

**Geophysical Survey
Woodlands Farm
Wrotham Road
Meopham
Kent
DA13 0RQ**

(centred TQ 63489 62180)



Project Code: CULWOODFM

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Abstract

Kevin Cornwell was commissioned by [REDACTED] to carry out a geophysical survey on land at Woodlands Farm, Wrotham Road, Meopham, Kent DA13 0RQ (centred TQ 63489 62180. The survey covered approximately 1.8 hectares and took place between 10th – 12th June 2026. The survey area consisted of equestrian facility, an orchard, a recreational area, as well as the large adjoining field used by grazing animals which takes up the eastern half of the site.

The survey and subsequent results detected limited evidence for archaeological remains. A linear ditch was located in survey area 5 along with a possible in-filled pit.

A series of regular spaced areas of highly magnetic material below the all-weather equestrian arena could be of archaeological significance or modern in date.

Modern activity was identified in the form of a large quantity of ferrous features across three survey areas. This are probably associated with the construction of the all-weather equestrian arena and other recreational activity.

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1.0 Introduction

1.1 Site background

- 1.1.1 Kevin Cornwell was commissioned by [REDACTED] to conduct a geophysical (magnetometer) survey on land at Woodlands Farm, Wrotham Road, Meopham, Kent DA13 0RQ (centred TQ 63489 62180 (Figure 1 & 2).
- 1.1.2 The Proposed Development Area (PDA) is approximately 3 hectares in size and consists of Woodlands Farmhouse, buildings and equestrian facility as well as the large adjoining field which takes up the eastern half of the site (Figure 2). Only the accessible areas were surveyed (areas 2-5).
- 1.1.3 The survey forms part of an archaeological program recommended by the Draft Archaeology Desk Based Assessment & Heritage Statement (Layfield 15 May 2026, para. 10.1.2).
- 1.1.4 All field work was conducted in accordance with standard procedures for geophysical surveys (Chartered Institute for Archaeologists December 2014 (updated October 2020)).

1.2 Scope of Report

- 1.2.1 The scope of this report is to detail the process of the magnetometry survey and present the findings of the Fieldwork. The site survey and report were completed by Kevin Cornwell. Fieldwork was assisted by Anton Burrows, Invicta Archaeological Services Ltd. staff under the direction of Kevin Cornwell.

2.0 Geology and Topography (reproduced from the Draft Archaeology Desk Based Assessment & Heritage Statement (Layfield 15 May 2026 section 2.3)).

2.1 Geology

- 2.1.1 The British Geological Survey (BGS) records the underlying bedrock geology as Lewes Nodular Chalk Formation. These are sedimentary rocks and are marine in origin, being formed between 93.9 and 86.3 million years ago during the Cretaceous period.
- 2.1.2 The BGS records superficial deposits of Clay-with-flints Formation across the whole site. These sedimentary deposits are subaerial and pedogenic in origin. They are detrital, comprising coarse to fine-grained materials, weathered to form layers of accumulated material. They were formed between 66 million years ago in the Palaeogene and 11,800 years ago during the Quaternary period.
- 2.1.3 The BGS does not hold any records of boreholes within the site boundaries, however, there are four records of previous borehole surveys having been conducted along Gravesend/Wrotham Road to the immediate east of the site (REF: TQ66SW14, TQ66SW13, TQ66SW24, and TQ66SW20). These were conducted between 1984-85 and all detected significant layers of Clay-with-flints superficial deposits.

2.2 Topography

- 2.2.1 The site of proposed development is set on a slope, increasing from around c.187m above Ordnance Datum (OD) along the northern boundary to around c.191m OD along the southern boundary.
- 2.2.2 Within the wider landscape context, the site is positioned on relative high ground on the northern side of the ridgeline running through Trosely Country Park c.900m south of the site. This ridgeline runs east-to-west between the River Medway valley and the River Darent valley and forms part of the North Downs which cross Kent and Surrey.

