# THAMES VALLEY

# ARCHAEOLOGICAL

# SERVICES

# SOUTH

## Land Adjacent to Hoe Court Lane, Lancing, West Sussex

**Geophysical Survey (Magnetic)**

**by Tim Dawson and Genni Elliott**

**Site Code: LCL12/143**

**(TQ 1902 0593)**

# Land Adjacent to Hoe Court Lane, Lancing, West Sussex

Geophysical Survey (Magnetic) Report

For Lancing College

by Tim Dawson and Genni Elliott

Thames Valley Archaeological Services Ltd

Site Code LCL 12/143

November 2014

# Summary

**Site name:** Land Adjacent to Hoe Court Lane, Lancing, West Sussex

**Grid reference:** TQ 1902 0593

**Site activity:** Magnetometer survey

**Date and duration of project:** 27th - 31st October 2014

**Project manager:** Steve Ford

**Site supervisor:** Genni Elliott

**Site code:** LCL 12/143

**Area of site:** 6.77ha

**Summary of results:** Several magnetic anomalies were recorded by the survey. These were clustered primarily in the northern half of the field with several possibly indicating the presence of buried archaeological deposits. These take the form of several linear and discreet positive anomalies which are most likely caused by cut features such as ditches and pits. A large circular positive anomaly may represent a quarry pit of unknown date. This fieldwork has not located any features that can be interpreted as cemetery deposits on the site.

**Location of archive:** The archive is presently held at Thames Valley Archaeological Services, Reading in accordance with TVAS digital archiving policies.

Report edited/checked by:   Steve Ford✔ 27.11.14
                            Andrew Mundin✔ 27.11.14

# Introduction

This report documents the results of a geophysical survey (magnetic) carried out on a parcel of land located immediately west of Hoe Court Lane, Lancing, West Sussex (TQ 1902 0593) (Fig. 1). The work was commissioned by Mr Mark Milling, bursar at Lancing College, Lancing, West Sussex BN15 0RW.

Planning permission is to be sought from Adur District Council to redevelop the site for residential accommodation. A geophysical survey was requested in order to further inform the determination of the application once made. This is in accordance with the Department for Communities and Local Government's National Planning Policy Framework (NPPF 2012) and the District's policies on archaeology. The field investigation was carried out to a written scheme of investigation prepared by TVAS. The fieldwork was undertaken by Rebecca Constable and Genni Elliott between 27th and 31st October 2014 and the site code is LCL 12/143.

The archive is presently held at Thames Valley Archaeological Services, Reading in accordance with TVAS digital archiving policies.

# Location, topography and geology

The development area is roughly rectangular in plan, covering an area of *c*. 9.4 ha, and is centred on NGR TQ 1902 0593 (Fig. 2). The site is located to the north of Old Shoreham Road (A27) and immediately west of Hoe Court Lane. The northern part of the site is occupied by residential properties dating from the 20th century, and there are further buildings along the eastern boundary, along with a large house, known as "Little Houghton" roughly in the centre of the site. The remainder of the site is not currently farmed, due to the poor quality of the soil (there are patches of exposed chalk in the northern part of the field), and can presently be described as a slightly overgrown meadow (Pl. 1-2). The site generally slopes down steeply towards the south-east, and as a result the height above Ordnance Datum varies from about 45m in the north-west corner to less than 5m along the southern boundary. Lancing Hill rises to 81m above Ordnance Datum just to the north while to the south is the coastal plain. According to the British Geological Survey, the underlying geology in the northern half of the

site consists of chalk from the Newhaven Formation, whilst Head deposits are present in the southern part of the site (BGS 2006). Conditions during the survey were dry and sunny.

