



Alison Deegan

AIR PHOTO MAPPING,
INTERPRETATION AND
ANALYSIS FOR ALL
ARCHAEOLOGICAL APPLICATIONS
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Air Photo Mapping and Interpretation
for
Land North of Broom Road
Lakenheath
Suffolk

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Commissioned by

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Summary

This report concerns the results of interpretation and mapping of archaeological features from air photographs and LiDAR imagery for Land North of Broom Road, Lakenheath, Suffolk.

This survey has recorded the remains of post medieval quarrying activity on the proposed development site. In the surrounding area the remains of a medieval or post medieval headland, banks, two former building plots and extensive quarrying have been recorded. Second World War features including aircraft obstructions and barbed wire obstructions are visible on the historic air photographs. A Royal Observer Corps post lies just to the east of the proposed development site on Maids cross Hill. Within the wider survey area there are also several possible archaeological features of uncertain origin.

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1 Introduction

1.1 Client details

1.1.1 This survey was commissioned by Britannia, Winnington House, 2 Woodberry Grove, North Finchley, London, N12 0DR.

1.2 Specification

1.2.1 The client required the mapping of levelled and upstanding archaeological features that are visible on the available air photographs and on LiDAR imagery. The mapping is at a nominal scale of 1:2500.

1.3 The Survey Area (see Figure 1)

1.3.1 The air photo survey area (hereon the Survey Area) is centred on and around a proposed 5 hectare development site on Land North of Broom Road, which lies between the village of Lakenheath and Lakenheath Airfield in Suffolk.

1.3.2 The Survey Area covers approximately 1.3km² of land and is centred at TL724 826 (572430, 282600).

1.3.3 In 1999 the proposed development site contained several standing and roofed buildings (Google Earth 1999). These appear to have been of relatively recent origin as they are not present on the 1959 air photos (RAF/58/2688 F22 258). The more recent air photos suggest that most of these buildings were cleared from the site in 2008 and that the site is now a mix of low scrub cover, open grassland and some deciduous planting (Google Earth 2008 & Bing ND).

1.3.4 The remainder of the Survey Area is of mixed use with late 20th century housing development to the west, large arable fields to the north and south and an unploughed but disturbed heathland zone known as Lakenheath Warren in the east.

1.3.5 The Survey Area lies on chalk bedrock overlain with coversands and sand and gravel deposits (BGS Viewer). These are overlain with freely draining sandy Breckland soils and some freely draining slightly acid sandy soils along the eastern edge (Soilscapes).

1.3.6 The Survey Area lies close to the western edge of The Brecks National Character Area and is flanked by fenland to the west (Natural England).

- 1.3.7 Maidscross Hill lies at the centre of the Survey Area and is its highest ground at approximately 31m OD. From here the land falls on all sides to below 20m OD (see Figure 2).

2 Methodology

2.1 Data sources

- 2.1.1 The air photo collections held by the English Heritage Archive (EHA) and Cambridge University Collection of Aerial Photography (CUCAP) were consulted for this survey. The photographic prints were systematically examined, using x2 magnification where necessary and stereoscopically where possible. Selected prints were then photographed with a hand-held digital camera, where permission to do so was granted. Where permission was not forthcoming the pertinent features were traced onto acetate overlay sheets which were then scanned.
- 2.1.2 Digital images delivered through the Google Earth and Bing portals were examined on screen and relevant views were captured.
- 2.1.3 Lists of the individual air photographs and image datasets consulted are provided in Appendix 3.
- 2.1.4 Environment Agency LiDAR data for the one kilometre square TL7282 was obtained via www.geomatics-group.co.uk. This data is a 1m resolution Digital Surface Model (DSM) data in ASCII format.

2.2 Image capture, rectification and mapping

- 2.2.1 The Bing portal delivers seamless georeferenced imagery direct into MAPINFO Professional 12 and so any visible archaeological information was digitised directly from this source.
- 2.2.2 The various digital captures from the air photographs, overlays and Google Earth were rectified to ground control points derived from the Ordnance Survey 1:2500 scale map supplied by Britannia.
- 2.2.3 Image transformation was undertaken using the Bradford Aerial Photographic Rectification Programme, AERIAL5.33. Archaeological features were mapped to a scale of 1:2500 in detail and accuracy. AERIAL5.33 gives error readings for each control point, where 5 or more control points are used. In all cases errors of within ±3m were achieved for the control points. However this may not reflect the on-the-

ground positional accuracy of the features mapped since these tend to lie between rather than at the control points.

- 2.2.4 The 1m resolution DSM LiDAR data was imported into LandSerf 2.3 and examined as elevation and shaded relief surfaces. The viewing parameters were methodically adjusted to optimise the visual appearance of any upstanding archaeological earthworks. Then ARCGIS “Gridfloat” rasters from at least four different azimuthal angles were imported into MapInfo Professional 12.
- 2.2.5 All of the georeferenced photographs and images were then collated in MAPINFO Professional 12 where the archaeological features were digitised, with reference back to the original source material where possible.
- 2.2.6 Data pertaining to each feature was recorded in the MapInfo table.
- 2.2.7 The resulting dataset was then exported to the Autodesk .dwg format for the client. The structure and content of this digital map dataset is described in Appendix 4.

3 Results

3.1 The air photographs

- 3.1.1 The EHA holds 19 black and white air photographs from 9 different sorties flown between 1942 and 1971. Together these provide good cover the whole of the Survey Area for the 1940s, but sparser coverage for the 1950s and 1970. There are no vertical photographs taken in the 1960s or after 1971. These vertical photographs were taken by or for the Royal Air Force, the United States Air Force and the Ordnance Survey for military and cartographic purposes rather than to record archaeological sites. However earthwork and some soilmark archaeological features are visible on many of these photographs.
- 3.1.2 The EHA also holds 1 black and white oblique air photograph of the Survey Area in its specialist collection. This was taken in 1983 but is a fairly low level oblique taken from the west and so the Survey Area lies in the middle ground and background and little detail can be seen.
- 3.1.3 The CUCAP collection holds 6 vertical air photographs of the Survey Area taken in 1969 and 1972. These are a valuable complement to the earlier EHA vertical coverage.