3.0 Archaeological Periods Represented

3.1.1 The timescale of the archaeological periods referred to in this report is shown below.

Palaeolithic c. 750,000 BC - c. 10,000 BC

Mesolithic c. 10,000 BC - c. 5000 BC

Neolithic c. 5000 BC - c. 2300 BC

Bronze Age c. 2300 BC - c. 600 BC

Iron Age c. 600 BC - AD 43

Romano-British: AD 43 - c. AD 410

Medieval: c. AD 410 - AD 1536

Post-medieval: AD 1536 to present

3.2 Heritage Asset

3.2.1 The Historic Environment Record maintained by Kent County Council, was consulted, together with The Archaeological Data Service (ADS), OASIS, PastScape and MAGIC.gov, Historic manuscripts, surveyed maps, and Ordnance Survey maps held online. Published and unpublished archaeological reports relating to excavations and observations in the study area were also consulted. These are discussed in detail in the Draft Archaeology Desk Based Assessment & Heritage Statement (Layfield 15 May 2026) and have been summarised below.

3.2.2 There are no scheduled monuments within the site boundary.

3.2.3 The Kent HER records no archaeological features on the site.

4.0 Geophysical Survey Methodology

4.1 Geophysical survey

- 4.1.1 A fluxgate gradiometer (magnetometry) survey was undertaken in four areas depicted on the geophysical grid plan Figure 3.

4.2 Magnetometry Instrumentation: settings

- 4.2.1 The Fluxgate Gradiometer employed was the Bartington Instrumentation Grad 601-2. The Grad 601-2 has an internal memory and a data logger that store the survey data. This data is downloaded into a PC and is then processed in a suitable software package.

Bartington 601-2 Magnetometer equipment settings:

Grid size 40m

Sample Intervals 0.25m

Traverse Intervals 1.0m

Traverse Mode Zig-Zag

Resolution 0.01nT

Frequency 50Hz

Operating Temperature -20°C to +70°C

Rating IP65

Sensor element spacing 1m

Power supply current 60mA

Drift <1nT in 24 hours

Gradient range $\pm 100\text{nT/m}$ or $\pm 1000\text{nT/m}$ full-scale

Bandwidth DC to 14Hz with -40dB 5-Hz/600Hz rejection

Sensitivity 0.03nT/m (max effective)

Calibration error $\pm 2\%$

Maximum ambient field $\pm 100\mu\text{T}$

- 4.2.2 The magnetometer was set to record at 4 readings per 1 metre transverse, surveying in a zig-zag pattern with the magnetometer set to a 'full scale range of $\pm 100\text{nT/m}$ (resolution 0.03nT/m (max effective))' (Bartington Instruments 2025). This Level 2 investigation (Delineation) method is recommended by Schmidt et al. (2016).
- 4.2.3 40m x 40m grids or partial grids were set out using Leica GPS Rover 1200 equipment (see below). Each grid was surveyed with 1m traverses; samples were taken every 0.25m. This results in 6400 logged values per complete grid.
- 4.2.4 Data was collected along north-east traverses in a zigzag pattern beginning in the south-east corner of each grid.
- ### 4.3 Survey Limitations

4.3.1 The effectiveness of magnetometer surveys depends on a contrast between the absolute magnetic susceptibility of the topsoil to the underlying subsoil (Clark 1996; Gaffney & Gater 2011). Features may also be difficult to detect where there has been significant primary silting.

4.4 GNSS Equipment

4.4.1 The survey grids, or partial grids for the site were set-out and geo-referenced using a Leica GPS Rover 1200. The equipment is survey grade and provides sub-centimetre accuracy for position and height in the desired projected coordinate system. The Ordnance Survey National Grid projection (OSGB-1936: OSTN-15; EPSG: 27700) was adopted for this project. The equipment was set at 0.02+/-m accuracy.

4.4.2 The survey grid location data does not form part of this report and is available from Invicta Archaeological Services Ltd.

