were plotted. Nineteen linear earthworks were identified as medieval field boundaries, boundaries, trackways or wood banks, the majority of which (84%) were previously unrecorded.

6.8 NMP results: post medieval sites (AD1540 - AD1900)

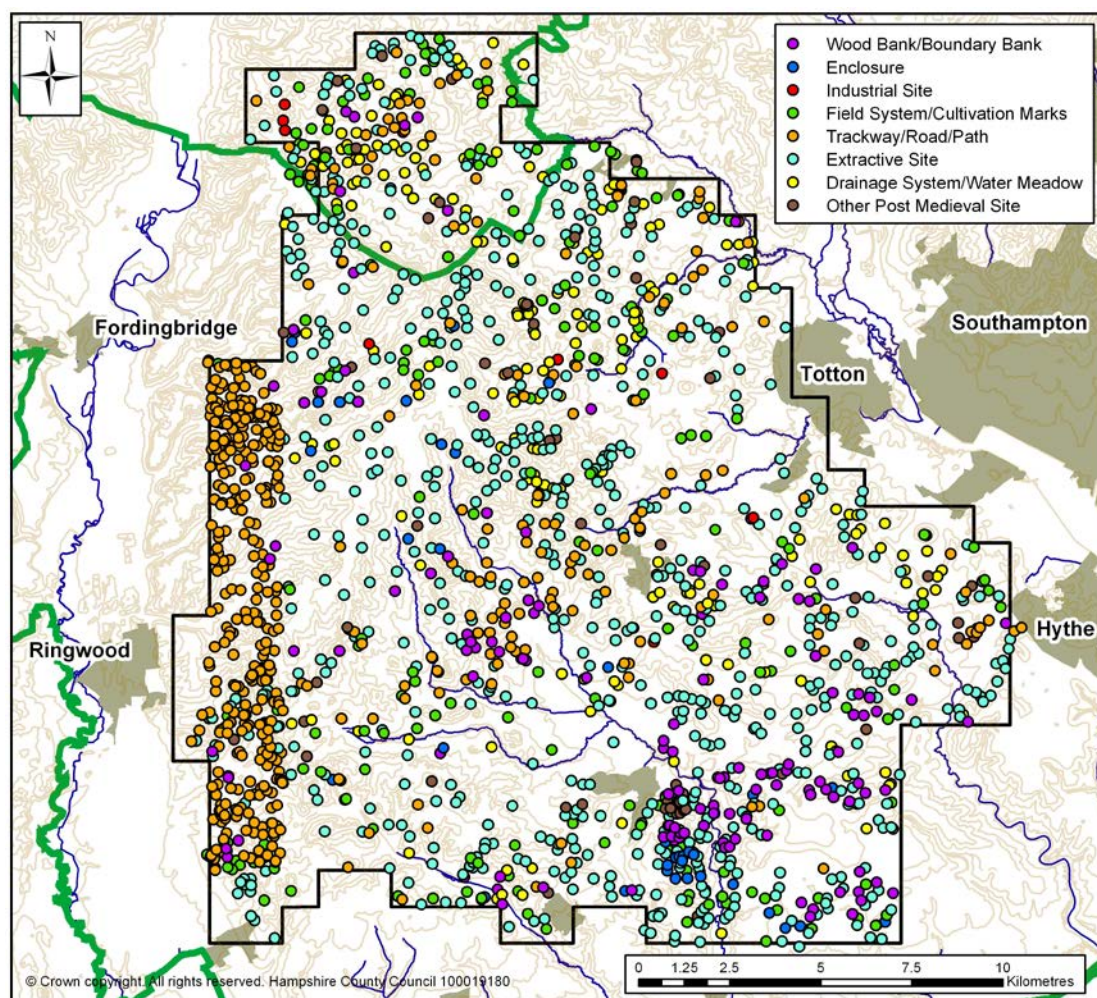


Figure 42. Distribution of post medieval sites.

During the mapping project 1119 sites were identified from the aerial photographs and attributed a post medieval date. In addition a further 746 sites were allocated a post medieval or early 20th century date. This amounted to 43% of all site records in the project database. The majority (97%) of the post medieval monuments were visible as extant earthworks or structures and 96% were new sites to the county HERs or AMIE.

In terms of surviving form, by far the majority of sites recorded, 1800 (97%), were still surviving as earthworks and generally visible on the lidar. Fifteen sites were partially surviving as earthworks and 50 (3%) completely levelled and either visible only as cropmarks or no longer visible at all on the lidar, nor on the latest photographs.

6.8.1 Agricultural and woodland management features

Of the 1865 post medieval sites recorded during the project, 385 (21%) were associated with agricultural activity. These monuments included 12 water meadows, 75 cultivation marks or ridge and furrow and 174 ditches, drains and drainage systems. Post medieval encroachment of agriculture and settlement along the margins of the forest is evidenced at a number of sites by field boundaries and enclosures dating to this period. One hundred and thirty four post medieval parliamentary field boundaries and fragments of field systems were identified, being distinguishable from medieval boundaries by their ruler-straightness.

Site Type	No: Sites
Assart	6
Bee Garden	7
Boundary/Boundary Bank/Boundary Mound	7
Brickfield/Brickworks	9
Bridge	1
Building/Building Platform	3
Chalk Pit/Gravel Pit/Extractive Pit/Sand Pit	493
Charcoal Burners Site	1
Clay Pit	6
Cultivation Marks/Ridge and Furrow	75
Enclosure/Pound	25
Decoy Pond	1
Drain/Drainage Ditch/Drainage System	174
Field Boundary/Field System	134
Firing Range/Rifle Range	4
Garden Feature/Sunken Garden	16
Gunpowder Works	1
Mound/Spoil Heap	3
Lodge	1
Milestone	1
Pond	22
Quarry	220
Racecourse	1
Saltpetre Works	1
Settlement	1
Toll Boundary Marker	2
Trackway/Path/Road	496
Tree Avenue	2
Tree Enclosure Ring	15
Water Meadow	12
Wood Bank	125
Total	1865

Table 8. Post Medieval Site Types

One of the best examples of post medieval settlement encroachment is the system of field enclosures associated with the post medieval settlement of Beaulieu Rails, East Boldre (MKM3068). The name reflects its origin being a squatter settlement which grew up along the wooden railings surmounting the bank that formed the boundary of the manor and parish of Beaulieu (James 1994). The settlement illegally cut into the forest boundaries and was situated entirely on forest common land until the mid twentieth century when the modern settlement of East Boldre settlement progressed eastward into Beaulieu parish.

A complex series of enclosures are visible on lidar lying in the open heathland to the west of the modern road (Figure 43). The western edge of the enclosures is formed by the line of a small stream channel. It has been suggested (Smith 1999, 33) that the plan represents linear settlement expansion onto marginal land, perhaps similar to examples noted in Breckland where stretches of heathland were cultivated for a few years before reverting back to heathland (Mason and McClland 1994). Further fragments of field systems were mapped immediately to the west of Beaulieu Rails on Beaulieu Heath itself which were also considered likely to be post medieval, possibly out-fields associated with the settlement (MKM3041).



Figure 43. Field system associated with the post medieval settlement of Beaulieu Rails, East Boldre. (MKM3068). NMP Mapping © English Heritage. Lidar: © Forest Research based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

In addition to field boundaries, 129 sites specifically associated with woodland management and clearance were identified including 125 wood banks, and seven groups of tree clearance pits or charcoal burning platforms. Twenty two additional enclosures were recorded, most of which were interpreted either as coppice enclosures or related to stock management.

Seventy five areas of parallel cultivation marks were recorded as post medieval in date and an additional 93 sites as medieval or post medieval. Many of these sites were under modern plantations and therefore interpreted as either early plantation ridges or areas of pre-plantation cultivation.

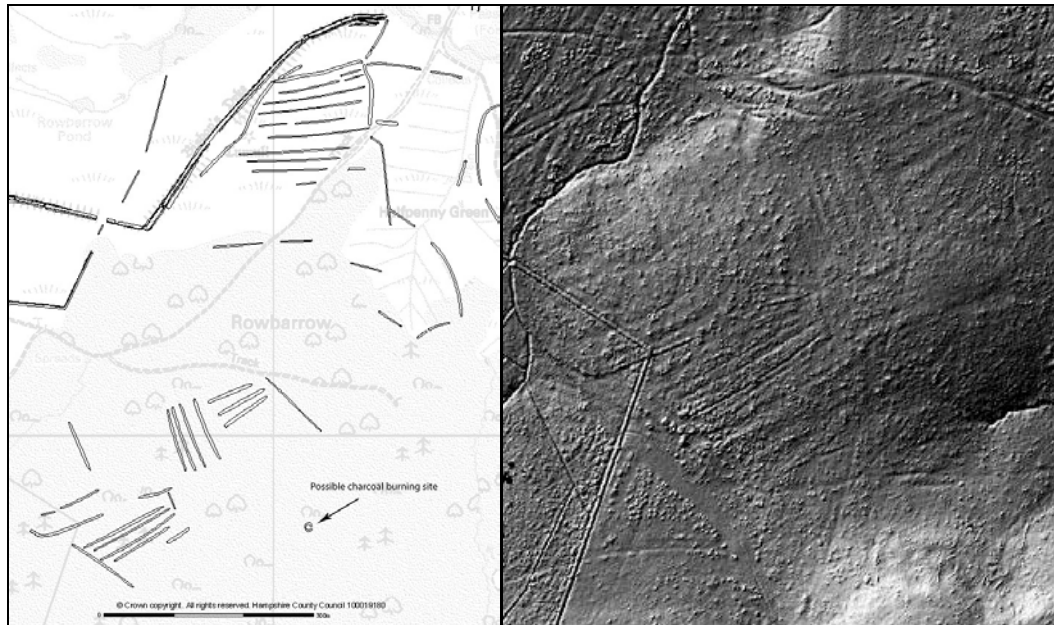


Figure 44. Parallel cultivation marks visible as low earthworks at Rowbarrow, Denny Lodge. (MKM2949). NMP Mapping © English Heritage. Lidar: Cambridge University Technical Services data 2011 © Cambridge University Technical Services and New Forest National Park Authority.

Water meadows

Water meadows were important features of the post medieval landscape and developed on many river flood plains. They consisted of parallel networks of ridges and drainage channels, the water being diverted from the river in a series of leats controlled by sluices. These enabled the controlled flooding of the grasslands in winter or early spring which increased the overall grass production or accelerated the growth of grass earlier in the agricultural year.



Figure 45. Post medieval water meadows at Queens Road, Lyndhurst. MKM5522 NMP Mapping © English Heritage.

A number of potential water meadows and drainage systems were identified within the valleys of the River Blackwater, the Cadham River and tributaries of the Beaulieu

River (Figure 45). In many cases, the main drainage channels were already partially marked on the OS First Edition maps although none had previously been recorded in the AHBR.

Coppice enclosures and wood banks

Management of the woodlands within the New Forest dates back to the earliest times and documentary evidence for medieval coppicing is good with the earliest formal account of tree management documented in the Beaulieu Abbey accounts 1269-70 (Rackham 1980, 140). Thirty one former medieval coppices have been previously documented (Flower 1980).

Earlier medieval wood-banks are often irregular curvilinear in shape, with meandering alignments enclosing large areas. Later wood boundaries tend to be smaller and more rectilinear in plan. Those dating from the 18th century onwards were laid out along straight lines with sharply angled corners and defined by substantial earthen banks and ditches (Smith 1999, 39-40).



Figure 46. Post medieval wood bank at Brock Hill, Brockenhurst. (MKM5385). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

This transition in form from the medieval to later post medieval coppice enclosures led to a degree of uncertainty in the date of many of the wood banks encountered during the mapping project. During the project, 352 potential wood banks were recorded of which 125 were specifically allocated a post medieval date. Bar two, which were tentatively given a medieval date, the remainder were given a more general historic or uncertain date range.

A good example of a post medieval coppice woodland boundary is that within the Vinny Ridge Inclosure at Brock Hill (Figure 46). Here a linear banked and ditched boundary is visible as earthworks running northward for over 350m, before turning sharply east. The feature continues for a further 500m before abutting the modern Inclosure boundary. The wood bank is cut by (and therefore considered to predate) the Rhinefield Ornamental Drive.

Tree Enclosure Rings

The sites of 15 possible post medieval tree enclosure rings were identified, all bar three situated in the vicinity of Setley Common, Brockenhurst (Figure 47). Here a dispersed group of 12 enclosures were identified on the lidar. The enclosures are all

perfectly circular or near circular and range between 16m and 68m across. The features are likely to be part of a formal planting scheme, possibly associated with Brockenhurst House to the north and most, but not all, are marked on the OS First Edition map.



Figure 47. Post medieval tree enclosure rings at Roydon Woods, Brockenhurst. (MKM3635-40). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

6.8.2 Livestock management features

Bee Gardens

Redhill Bog MKM4256	Shirley Common MKM8690	Shirley Common MKM8691
Ober Corner MKM4296	Sway MKM3928	King's Garden MKM4908
0 100m		

The New Forest heathlands contain a wealth of pollen-rich heathers which attract many insects including bees. Until recently it was common New Forest practice to set out hives in the remote heaths in the summer months to take advantage of the heathers in bloom. John Wise, in the mid-19th century, noted that bees were still largely kept throughout the New Forest noting that: 'The bee-season, as it is called, generally lasts, on account of the heath, a month longer than on the Wiltshire downs.' (Wise 1863).

Figure 48. Potential sites of post medieval bee gardens. NMP Mapping © English Heritage.

Small embanked enclosures were constructed to protect the hives from deer and grazing stock. Indeed, the New Forest Court of Swainmote in 1635 gave fines to many guilty of creating 'small hedged enclosures' for keeping hives on the open lands of the New Forest (Stagg 1983, 102-9).

The tradition of keeping bees on the forest heaths is indicated by 'hive', 'garden', 'garn' and 'bee' place names such as at Hive Garn Bottom, near Pitts Wood Inclosure, and Anthony's Bee Bottom, near Holmsley. A number of small sub-rectangular embanked enclosures, presumably bee gardens, have been found in the isolated heaths. They have been named 'Holmsley Ridge' enclosures after the type site where over 60 examples have previously been recorded (Smith 1999, 40-42).

The enclosure at King's Garden is 23m across and therefore significantly larger than other known bee gardens. It is also unusual being circular in shape and it has previously been suggested that it might alternatively be a stock pound (Smith, 1999). Its near perfect circular shape would however also be unusual for a pound enclosure and its size is comparable to the potential bee garden at Sway.

Bee gardens proved difficult to identify on conventional aerial photographs and lidar being very small, generally less than 10m across, and often situated in overgrown un-grazed shrub and heath. However six potential bee enclosures or groups of bee gardens were identified during the project (Figure 48).

At Dur Hill Down, five small embanked rectilinear enclosures were identified on the aerial photographs and lidar. They ranged in size from 8-10m across and are also considered likely to be post medieval bee gardens (Figure 49).