## Site history and archaeological background

An archaeological desk-based assessment was undertaken for the site which concluded that it lay within an area of moderate to high archaeological potential due to its location on the southern slopes of the South Downs (Wallis 2012). In summary: features dating from the prehistoric and Roman periods have been found during archaeological work on Lancing Down to the north-west of the site, whilst there have been a number of stray finds in the area, including Roman and medieval objects within Lancing itself. A number of Saxon burials were recorded just beyond the northern boundary of the proposed site in the first half of the 20th century, and it is possible that further inhumations may be present nearby. The southern boundary of the site lies close to the projected line of the Roman road from Chichester to Brighton, and it is possible that features or roadside occupation associated with the road may be present.

## Methodology

<u>Sample interval</u>

Data collection required a temporary grid to be established across the survey area using wooden pegs at 20m intervals with further subdivision where necessary. Readings were taken at 0.25m intervals along traverses 1m apart. This provides 1600 sampling points across a full 20m × 20m grid (English Heritage 2008), providing an appropriate methodology balancing cost and time with resolution. The grid was laid out aligned with the field's long north-south axis (Fig. 2).

The Grad 601-2 has a typical depth of penetration of 0.5m to 1.0m. This would be increased if strongly magnetic objects have been buried in the site. Under normal operating conditions it can be expected to identify buried features >0.5m in diameter. Features which can be detected include disturbed soil, such as the fill of a ditch, structures that have been heated to high temperatures (magnetic thermoremnance) and objects made from ferro-magnetic materials. The strength of the magnetic field is measured in nano Tesla (nT), equivalent to $10^{-9}$ Tesla, the SI unit of magnetic flux density.

<u>Equipment</u>

The purpose of the survey was to identify geophysical anomalies that may be archaeological in origin in order to inform a targeted archaeological investigation of the site prior to development. The survey and report generally follow the recommendations and standards set out by both English Heritage (2008) and the Institute for Archaeologists (2002, 2011).

Magnetometry was chosen as a survey method as it offers the most rapid ground coverage and responds to a wide range of anomalies caused by past human activity. These properties make it ideal for fast yet detailed survey of an area.

The detailed magnetometry survey was carried out using a dual sensor Bartington Instruments Grad 601-2 fluxgate gradiometer. The instrument consists of two fluxgates mounted 1m vertically apart with a second set positioned at 1m horizontal distance. This enables readings to be taken of both the general background magnetic field and any localised anomalies with the difference being plotted as either positive or negative buried features. All sensors are calibrated to cancel out the local magnetic field and react only to anomalies above or below this base line. On this basis, strong magnetic anomalies such as burnt features (kilns and hearths) will give a high response as will buried ferrous objects. More subtle anomalies such as pits and ditches, can be seem from their infilling soils containing higher proportions of humic material, rich in ferrous oxides, compared to the undisturbed subsoil. This will stand out in relation to the background magnetic readings and appear in plan following the course of a linear feature or within a discrete area.

A Trimble Geo7x handheld GPS system with sub-decimetre real-time accuracy was used to tie the site grid into the Ordnance Survey national grid. This unit offers both real-time correction and post-survey processing; enabling a high level of accuracy to be obtained both in the field and in the final post-processed data.

Data gathered in the field was processed using the TerraSurveyor software package. This allows the survey data to be collated and manipulated to enhance the visibility of anomalies, particularly those likely to be of archaeological origin. The table below lists the processes applied to this survey, full survey and data information is recorded in Appendix 1.

| Process | Effect |
| --- | --- |
| Clip from -3.00 to 3.00 nT | Enhance the contrast of the image to improve the appearance of possible archaeological anomalies. |
| De-stripe: median, all sensors | Removes the striping effect caused by differences in sensor calibration, enhancing the visibility of potential archaeological anomalies. |
| De-spike: threshold 1, window size 3×3 | Compresses outlying magnetic points caused by interference of metal objects within the survey area. |

De-stagger: all grids, both by -1 intervals       Cancels out effects of site's topography on irregularities in the traverse speed.

Once processed, the results are presented as a greyscale plot shown in relation to the site (Fig. 3), followed by a second plan to present the abstraction and interpretation of the magnetic anomalies (Fig. 4). Anomalies are shown as colour-coded lines, points and polygons. The grid layout and georeferencing information (Fig. 2) is prepared in EasyCAD v.7.58.00, producing a .FC7 file format, and printed as a .PDF for inclusion in the final report.