5.0 Geophysical Survey Scope

5.1 Introduction

- 5.1.1 The purpose of the geophysical survey was to detect any buried archaeological anomalies that might provide a measurable magnetic response and characterise the potential of the site. The survey was focused on the area outlined in the Draft Archaeology Desk Based Assessment & Heritage Statement (Layfield 15 May 2026).
- 5.1.2 A fluxgate gradiometer (magnetometry) survey was undertaken in four areas depicted on the google earth image (Figure 4). Area 1 was not surveyed.
- 5.1.3 The fieldwork was undertaken between 10th – 12th June 2026 when the weather was mostly fine, sunny, and with occasional heavy showers.

5.2 Details

- 5.2.1 The survey area totalled approximately 1.8 hectares of an all-weather equestrian arena, junior football pitch, recreational area and horse pasture. This was sub-divided into four areas (area 2-5) for survey and interpretation purposes. Area 1 was not surveyed (Figure 4).
- 5.2.2 Area 1 (centred on NGR TQ 63437 62286) was situated to the north-western of the site and covered approximately 1 hectare of the PDA. It considered of Woodland Farmhouse, ancillary buildings, including a Barn and a Stable and a metalled track (Plate 1 & 2). It was not possible to survey this area.
- 5.2.3 Area 2 (centred on NGR TQ 63393 62204) to the west of the study area covered just under a tenth of a hectare. This cherry orchard was difficult to survey (Plate 3).
- 5.2.4 Area 3 (centred on NGR TQ 63448 62226) to the south of Woodlands Farm was the area of the all-weather equestrian arena, junior football pitch and the adjoining landscaped area (Plate 4).
- 5.2.5 Area 4 (centred on NGR TQ 63440 62174) to the south of the all-weather equestrian arena was used recreational purposes (Plate 5).
- 5.2.6 Area 5 (centred on NGR TQ 63518 62156) to the east of the PDA was an open field used by grazing horses (Plate 6).

6.0 Data/ Results

6.1 Presentation

- 6.1.1 Data is presented using images exported from Geoplot software.
- 6.1.2 The RAW data is presented along with the results of the required processing. (Figure 5).
- 6.1.3 The data has been presented using a standard grey-scale where White (lowest) to Black (highest) indicates increasing earth's magnetic readings.

6.2 Raw Data

Mean	1.782745
SD	14.38694
3 SD	43.16082
Minimum	-100 nT
Maximum	100 nT
Dummy Value	2047.5 nT

6.3 Data Processing

- 6.3.1 All of the geophysical data processing was carried out using Geoplot 4.02 interpretative software (Figure 6).
- 6.3.2 For accurate presentation and interpretation a number of preset processes and filters are applied to the RAW data set:
 - (i) DESPIKE: the process removes the random 'iron spikes' that occur within fluxgate gradiometer survey data.
 - (ii) ZERO MEAN GRID and ZERO MEDIAN TRAVERSE: was applied to survey data. This removes stripe effects within grids and ensures that the survey grid edges match.
 - (iii) CLIPPED; a LOW PASS FILTER applied and an INTERPOLATE in both 'X' and 'Y' coordinates.

6.4 Introduction to Results

- 6.4.1 The results should be read in conjunction with the figures at the end of this report. The types of anomalies likely to be identified are discussed below.
- 6.4.2 Positive Magnetic Anomalies: Positive anomalies generally represent cut features that have been in-filled with magnetically enhanced material.

- 6.4.3 Negative Magnetic Anomalies: Negative anomalies generally represent buried features such as banks that have a lower magnetic signature in comparison to the background geology.
- 6.4.4 Magnetic Disturbance: Magnetic disturbance is generally associated with interference caused by modern ferrous features such as fences and service pipes or cables.
- 6.4.5 Magnetic Debris: Low amplitude magnetic debris consists of a number of dipolar responses spread over an area and is indicative of ground disturbance.
- 6.4.6 Dipolar Anomalies: Dipolar anomalies are positive anomalies with an associated negative response. These anomalies are usually associated with discreet ferrous objects or may represent buried kilns or ovens.
- 6.4.7 Bipolar Anomalies: Bipolar anomalies consist of alternating responses of positive and negative magnetic signatures. Interpretation will depend on the strength of these responses; modern pipelines and cables typically produce strong bipolar responses.
- 6.4.8 Thermoremanence: this is commonly encountered through the magnetizing of clay through the firing process although stones and soils can also acquire thermoremanence.