- 3.1.4 Google Earth displays imagery attributed to 1999, 2006, 2007 and 2008. The aerial imagery provided on the Bing Maps website is not dated but appears to post date 2008. Together these images record the Survey Area at various times of year. They show some of the earthworks and are a valuable record of recent landuse.

3.2 The archaeological features (Figure 3)

- 3.2.1 The mapping is reproduced in Figure 3. This report is supplied in conjunction with a digital version of the map data, the recommended viewing scale is 1:2500 to 1:5000.
- 3.2.2 Details including type, period and sources for individual archaeological features can be accessed in the digital version of the mapping (see **Appendix 4**) and these are summarised with a description in **Appendix 5**.
- 3.2.3 In the absence of direct archaeological evidence all attributions of date and type are open to re-interpretation.

3.3 Prehistoric and Roman activity

- 3.3.1 That there was prehistoric and Roman activity within and around the Survey Area is well demonstrated by the rich finds spots and clusters and historic archaeological investigations recorded in the HER.
- 3.3.2 A cluster of Palaeolithic artefacts have been recovered in the Maids cross Hill area (eg HER MSF9471). These came to light as a result of historic quarrying in this area. There may be more such discoveries to be made either in situ or already displaced by post medieval quarrying (ie **AP no. 4**) or late 20th groundworks.
- 3.3.3 The field to the east of Sandy Drove, known as Roman Field, has produced a wide range of artefacts dating from the Neolithic (MSF2244) through to the Medieval period (MSF9512) and including some structural elements such as kilns and hearths from the Roman period (MSF2252).
- 3.3.4 No features prehistoric or Roman date were positively identified on the air photos, though it is possible that some of the undated features discussed in Section 3.6 may have their origins in these periods.

3.4 Saxon and Medieval period

- 3.4.1 A Saxon cemetery and medieval artefact scatters have been identified in Roman Field and in the wider area between the Maids Cross Hill road and the B1112 (eg MSF9477 and MSF16273).

3.4.2 The sinuous bank in **AP no. 2**, which runs parallel the Maids Cross Hill road, may be a medieval plough headland. The other two possible banks in this field, which are straighter and less well defined may also be of this date. However a post medieval origin for all or any of these banks cannot be discounted.

3.5 Post medieval period

- 3.5.1 Most of the features identified from the air photographs are likely to date from the end of the post medieval period or later.
- 3.5.2 The Ordnance Survey map of 1882 depicts a small gravel pit within the proposed development site and a cluster of stone quarries to the immediate south-east. The site of the gravel pit is obscured by vegetation on the air photos and LiDAR imagery but the earliest air photos do suggest that a wider area had been disturbed (**AP no. 4**).
- 3.5.3 The stone quarries depicted on the 1882 map are more readily reconciled with earthworks that are visible on the air photos and LiDAR imagery but again a wider area than that depicted on the historic map appears to have been disturbed (**AP no. 5**).
- 3.5.4 Quarrying on the eastern edge of the Survey Area, which though relatively shallow and piecemeal was quite extensive by the late 20th century (**AP no. 10**). Some of these workings predated the earliest of the air photos and may have had their origins in the post medieval period.
- 3.5.5 The remains of two former building plots are visible on this historic air photos (**AP nos 9 & 16**). Both were depicted on the Ordnance Survey maps of 1836 and 1882 so are presumed to have been extant at these times. **AP no. 9**, a house and garden plot, stood next to the Maids Cross Hill road and was extant on the earliest air photos. It has now been levelled and replaced with a small car park. **AP no. 16**, which may have been a small farmstead set back from Eriswell Road, had been demolished by 1942 but the plot is still visible as a disturbance on the most recent air photos and on the LiDAR imagery.
- 3.5.6 The mutilated banks on the south side of the Maids Cross Hill road may also have their origins in the post medieval period (**AP no. 11**). However the purpose of these features within the wider context of Lakenheath Warren and historic routes and boundaries that extend beyond the Survey Area is not known.

- 3.5.7 As mentioned above (see Section 3.4.2) the banks in the field to the north of the Maids Cross Hill road (**AP no. 2**) may have their origins in this period.
- 3.5.8 **Second World War**
- 3.5.9 The airfield at Lakenheath had its origins in the First World War. In the early part of the Second World War it was used as a decoy airfield to RAF Feltwell but was subsequently developed and expanded into an operational airfield (MSF27501). Although the airfield lay just outside the Survey Area some peripheral features are to be found within it.
- 3.5.10 Just beyond the north-west boundary of the airfield a large area of the heathland was enclosed by some temporary boundary, possible bales or lines of barbed wire (**AP no. 13**). This was present in 1942 and in 1946 but had been removed by 1959.
- 3.5.11 Such defences would suggest the presence of potential targets within the enclosed area and indeed three V-shaped blast pens are visible within it (**AP nos 14 & 15** and a third beyond the Survey Area at TL7301 8220). These pens are similar in form to, though slightly smaller than, the V-shaped fighter pens at former RAF Catterick (Scheduled Monument No. 1020990). The RAF Catterick pens were built to camouflage and protect single-engine aircraft. Like the RAF Catterick examples the Lakenheath pens lie a little beyond the airfield and would have been easy to camouflage with the heathland vegetation.
- 3.5.12 The layout and extents of the barbed wire defence (**AP no. 13**) may suggest that there were other potential targets within the enclosure area that are not visible on the air photos, either because they were too small, too well-camouflaged or perhaps because they were built below ground.
- 3.5.13 There are two other structures visible on the air photos within the Survey Area that are likely to be associated with the airfield (**AP no. 12**). These small square structures are linked to the western side of the airfield by straight trackways. They were present in 1947 but cannot be detected on the earlier air photos.
- 3.5.14 During the Second World War the large flat fields on the north side of the Maids Cross Hill road were bisected with trenches (**AP no. 1**). These were aircraft obstructions designed to prevent the landing of enemy aircraft.
- 3.5.15 By 1942 a Royal Observer Corps (ROC) post and associated features had been established near the highest point on Maidscross Hill (**AP no. 8**). This post appears

to have continued in use through most of the 20th century and is recorded as having closed in 1991 (Subterranea Britannica).