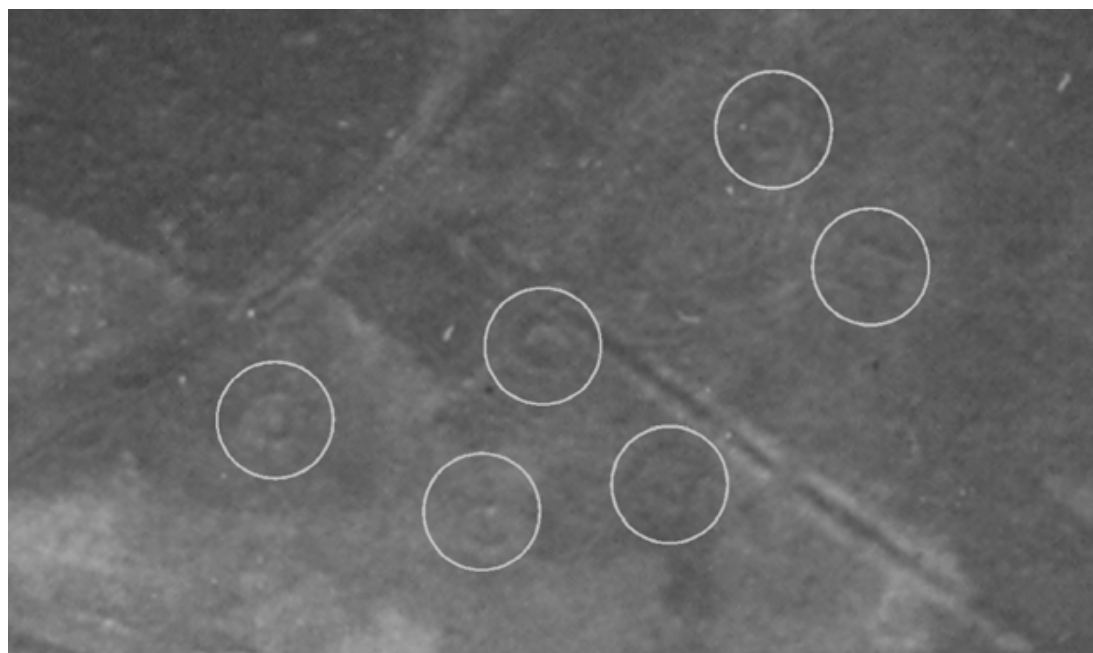


Figure 49. Potential bee gardens on Dur Hill. (MKM5227). Photograph: RAF CPE/UK/1893 Frame 3128, 12th Dec Apr 1946. English Heritage RAF Photography.

Stock enclosures.

A small number of sub-square enclosures were recorded within the project area and allocated a post medieval date. These range in size from 40m to 250m across (Figure 50). Whilst the larger enclosures may be coppice enclosures, it seems reasonable to suggest that the smaller ones may have been used as stock enclosures or pounds.

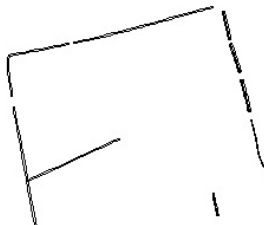
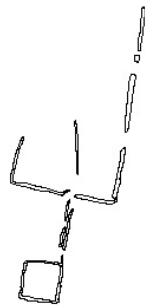
Ashley Bottom MKM6005	Hursthill Inclosure MKM5527	Milking Pound Bottom MKM3938	Bull Hill MKM3541
			
Broomy Inclosure MKM6444	Sloden Inclosure MKM6300	Hawkhill Inclosure MKM3105	
			
0  400m			

Figure 50. Possible post medieval stock enclosures or pounds. NMP Mapping © English Heritage.

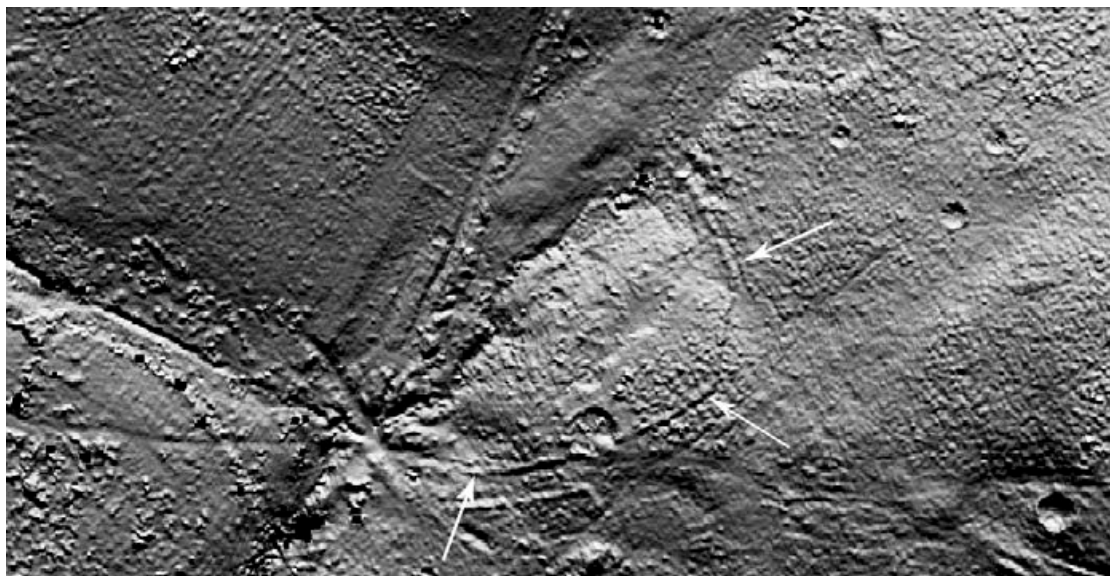


Figure 51. Potential post medieval pound adjacent to a small stream on Ashley Walk, Godshill. (MKM6003). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

One post medieval pound has been previously suggested at Ashley Bottom, Godshill (MKM6003) (Pasmore, 1967, 20). Here a linear banked earthwork curves round to

the east of a small stream forming an enclosure 155m across. The earthworks appear to be very slight on the lidar (Figure 51) and an earlier origin is possible.

Decoy Pond

Another site associated with animal management is the decoy pond at Decoy Pond Farm, Denny Lodge (Figure 52). Decoy ponds were artificially created pools of water specifically designed to entrap wildfowl. They date to the 18th and 19th centuries and are generally square or triangular in form with long curving channels at each corner called pipes which taper away from the pond. Wildfowl were encouraged onto the pond and then lured up the funnel shaped pipes which would have been covered with netting stretched over metal or wooden hoops (EH 2013).

The site at Decoy Pond Farm is no longer in use and therefore not easily visible on the ground, however earthworks associated with the site are clearly discernable on the lidar including the rectangular pond and traces of the pipes.

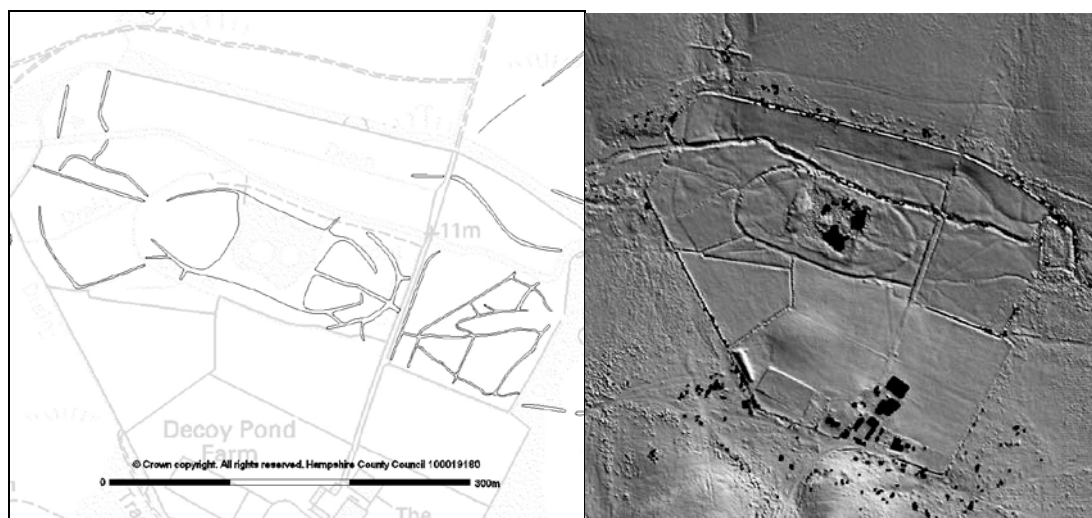


Figure 52. Post medieval decoy pond at Decoy Pond Farm, Denny Lodge. (MKM4523). NMP Mapping © English Heritage. Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

6.8.3 Industrial sites

A large portion of sites assigned a post medieval date are associated with extraction and related industries. Seven hundred and thirty one extractive and industrial sites were recorded of which of which only eight had previously been recorded in the HERs or AMIE. Larger quarries and those marked on the various OS historical maps were recorded in the NFNPA Quarry database however this was not available to the project team during the mapping.

Extractive sites included large scale quarries as well as smaller extractive pits. Forty-seven sites were specifically recorded as clay, chalk, gravel or sand pits with a further 673 more general interpretations of quarry or extractive pit plus one spoil heap. Some of these sites, particularly the larger pits and quarries, are marked on the OS First and/or Second Edition maps and several may have had their origins in the medieval period.

A series of rectilinear extractive pits are visible as earthworks on the valley sides of tributary stream of Ober water to the south of Markway Inclosure, Brockenhurst. They are part of a wider group of over 50 pits lying within the Inclosure and are considered to be post medieval in date (Figure 53).



Figure 53. Post medieval gravel pits at Markway Inclosure, Brockenhurst. (MKM4069, MKM4425 and MKM4426). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

The extractive features are widely scattered across the entire New Forest. Although particularly on the superficial river terrace deposits of sand and gravel, significant numbers also lie off the tertiary deposits and may have been related to extraction of the underlying clay silts and sands, presumably associated with the post medieval brick industry.

Charcoal Burning

Charcoal production has been an important industry in the New Forest since medieval times supplying the local iron and brick making industries and being exported to the smelting industry in the West Country. Charcoal burning sites would have comprised a stack of cut wood which when lit would have been mounded with earth to allow slow burning. Archaeological evidence for the industry is slight: removal of the charcoal would have produced low rings of the removed earthen mound and debris between 6–13 metres in diameter with a slight central depression. One such possible site was identified at Rowborrow where a circular ring 12m across with a central pit was identified on lidar (see Figure 44 above) site MKM2989.

Brick kilns

The New Forest is underlain by a variety of clay beds. Facilitated by a ready source of clay and fuel, brick making developed in the area; the earliest evidence for kilns dating from the Roman period. Kilns and brickyards were found during excavations at Rockbourne Roman villa (James 1982). A continuous industry starting in the 16th century developed through the 17th and 18th centuries with major production in the 19th and 20th centuries. Traditionally most of the bricks and tiles were fired in clamps. Many of the kilns on the edge of the open forest were of the Scotch open topped variety which provided a red glow in the night sky. Many Scotch kilns were located in coastal areas and as a consequence these ceased production at the outset of the Second World War so as to reduce the possibility of being used for navigation by enemy aircraft. The local brick and tile industry was not re-established after the war. Examples of Scotch kiln remains and heaps of land drain tiles can be seen at Pitts Deep on the Pylewell Estate (Frank Green pers com).

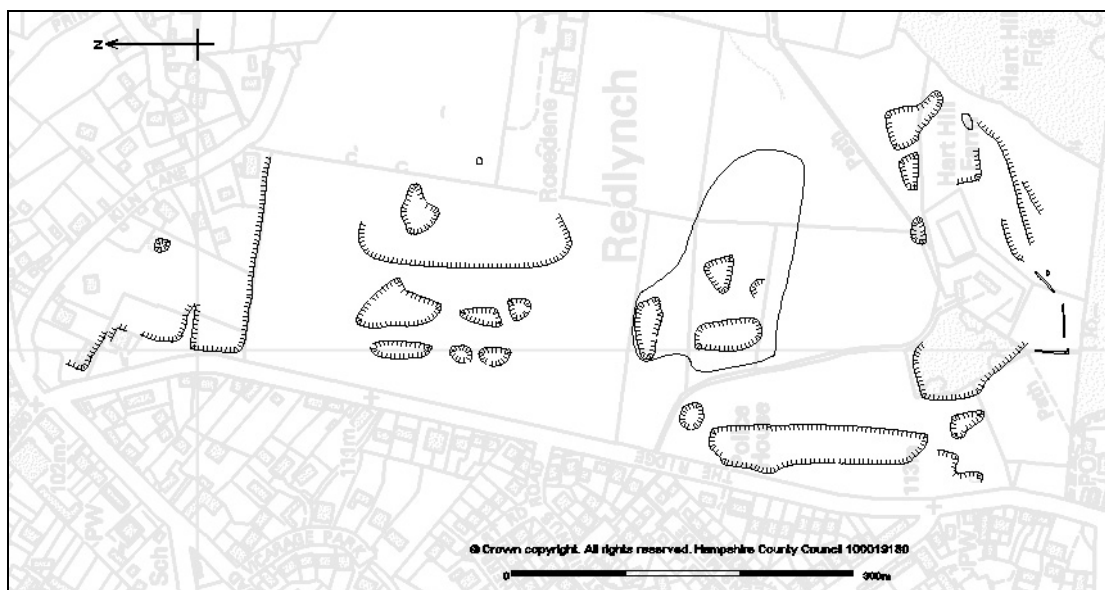


Figure 54. Brickfields associated with the 19th century Hart Hill Brickworks at Redlynch. (MKM5720-22). NMP Mapping © English Heritage.

Fifteen sites associated with the post medieval brick industry were recorded during the project including nine brickfields, brick kilns and brickworks and six groups of clay pits. The most extensive site lies at Redlynch where earthworks associated with the Hart Hill Brick Kiln marked on Ordnance Survey historic mapping are visible as low earthworks on lidar. The shallow clay pits and associated features cover an area of over 22 ha (Figure 54).

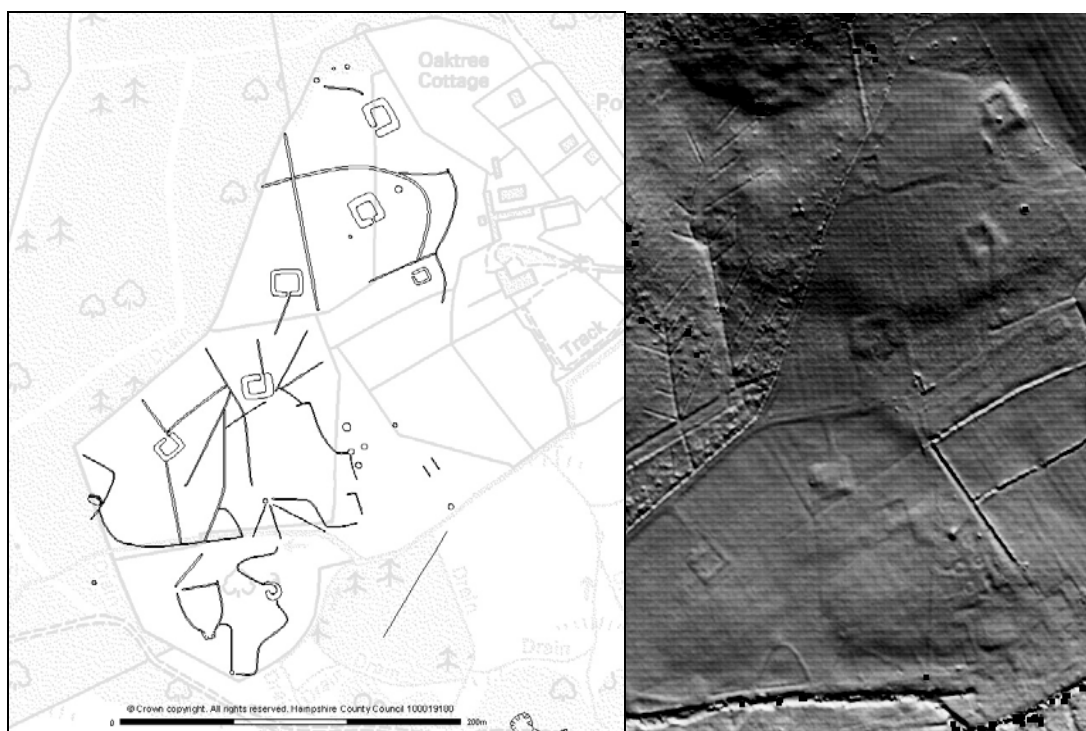


Figure 55. Earthworks associated with the 19th century gunpowder factory at Powder Mill Farm, Bramshaw. (MKM6141). NMP Mapping © English Heritage. Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

The remains of two other significant industrial sites were identified during the project. These include the 16th century saltpetre works at Ashurst Wood, Denny Lodge (MKM5573) and the remains of a 19th century gunpowder factory at Powder Mill Farm, Bramshaw (MKM6141).