7.0 Interpretation

7.1 Area 1 – This area was not surveyed.

7.2 Area 2-4; *Key Features (Figure 7)*.

7.2.1 Within survey area 4 there were two large modern ferrous features, Sun lounge area (Plate 5) and a farm Tractor (Plate 7). These restricted the area available for the survey.

7.2.2 Across the whole of areas 2-4, spots and/or blobs with very strong positive and negative (black and white) values represent strongly magnetic objects, generally ferrous metal. Most of these will be fairly modern, probably associated with the construction of the all-weather equestrian arena in area 3 (highlight by the red box on Figure 7).

7.2.3 Within the green 'egg shaped object' there are four regular spaced areas of highly magnetic material (black dots). As these are below the all-weather equestrian arena, they are likely to be modern in date, however they could be of archaeological interest.

7.3 Area 5; *Key Features (Figure 8)*.

7.3.1 Feature 1 was the remains of a fence running across the field in a west-north-west to east-south-east direction. The magnetometer recorded metal artefacts attached to the wooden posts (Plate 8) and the feature can clearly be seen on a Google Earth Image (2026) dated January 2022 (Figure 9).

7.3.2 A linear feature (2) has been identified running across the field in a north-north-east to south-south-west direction. This is visible on the ground as a shallow ditch and can be seen on the Google Earth Image (2026) dated January 2022 (Figure 9).

7.3.2 A series of faint responses (3) can be seen within the 'green egg-shaped area' in the north-west corner of the field. These are likely associated with underlying geological features (Gaffney & Gater 2011, 79); however archaeological remains cannot be discarded.

7.3.4 A positive magnetic anomaly (4) was identified in the centre of the field. This generally represent a cut feature that has been in-filled with magnetically enhanced material.

7.3.5 To the north of area 5 magnetic disturbance was identified adjacent to the gate. This is likely to be as a result of hardcore in the gateway entrance.

8.0 Conclusion

8.1 Discussion

- 8.1.1 This was a difficult survey with the site split into five areas, with large ferrous features (sun lounge and a Traylor), cherry trees, long grass and brambles.
- 8.1.2 The geophysical survey has been successful in identifying anomalies of definite, probable, and possible archaeological interest, and can therefore be considered to have successfully fulfilled the aims of the project.
- 8.1.3 The western areas (2-4) produced little archaeological evidence with the exception of a series of regular spaced areas of highly magnetic material below the all-weather equestrian arena.
- 8.1.4 The eastern grazing field identified a linear feature running across the field, a possible in-filled pit and area of underlying geological features or archaeological remains.
- 8.1.5 Further investigations of this site may be required.

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I would also like to thank Anton Burrows, Invicta Archaeological Services Ltd. for his assistance in the field.