3.6 Undated features and other observations

- 3.6.1 A sinuous band of darker soils or slower ripening crop has been detected along the north edge of the Survey Area. It runs east to west towards the lower lying ground and fen in an area where the chalk is free from overlying sands and gravels. This feature is likely to be of natural origin, perhaps a dry valley.
- 3.6.2 The field known as 'Roman Field' on the north side of the Maids Cross Hill road has produced many artefacts with a broad range of dates (see 3.3 above). Some potential archaeological features are visible within this field but their origin is not known. A possible cropmarked-ditch (**AP no. 3**) runs near east to west across the field and parallel to the road. One set of air photos, taken in 1969, show a group of indistinct pale-tone earthworks in this field. It is not certain whether these are truncated archaeological remains or disturbances caused by archaeological excavations in the late 1940s. The ditch (**AP no. 3**) was not visible as a soilmark on these photos. Several of the HER records report patches of black sand or soil in this field with which the finds are associated but it is not clear if these are related to the pale-toned soilmarks that are visible on the air photos (eg MSF2253 & MSF9413).
- 3.6.3 On Maidscross Hill the HER records part of a medieval stone cross erected in a modern mound but suggests that the mound may have been rebuilt from an older barrow in the vicinity (MSF9479). A small mound, approximately 6m in diameter, is visible as an earthwork on historic air photographs in this location (**AP no. 6**). On the earliest photographs the mound is surrounded by uneven hummocky ground that may have been disturbed by quarrying (see **AP no. 5**). It is only on later photographs, when the surrounding ground has been levelled by ploughing, that the mound becomes conspicuous.
- 3.6.4 Approximately 20m north-east of the mound there now stands a viewing area set within a small walled enclosure (**AP no. 7**). This has been attributed a catalogue number to avoid confusion with the mound (**AP no. 6**).

4 Concluding remarks.

- 4.1.1 Land on the proposed development site appears to have been disturbed by quarrying in the post medieval period and again by building construction and

Air Photo and LiDAR Mapping and Interpretation for Land North of Broom Road, Lakenheath, Suffolk demolition in the late 20th century. However these factors would not necessarily preclude against the recovery of further Palaeolithic artefacts in this area.

- 4.1.2 The finds record suggests considerable archaeological activity in the Survey Area from the Neolithic period through to the medieval period. However this rich record is not matched with features on the air photographs, even in those areas to the north of the Maids Cross Hill road and to the south-west of the site that might be considered most conducive to cropmark formation. However the absence of evidence should not be taken as absence of presence of archaeologically significant remains.

Appendix 1 Archaeology from black and white and colour air photographs

Air photographs taken in appropriate conditions can record crop marks, soilmarks and earthworks of archaeological origin.

Crop marks result from variations in leaf and stalk colour and plant height and vigour. Crop marks occur where there are anomalies below the ground: in-filled hollows, palaeochannels, frost cracks, archaeological pits, ditches, surfaces and banks or modern disturbances such as land drains. Crop marks can also be created by variations in the treatment of the topsoil and ground cover, for example the uneven application of fertilizers, pesticides and herbicides or damage.

Crop marks that delineate buried and levelled archaeological features are the effect of differential growth and ripening between the vegetation on the archaeological deposits and that on surrounding undisturbed ground. Variations in growth and ripening are most visible when there is a significant difference in the water and nutrient availability between the archaeological and natural deposits. Crop marks can form at any stage from germination to ripening but the optimal conditions are during periods when precipitation is exceeded by transpiration. This results in potential soil moisture deficit (SMD) and water-stressed plants (Jones and Evans 1975). Prolonged periods of SMD halt plant growth and then cause wilting of the plant leaves, stem and finally root. Water-stress is exacerbated by free-draining sub-surface deposits such as archaeological walls or road surfaces but mitigated by rich and humic ditch and pit deposits. Even after ripening, differences in crop height and bulk can indicate the presence of buried features where there are no tonal differences. Crop marks can be seen most clearly in large areas of homogenous, fast-growing plants such as cereal crops and, less frequently, in root crops and grass. Crop marks produced in arable and grass at times of significant moisture stress, usually over buried structures or other highly permeable archaeological deposits, are often referred to as parchmarks.

Soilmarks are the colour and tonal differences between archaeological deposits and the plough or subsoil. The action of ploughing, which can penetrate the ground to a depth of 45cm, brings to the surface previously buried material. The rotation of the plough exposes the cut surface uppermost. Where the plough cuts buried and infilled archaeological features such as banks and ditches it brings to the surface slices of these deposits. If these slices are sufficiently differentiated from the natural plough or subsoil they can be visible from the air.

Archaeological earthworks that are visible on the ground can also be seen from the air. Detection and recording of earthworks from the air is determined by their survival and visibility. The survival of earthworks depends on past and present land use; natural erosion processes, deliberate destruction and ploughing can all reduce upstanding features to ground level. Earthworks can be revealed by the pattern of sunlight and shadow, differential frost or snow cover or the distribution of standing and flood water. Large and subtle variations in ground relief are further accentuated when viewed stereoscopically. Most stereo images are vertical photographs taken in long, regular sorties but stereo-overlapping can also be achieved from correctly set-up oblique views.