At Powder Mill Farm the surviving remains of the gunpowder factory consist of several dispersed sub-square features, mounds and trackways (Figure 55). The factory was known as Schultze Gunpowder Factory and was active between 1865 and 1923. At one time it was the largest nitro-compound gunpowder factory in the world, supplying three-quarters of the world's annual consumption of gunpowder for sporting purposes. Eyeworth Pond, near Fritham, was specially created by the factory as a reservoir to hold water needed during the manufacturing process (Pasmore 1993).

6.8.4 Transportation Sites

Sites associated with transportation included the remains of a railway cutting at Burbush Hill, Burley forming part of a now disused section of the Southampton to Dorchester railway (MKM4387) cuttings of the same line at Blackhamsley Hill, Brockenhurst (MKM4080) and Long Slade Bottom, Brockenhurst (MKM4241).

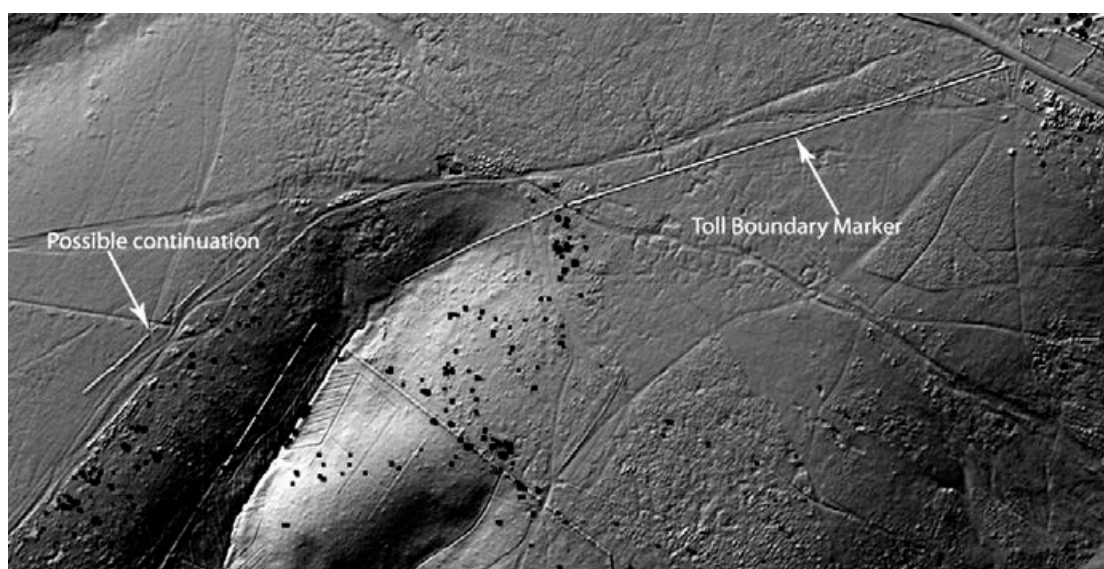


Figure 56. Possible post medieval toll boundary marker at Studley Head, Bramshaw. (MKM7373 and MKM7374). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

The sites of two possible toll boundary markers were identified at Godshill (MKM7373 and MKM7374) just to the north of Studley Castle. They are associated with the Cadnam (Southampton) to Fordingbridge road (B3078) and comprise a linear bank and ditched earthwork running for 650m to the south-west of the road from Picket Corner to Roger Penny Way. A possible continuation of the feature is situated 200m to the west.

Over 490 linear features were recorded which were considered likely to be trackways of post medieval or early 20th century. Although widely scattered, they were mainly concentrated on the western side of the project area and may have been associated with progress onto the forest from the towns and villages bordering the Avon Valley. Many of the trackways lie in the vicinity of the Second World War training areas associated with Ashley Walk bombing range and a later 20th century origin cannot be ruled out.

A series of rectilinear pits were identified to either side of the B3054 road running from Hatchet Gate to Portmore. They are very regular in both shape and spacing and were initially considered to be military features associated with the adjacent airfield. They are however marked on the OS First Edition map of the area and were borrow pits used for extracting gravel to stabilise the road surface in the 19th century (Figure 57).



Figure 57. 19th century rectangular extractive pits adjacent to the road on Hatchet Moor, Boldre. (MKM2999). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

6.8.5 Miscellaneous post medieval features

In addition to the above sites, 65 miscellaneous features were allocated a post medieval date including 16 garden features and 22 ornamental ponds. The sites of four 19th century rifle ranges were identified at Strodgemoor Bottom (MKM4847) and White Moor (MKM4149 and MKM4151 and MKM5172). Remains of the 18th and 19th century racecourse at Lyndhust Race course were also plotted from aerial photographs dating to the 1940s where parts of the race track could be seen surviving in trackways around the later golf course (MKM5569).

6.9 NMP results: Historic (medieval or post medieval) sites (AD410 - AD1900)

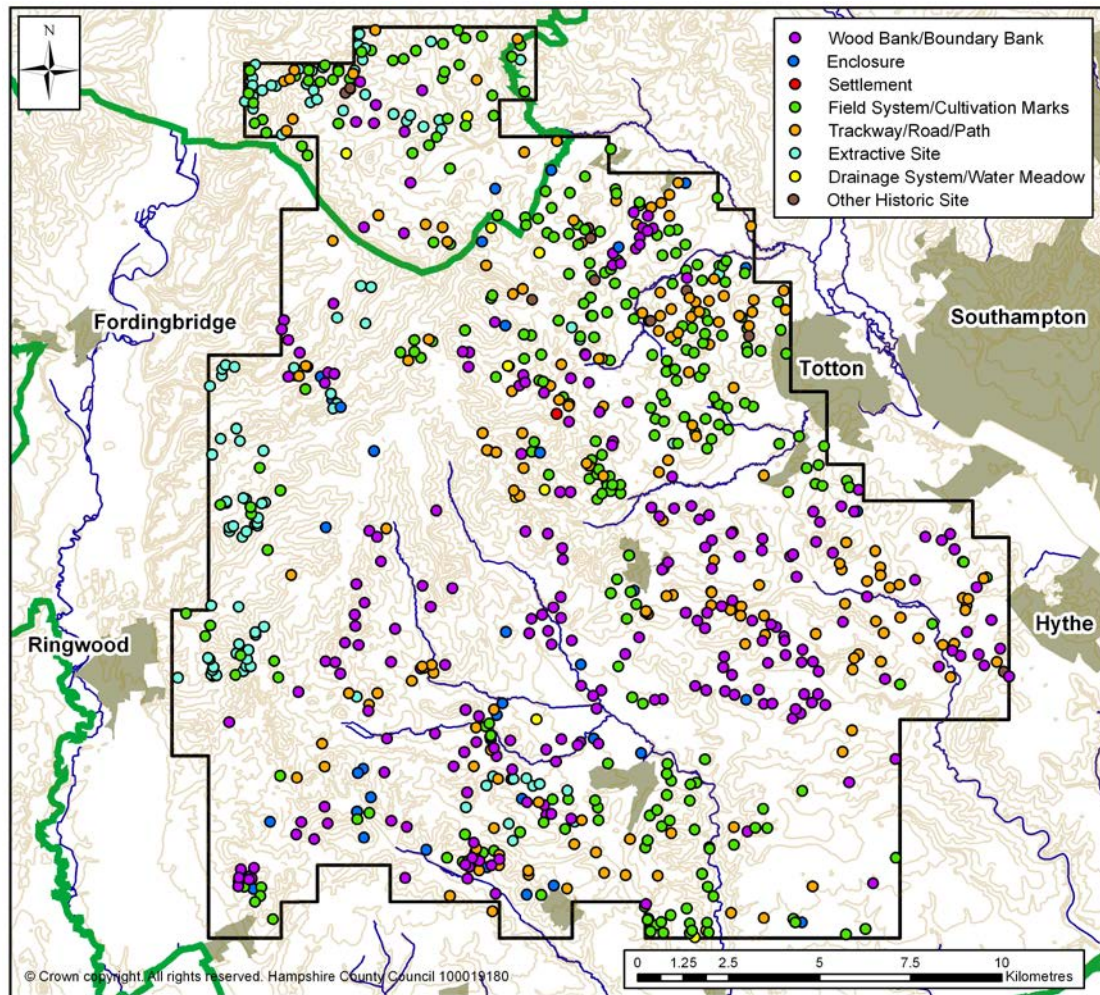


Figure 58. Distribution of Historic (medieval or post medieval) sites.

The nature of much of the evidence recorded during the project meant that for many sites it was not possible to ascribe a more precise date than historic (Roman/post Roman or later) in origin. This was particularly true for agricultural features such as field boundaries, fragments of field systems, trackways and areas of parallel cultivation marks (ridge and furrow) which could have been medieval or post medieval in date. Where a more specific date could not be determined from the aerial photographic evidence, these sites have been attributed a general historic date.

Of the 856 records allocated an historic date 89% were new sites to the county HERs and AMIE. Ninety six percent were still visible or partially visible as upstanding earthworks on the lidar and 4% as plough-levelled earthworks or cropmarks.

Sites included 637 linear features or groups of linear features interpreted as field boundaries and systems, woodbanks or trackways. In addition, 81 areas of ridge and furrow or cultivation marks, 17 hollow ways and 105 groups of extractive pits medieval or later date were mapped.

Site Type	No: Sites
Assart	1
Bank (Earthwork))	4
Boundary/Boundary Bank/Boundary Ditch/Boundary Mound	11
Building Platform	1
Chalk Pit	13
Clay Pit	10
Cross Dyke	1
Cultivation Marks /Ridge and Furrow	93
Enclosure/Pound	26
Deer Park	1
Drain/Drainage Ditch/Drainage System	10
Extractive Pit	82
Field Boundary/Field System	195
Fishpond	1
Garden Terrace/Walled Garden	2
Hollow way	17
Pillow Mound/Rabbit Warren	4
Pound	7
Road	1
Strip Lynchet/Cultivation Terrace	2
Settlement	1
Trackway	158
Tree Mound	1
Well	1
Wood Bank	213
Total	856

Table 9. Historic Site Types

6.9.1 Enclosures

Forty seven enclosures were attributed a general historic date-range including 40 sites recorded as enclosures or woodbanks and seven pounds. These enclosures were more curvilinear than their post medieval counterparts perhaps indicating an earlier origin; this is the reason for their generic 'historic' interpretation. Most are likely to be coppice enclosures or stock rearing enclosures (Figure 59).

At Pigsty Hill, Burley a group of linear banks (MKM4398) form a system of small fields, 45m to 70m across. The place-name evidence led the interpreter to suggest

that they may have been associated with medieval or later pig-rearing. Similarly, a small pound at Goatspen Plain is likely to have been related to the keeping of goats (MKM4400).

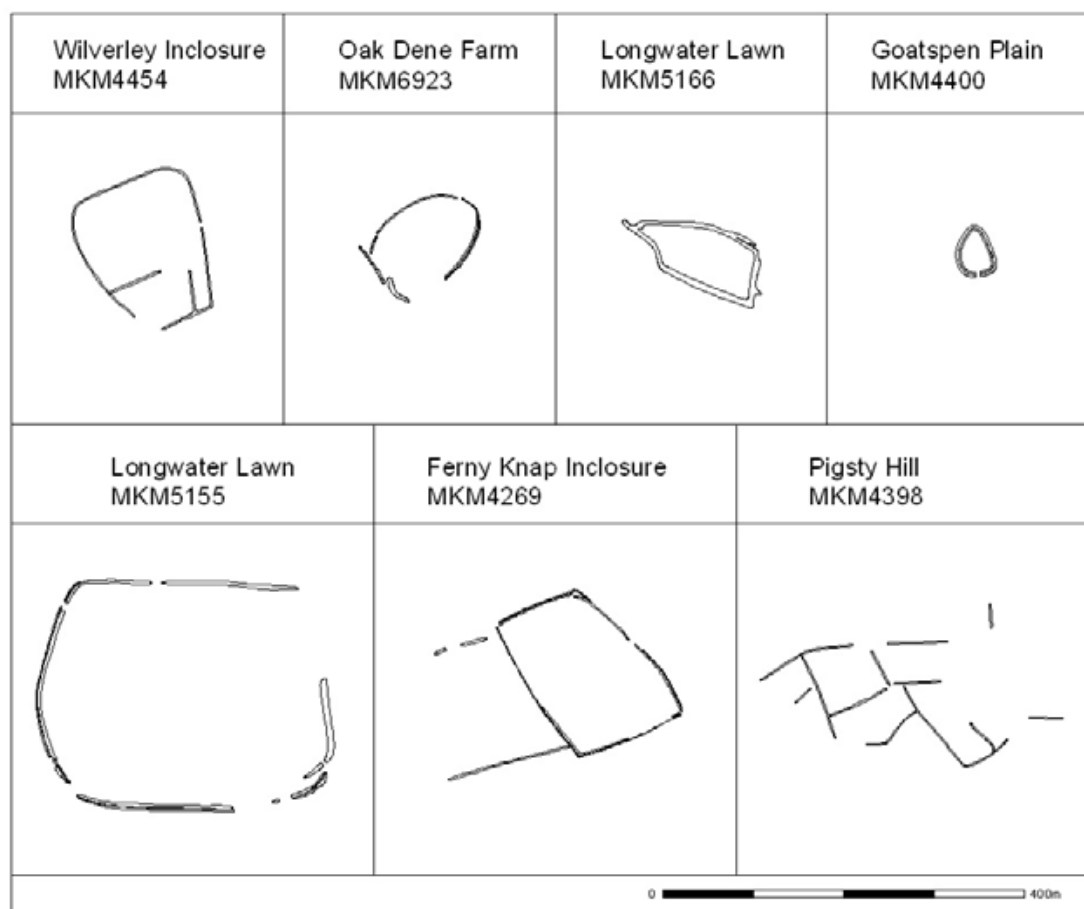


Figure 59. Possible medieval or post medieval coppice enclosures or pounds. NMP Mapping © English Heritage.

6.9.2 Rabbit warrens and pillow mounds

The historic sites include a small group of curvilinear enclosures at Half Moon Common. They range in size from 35m to 130m across and have been interpreted as medieval or later coppice enclosures. The possibility that some of the enclosures may be warren boundaries has been suggested on the grounds of place name evidence such as Half Moon Warren (MKM7699) and Warren Plantation (MKM7697 and MKM7698) (Figure 60).

Additional sites potentially associated with rabbit husbandry have been suggested at Larks Lease Copse, Copythorne (MKM7089) where a group of five linear mounds may have been the sites of pillow mounds. Two linear mounds, 16m long, on Beaulieu Heath, Denny Lodge (MKM4680) may also have been pillow mounds. At Furzley Common, Bramshaw (MKM7691) an oval enclosure 76m across lies on Stagbury Hill. The enclosure has been interpreted as a medieval or later warren boundary being half a kilometre south-west of the Half Moon Common group. Its bank and ditched ramparts enclose a linear barrow cemetery of four barrows which may have been reused as artificial rabbit burrows or pillow mounds. The suggestion that the site may be of later prehistoric date however cannot be ruled out.