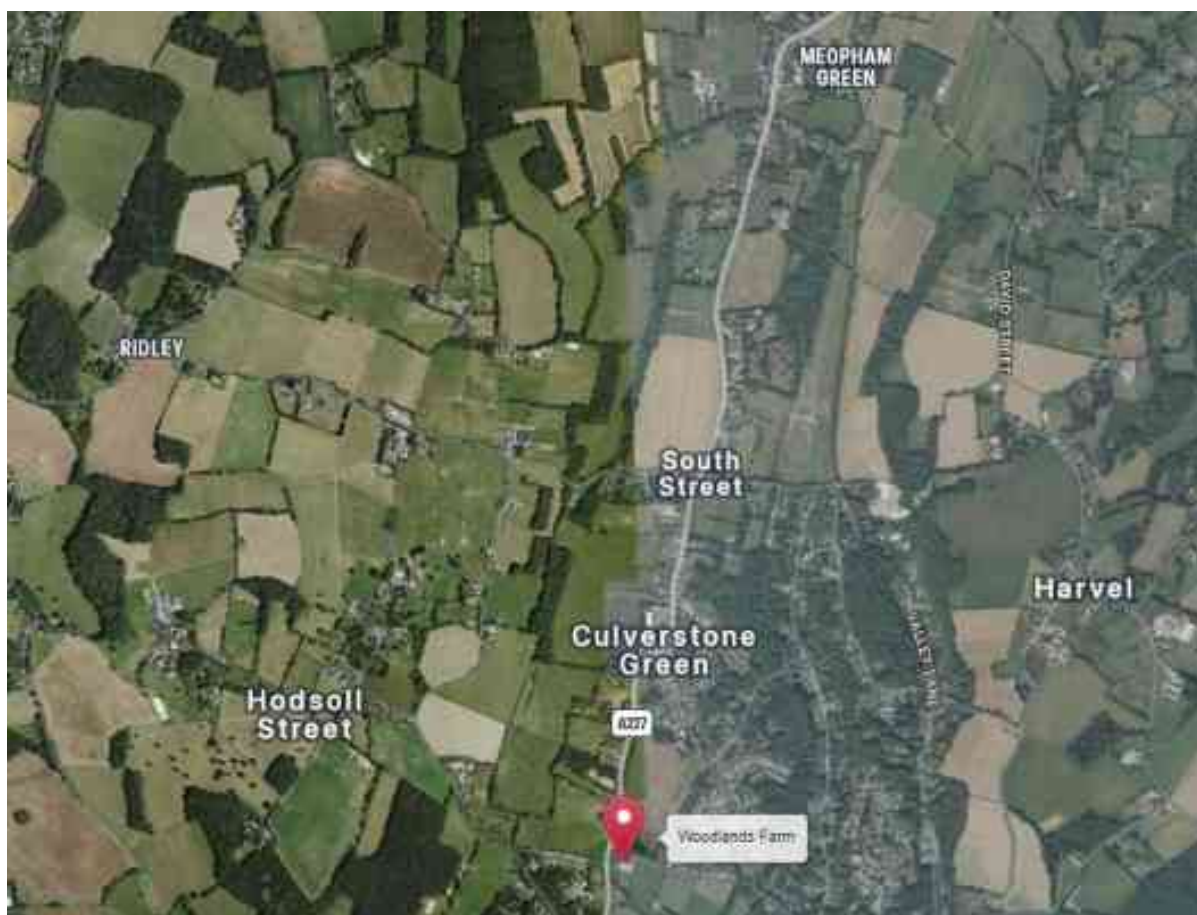


Figure 1 - Site location adjacent to the A227 in relation to Culverstone Green, Hodsoll Street and Harvell (Google Earth Image 2026).



Figure 2 - Google Earth Image of the site and surroundings (Google Earth Image 2026).