The greyscale plot of the processed data is exported from TerraSurveyor in a georeferenced portable network graphics (.PNG) format, a raster image format chosen for its lossless data compression and support for transparent pixels, enabling it to easily be overlaid onto an existing site plan. The data plot is combined with grid and site plans in QGIS 2.4.0 Chugiak and exported again in .PNG format in order to present them in figure templates in Adobe InDesign CS5.5, creating .INDD file formats. Once the figures are finalised they are exported in .PDF format for inclusion within the finished report.

## Results

A variety of magnetic anomalies were recorded across the survey site, several of which may indicate the presence of archaeological deposits (Fig. 3). These are primarily located in the northern part of the site and consist of linear and discreet positive magnetic anomalies which are usually indicative of buried cut features such as ditches and pits. A linear anomaly, probably a ditch, runs southwards from the northern site boundary **[Fig. 4: 1]** for approximately 70m before petering out for 15m and then appearing again for a short length **[2]**. This shorter length is almost abutted by another positive linear anomaly which extends in an ENE direction for *c*.48m **[3]**. A second, slightly weaker and more diffuse, positive linear anomaly **[4]** continues for *c*.45m on a slightly different alignment after a break of 8.5m. These two linear anomalies appear to follow the contour of the hill which possibly accounts for the more spread out magnetic signature. The remaining anomalies that may be of archaeological origin are small discreet positive patches, possibly representing buried pits. These are scattered primarily around the northern end of the survey area **[5]** with two outlying instances in the south-western **[6]** and south-eastern **[7]** corners. A much larger strong discreet positive anomaly was recorded one third of the way down the site's western boundary **[8]**. This measures approximately 14.25m in diameter and may represent a large cut feature such as a quarry pit.

The remaining magnetic anomalies recorded by the survey relate either to near-by ferromagnetic objects, such as fences or buried pipes, or to buried ferrous debris. The former appear particularly along the northern and

eastern edges of the survey area, probably being the result of wire fencing, and in the location of a manhole **[10]** which was observed on the ground surface in the north-eastern corner. Further to the south the survey plotted what appears to be a line of dipolar anomalies, possibly caused by a series of buried ferrous objects **[9]**. Several smaller discreet magnetic spikes are recorded in the central and southern parts of the field. These are probably the result of buried ferrous debris.

## Conclusion

The geophysical survey of the plot of land to the west of Hoe Court Lane was undertaken successfully and plotted several magnetic anomalies, some of which may be archaeological in origin. These consist of both linear and discreet positive anomalies, which suggest the presence of buried ditches and pits, and are clustered primarily in the northern part of the field. A large circular positive anomaly may represent a quarry pit of unknown date. A limited amount of magnetic disturbance was recorded along the northern and eastern edges of the site which could have a masking effect on any weaker, possible archaeological anomalies located in these areas. This survey has not confidently located any features that can be interpreted as cemetery deposits given the previously recorded graves located just beyond the northern margins of the site.

## References
BGS, 2006, *British Geological Survey*, 1:50,000, Sheet 318/333, Solid and Drift Edition, Keyworth
English Heritage, 2008, *Geophysical Survey in Archaeological Field Evaluation*, English Heritage, Portsmouth (2nd edn)
IFA, 2002, *The Use of Geophysical Techniques in Archaeological Evaluation*, IFA Paper No. 6, Reading
IFA, 2011, *Standard and Guidance: for archaeological geophysical survey*, Reading
NPPF, 2012, *National Planning Policy Framework*, Dept Communities and Local Government, London
Wallis, S, 2012, 'Land Adjacent to Hoe Court Lane, Lancing, West Sussex: An archaeological desk-based assessment', Thames Valley Archaeological Services (South) report 12/143a, Brighton