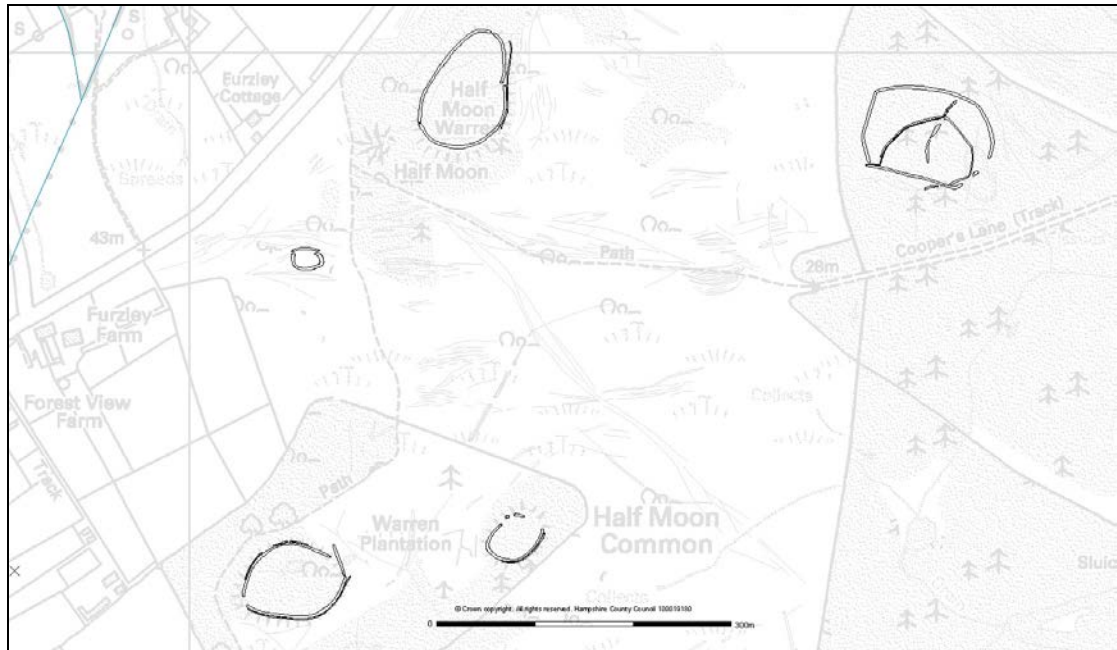


Figure 60. Medieval or post medieval coppice enclosures or warren boundaries at Half Moon Common, Copythorne. (MKM7697-MKM7701). NMP Mapping © English Heritage.

6.9.3 Deer Park

One site of interest which has been given a medieval or post medieval date range is a large pale enclosure within Holmsey Inclosure, Burley (MKM4443). The curvilinear enclosure is over 500 m across and still visible as a slight earthwork on lidar (Figure 61), it is considered to be the possible site of a deer park associated with Holmsey Lodge.



Figure 61. Possible medieval or post medieval deer park at Holmsley Lodge, Burley. (MKM4443). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services data and New Forest National Park Authority data 2011.

6.10 NMP results: twentieth century sites

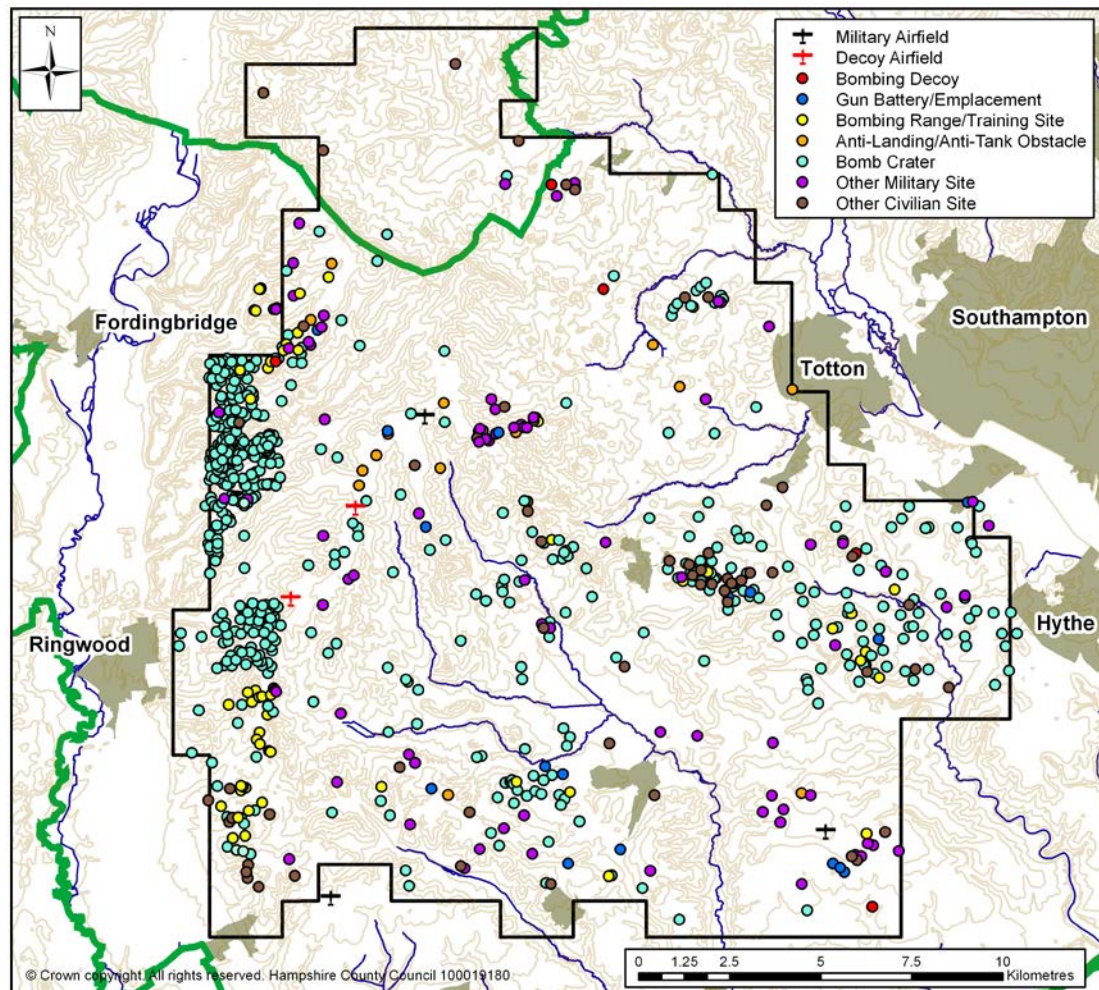


Figure 62. Distribution of twentieth century sites.

Eight hundred and twenty four twentieth century sites were recorded during the course of the project, of which 96% (793 sites) were new to the county HERs or AMIE. The majority, 83%, were recorded as extant or partially extant structures on the lidar and historic photography the rest having been completely levelled.

Of the 824 twentieth century sites recorded, all but 18 are associated with military activity within the forest dating to the first and second world wars.

6.10.1 Civilian Sites

Eighteen sites of non-military twentieth century date were recorded during the project. These are listed in Table 10 below.

They include a group of clay pits at Thorney Wood which are presumable associated with a brickworks marked on the OS 3rd Edition map (MKM4461). Rectilinear enclosures at Larks Lease Copse (MKM7094), New Park Plantation (MKM5514) and Loosehanger Farm (MKM7165) may be early twentieth century stock enclosures or paddocks.

Three ring ditches were identified on aerial photographs taken in 1981 at Burley Croft (MKM5061, MKM5068 and MKM5069). The northern of the three is the most faint and visible as a dark vegetation mark (ringed in Figure 63) whereas the other two appear to be bare earth features. They are almost perfectly circular, between 11.5 and 12m across and may be associated with animal training or recreational vehicle tracks.

Site Type	No: Sites
Boundary Bank	1
Brickworks	1
Building Platform	2
Cultivation Marks	1
Enclosure	4
Extractive Pit	1
Field Boundary	2
Pipeline	1
Quarry	2
Ring Ditch	3
Total	18

Table 10. Twentieth Century Civilian Site Types



Figure 63. Twentieth century ring ditches of uncertain origin at Burley Croft, Burley. (MKM5061, MKM5066 and MKM5069). Photograph: OS/81016 Frame 166 14th June 1981 © Crown Copyright. Ordnance Survey.

6.10.2 First World War Military Features

Four sites associated with First World War or earlier military activities were identified during the project. These included a military training site (MKM5174) and firing range over 1km long on White Moor (MKM4147). The firing range lies to the north of the

19th century firing range (MKM4149). White Moor was documented to have been used for camps and a 'grenade school' during the First World War (Fisher 2013, 87) and the range may date to this earlier phase of military activity although it was clearly still used in the Second World War as evidenced by the fresh bare soil erosion on photographs taken in 1945 (Figure 65). Some of the rifle butts are still extant and visible as earthwork on lidar.



Figure 64. Military firing range on White Moor, Brockenhurst, possibly dating to the First World War and reused in the Second World War. (MKM4147). Photograph: RAF 106G/UK/522 Frame 4015 17th July 1945 English Heritage RAF Photography.



Figure 65. First World War military training site on White Moor, Brockenhurst, possibly dating to the First World War and reused in the Second World War. (MKM5174). Photograph: RAF 106G/UK/522 Frame 4200 17th July 1945 English Heritage RAF Photography.

East Boldre Airfield.

The site of an early twentieth century airfield was situated at East Boldre. Originally opened as a private grass airfield by the New Forest Flying School, in 1910 the airfield was taken over by the Royal Flying Corp (later the RAF) in 1915. The military base, which was primarily used for aircraft training, had a short lifespan being closed in 1919 but was later used as a civilian field in the 1930s (Ashworth, 1990, 35). Features possibly associated with the First World War airfield including pathways (MKM3772), building platforms and hollows (MKM3770) were identified underlying the later Second World War anti-aircraft obstructions on Hatchet Moor (see section 6.10.3.3; page 83 (MKM3108)).

6.10.3 Second World War Military Features

During the Second World War, the entire length of the south coast of England became the front-line of the European conflict and was fortified in anticipation of invasion. Large areas of the countryside were requisitioned for military training areas, camps and for the construction of airfields. The New Forest, being in a prime location on the south coast, relatively unpopulated and in close proximity to the important urban centres of Southampton and Bournemouth, was greatly affected by the war.

In 1939, at the start of the war, a number of anti-aircraft batteries were constructed across the New Forest, built to defend Southampton and Southampton Water. The Forest was also earmarked as a location for evacuees from the neighbouring cities with 2,300 children from Portsmouth and Southampton being moved to accommodation within the Forest on 1st and 2nd September (Leete, 2004, 18 and Fisher, 2013, 36).

Prior to the outbreak of war, the New Forest had been the setting for annual camps by the Territorial Army but with the outbreak of war, these became much larger affairs and the New Forest became an important year-round military training area. Land acquisition was carried out from 1939 onwards including 3800 acres of land at Ashley Walk which were acquired for a bombing range in 1940.

Large open spaces suitable for the landing of enemy aircraft were protected with anti-landing obstacles and as the war progressed, an increasing threat of invasion resulted in a build up of allied forces in Southern England and along the south coast. Further land requisition was required and in 1941 and 1942 the New Forest saw the widespread construction of airfields, decoy bombing sites and training areas.

With the invasion of Europe the New Forest became an important area for the storage of supplies and encampment of troops.

After the end of the war in Europe, in May 1945, areas of requisitioned land began to be returned. In the New Forest, RAF Stoney Cross and RAF Holmsley South airfields were closed between 1946 and 1948 although many of the military camps remained in use for longer.

Remains of many of the structures dating to this period still remain and were visible as extant features on the lidar, in all 801 sites dating to the Second World War were recorded during the mapping project (Table11).

A complete assessment of all known military sites dating to the Second World War (including those mapped and recorded during this NMP project) has been recently made as part of the wider remit of the New Forest Remembers Project (Fisher 2013). That assessment used data from many more sources than the NMP element, including RAF site maps and charts, grey literature, war diaries and oral history archives. It is therefore felt unnecessary include a full and detailed report of all sites dating to this period of military activity in this current report. This section will therefore

give only a brief summary of the features encountered; dealing only with key sites and significant discoveries made during the NMP mapping.

Site Type	No: Sites
Anti Aircraft Battery/Anti Aircraft Gun Emplacement	7
Anti Landing Obstacle/Trench	13
Anti Tank Block	5
Barracks	2
Bomb Crater	557
Bombing Decoy	5
Bombing Range Marker	1
Bombing Range Target	13
Bombing Range Ancillary Site	6
Broadcasting Transmitter	1
Enclosure	4
Fence	2
Fire Trench	1
Gun Emplacement	4
Gun Laying Radar Platform	1
Military Airfield	3
Military Buildings/Building Platform	13
Military Camp	8
Military Depot/Storage Depot	7
Misc Military Site	44
Military Training Site	2
Ordnance Disposal Trench	1
Pillbox	5
Rifle Pit/Weapons Pit /Practice Trench/Slit Trench/Shell Hole	38
Prisoner of War Camp	1
Radar Mast	1
Royal Navy Shore Establishment	1
Searchlight Battery	3
Sewage Works	2
Trackway/Road	28
Total	801

Table 11. Second World War Site Types

6.10.3.1 Airfields

Three airfields were mapped during the project: RAF Beaulieu (MKM3090); RAF Stoney Cross (MKM6306) and RAF Holmsley South (MKM4460). All were opened in 1942 as Class A military airfields.



Figure 66. Beaulieu Second World War airfield. (MKM3090) Photograph: RAF 3G/TUD/UK163 PT1 Frame 5072 20th April 1946 English Heritage RAF Photography.

RAF Beaulieu. The Second World War airfield at Beaulieu was constructed on Hatchet Moor to the west of the First World War airfield at East Boldre (section 6.10.2; page 76-7). Originally intended as a satellite for Thorney Island it was modified to accommodate two reconnaissance squadrons and opened in August 1942 (Ashworth 1990). Initially the airfield was used by Royal Air Force Coast Command flying Liberator aircraft and also by Royal Canadian Air Force Halifax bombers operating in an anti-submarine role. By 1944 the airfield was used by the United States Army Air Force flying P-47 and B-26 aircraft in support of the D-Day Landings as well as RAF units flying Typhoons and Boston aircraft. After the war,

Beaulieu Airfield was used by the Airborne Forces Experimental Establishment until the base closed in 1950 (Honeysett 2013).

The runways, hangars and ancillary buildings associated with the airfield are visible as extant structures on aerial photographs taken during and immediately after the war (Figure 66).

RAF Stoney Cross. The Second World War airfield of Stoney Cross on Janesmoor Plain was originally planned as a secret advanced landing ground for the allied invasion of Europe and therefore without any of the usual facilities and aircraft camouflaged with hides (Ashworth, 1990, 185). It was later developed into an advance base for bombers and fighters opening in November 1942 whilst building work was still underway on the necessary additional ancillary buildings. In 1944 United States Army Air Force Squadrons used the site for training to prepare for D-Day. After D-Day the airfield returned to RAF use for glider servicing and Transport Command duties. The airfield was derequisitioned in 1948. (Brooks, 2003).