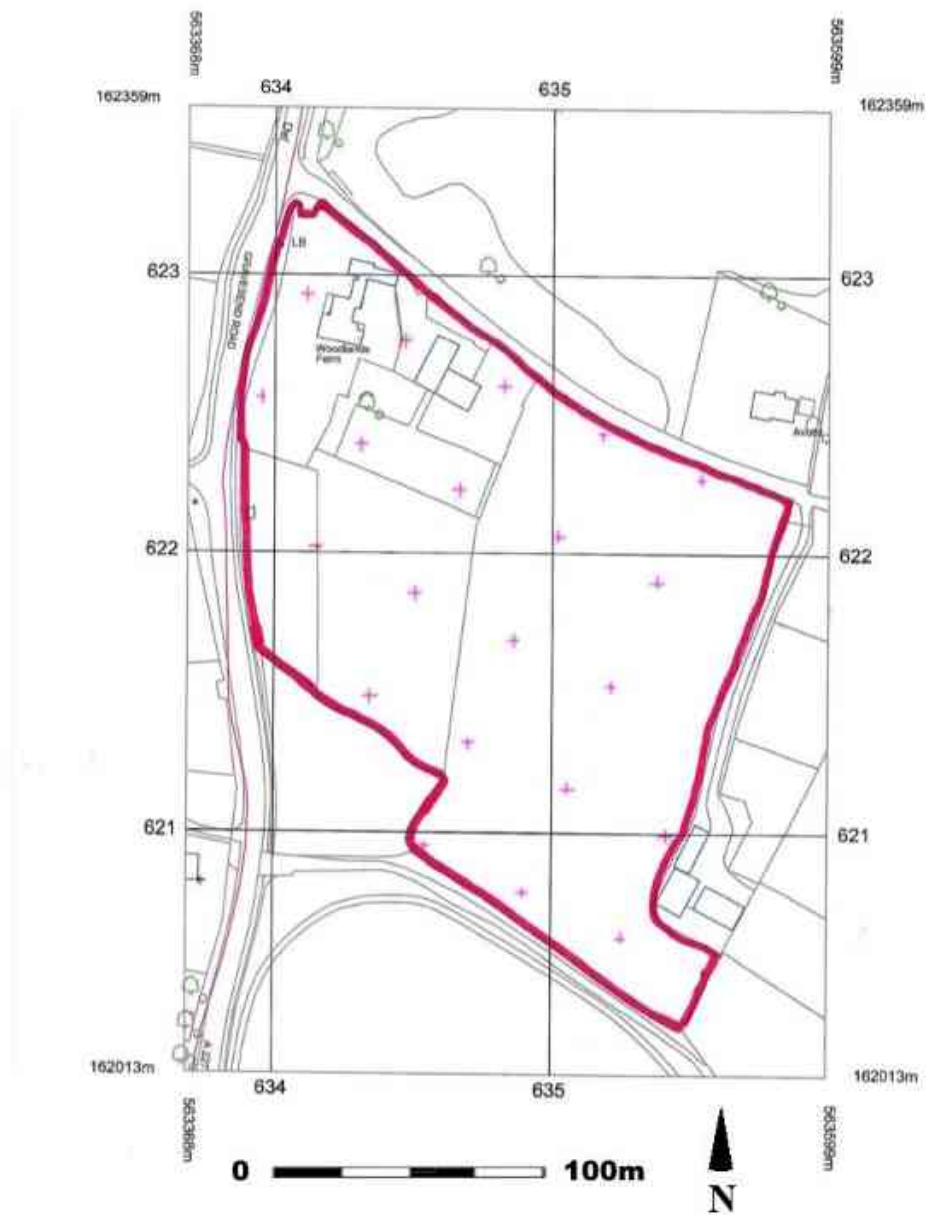


Figure 3 – Plan showing survey grids across the PDA.