Appendix 2 Archaeology from LiDAR survey data

Airborne Light Detection and Ranging (LiDAR) is a data collection technique that uses a laser to measure certain variables. For archaeological purposes it is the distance between the aircraft and the ground that provides particular interest. During LiDAR flights up to 100,000 measurements per second are made of the ground, allowing highly detailed terrain models, including the details of surviving archaeological earthworks, to be generated at spatial resolutions of between 25cm and 2 metres.

The LiDAR data used for this survey was obtained from the Environment Agency as an ASCII Digital Surface Model. This data was derived from a combination of all of the EA data collected since 1998, which has been merged and re-sampled to give the best possible coverage.

Further information and guidance on the use of LiDAR for archaeological prospection can be found in Crutchley and Crow (2009).

Appendix 3 Sources consulted

English Heritage Archive

English Heritage, The Engine House, Fire Fly Avenue, Swindon, SN2 2EH. Enquiry reference no. AP 83402. The vertical and oblique air photographs listed below were consulted at the Archives on the 6th and 18th December 2013.

Vertical air photographs

Sortie & frame nos	Date	Scale 1:
RAF/3G/TUD/UK/59 5344	05-FEB-1946	9000
RAF/3G/TUD/UK/59 5345	05-FEB-1946	9000
RAF/3G/TUD/UK/59 5406	05-FEB-1946	9000
RAF/3G/TUD/UK/59 5407	05-FEB-1946	9000
RAF/106G/UK/1557 3020	07-JUN-1946	9800
RAF/106G/UK/1557 3021	07-JUN-1946	9800
RAF/106G/UK/1634 1405	09-JUL-1946	10000
RAF/106G/UK/1634 1406	09-JUL-1946	10000
RAF/106G/UK/1704 4105	28-AUG-1946	9800
RAF/106G/UK/1704 4106	28-AUG-1946	9800
RAF/CPE/UK/1952 1211	25-MAR-1947	10000
RAF/CPE/UK/1952 1212	25-MAR-1947	10000
RAF/CPE/UK/1952 1213	25-MAR-1947	10000
RAF/58/2688 F22 258	25-JAN-1959	9600
RAF/58/2688 F22 259	25-JAN-1959	9600
US/7PH/GP/LOC127 1004	29-DEC-1943	16000
RAF/HLA/500 6113	25-APR-1942	20000
RAF/HLA/500 6114	25-APR-1942	20000
OS/71216 142	14-MAY-1971	7500

RAF = Royal Air Force, OS = Ordnance Survey, US = United States Air Force

Specialist (oblique) air photographs

EHA reference no.	Date
TL 7283/1	05-JUL-1983

Cambridge University Collection of Aerial Photographs (CUCAP) Library

Department of Geography, University of Cambridge, Downing Place, Cambridge, CB2 3EN. The following vertical air photographs were examined at the library on 13th January 2013.

Reference no.	Date
RC8 H 135	03-APR-1969
RC8 H 136	03-APR-1969
RC8 H 137	03-APR-1969
RC8 EA 101	23-MAR-1982
RC8 EA 102	23-MAR-1982
RC8 EA 103	23-MAR-1982

Other imagery consulted

The following resources were consulted between 26th November 2013 and 10th December 2013.

Resource	Link/Source	Date	Description and comment
Google Earth	http://earth.google.com/	1999	Full coverage
		02-JUL-2006	Full coverage
		03-AUG-2007	Full coverage
		25-JUL-2008	Full coverage
Bing maps	http://www.bing.com/maps	No date	Full coverage
LiDAR (Digital Surface Model)	Environment Agency	1998 to NOV-2012	Coverage of km square TL7282 only

Appendix 4 Structure and content of digital map dataset

In the Autodesk drawing **AP & LiDAR Land North of Broom Rd, Lakenheath.dwg** the features in the layers APDITCH, APBANK, APTHACHURE, APEXTENTOFFEATURE & APSTRUCTURE are tagged with the following information

Data field	Description
APUID	Catalogue no.
TYPE	NMR Monument Type Thesaurus term
PERIOD	Period
LAYER	BANK, DITCH, EXTENT OF FEATURE, NATURAL FEATURE, THACHURE
PHOTO1	Photo/Map/Lidar reference number
DATE1	Date of PHOTO1
FORM1	Evidence (EARTHWORK, STRUCTURE, SOILMARK, PARCHMARK, CROPMARK)
SOURCE1	Source of PHOTO1 (EHA – English Heritage Archive, EA – Environment Agency, WWW – World Wide Web, CUCAP = Cambridge University Collection of Aerial Photographs)
PHOTO2	As above for additional images
DATE2	
FORM2	
SOURCE2	
PHOTO3	As above for additional images
DATE3	
FORM3	
SOURCE3	

Appendix 5 Archaeological features identified on air photos (see Figure 3)

APUID	Central NGR	Type(s)	Period(s)	Description of feature(s)
1	TL7256 8307	AIRCRAFT OBSTRUCTION	SECOND WORLD WAR	Traces of aircraft obstruction trenches are visible as soilmarks in the large flat fields on the north side of the Maids Cross Hill road on air photographs taken in 1942. (1) 1 RAF/HLA/500 6113 25-APR-1942
2	TL7236 8301	PLOUGH HEADLAND BANK (EARTHWORK)	MEDIEVAL POST MEDIEVAL	A possible medieval or post medieval plough headland or bank and traces of two further banks in a similar alignment are visible as soilmarks on historic air photos. (1-3) 1 RAF/3G/TUD/UK/59 5344 05-FEB-1946 2 RC8 EA 103 23-MAR-1982 3 RC8 H 136 03-APR-1969
3	TL7276 8286	DITCH	UNCERTAIN	A short ditch of uncertain date is visible as a cropmark on historic air photos. (1) 1 RAF/106G/UK/1704 4106 28-AUG-1946
4	TL7244 8258	GRAVEL PIT QUARRY	POST MEDIEVAL EARLY 20 TH CENTURY	A small gravel pit is depicted on the 1882 Ordnance Survey map at TL7244 2825. (1) The earliest photographs show that the surrounding area was hummocky and uneven, which may indicate further quarrying. On more recent air photos and on the LiDAR imagery this area is largely obscured by trees and did contain some late 20 th century structures that have now been removed. (2-3) 1 ORDNANCE SURVEY MAP 1882 2 RAF/3G/TUD/UK/59 5345 05-FEB-1946 3 LiDAR DSM TL7282 1998-2012