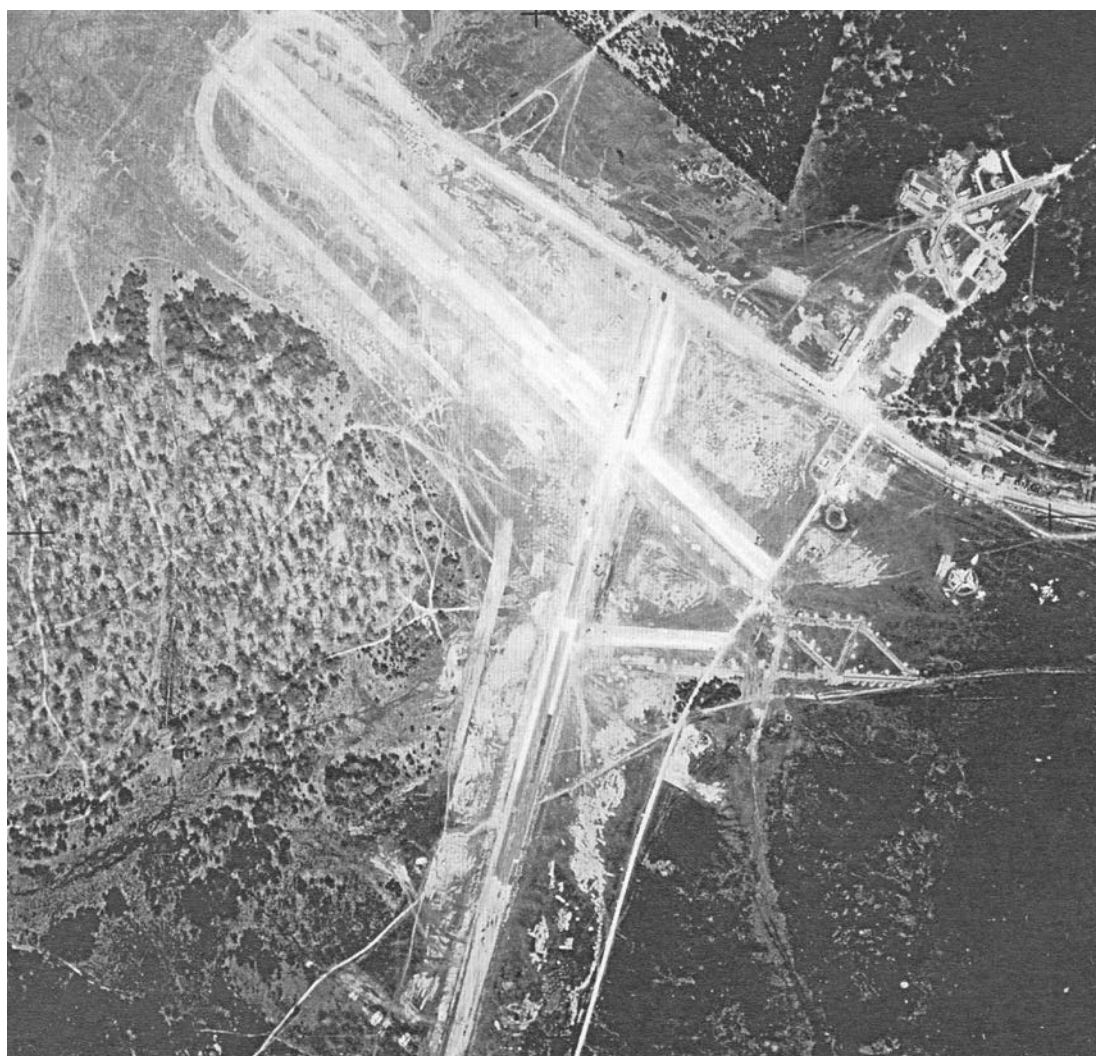


Figure 67. Stoney Cross Second World War military airfield. (MKM6306) Photograph: RAF 13T/AC49 Frame 13 29th April 1942 English Heritage RAF Photography.

Ancillary sites associated with the airfield including barracks and a sewage works were mapped from historical photographs during the project. Few structures associated with the airfield now remain other than the water tower at SU 250129, now serving a campsite on the foundations of the main barracks area. Other campsites at Janesmoor Pond and Ocknell occupy old aircraft dispersal areas; the

road to Linwood lies along one old runway, and the road to Lyndhurst uses the old perimeter track.

RAF Holmsley South. This Second World War military airfield was opened 1942 to accommodate reinforcements for Coastal Command during operation Torch (Ashworth 1990, 101). The airfield, which was used by Royal Air Force, Royal Canadian Air Force and United States Army Air Force units, consisted of three tarmac runways with five aircraft hangars and temporary accommodation buildings for personnel. The airfield does not show as clearly as Beaulieu and Stoney Cross on aerial photographs taken in 1944 and appears to have been partially camouflaged (Figure 68).



Figure 68. Holmsley South Second World War military airfield. The runways appear to have been partially camouflaged on this photograph taken in 1944. (MKM4460) Photograph: US/7PH/GP/LOC231 Frame 5001 15th Mar 1944. English Heritage USAAF Photography

After the end of the war, the airfield quickly went out of use and was placed on Care and Maintenance as an inactive site in October 1946 (*ibid*, 103). The hangars and accommodation buildings have mostly been demolished and parts of the former runways are now in use as caravan and camping parks.

6.10.3.2 Anti Aircraft batteries

German aerial bombing raids over Britain were most intensive during the winter of 1940-41. Important urban installations and dockyards were targeted by the Luftwaffe during the 'Blitz'. Less intensive bombing continued throughout the war before intensifying once again in 1944 (Dobinson 1996). Anti-aircraft guns were first deployed in England as a response to the first World War and by 1939 were

distinguished between heavy anti-aircraft artillery (HAA) for high-flying bomber aircraft and light artillery (LAA) as a defence against low-flying aircraft. Artillery batteries were most extensive across England in the later years of the Second World War with Operation Diver, the code name given to the defensive actions taken against the German flying-bomb. *Diver* was developed during the spring of 1944 and between June 1944 and March 1945 a series of anti-aircraft guns, searchlights, radar and early warning installations were developed across the south of England (Dobinson 1996 and 1996c).

The sites of 7 anti aircraft batteries were recorded during the project including three Diver Batteries on Beaulieu Heath (MKM3768 and MKM3769) and Matley Ridge (MKM5181); and further gun emplacements and batteries on Wilverly Post (MKM4421), Yew Tree Heath (MKM4520), Matley Heath (MKM5184) and Ashley Walk (MKM5794).

The Yew Tree Heath site was a heavy anti aircraft battery to the east of Beaulieu airfield. The site covered an area of 25 hectares and included accommodation blocks, storage, service roads and other ancillary structures. The four guns were set on concrete emplacements around the central command post; the sites of the gun emplacements themselves are still extant and clearly visible on the lidar (Figure 69).

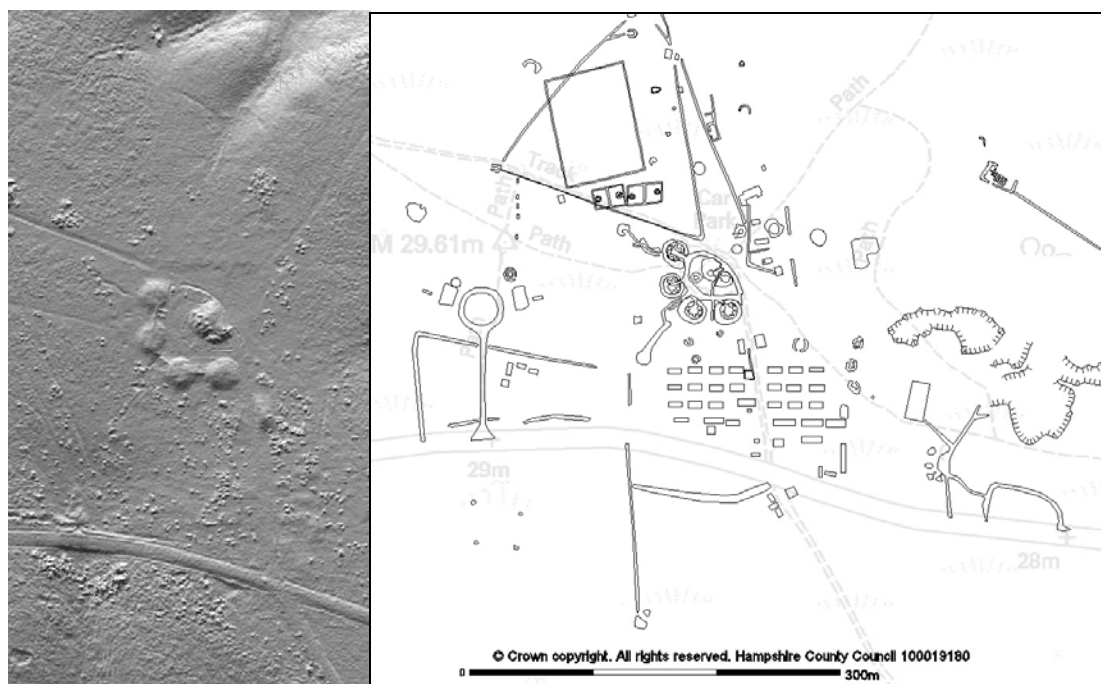


Figure 69. Yew Tree Heath Heavy Anti Aircraft Battery, Denny Lodge. (MKM4520). NMP Mapping © English Heritage. Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

6.10.3.3 Anti Landing Obstacles

The expected invasion of Britain was considered most likely to combine an invasion force landing on the beaches combined with parachute and glider troops landing inland. Following the evacuation from Dunkirk, the Home Executive were tasked with constructing anti-landing obstacles as a matter of urgency. Potential areas suitable for the operation of troop carrying aircraft were made unfit to land on being systematically obstructed with trenches, poles, scaffolding and barbed wire. These obstructions were one of Britain's earliest anti-invasion defences and became the most extensive (Dobinson 1996a). Work began in May 1940 on areas within 5 miles

of operational airfields and continued until autumn 1941. Potential landing grounds were to be obstructed by trenches dug on a chequer board pattern with sides of 150 yards. The approved method issued by War Office on 27th May 1940 was for the trenches were to be four feet wide and flanked with spoil heaps to enhance the obstacle. (*ibid*, 134).

Thirteen areas of anti-landing obstacles and trenching were identified during the mapping, including sites at Ashley Walk (MKM5743), Broomy Plain (MKM6423) and Ocknell Plain (MKM6388). The most extensive were constructed on Hatchett Moor, (Figure 70) where a checker board pattern of linear trenching and spoil heaps covered an area of over 580ha. They are clearly visible on photographs taken in September 1941 (Figure 14). The military airfield of Beaulieu Heath was later constructed at this location in 1942; remnants of the system of obstacles are visible between the landing strips and around the periphery of the air field on photographs taken 1946 (Figure 66).



Figure 70. South Second World War anti landing obstacles on Hatchett Moor, Beaulieu Heath. (MKM3108) NMP Mapping © English Heritage.

Two areas of anti landing trenching were identified on Bratley Plain, Ellingham Harbridge and Ibsley (Figure 7). These were possibly associated with the airfield bombing decoy Q site documented on the adjacent Ridley Plain (Dobinson 1996b, 98-9).

6.10.3.4 Anti Tank Block/Obstacles

After the evacuation of British forces from Dunkirk in 1940 and the ensuing threat of invasion from Germany, on 27 May 1940 a Home Defence Executive was formed under General Ironside, Commander-in-Chief Home Forces, to organize the defence of Britain. At first these defences focused on the coastline and a series of inland anti-tank 'stop' lines. These were often natural obstacles like rivers or breaks in the land-form like natural scarps that were enhanced with anti-tank obstacles and defended

by pillboxes. The defences effectively divided the country up into a series of 'fields' surrounded by 'hedges' of anti-tank obstacles so slow down the advance of enemy troops (Dobinson, 1996a).

Lines of potential military obstacles were identified along the A31 at Castle Malwood Walk, Minstead (MKM6337). The features appear to be round mounds, 1.5m to 4m across, and are visible as bare soil marks on aerial photographs taken in 1946 and 1954. Towards the north east of the project area similar features were mapped in Copythorne and Netley Marsh along the Southampton Road (MKM6573), Ringwood Road (MKM6772) and Romsey Road (MKM6592 and MKM7069). They lie adjacent to the roads and are spaced between 7m and 30m apart (Figure 71). They are of uncertain function but considered to be possible military obstructions, potentially the sites of removed anti-tank blocks; the features may alternatively be road markers. The site at Castle Malwood Walk is the most extensive lining the A31 roadway for almost 1.5km; they may have formed part of the defences around the approaches to RAF Stoney Cross.



Figure 71. A linear series of bare soil features lining the Ringwood Road, Totton and Eling, Possibly the sites of military obstructions. (MKM6772) Photograph: RAF 82/895 (F22) Frame 0159 08th April 1954. English Heritage RAF Photography

6.10.3.5 Bombing Decoys

The bombing of airfields, communications targets, towns and cities was an integral part of Germany's *blitzkrieg* or lightning war. Heavy bombing of the British mainland commenced in 1940 with attacks on airfields and important strategic settlements. Air defences included gun batteries and balloon barrages as well as less conspicuous dummy targets and decoy sites designed to draw enemy bombing away from their intended targets. (Dobinson 1996b, 1).

Airfields were protected by a series of day and night dummy airfields (K and Q sites) and by diversionary fires (QF and Starfish) designed to simulate night time fires after a successful bombing raid. Other strategic sites such as towns, factories and army and naval establishments were protected with Starfish and simulated urban lighting decoys (QL).

Five bombing decoys were identified during the project. These included QL sites at East Boldre (MKM3067), Plaitford Common (MKM7640) and Cadnam Common (MKM7726) and Starfish sites at Longdown Inclosure (MKM4525) and Ashley Walk (MKM5791).

The Longdown Starfish decoy site was designed to draw bombing raids away from Southampton. The fire break trenches were identified as bare soil marks on aerial photographs taken in immediately after the war 1945. The presence of a large bomb

crater immediately to the north east of the decoy site is perhaps evidence of its success in attracting at least one enemy raid, (Figure 72). It should be noted that some of the features identified from the lidar and initially thought to relate to this bombing decoy have been identified as modern features as a result of post-mapping field work.

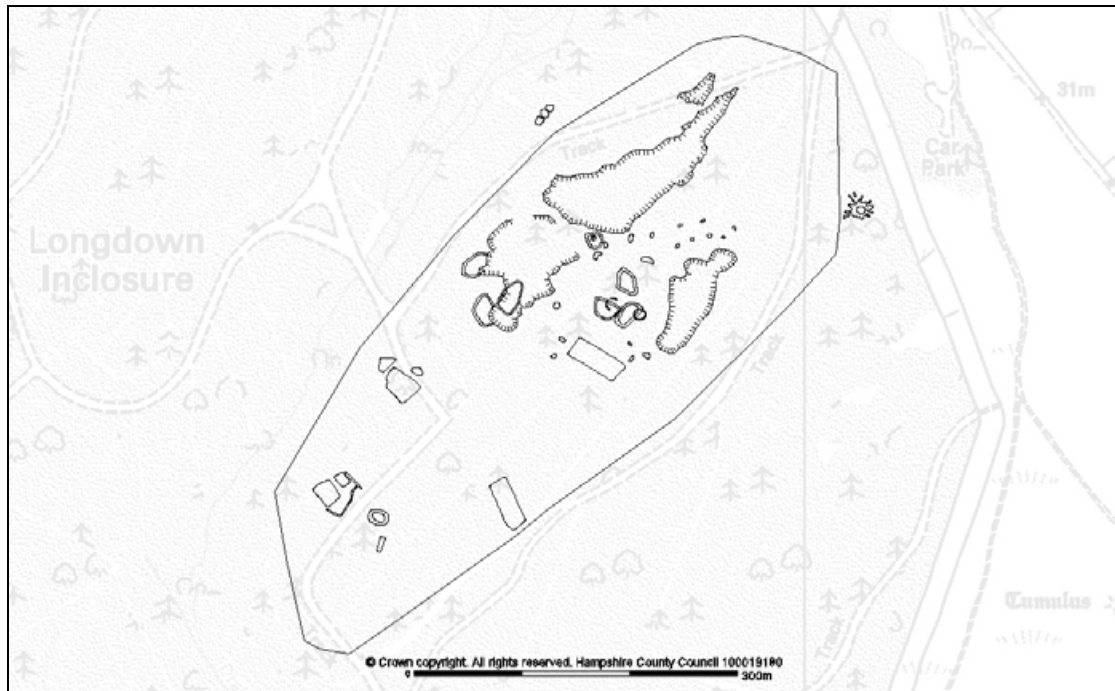


Figure 72. Starfish Bombing Decoy at Longdown Inclosure, Denny Lodge. (MKM4525). NMP Mapping © English Heritage.