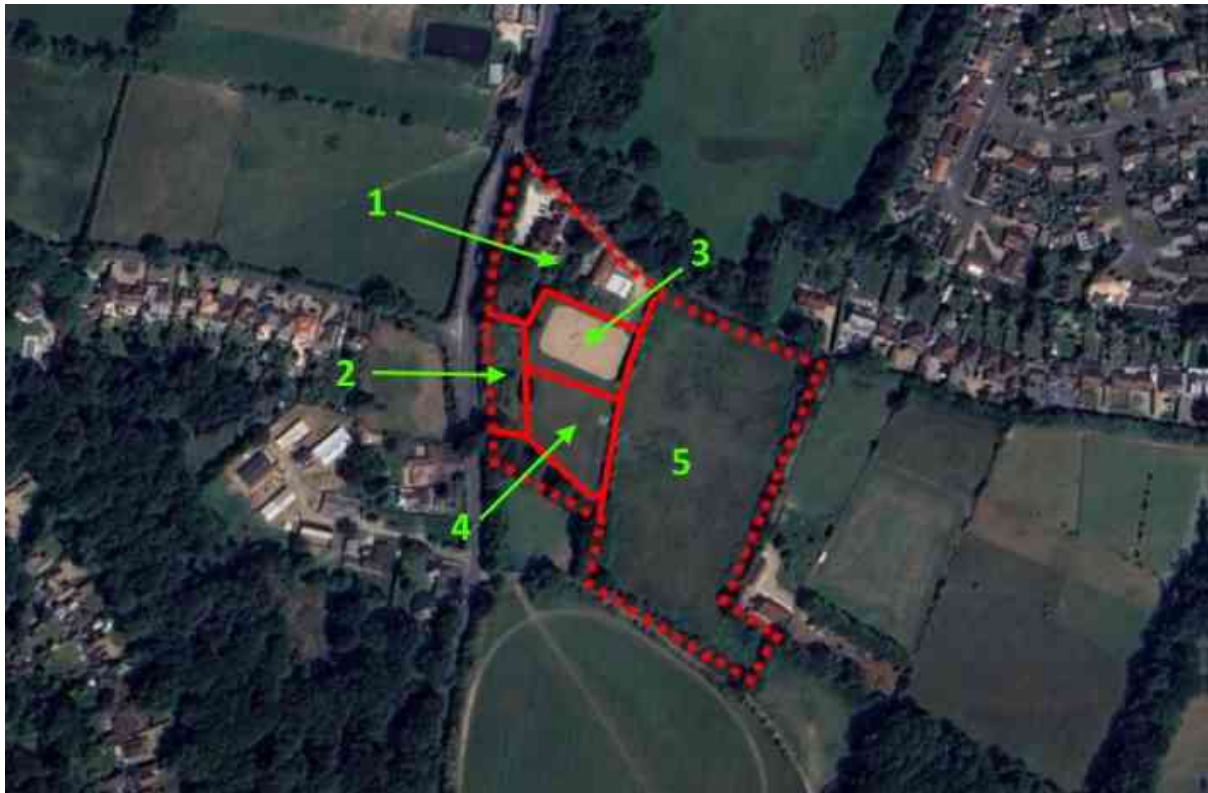


Figure 4 – Google Earth Image with the four survey areas (no. 2-5) and one non-survey area (no. 1) of the PDA outlined.



Figure 5 – Magnetometer survey raw data.



Figure 6 – Magnetometer survey processed data.

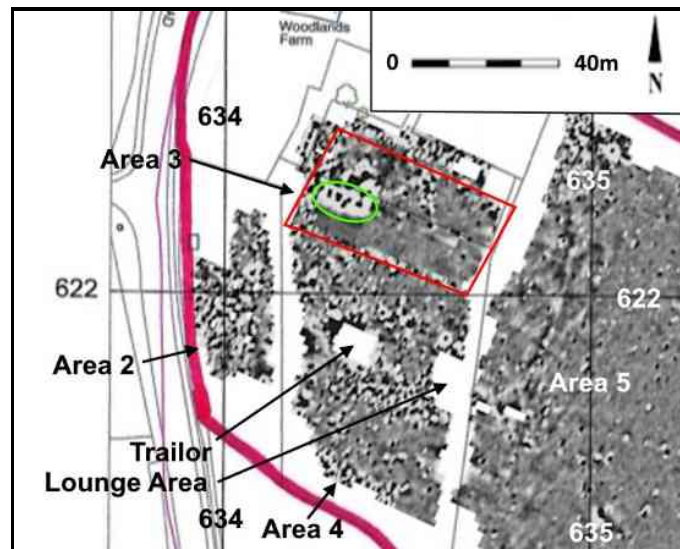


Figure 7 – Magnetometer survey processed data for survey areas 2-4.