APUID	Central NGR	Type(s)	Period(s)	Description of feature(s)
5	TL7258 8260	STONE QUARRY QUARRY	POST MEDIEVAL	<p>The 1882 Ordnance Survey map depicts a cluster of "Stone Pits" just beyond the south-east corner of the proposed development site. (1)</p> <p>The earliest air photos show hummocky uneven ground across Maids Cross Hill with some distinct small pits, these are likely to be the remains of post medieval quarrying activities. (2-3)</p> <p>Most of this area was levelled for cultivation by 1959 but the more south-westerly pits appear to survive as earthworks. (4-5)</p> <p>1 ORDNANCE SURVEY MAP 1882 2 RAF/3G/TUD/UK/59 5407 05-FEB-1946 3 RAF/HLA/500 6113 25-APR-1942 4 RAF/58/2688 F22 258 25-JAN-1959 5 LiDAR DSM TL7282 1998-2012</p>
6	TL72508279	MOUND	UNCERTAIN	<p>A small mound, approximately 6m in diameter, is visible as an earthwork on historic air photographs. The HER record MSF9479 suggests this mounds is modern feature, though possibly rebuilt from an historic barrow. On the earliest photographs the mound is visible in an area of rough hummocky ground that is thought to be the remains of post medieval quarrying (see AP no. 5).(1)</p> <p>By 1959 the surrounding area had been levelled for cultivation but the mound was still visible as a low earthwork with different vegetation cover. (2)</p> <p>The current condition of this feature is not known because the area has been colonised by low shrubs. (3-4)</p> <p>1 RAF/HLA/500 6113 25-APR-1942 2 RAF/58/2688 F22 258 25-JAN-1959 3 BING ND 4 LiDAR DSM TL7282 1998-2012</p>

APUID	Central NGR	Type(s)	Period(s)	Description of feature(s)
7	TL7252 8280	ENCLOSURE	21ST CENTURY	<p>A small, circular walled enclosure, approximately 5m in diameter is visible on recent air photos (1)</p> <p>This feature was not visible on the 1999 Google Earth imagery or any earlier air photographs and so is presumed to be a 21st century construction. (2)</p> <p>1 BING ND 2 GOOGLE EARTH 1999</p>
8	TL7265 8260	ROYAL OBSERVER CORPS SITE	SECOND WORLD WAR LATE 20TH CENTURY	<p>A Royal Observer Corps post and associated features are visible as structures and earthworks on historic air photos. These features were in place in 1942 and still extant, though relandscaped and fenced off on the most recent images. (1-4)</p> <p>1 RAF/HLA/500 6113 25-APR-1942 2 RAF/3G/TUD/UK/59 5407 05-FEB-1946 3 BING ND 4 LiDAR DSM TL7282 1998-2012</p>
9	TL7277 8275	HOUSE GARDEN	POST MEDIEVAL	<p>A house and garden plot are depicted on the 1836 and 1882 Ordnance Survey maps and were extant on the earliest air photos. (1-2).</p> <p>These features were visible as earthworks in 1946 and the area appears to have been relandscaped as a car park on more recent images. (3-5)</p> <p>1 ORDNANCE SURVEY MAP 1836 2 ORDNANCE SURVEY MAP 1882 3 RAF/HLA/500 6113 25-APR-1942 4 RAF/3G/TUD/UK/59 5407 05-FEB-1946 5 LiDAR DSM TL7282 1998-2012</p>

APUID	Central NGR	Type(s)	Period(s)	Description of feature(s)
10	TL7282 8240	QUARRY	POST MEDIEVAL 20THCENTURY	<p>Dispersed quarry pits are visible as earthworks on historic and recent air photos and on the LiDAR imagery. Some of these features appear to have been dug after the earliest photographs but some are earlier and may have pre-20th century origins. (1-5)</p> <p>1 RAF/HLA/500 6113 25-APR-1942 2 RAF/3G/TUD/UK/59 5406 05-FEB-1946 3 BING ND 4 RC8 H 136 03-APR-1969 5 LiDAR DSM TL7282 1998-2012</p>
11	TL7286 8267	BANK (EARTHWORK)	POST MEDIEVAL	<p>Three mutilated banks are visible as earthworks on historic air photos, these features may be of post medieval origin. Two of these lie parallel to the Maids Cross Hill road and continue eastward beyond the Survey Area. The third is oriented south-west to north-east and runs along the southern side of an extant drainage ditch. This latter feature is also visible on the LiDAR imagery. (1-4)</p> <p>1 RAF/3G/TUD/UK/59 5406 05-FEB-1946 2 RC8 EA 103 23-MAR-1982 3 RC8 H 137 03-APR-1969 4 LiDAR DSM TL7282 1998-2012</p>
12	TL7274 8209	MILITARY SITE TRACKAY	MID 20 TH CENTURY	<p>Two small structures linked by trackways to the western side of the airfield are visible on historic air photos. The purpose of these structures is not known but given their position they are likely to be associated with the airfield. These features do not appear to have been present in 1942 or 1946 but are visible in 1947. (1-2)</p> <p>Some earthwork traces of these features are visible on recent air photos and on the LiDAR imagery. (3-4)</p> <p>1 RAF/CPE/UK/1952 1212 25-MAR-1947 2 BING ND 3 LiDAR DSM TL7282 1998-2012</p>