6.10.3.6 Bombing Range and Craters

The 557 bomb craters and groups of bomb craters that were encountered during the project is evidence of the amount of military activity that took place within the New Forest during the Second World War. The bomb craters encountered were associated with both enemy bombing raids and Allied training associated with the Ashley Walk bombing range and other training sites. (MKM4525)



Figure 73. A line of three Second World War bomb craters at Three Acre Plantation, Copythorne. (MKM7046-8) Photograph: RAF CPE/UK/2101 Frame 4178 28th May 1947. English Heritage (NMR) RAF Photography

Ashley Walk Bombing Range

The Ashley Walk bombing range was opened in 1940 and controlled by the Armaments Squadron of the Airplane and Armament Experimental Establishment from RAF Boscombe Down. The range covered an area of over 2000ha and between 1940 and 1946 almost every kind of air-dropped ordnance was tested, ranging from small anti-personnel types to the 22,000lb Grand Slam earthquake bomb (Parker and Pasmore 2006).

The range consisted of a practice range and a high explosive range. The practice range was 2000 yards in diameter and was used for day and night timing bombing practice. It was controlled by a bombing tower on Hampton Ridge and could be lit at night by a generator. The high explosive range was 4000 yards across and was controlled by the northern Observation Tower.

Several different targets were incorporated into the range for bombing as well as ground attack, those identified on the aerial photographs included three wall targets (MKM5763-5), an air to ground firing target (MKM5781), a line target (MKM5767), a ship target (MKM5768), aircraft pens (MKM5769), fragmentation targets (MKM5772) and a range of other custom targets.

Many associated features were identified on aerial photographs dating to the 1940s and plotted during the project, the most apparent being a large concentric target, consisting of five circular lines laid out roughly 140m apart to a final diameter of 1390m (MKM5743). These concentric rings surrounded No.2 Wall Target which was set on a large concrete base 200 yards across and the centre of the dartboard-like target.

Chalk was imported in to mark targets so they could be seen from the air. It was also placed in mounds adjacent to some of the target lines, acting as anti-landing obstacles. Where the chalk was placed it stopped future vegetation from growing back, hence why many of the marked targets can still be seen today (Figure 74).

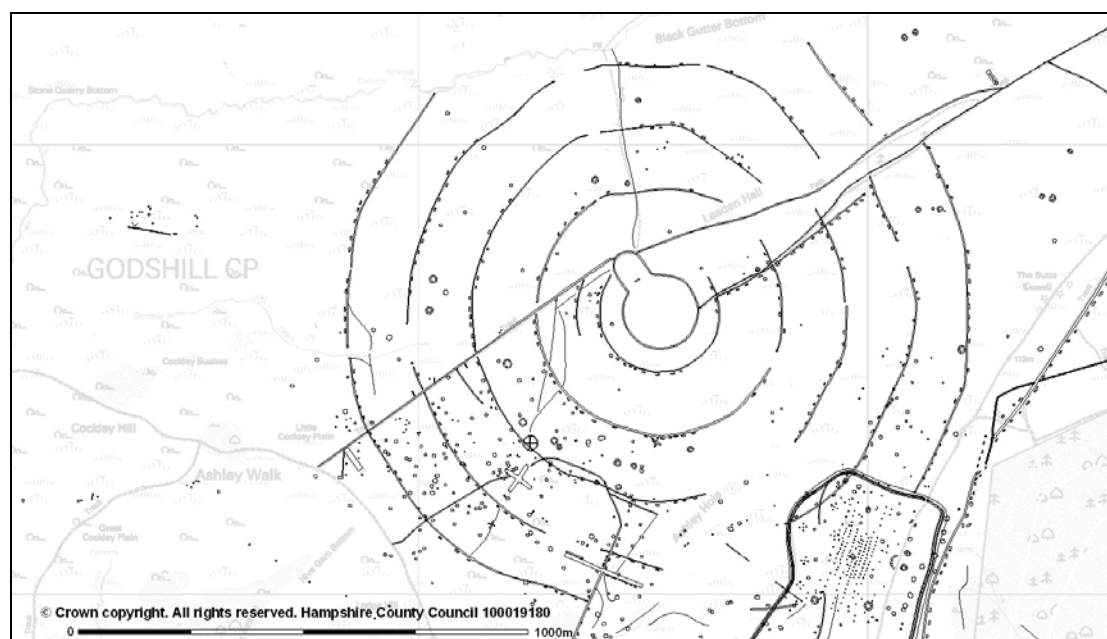


Figure 74. Ashley Walk practice bombing range, No.2 Wall Target, Godshill. (MKM5743). NMP Mapping © English Heritage.

The Ashley Walk range was used extensively in the war for the development and experimentation of bombs, bombing techniques and delivery methods. Due to restrictions in the load-carrying capacity of military aircraft at the beginning of the war, the standard bomb size when war was declared in 1939 was 500lb (*ibid*, 17); as the capacity of bomber aircraft increased, so did the size and sophistication of the bombs. Ashley Walk saw the testing of many new bombs as they were developed including blast bombs, incendiary bombs and the 'Bouncing Bomb'. Development of Deep Penetration bombs included the 12,000lb 'Tallboy' and 22,000lb 'Grand Slam' bombs both of which were tested at the range.

A series of inert trails of the 'Grand Slam' were carried followed by one live bomb test on 13th March 1945 (*ibid*, 13). The bomb was dropped from 16,000ft and on impact the 'Earthquake Bomb' caused a crater nearly 40m across and over 21m deep. The impact craters are visible to the top of the photograph in Figure 75, the 'Earthquake Bomb' crater being the largest of the group just right of centre (MKM5762).



Figure 75. Ashley Walk high explosive range, Godshill. The sites of target aircraft pens (MKM5769) and line target (MKM5767) are clearly visible on this photograph taken in 1947. The oval 'enclosures' towards the top of the photograph may be firebreaks associated with a bombing decoy (Starfish) site. Photograph: RAF CPE/UK/2038 Frame 4151 27th April 1947. English Heritage RAF Photography

Immediately to the south of the 'Earthquake Bomb' crater is a square structure initially interpreted as a submarine pen target (MKM5770). This large concrete bunker was actually an air raid shelter test site. Built in 1941, it was extensively bombed throughout the war and subsequently covered with soil when the range closed (Fisher 2013, 50).

The covered bunker is clearly visible on the lidar along with numerous small bomb craters and the oval fire breaks of a possible Starfish decoy site (Figure 76), the site of the 'Earthquake Bomb' crater however has since been filled in.

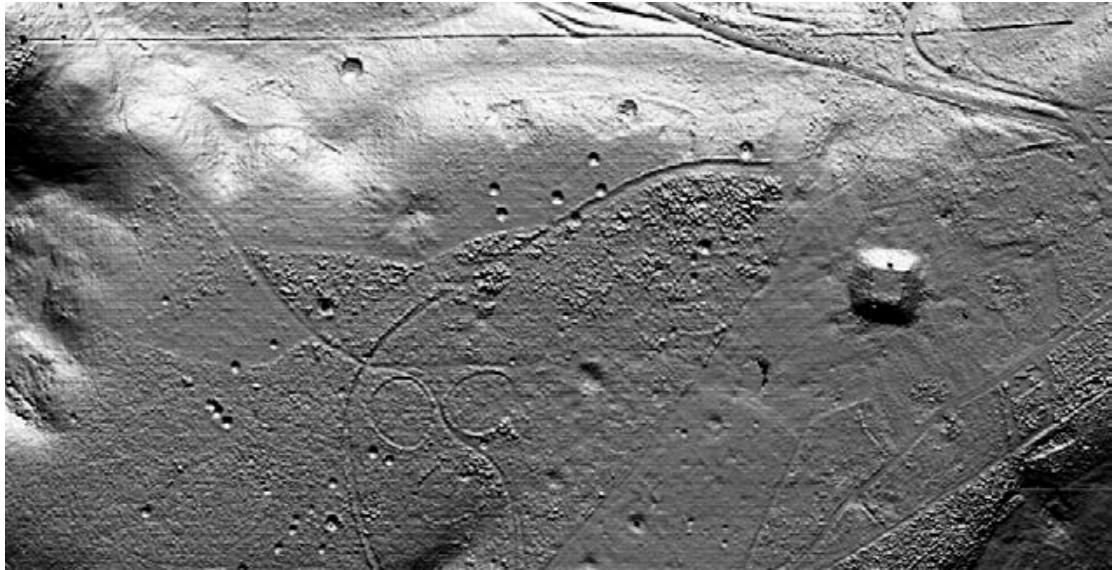


Figure 76. Air raid shelter test site and associated bomb craters on Ashley Walk High Explosive Range, Hyde. (MKM5770 and MKM5780). Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

6.10.3.7 Gun Laying Radar Platform.



Figure 77. The potential sites of two gun laying radar platforms at the end of the NW-SE runway at RAF Stoney Cross. (MKM6312) Photograph: RAF 106G/LA108 Frame 0196 22nd January 1945. English Heritage RAF Photography

Gun-laying radar (initially known as Radio Direction Finding) was the most sophisticated equipment used on heavy anti aircraft batteries during the Second World War (Dobinson, 1996d, 128-138). Radar provided medium range warning of incoming enemy aircraft, tracking them and allowing fire upon airborne targets in poor visibility or at night. The operational equipment involved the anti aircraft radar

receiver (GL) mounted on a platform and surrounded by a large horizontal wire mat to enhance its performance. The mats were octagonal in construction and 130yd (119m) across. The potential sites of two radar platforms can be seen as dark vegetation marks at the end of the northwest-southeast runway of RAF Stoney Cross (Figure 77).

6.10.3.8 Military Camp

Eight sites were specifically recorded as Military Camp, five of which were ancillary sites associated with RAF Beaulieu airfield (MKM3100-3 and MKM6420) and sixth at Castle Malwood Walk (MKM6314) associated with RAF Stoney Cross.

At Mogshade Hill, Minstead a large tented encampment was identified to the south of RAF Stoney Cross on aerial photographs taken between 1944-46 (MKM4987). The site consisted of numerous rows of tents and other temporary structures, as well as associated trackways, earthworks and hollows. The camp was located in and around the site of a former post medieval quarry (MKM4988) and appears to have also reused late 19th century/early 20th century military earthworks (MKM4985). It has been recorded that Canadian troops were encamped in this area prior to D-Day (Fisher 2013, 63).

The site of another tented encampment was identified in the far east of the project area at Pumpfield Farm, Marchwood (MKM4572). Over 120 circular parchmarks mark the sites of bell tents possibly associated with the allied build-up of troops prior to D-Day. The camp was protected alongside the Marchwood Military Railway by a long earthen mound, slit trenching and a possible gun emplacement to the north of the railway (MKM4573). The site lies to the north of a possible military storage depot alongside the Fawley Light Railway (MKM4574) and 550m to the north-west of a Z battery at Veal Farm (Fisher 2103, 153). A barrage balloon mooring site and possible gun-laying radar platform associated with the battery were mapped during the Hampshire Aggregate Resource Assessment NMP mapping project (EH project no. 5783, Trevarthen 2010), Figure 78.

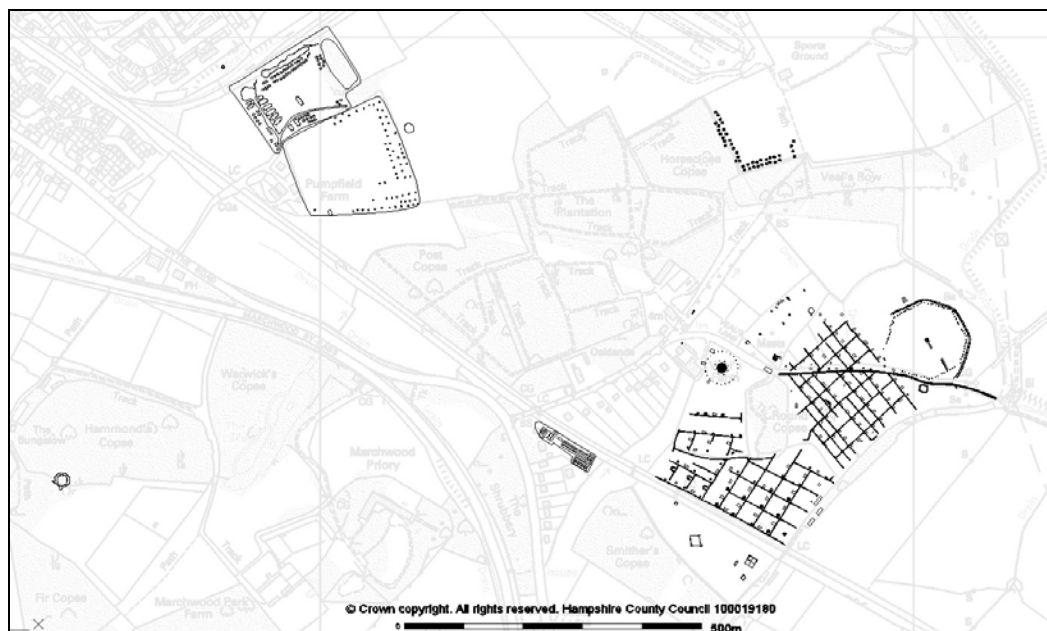


Figure 78. Second World War military features at Marchwood. NMP Mapping © English Heritage. Features mapped during this project include a tented encampment (MKM4572), a storage depot (MKM4574) and towards left of the illustration a large bomb impact crater (MKM4546). Other features were mapped during the Hampshire Aggregate Resource Assessment.

6.10.3.9 Military Depot

The New Forest became an important military storage area during the invasion of Europe (Fisher 2013, 44). Seven depots and storage depots were identified during the project.

At Balmer Lawn (MKM3738 and MKM3739) a series of rectangular buildings and associated pathways maybe the site of an ammunitions store. At Denny Lodge a number of storage sites were identified lining the B3056 between Pig Bush and Beaulieu Road station (MKM4478, MKM4479) and at The Shrubbery, Hythe and Dibden (MKM4574) a group of over 20 buildings adjacent to the Fawley Light Railway may have been associated with military storage see Figure 78.

6.10.3.10 Pillboxes

The sites of seven possible pillboxes were identified during the project, four of which were visible as extant structures on RAF photographs taken soon after the war. Two pillboxes were recorded as part of the Diver Battery on RAF Beaulieu Heath airfield (MKM3769) and a third 200m to the south (MKM3084).

Three bare earth marks were identified in strategic roadside positions in Brockenhurst which were considered to be the sites of removed pillboxes. These included one in the bend in the road immediately adjacent to the railway line at Lymington Junction (MKM4202) and two alongside the Rhinefield Road on Whitefield Moor (MKM4203 and MKM4204). The final site lies at Castle Malwood Walk, Minstead (MKM6353) where a small D-shaped pillbox lay adjacent to a possible line of anti-tank cubes (section 6.10.3.4; page 83). Situated alongside the A31, the structure may have formed part of the defences to the approaches of RAF Stoney Cross airfield.

6.10.3.11 Prisoner of War Camps Setley Plain



Figure 79. Setley Plain Prisoner of War Camp, Brockenhurst. (MKM3509) Photograph: RAF CPE/UK/1893 4142 Frame 4142 12th December 1946. English Heritage RAF Photography

A Second World War Prisoner of War camp was constructed on Setley Plain probably between 1942 and 1943. The camp was a 'Standard' type, described as a German working camp (Thomas 2003, camp No 65) and was constructed initially to house Italians captured in Africa. It was later used to accommodate German prisoners, many of whom were put to work in the Forest. The camp possibly held

men as late as 1947 and is likely to have closed in 1948 after which time it was used to provide housing up until the 1960s (Fisher 2013, 75).

Accommodation huts, ancillary buildings (including soldier's quarters, offices and stores) and a recreation ground with traces of a wire fence around are visible on aerial photographs taken soon after the war (Figure 79).

6.10.3.12 Searchlight Batteries

Searchlights were used extensively as defence against night time bombers during the Second World War. Prior to the development of gun-laying radar systems, searchlights were the only means of targeted night-time anti-aircraft fire (Lowry 1995). The searchlights could track bombers and indicate targets to anti-aircraft guns and fighters; they encouraged the enemy to fly at higher levels thus decreasing their bombing accuracy. The searchlights also facilitated the guidance of stricken allied aircraft back to their bases.