**Appendix 1.** Survey and data information

<div style="display:flex">
<div>

**PROGRAMME**
Name:                TerraSurveyor
Version:             3.0.25.1

**Raw data**
Instrument Type:        Grad 601 (Magnetometer)
Units:              nT
Direction of 1st Traverse: 87.63 deg
Collection Method:      ZigZag
Sensors:            2  @  1.00 m spacing.
Dummy Value:          2047.5

Dimensions
Composite Size (readings): 960 x 340
Survey Size (meters):    240 m x 340 m
Grid Size:           20 m x 20 m
X Interval:           0.25 m
Y Interval:          1 m

Stats
Max:                100.00
Min:                -100.00
Std Dev:            3.92
Mean:               0.32
Median:             0.19
Composite Area:          8.16 ha
Surveyed Area:          5.4856 ha

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```

**Processed data**

Stats

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| Min: | -3.00 |
| Std Dev: | 0.75 |
| Mean: | -0.01 |
| Median: | 0.00 |

Processes:    5
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 2  DeStripe Median Sensors: All
 3  De Stagger: Grids: All  Mode: Both By: -1 intervals
 4  Clip from -3.00 to 3.00 nT
 5  Despike Threshold: 1 Window size: 3x3
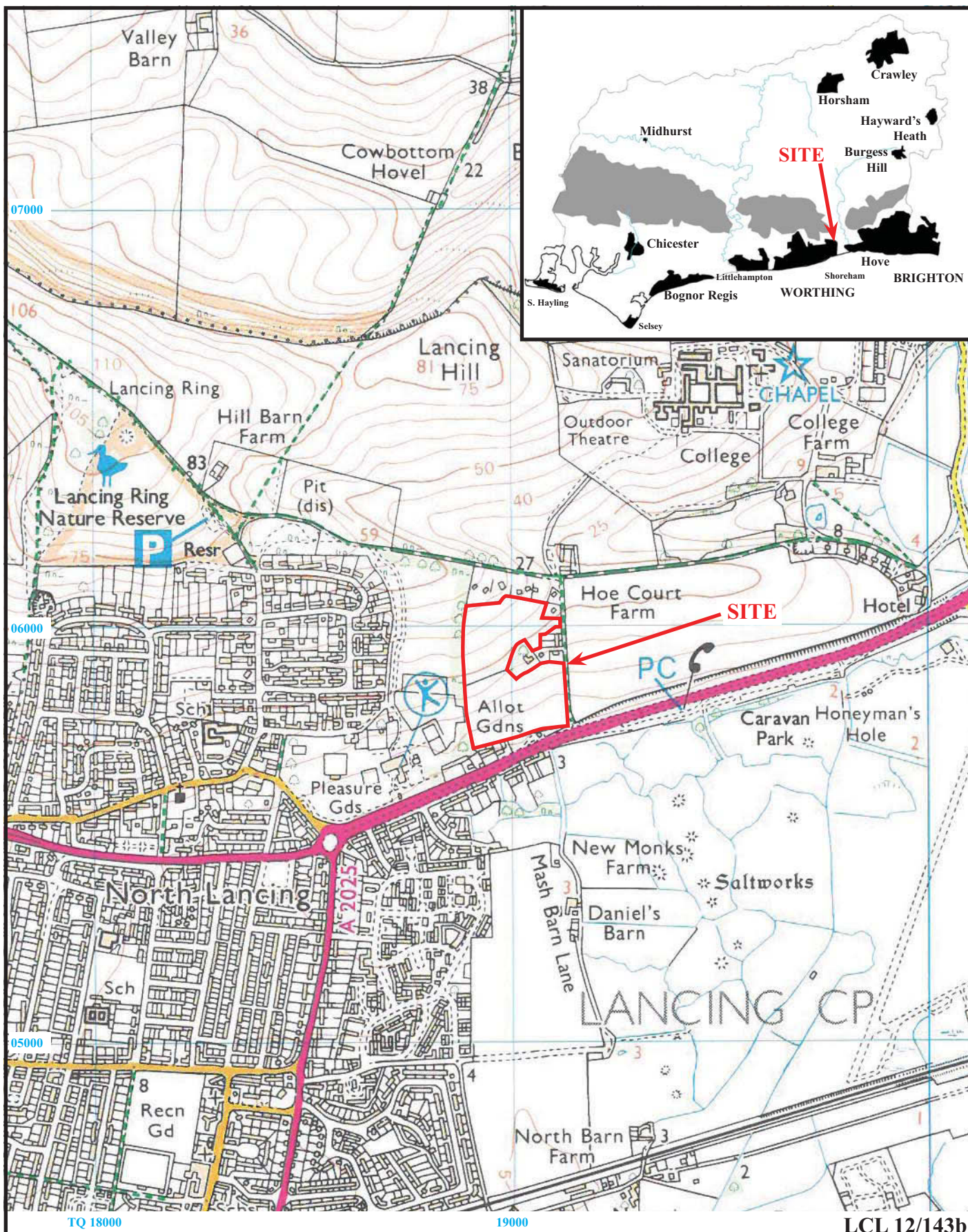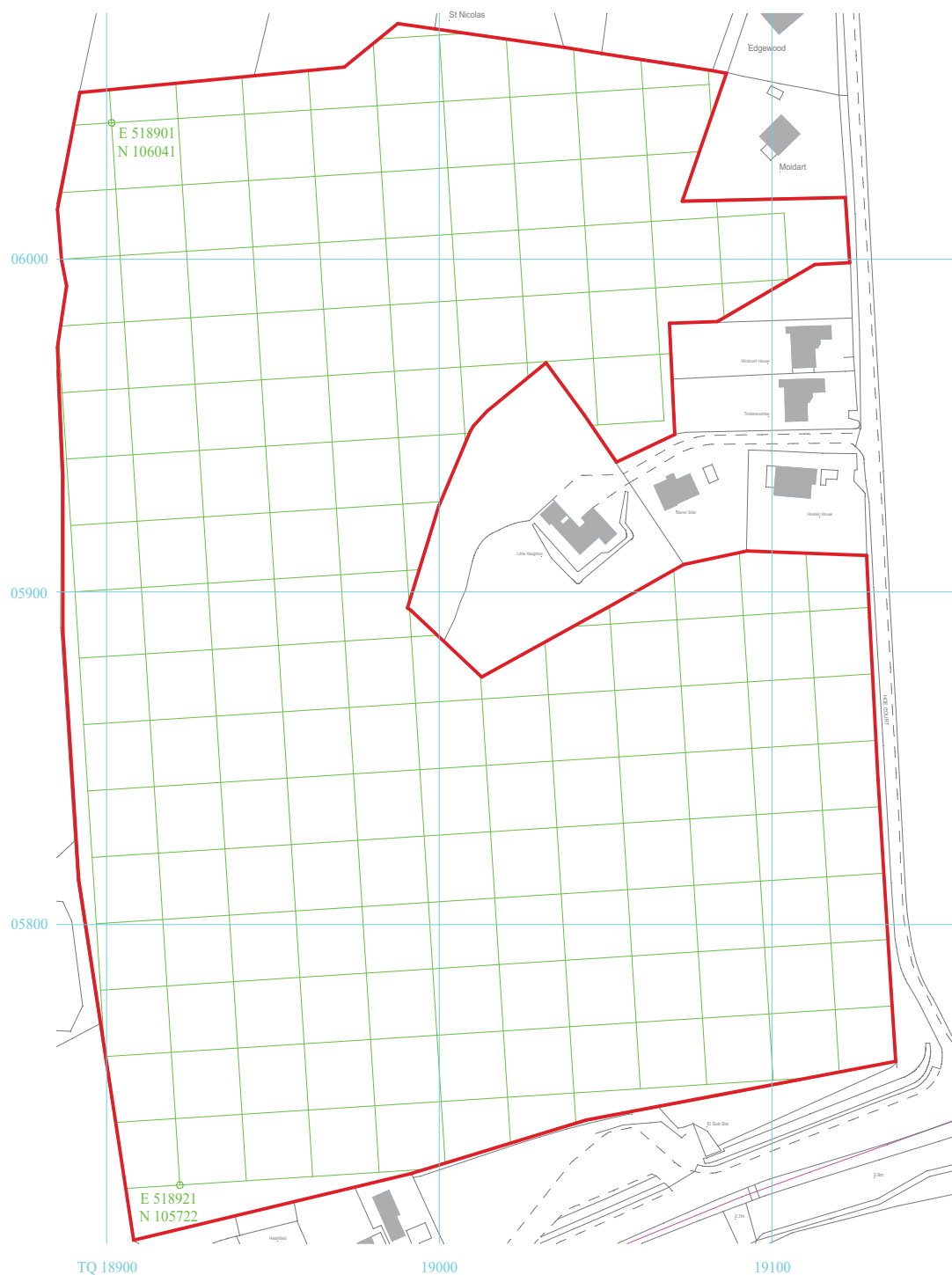
Land Adjacent to Hoe Court Lane, Lancing,
West Sussex, 2014
Geophysical Survey (Magnetic)
Figure 1. Location of site within Lancing and West Sussex.