APUID	Central NGR	Type(s)	Period(s)	Description of feature(s)
13	TL7282 8217	BARBED WIRE OBSTRUCTION	SECOND WORLD WAR (1942)	<p>A large area of the heath on the western side of the airfield was enclosed by barbed wire obstructions on the earliest air photos. These features are likely to be associated with protecting activities in this area in the Second World War. These defences extended beyond the limits of the Survey Area but within it two blast pens can be seen within the barbed wire circuit (see AP nos 14 & 15). Although they appear to have been removed by 1959 and little if any trace is visible on the more recent air photos or LiDAR imagery small remnants of these temporary structures may remain on the ground. (1-2)</p> <p>1 RAF/HLA/500 6113 25-APR-1942 2 RAF/58/2688 F22 258 25-JAN-1959</p>
14	TL7288 8215	BLAST PEN	SECOND WORLD WAR (1942)	<p>A Second World War blast pen is visible as an earthwork on air photographs taken in 1942. It appears to have been recently constructed at this time. A similar pen lies 150m to the NE of this one (see AP no. 15). (1)</p> <p>This pen was still upstanding in 1946 but the LiDAR imagery suggests it has now been levelled. (2-3)</p> <p>1 RAF/HLA/500 6113 25-APR-1942 2 RAF/3G/TUD/UK/59 5406 05-FEB-1946 3 LiDAR DSM TL7282 1998-2012</p>
15	TL7295 8229	BLAST PEN	SECOND WORLD WAR (1942)	<p>A Second World War blast pen is visible as an earthwork on air photographs taken in 1942. It appears to have been recently constructed at this time. A similar pen (AP no. 14) lies 150m to the SW of this one. (1)</p> <p>This pen was still upstanding in 1946 but the LiDAR imagery suggests it has now been levelled. (2-3)</p> <p>1 RAF/HLA/500 6113 25-APR-1942 2 RAF/3G/TUD/UK/59 5406 05-FEB-1946 3 LiDAR DSM TL7282 1998-2012</p>

APUID	Central NGR	Type(s)	Period(s)	Description of feature(s)
16	TL7220 8220	FARMSTEAD	POST MEDIEVAL	<p>A small building complex, possibly a farmstead is depicted on historic maps. (1-2)</p> <p>By 1942 the standing structures had been removed and the site was marked by earthworks. (3)</p> <p>The LiDAR imagery suggests low earthworks survive at this spot. (4)</p> <p>1 ORDNANCE SURVEY MAP 1882</p> <p>2 ORDNANCE SURVEY MAP 1836</p> <p>3 RAF/HLA/500 6113 25-APR-1942</p> <p>4 LiDAR DSM TL7282 1998-2012</p>
17	TL7280 8297	UNCERTAIN	UNCERTAIN	<p>Indistinct soilmarks in the field known as 'Roman Field' are visible on air photos taken in 1969. These pale-toned soilmarks have the zigzag appearance that indicates deposits have been dragged back and forth by modern ploughing. As such the apparent shape and even the position of these marks may be at some remove from the truncated remains from which they may have derived.</p> <p>Furthermore it is known that there were archaeological excavations in this area in the late 1940s, although their precise location is not available. It is possible that these soilmarks are in fact the backfill of those trenches. (1)</p> <p>1 RC8 H 136 03-APR-19691</p>

References and resources cited

Jones, R J A and Evans, R 1975. 'Soil and crop marks in the recognition of archaeological site by air photography' in Wilson, D (ed) *Aerial Reconnaissance for Archaeology*. CBA Research Report 12. 1-11

Soil Survey of England and Wales 1983 Soils of England and Wales, 1:250 000 scale map and legend. Sheet 3.

Digital resources

BGS Viewer <http://mapapps.bgs.ac.uk/geologyofbritain/home.html> Accessed 03/01/2014

Natural England http://www.naturalengland.org.uk/Images/jca85_tcm6-5646.pdf Accessed 03/01/2014

Soilscapes <https://www.landis.org.uk/soilscapes/> Accessed 03/01/2014

Ordnance Survey First Series 1836 1:63360 Sheet 51
http://www.visionofbritain.org.uk/maps/sheet/first_edition/lm_51. Accessed 03/01/2014

<http://www.old-maps.co.uk> for the Ordnance Survey map of 1882 (1:2500 scale). Accessed 03/01/2014

Subterranea Britannica <http://www.subbrit.org.uk/rsg/roc/db/988807445.026002.html> Accessed 03/01/2014