Searchlights were generally single predictor emplacements comprising a circular earthwork approximately 9m across housing a 90cm light with associated machine gun pit and ancillary buildings. More extensive emplacements with three 9m lights and a larger 150cm light (Lowry 1995, 62-3) were constructed at more strategic locations such as a troop headquarters.

The possible sites of three searchlight batteries were identified at Castle Malwood Walk (MKM6316) associated with RAF Stoney Cross and at Avon Tyrrell (MKM4615) and Black Heath (MKM7383). The Black Heath and Avon Tyrrell sites lie 9km apart on the western edge of the Forest on higher ground above the Avon Valley. They have very similar in morphology comprising a group of three near circular parch marks (for the 9cm lights) with an adjacent outlier (for the 150cm light) and associated features (Figure 80).

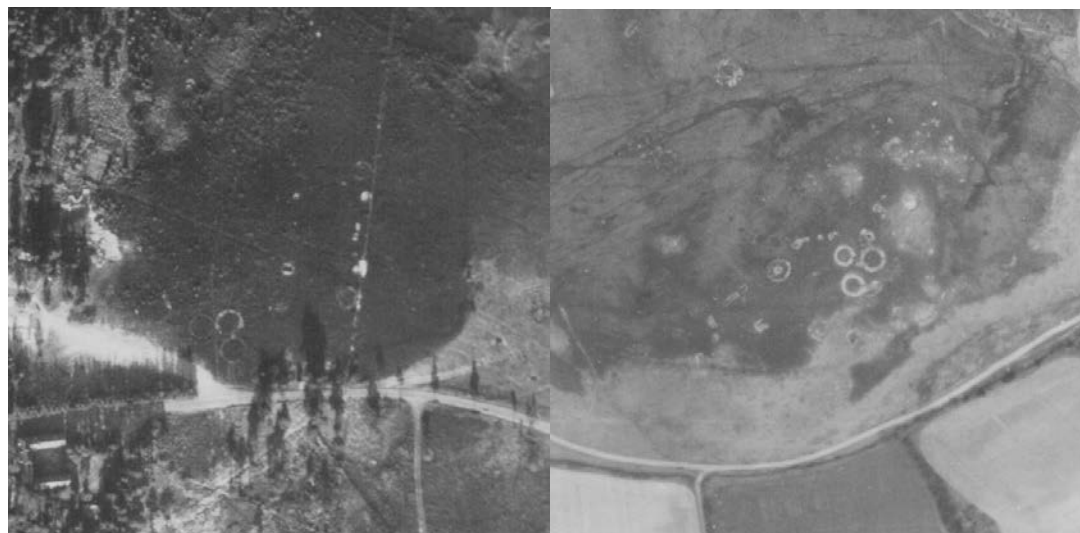


Figure 80. Potential sites of searchlight batteries at Avon Tyrrell left (MKM4615) and Black Heath right (MKM7383). Photographs: RAF CPE/UK/1893 Frame 4126 12th December 1946 (left) and RAF CPE/UK2038 Frame 4274 27th April 1947. English Heritage RAF Photography

6.10.3.13 Shell holes, Rifle Pits, Slit Trenches and Weapons Pits

The large quantities of bomb craters encountered during the project are described in section 6.10.3.6 above (pages 85-88). In addition to these large features (often with their distinctive rays of up-cast material), numerous clusters of smaller bare-earth pits

were identified. These were considered to be associated with military training activity and may have been impact shell holes or deliberately dug protective trenches or fox-holes. Due to uncertainties with their interpretation, they were recorded as combinations of bomb crater and/or practice trench, rifle pit, slit trench or weapons pit. A small number of conventional zig-zag practice or slit trenches were also recorded.

One example lies at Holmhill Bog, considered to be part of the large field firing area of Rhinefield Training Area (Fisher 2013, 72). The mapped features included slit trenching as well as numerous small pit-like features which may have been shell holes or protective pits (MKM4262) (Figure 81).



Figure 81. Holmhill Bog, Brockenhurst. Site of military activity including slit trenching and numerous small pits (either shell holes or dug rifle or weapons pits). (MKM4262) Photograph: RAF CPE/UK/522 Frame 4011 17th July 1945. English Heritage RAF Photography

6.10.3.14 Other Second World War Military Sites

Millersford Armaments Research Centre (MKM7338).

The Armaments Research Department was relocated to the New Forest from Shoebury Ness, Essex during the early part of 1941. Situated at Turf Hill the new site covered an area of 650 acres and was used for the static trials of explosive devices. It comprised two principal areas: the administrative, storage and preparation area, which was situated around the present day Turf Hill car park; and the operational area on the centre of Turf Hill Ridge. The installation was closed within five years of the war ending when most of the above ground constructions were removed before deep ploughing and afforestation of the area was carried out (Pasmore 1993, 23-4).

The site is clearly visible on historic photographs taken soon after the war (Figure 82). Some of the roads and remains of demolished buildings still remain and are visible on modern aerial photographs and lidar.



Figure 82. Millersford Armaments Research Centre. (MKM7338) Photograph: RAF CPE/UK/1749 Frame 4345 21st September 1946. English Heritage RAF Photography

Tatchbury Mount Royal Naval Shore establishment (MKM6768).

A wartime Royal Naval shore establishment was located in the grounds of Tatchbury Mount Mental Hospital, Netley Marsh. Known as HMS Safeguard, the base was a rest and recuperation centre housing naval gun crews from defensively equipped merchant ships. The site, which is believed to have supplied ratings to man the Hotchkiss Machine Gun at Catchold Tower in Southampton, is visible on aerial photographs taken soon after the war but was demolished in 1975-6 (Archaeology Data Service 2013).



Figure 83. Tatchbury Mount Royal Naval Shore Establishment, Netley Marsh. (MKM6768) Photograph: RAF 82/895 (F22) Frame 0074 8th April 1954. English Heritage RAF Photography

Bisterne Common (MKM5005, MKM5011 and MKM5016)

Two curvilinear features enclosed by barbed wire fencing were identified from aerial photographs taken in 1947 (Figure 84). The features are likely to be of military origin and are associated with a group of over 50 small sub-circular pits which may be late post medieval extractive pits or Second World War bomb craters. This area of the Forest was not classed as a live firing range during the war (Fisher 2013, 129) and the pits may be due to enemy bombing of the adjacent installations.



Figure 84. Bisterne Common, Burley. Two barbed wire enclosures of probable military origin with associated extractive pits or bomb craters. (MKM5005, MKM5011 and MKM5016) Photograph: RAF CPE/UK/1893 Frame 4126 12th December 1946. English Heritage RAF Photography

6.10.4 Cold War Sites

The Royal Observer Corp (ROC) was a civil defence organisation that operated in the UK between 1925 and 1995. It was composed mainly of part-time volunteers, whose primary task was the detection, identification, tracking and reporting of aircraft over Britain. From 1955 the ROC were given an additional task in the form of defending against the effects of nuclear weapons by detecting and reporting nuclear explosions and associated radioactive fall-out. The ROC continued until the early 1990s when the end of the Cold War substantially reduced the threat of nuclear attack (Dobinson 2000b).



Figure 85. Fox Hill ROC monitoring post at Minstead. Earthworks associated with the site of the underground bunker are visible on this vertical image from 1967. (MKM5300) Photograph: NMR MAL/6722 072, 30th August 1967. © Crown Copyright.

The ROC monitoring posts were bomb proof-nuclear protected buildings, usually semi-sunk blockhouse buildings of standard layout and providing accommodation, life support systems, decontamination facilities and a communications centre. These underground bunkers were often hidden away in the corners of fields.

The site of a ROC monitoring post was established on Fox Hill, Minstead in January 1962. A group of small earthworks associated with the post were identified as earthworks on photographs taken in 1967 (Figure 85) the site was closed in September 1991.

6.11 NMP results: Undated sites

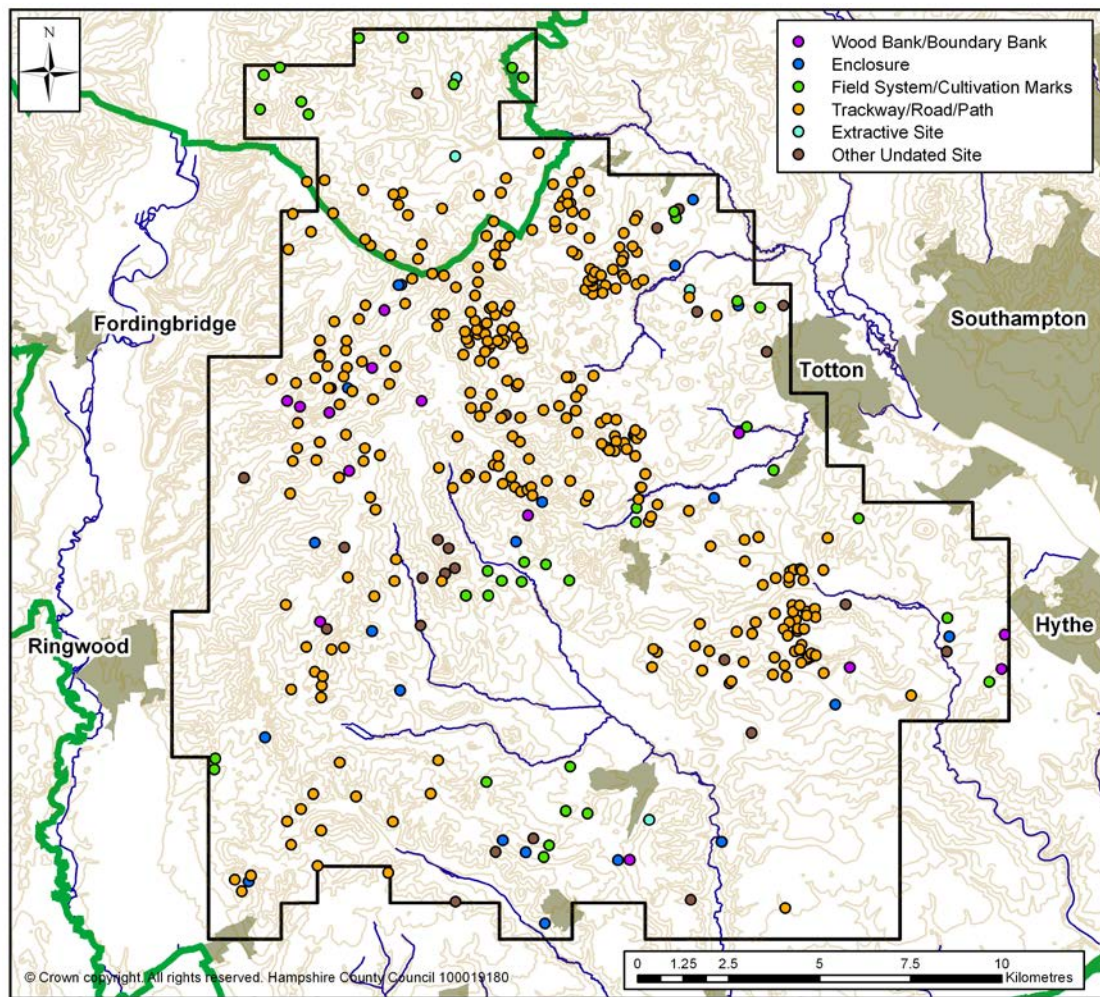


Figure 86. Distribution of undated sites.

A large number of sites were listed in the project database as of uncertain date or given a date range spanning the prehistoric and historic periods. These are monuments to which a specific date could not be allotted with confidence; they include generic features such as wood banks, field boundaries, extractive sites and enclosures.

Undated features included 12 linear banks which may have been boundary banks, 27 field boundaries and systems, 18 mounds and 19 enclosures and pounds. The majority of sites (74%) were undated trackways which may be of prehistoric, historic or twentieth century military origin.

Of the 414 sites, most (95%) were previously unrecorded in the county HERs or AMIE. Three hundred and ninety four (95%) sites were recorded as extant earthworks, generally using the lidar and 14 (3.5%) as partially extant earthworks. Only 6 sites (1.5%) were recorded as totally levelled.

Site Type	No: Sites
Bank (Earthwork))	12
Boundary/Boundary Bank/Boundary Ditch/Boundary Mound	3
Cross Dyke	2
Ditch	2
Enclosure	13
Extractive Pit/Pit	3
Field Boundary/Field System	27
Hollow way	3
Long Mound/Mound	20
Lynchet	2
Paleochannel/Natural Feature	2
Pound	2
Ring Ditch	4
Trackway	307
Wood Bank	12
Total	414

Table 12. Undated Site Types

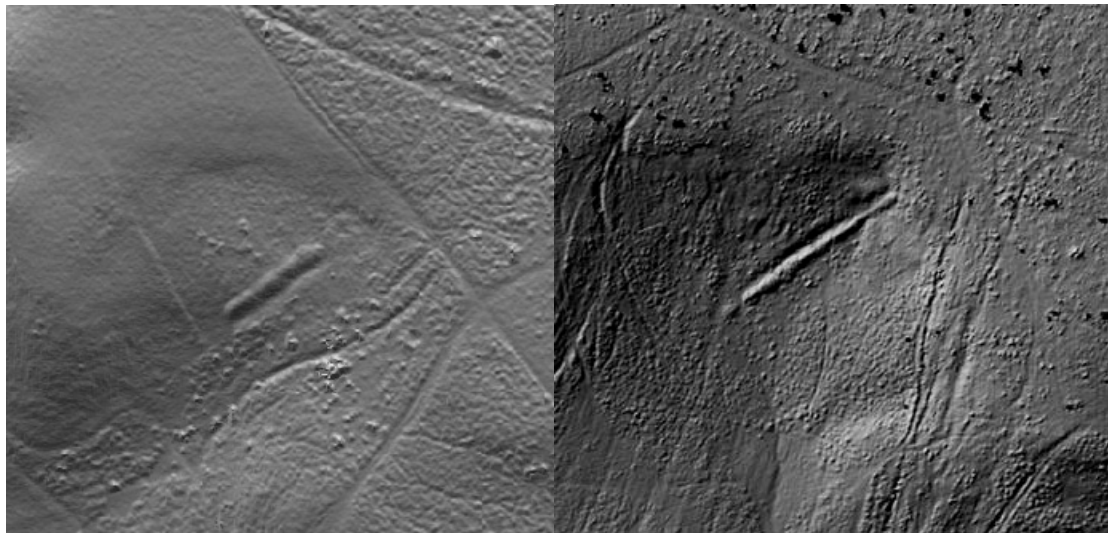


Figure 87. Two linear mounds of uncertain origin at Yew Tree Bottom (MKM4062 left) and Hinchleslea Holm (MKM4245 right), Brockenhurst. Lidar: © Cornwall Council 2013 based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

Many of these sites were classed as undated due to uncertainties in their interpretation. For example at Yew Tree Bottom where a linear mound 41m by 6m is visible as earthworks on lidar (MKM4062). The feature lies on the crest of a ridge and is morphologically similar to Neolithic long barrows however a much later origin

(possibly a medieval pillow mound or military feature) cannot be ruled out without further investigation. A similar site lies 1km to the north east at Hinchleslea Holm where an linear mound 100m long runs south westward for over 100m (MKM4245). Whilst the site may be a linear spoil heap or of military origin an earlier prehistoric date is possible, Figure 87.

Similarly at Acres Down, Minstead, a linear bank and ditched feature runs east-west across the brow of the ridge at the northern edge of the down (Figure 88). The feature appears to be of some antiquity and may be a medieval wood bank or an earlier cross dyke.



Figure 88. Undated linear bank and ditched feature at Acres Down, Minstead. (MKM5446). Lidar: © Cornwall Council based on Cambridge University Technical Services and New Forest National Park Authority data 2011.