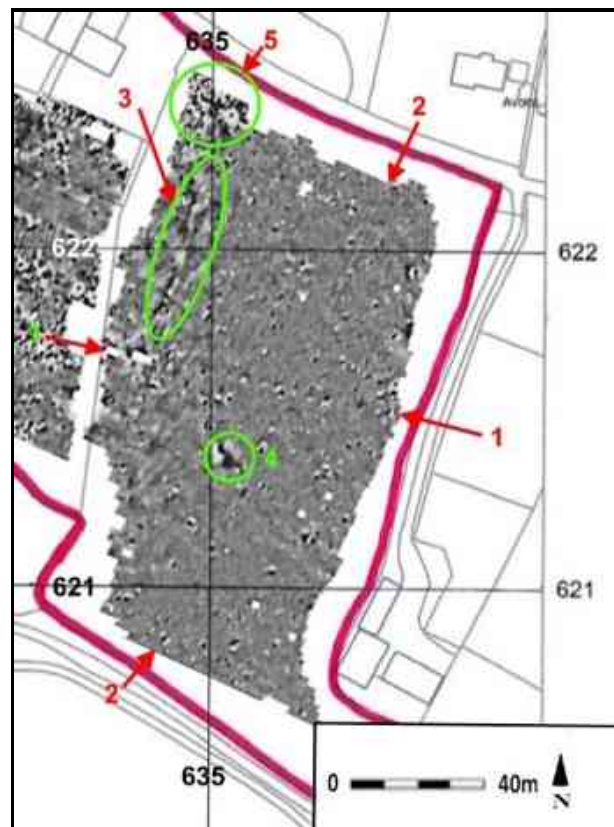


Figure 8 – Magnetometer survey processed data for survey area 5.

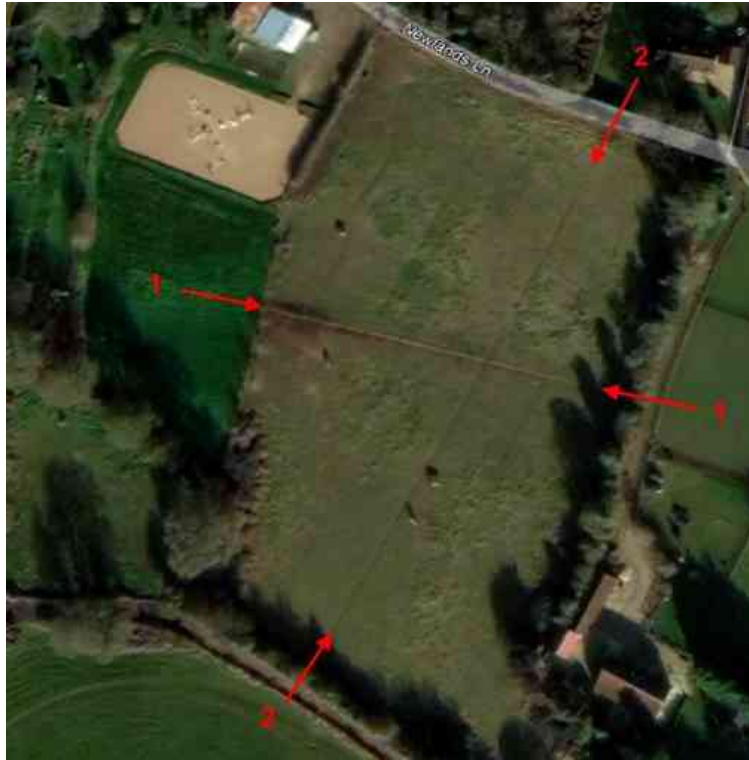


Figure 9 – Google Earth Image (2026) dated January 2022 clearly showing features 1 & 2 in survey area 5.



Plate 1 – Woodlands Farmhouse, ancillary buildings, including a Stable looking south-west across the PDA.



Plate 2 – Woodlands Farm barn, outbuildings and metalled track looking north-west across the PDA.



Plate 3 – Woodlands Farm Cherry orchard looking north-west.



Plate 4 – Woodlands Farm all-weather equestrian arena, junior football pitch and barn looking north-east across the DPA.



Plate 5 – Sun lounge within the recreation area looking south-east across the DPA.



Plate 6 – Grazing field to the east of the DPA looking south south-west.



Plate 7 – Farm Trailor within the recreational area (survey area 4).



Plate 8 – The remains of the fence in survey area 5.