Reproduced from Ordnance Survey Explorer 122 at 1:12500
Ordnance Survey Licence 100025880

St Nicolas

Edgewood

E 518901
N 106041

Moidart

06000

Wolnoth House

Timbercombe

05900

Manor Side

Hooley House

Little Houghley

05800

El Sub Sta

E 518921
N 105722

Hoghfield

TQ 18900        19000        19100

**LCL 12/143b**

N

**Land Adjacent to Hoe Court Lane, Lancing,
West Sussex, 2014
Geophysical Survey (Magnetic)**

Figure 2. Survey grid layout.

0                  100m

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St Nicolas

Edgewood

**Site**

Moidart

06000

Windrush House

Timberscombe

Manor Side

Hoelain House

Little Houghton

05900

HOE COURT

05800

05700

El Sub Sta

2.8m

2.7m

Heathfield

TQ 18900

19000

19100

LCL 12/143b

N

**Land Adjacent to Hoe Court Lane, Lancing,
West Sussex, 2014
Geophysical Survey (Magnetic)**

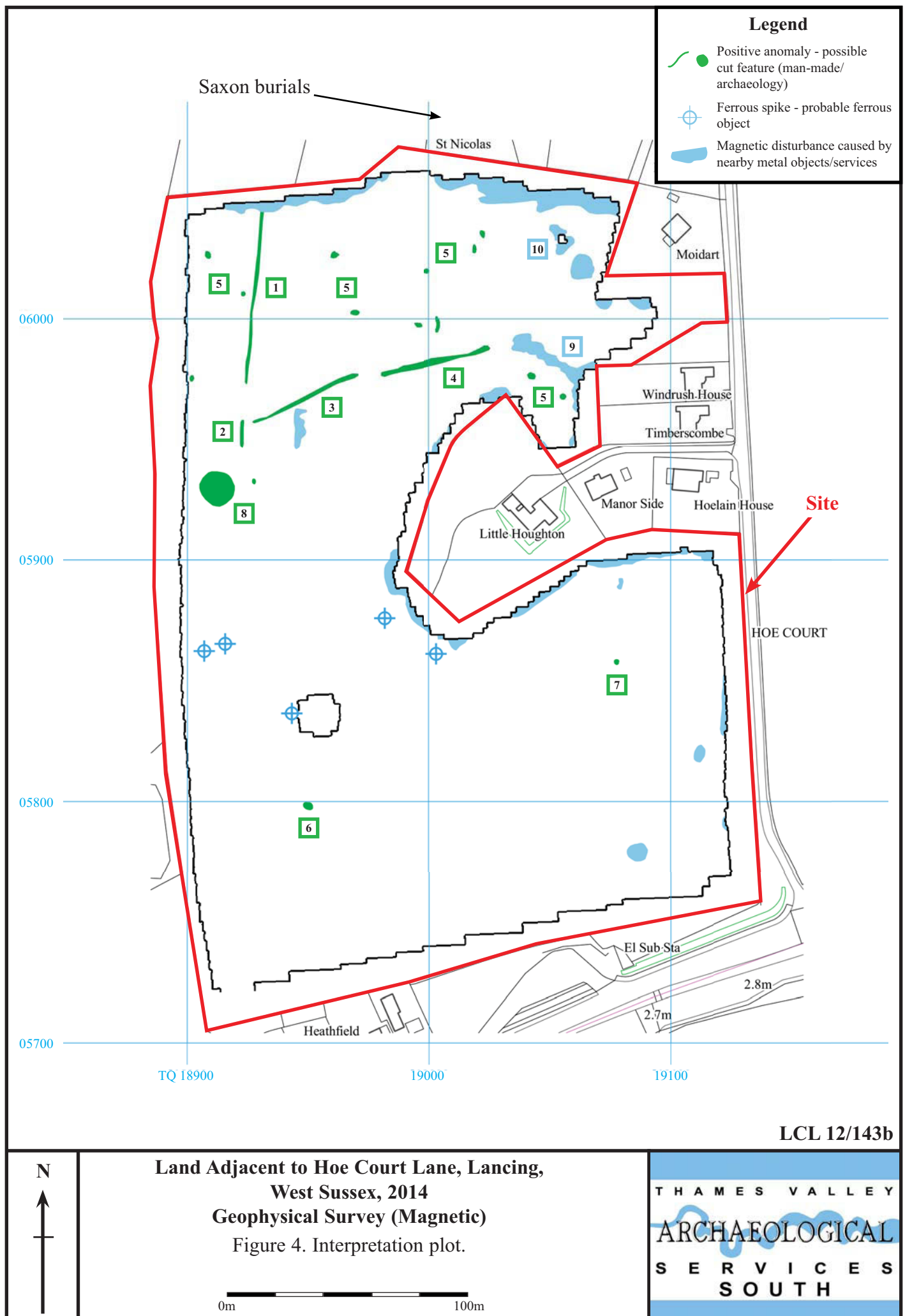Figure 3. Plot of minimally processed gradiometer data.

+3 nT

-3 nT

0m          100m

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**Land Adjacent to Hoe Court Lane, Lancing, West Sussex, 2014**
**Geophysical Survey (Magnetic)**
Figure 4. Interpretation plot.

Legend
Positive anomaly - possible cut feature (man-made/archaeology)
Ferrous spike - probable ferrous object
Magnetic disturbance caused by nearby metal objects/services

Saxon burials

Site

St Nicolas
Moidart
Windrush House
Timberscombe
Manor Side
Hoelain House
Little Houghton
HOE COURT
El Sub Sta
Heathfield

2.8m
2.7m

N

0m          100m

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Plate 1. The northern area, looking south.



Plate 2. The southern area, looking south-east.