In addition, the undated sites included 13 enclosures, two pounds, 20 mounds and 360 linear features or groups of features indexed variously as bank, ditch, field boundary, field system, trackway or wood bank. Whilst potentially of historic date a prehistoric origin for these features cannot be ruled out.

Conclusions

The NMP mapping in the New Forest identified 4316 monuments of which 3823 were previously unrecorded in the County HER or AMIE databases. The mapping therefore has greatly improved our knowledge of the archaeological resource, by providing a fuller awareness of the range and extent of archaeological remains within the project area. The enhanced awareness of the archaeological resource will facilitate management of the area's historic environment on a site specific as well as a strategic level.

This NMP project has clearly demonstrated the value of lidar survey, especially in areas of open woodland and scrub. Relatively few specialist oblique photographs were available for the project area, demonstrating the lack of potential for finding new sites using conventional photography. Despite this, huge numbers of new sites were mapped and recorded for the first time, 95% of which were earthwork sites and the majority of which were identified from the lidar.

The main outcomes of the NMP mapping and recommendations for further survey and research are set out below.

6.12 Outcomes

Whilst many of the sites recorded during the mapping project were post medieval extractive features and cultivation remains dating to the historic periods, a significant number of prehistoric or Romano-British sites were identified as were a range of twentieth century military sites. The mapping results have therefore greatly improved our understanding of the nature and extent of human activity in the Forest for all periods from the Bronze Age onwards.

No sites were plotted of Neolithic or earlier date. Bronze Age round barrows were the most common type of prehistoric monument encountered with 226 being recorded, 25 of which were new to the record. The most significant new discovery was a group of eight barrow mounds at Horse Down, Redlynch. The previously unrecorded mounds, which range from 5m to 9m across, lie under tree cover and were only visible on the lidar DTMs,

Sixty six sites were assigned an Iron Age, Prehistoric or Roman date of which 40% were new to the record. Types of new sites attributed to these periods included six field systems, nine groups of field boundaries and four enclosures.

The early medieval period is still poorly understood with only five potential sites identified during the mapping, all of which had been previously recorded. The later medieval period is, however, more richly represented with 56 sites allocated a specifically medieval date. Significant new sites include a possible hunting lodge at East Boldre and three deserted or shrunken villages at Battramsley, Landford Lodge and Bartley.

The greatest numbers of sites recorded were post medieval, with 1865 sites attributed to this period. This is a period that has, until recently, been subject to less archaeological survey and field investigation than some other periods. The current project is perhaps the first to systematically record post medieval and early twentieth century sites; this is reflected in the fact that 96% of sites attributed to this period encountered were new to the record. New sites included field banks, wood banks, trackways and cultivation marks. A large number of extractive features were also mapped and recorded and the fuller picture of the location and extent of these extractive sites will hopefully assist our understanding of the importance and extent of the extractive industries, particularly at a local scale.

The New Forest, given its south coast location adjacent to the important urban areas of Southampton and Bournemouth and being relatively unpopulated with large tracts of open land, was greatly affected by the Second World War. Parts of the Forest were requisitioned for military camps, airfields and training areas. As the many of these sites were temporary installations and not designed for longevity, they leave little trace on the ground. The recording of twentieth century military sites, particularly using the RAF vertical photographs taken during and soon after the Second World War, has proved highly informative with significant sites being recorded, many for the first time.

6.13 Recommendations

- **Further investigation of sites recorded from aerial photographs and lidar.** Although a large number of sites have been recorded from aerial photographs and lidar, a relative lack of field work and excavation means that little is known about them. In particular the date and function of many features is unclear. A programme of ground-based investigation of a representative sample of the sites recorded by NMP, involving field walking, geophysical survey and limited excavation, would significantly enhance current knowledge of prehistoric, Roman and early medieval rural settlement.
- **Continuing aerial reconnaissance.** Whilst the majority of sites recorded were earthwork sites identified either from the lidar or from historical photographs, there is potential value in carrying out a programme of aerial reconnaissance in the open heathlands, particularly in the winter months when vegetation is low. A small number of cropmark sites were recorded, particularly in the periphery of the project area to the north and west and there is further potential for new sites in these areas.
- **Further landscape-led research.** The NMP mapping project has clearly enhanced the baseline data for all future landscape-led research within the New Forest. All themes, areas and sites described in this report have great research potential. The new distributions of sites could be reviewed in their HLC and landscape character context to see what impact they might have on our understanding of the organisation and development of the landscape across different periods and the evaluation of the present landscape.
- **Enhanced Designations.** The NMP mapping has significantly added to the numbers of important archaeological monuments within the project area. The extents of previously known sites (such as field systems) have in some cases also been increased. This is an important area of the country in terms of the National archaeological resource and therefore it is strongly recommended that the current designations (in terms of the numbers and extent of scheduled sites) are reviewed at the earliest opportunity.

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Project Archive

The HES project number is **HEXQPR146086**

The project's documentary and drawn archive is housed at the offices of the Historic Environment Service, Cornwall Council, Fal Building, County Hall, Treyew Road, Truro, TR1 3AY. The contents of this archive are as listed below:

1. A project file containing the project design, project correspondence and administration.
2. This report held in digital form at: G:\Historic Environment (Documents)\NMP DATA\NEW FOREST REMEMBERS\Report
3. The AutoCAD drawings held in digital form at: R:\Historic Environment (CAD)\CAD Archive\NMP Archive\New Forest Remembers

Appendix 1 Methodology

Sources

Aerial photograph collections

All readily available aerial photographs were consulted during the project.

The English Heritage Archive (EHA) formerly the National Monuments Record (NMR) in Swindon holds large numbers of aerial photographs of the project area. These include vertical prints taken by the Royal Air Force (RAF) and Ordnance Survey (OS) ranging in date from the 1940s to 1999. The NMR also holds a large collection of oblique prints; including military obliques taken by the Ministry of Defence (MOD) between 1941 and 1950 and a collection of specialist oblique prints, slides and digital images which were taken for archaeological purposes and range in date from the 1960's to the present day. In addition a small number of very earlier oblique images taken in the 1920s and 30s by OGS Crawford are held in the NMR collection

Cambridge University Committee for Aerial Photography (CUCAP) holds an important national collection containing a number of vertical photographs taken for a range of non-archaeological purposes as well as specialist oblique photography resulting from archaeological reconnaissance. Unfortunately the collection was not available throughout much of the project mapping time and therefore was not consulted.

In addition to these two national collections, the Hampshire County Council (HCC) holds a collection of vertical photographs. Images from several years of flying are held in this collection. The 2001 and 2005 colour images were provided to the project as digital jpegs. Prints from the earlier flights are housed in the HCC offices and were not available for loan but could be consulted at the HCC offices in Hampshire. As the project progressed it was felt that due to time constraints and the large numbers of photographs already available from the NMR library, the HCC prints would not be consulted.

In total 8900 aerial photographs were consulted during the project. These consisted of 5875 prints loaned from EHA Archive, 1702 digital images from HCC and 1323 digital images (both conventional and false colour infra-red) supplied via English Heritage by Next Perspectives through the Pan-Government Agreement (PGA).

The photographic prints supplied by English Heritage Archive consisted of 5293 verticals, 549 specialist obliques and 33 military obliques. A loan arrangement was put in place enabling the consultation of these photographs at Cornwall Council's offices in Truro.

Lidar

The NFR project included a full lidar survey of the national park. The central portion of the NFR had previously been surveyed by Cambridge University Technical Services in 2011 as part of the Crownlands survey. The remaining peripheral areas were commissioned and flown by Geomatics in 2012 as part of the wider NFR project. All data was provided to the project mapping team as geo-referenced digital surface models (DSM) and as digital terrain models (DTM) with the vegetation removed. In addition, static captured images (unrectified jpegs) were provided by Peter Crow of Forest Research which were multi-lit from all four cardinal points and could be used in exactly the same way as conventional aerial photographs.

The Environment Agency (EA) has also undertaken lidar surveys of the country as the technique results in the production of a cost-effective terrain map suitable for

assessing flood risk, measuring land topography and assessing coastal erosion and geomorphology.

The EA lidar was supplied to the project via English Heritage by Next Perspectives through the Pan-Government Agreement (PGA). The data was supplied as static .jpeg images derived from the full data with no height information incorporated within it. Due to time constraints and the availability of geo-referenced DTMs and DSMs from the NFNPA, it was decided not to use the EA .jpegs during the mapping.

Data sources

Data from the Hampshire AHBR

Data from the Hampshire HER (AHBR) was provided to the project team as a series of Arcview shape files with attached object data

Data from the National Record for the Historic Environment

Data from the National Record for the Historic Environment (NRHE) Archives and Monuments in England (AMIE) database was provided to the project team for the study area. This data included details of all archaeological sites and was provided digitally in a series of PDF files and Arcview shapefiles.

Map Sources

In addition to the current OS MasterMap data which was used as the primary source of control for the rectification and mapping, the historic mapping from the 19th and 20th centuries (Epoch's 1, 2 3 and 4) was consulted to further understand the archaeology of the project area and to aid interpretation of specific sites

Archaeological scope of the project

All archaeological features were recorded, both plough-levelled and upstanding remains, dating from the Neolithic period to the twentieth century (pre-1945), including industrial and military features. Archaeological or historically significant sites appearing on the OS base map which have not been photographed, or which are completely obscured by vegetation, were not recorded. The project did not usually record structures still in use or fossilized in later structures that are still in use, e.g. buildings, field walls, canals, railways, leats and hedges, but if appropriate, some exceptions were made.

Plough-levelled features and earthworks

All cropmarks and soilmarks representing buried "negative" features (i.e. ditches and pits), earthworks or stonework of archaeological origin were recorded. All earthwork sites visible on aerial photographs were recorded, whether or not they had previously been surveyed (including those marked on the OS maps), and whether or not they are still extant on the most recent photography.

Ridge and furrow

All areas of medieval and post medieval ridge and furrow were mapped using a standard convention to indicate the extent and direction of the furrows. The project database included brief comment on preservation and visibility over the area mapped as well as any archaeological assessment.

Buildings and structures

The foundations of buildings and structures which appear as ruined stonework, earthworks, cropmarks, soilmarks or parchmarks were recorded. Standing roofed or unroofed buildings and structures were not recorded unless there was no other adequate map record. However, in specific archaeological contexts (e.g. industrial and military complexes and country houses), or when associated with other cropmark

and earthwork features, and particularly when buildings have been demolished since the photography (even if depicted by the Ordnance Survey), then it may have been appropriate to map them, in order to make an association explicit.

Industrial features and extraction

Areas of industrial archaeology were recorded using the appropriate conventions where they can be recognised as pre-dating 1945. Roofed or unroofed buildings, when associated with other mapped features within industrial complexes, may have been recorded as described above.

All extractive features believed to pre-date 1945 were mapped. These included large-scale features such as quarries, pits and mines, as well as small-scale extraction of resources for immediate local use (e.g. minor stone quarries and gravel extraction).

Twentieth century military features

Twentieth Century military features were recorded to an appropriate level of detail. The extent of larger military complexes such as airfields and camps was depicted using the 'extent of area' symbol. The major buildings and structures within military complexes as well as isolated military structures, e.g. pillboxes or buildings associated with searchlight batteries, were mapped and recorded.

Field boundaries and field systems

All removed field boundaries and field systems were plotted where they were considered to pre-date the OS 1st Edition map (c.1880) and are not already recorded on any other OS map. Where post medieval field boundaries mapped by the OS may be misinterpreted (e.g. within complex areas of archaeological features), these may have been plotted or mentioned in the text record.

Parkland, landscape parks, gardens and country houses

All park and garden landscape features (including deer parks) visible on aerial photographs but not previously recorded by the OS were be plotted. Similarly, the former existence of country houses either completely or partially demolished during the period of photography were mapped. If the house is depicted by the OS then it will not be mapped but will be mentioned in the text record. Normally the whole complex of house, garden and park was recorded using a single brief text record.

Transport features

Major transport features (i.e. disused canals and main railways) are included in the Ordnance Survey sphere of interest and subsequently appear on OS mapping; these were therefore not mapped. Smaller features which are outside the Ordnance Survey sphere of interest were mapped, as were trackways, pathways and roadways considered to be post-medieval or earlier in origin and not already recorded by the OS.

Natural features

Geological and geomorphological features visible on aerial photographs were not generally mapped. In exceptional circumstances however, they were plotted but only if their presence helped to define the limits of an archaeological site or if it was considered likely that an archaeological interpretation may have already been (or in future be) made in error, in which case the true origin of the features was discussed within the project database.

Transcription

The results of the mapping were produced entirely in digital format using AutoCAD.

Information was derived from the photographs available in the collections identified above.

1. Oblique and vertical photographs were scanned.
2. Digital transformations of the archaeological features visible on the photographs were produced using AERIAL (Version 5.29). Digital copies of current OS 1:2500 MasterMap were used for control information and as a base for mapping in AutoCAD (Version Map3D 2010). All digital transformations will therefore be within a level of accuracy within 5m to true ground position, but typically less than 2.5m to the base map. Where necessary digital terrain models (DTM) were used to aid more accurate rectification of the photographs.
3. The rectified images were imported into the relevant AutoCAD drawings.
4. Archaeological features were digitally transcribed in AutoCAD according to a nationally agreed layer structure and using agreed line and colour conventions as specified by Aerial Survey and Investigation (EH 2010).
5. Polygons were drawn around each separate monument to define its extent. Object data was attached to the monument polygons and archaeological features in AutoCAD in a table called RECORD. This recorded the Unique Identifier numbers (UID) for records within the NRHE and Hampshire AHBR databases.
6. Map Note Sheets (MNS) were maintained for each OS quarter sheet within the survey area. MNS record the progress of each sheet and the sources used.
7. Quality assurance checks were carried out by each member of the project team on selected map sheets to ensure that all sheets were completed to NMP standards.

Data processing

Data for all features mapped during the project was input into their exegesis NMP HBSMR v3 database. The database automatically generated unique Project UID numbers (Monument Prefix MKM) and contained fields enabling monument indexing to be carried out to EH and ALGAO standards. Appropriate data was entered into this database for each archaeological feature mapped (data recorded included summary, description, photographic references, site type and period, locational information and details of the interpreter).

AutoCAD attached object data

Three object data tables were incorporated into each AutoCAD drawing to enable concordance with the GIS and to facilitate basic analysis of the drawings.

The HBSMR number of all sites, and the HCC AHBR number, WCC HBSMR number and AMIE Hob UID of each site (where it existed) was recorded in the first table.

The second table recorded basic interpretative information and contained four fields; period, type, form, and photo number as well as including a comment field.

The third table recorded the date, surveyor, scale of survey, and copyright information.

These tables were attached to all plotted features and the relevant polygon defining the monuments.

GIS shapefiles

Each AutoCAD drawing was exported as an ESRI shapefile and imported into ArcView using the exeGesIS MapLink Software. This automatically linked each mapped site to the relevant record in the project database through the attached PRN number.

Data exchange

The mapped data was provided to NFNPA, HCC and WCC as AutoCAD drawings as well as GIS data in the form of ESRI shapefiles with site summaries attached. Copies of the database records were supplied in html and rtf formats.

Copies of the mapping were provided to EH in AutoCAD format suitable for incorporation in to the EH Corporate GIS.

All data supplied to EH, NFNPA, HCC and WCC was to NMP monument recording standards and in line with EH minimum standards for monument recording.

Copies of the Project Design, Final Report and all other relevant project documentation will be deposited with EH. The PDF version of the report will be deposited with Archaeology Data Service (ADS).

Project outcome

A series of AutoCAD drawings was produced showing all archaeological features visible on aerial photographs for each of the two mapping blocks.

The Hampshire AHBR and WCC HBSMR were updated with shapefiles and descriptions of all archaeological sites mapped during the project.

The AutoCAD drawings with data attached were exported as ArcGIS shapefiles.