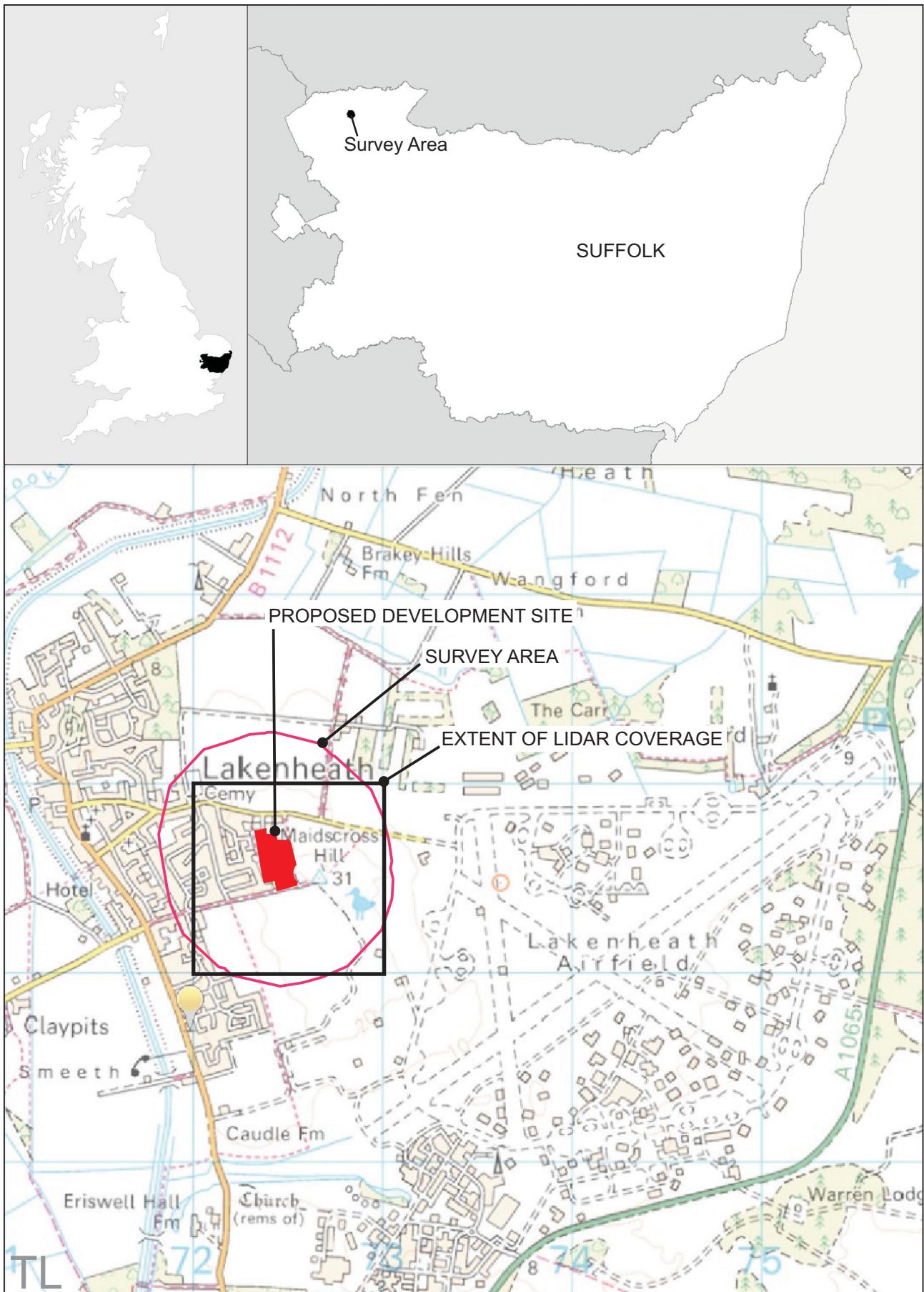


Figure 1. Location plan of the air photo interpretation and mapping for Land North of Broom Road, Lakenheath