**LCL 12/143b**

**Land Adjacent to Hoe Court Lane, Lancing**
**West Sussex, 2014**
**Geophysical Survey (Magnetic)**
Plates 1 - 2.

THAMES VALLEY
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# TIME CHART

**Calendar Years**

| | |
|---|---|
| Modern | AD 1901 |
| Victorian | AD 1837 |
| Post Medieval | AD 1500 |
| Medieval | AD 1066 |
| Saxon | AD 410 |
| Roman | AD 43 |
| Iron Age | BC/AD 750 BC |
| Bronze Age: Late | 1300 BC |
| Bronze Age: Middle | 1700 BC |
| Bronze Age: Early | 2100 BC |
| Neolithic: Late | 3300 BC |
| Neolithic: Early | 4300 BC |
| Mesolithic: Late | 6000 BC |
| Mesolithic: Early | 10000 BC |
| Palaeolithic: Upper | 30000 BC |
| Palaeolithic: Middle | 70000 BC |
| Palaeolithic: Lower | 2,000,000 BC |
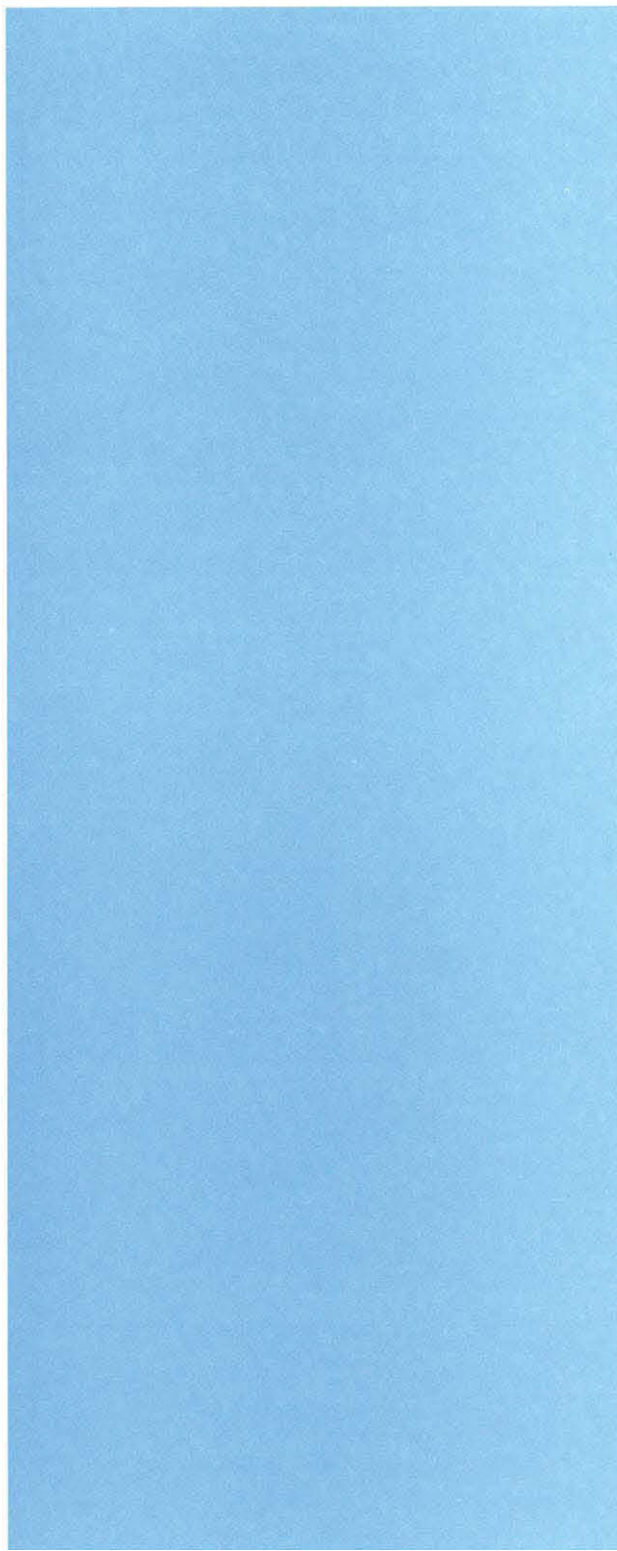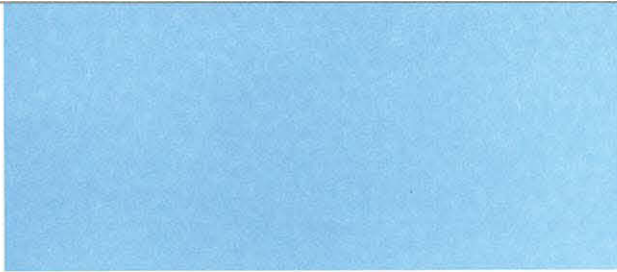
**TVAS (South)**
**77a Hollingdean Terrace, Brighton**
**Sussex, BN1 7HB**

**Tel: 01273 554198**
**Fax: 01273 564043**
**Email: south@tvas.co.uk**
**Web: www.tvas.co.uk**