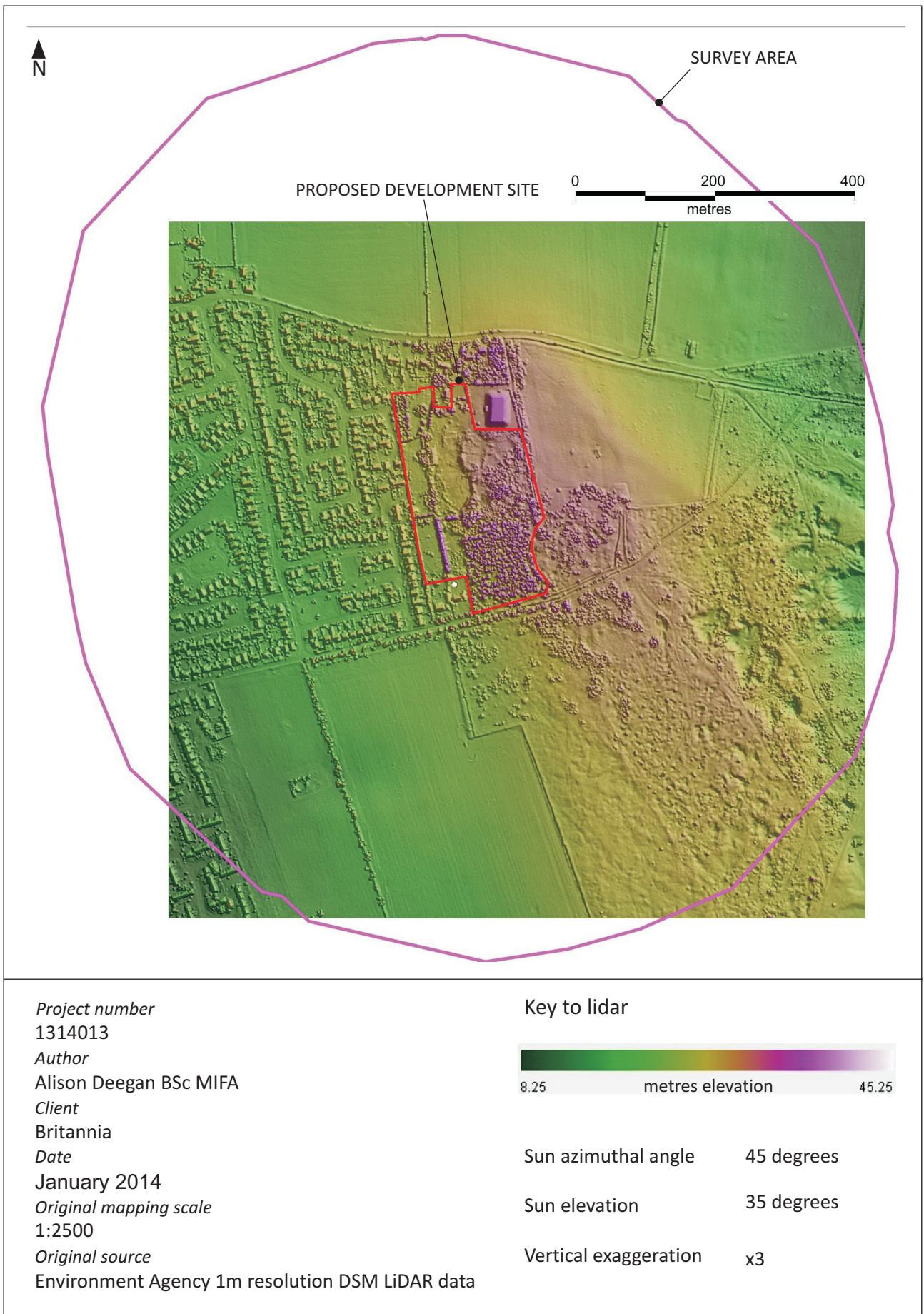


Figure 2. Overview of the 1m resolution LiDAR data (digital surface model) for TL7282.

Fig 3. Archaeological features from air photos and LiDAR for Land North of Broom Road, Lakenheath, Suffolk. (approx. 1:5000 scale)	
Project number	Archaeological ditch
1314013	Archaeological bank
Author	Area of large or poorly-defined archaeological features
Alison Deegan BSc MIFA	Archaeological slope (schematic)
Client	?Dry valley
Britannia	AP catalogue number
Date	1
January 2014	
Original mapping scale	
1:2500	
Original sources	
EHA, CUCAP, Google Earth & Bing air photos & EA LiDAR	
Air photo mapping and interpretation © Alison Deegan 2014	

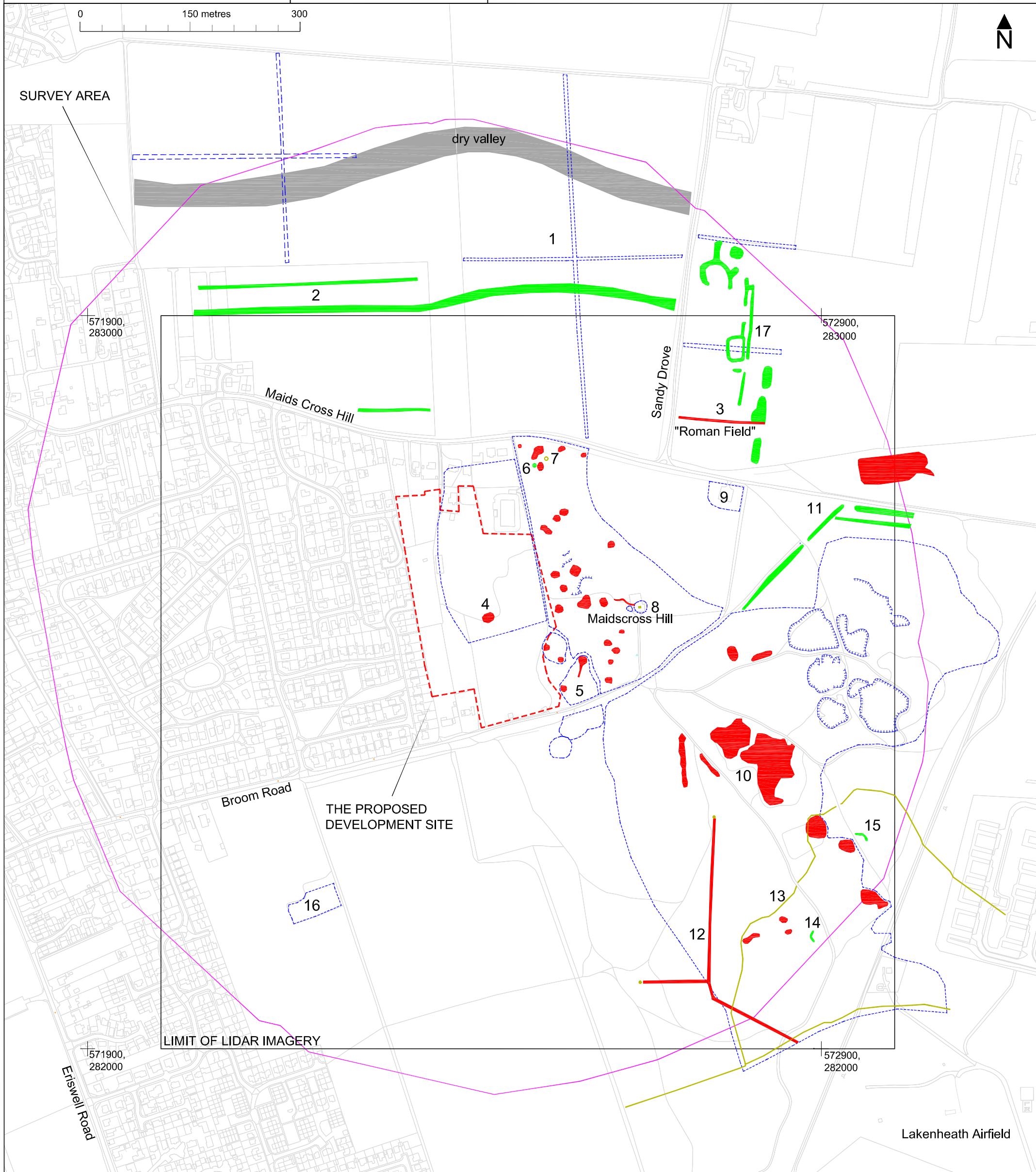


Figure 3. Archaeological features from air photos and LiDAR data for Land North of Broom Road, Lakenheath, Suffolk