

GEOPHYSICAL SURVEY REPORT

Land at Bird in Eye Farm, Framfield Road, Uckfield

Client

Orion Heritage Ltd

For

Croudace Homes Ltd

Survey Report

SUMO-05486

OAIS Ref. No.

sumogeop1-503508

Date

December 2021



Survey Report 05486: Land at Bird in Eye Farm, Framfield Road, Uckfield

Survey dates 22-25 November

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2. SURVEY TECHNIQUE

Detailed magnetic survey (magnetometry) was chosen as the most efficient and effective method of locating the type of archaeological anomalies which might be expected at this site.

Bartington Grad 601-2 Traverse Interval 1.0m Sample Interval 0.25m

3 SUMMARY OF RESULTS

- 3.1 A magnetometer survey of 14 ha of land Bird in Eye Farm, Framfield Road has not recorded any magnetic responses that could be interpreted as being of definite archaeological interest. A number of uncertain discrete responses and linear trends are likely to be a product of modern agricultural or natural processes. A former field boundary is visible in the dataset along with three pipes. Magnetic disturbance within three of the survey areas is likely to be due to historic agricultural processes.

4 INTRODUCTION

- 4.1 **SUMO Geophysics Ltd** were commissioned to undertake a geophysical survey of an area outlined for residential development. This survey forms part of an archaeological investigation being undertaken by **Orion Heritage Ltd** on behalf of **Croudace Homes Ltd**.

4.2 Site details

NGR / Postcode	TQ 48423 20743 / TN22 5HA
Location	The site is located 9.5km west of Heathfield and 4km south-east of Maresfield. The survey area surrounds Bird-in-eye Farm, which is bounded to the north by the B2102 and to the south by woodland.
HER	East Sussex HER
OASIS Ref. No.	sumogeop1-503508
District	Wealden
Parish	Framfield Civil Parish
Topography	The site slopes from north-east down to south-west
Current Land Use	Horse paddocks
Geology (BGS 2021)	Bedrock: Lower Tunbridge Wells Sand - Sandstone, Siltstone and Mudstone Superficial: None recorded
Soils (CU 2021)	Soilscape 8: Slightly acid loamy and clayey soils with impeded drainage.
Archaeology (RPS 2020)	An Archaeological Desk-Based Assessment has been carried out by RPS. The Site comprises a complex of farm buildings, several agricultural fields and an area of woodland. In terms of designated archaeological assets, no World Heritage sites, Scheduled Monuments, Historic Battlefield, or Historic Wreck sites are identified within the study area. The Site is likely to have come into agricultural use in the Medieval period. Evidence of historic cultivation in the form of plough soils or evidence of land division is anticipated to be present, though a low potential is identified for evidence of Medieval settlement features. A low archaeological potential is identified for evidence relating to all other past periods of human activity. Historic and modern agricultural use of the Site is anticipated to have had a moderate but widespread below ground impact on any archaeological evidence present.
Survey Methods	Magnetometer survey (fluxgate gradiometer)
Study Area	14 ha

4.3 **Aims and Objectives**

To locate and characterise any anomalies of possible archaeological interest within the study area.

5 **RESULTS**

The survey has been divided into 22 survey areas (Areas 1-22).

5.1 **Probable Archaeology**

- 5.1.1 No magnetic responses have been recorded that could be interpreted as being of definite archaeological interest.

5.2 **Uncertain**

- 5.2.1 A number of linear responses and trends have been detected across the survey areas and have been classed as *Uncertain*. They generally lack the defined morphology of anomalies that would normally be interpreted as being of archaeological interest, they are likely to be due to agricultural or natural processes.

- 5.2.2 A number of amorphous discrete responses has been recorded in the south of Area 10. These responses have been detected within a zone of magnetic disturbance (see 5.7.1). While these anomalies have been classified as *Uncertain*, they could be due to modern farming practices, possible landscaping or a spread of debris. However, an archaeological origin cannot be entirely discounted.

5.3 **Former Field Boundary**

- 5.3.1 A change in the background magnetic signature in Areas 9, 10 and 11 corresponds with the line of a former field boundary that can be seen on 1957 Ordnance Survey Mapping (see Figure 05).

5.4 **Natural / Geological / Pedological**

- 5.4.1 A number of anomalies have been detected that are somewhat sinuous and amorphous in shape and are relatively weak. They are likely to be natural, perhaps relating to pedological variations.

5.5 **Service**

- 5.5.1 Two strong dipolar ferrous responses are visible in Areas 4 and 5 which mark the routes of service pipes. A weaker dipolar anomaly in the west of Area 4 is likely to be due to a water pipe that leads to a trough.

5.7 **Ferrous / Magnetic Disturbance**

- 5.7.1 Areas of magnetic disturbance have been recorded in the south of Areas 9, 10 and 11. This zone appears to be confined to a former land parcel that is visible on historic mapping (see Figure 05). It is likely that some localised activity within the former parcel has caused the responses, possibly a spread of green waste.

- 5.7.2 Ferrous responses close to boundaries are due to adjacent fences, troughs, gates and agricultural buildings. Large ferrous responses have also been detected in Area 7 and are likely to be due to modern processes. Smaller scale ferrous anomalies ("iron spikes") are present throughout the data and are characteristic of small pieces of ferrous debris (or brick / tile) in the topsoil; they are commonly assigned a modern origin. Only the most prominent of these are highlighted on the interpretation diagram.

6 DATA APPRAISAL & CONFIDENCE ASSESSMENT

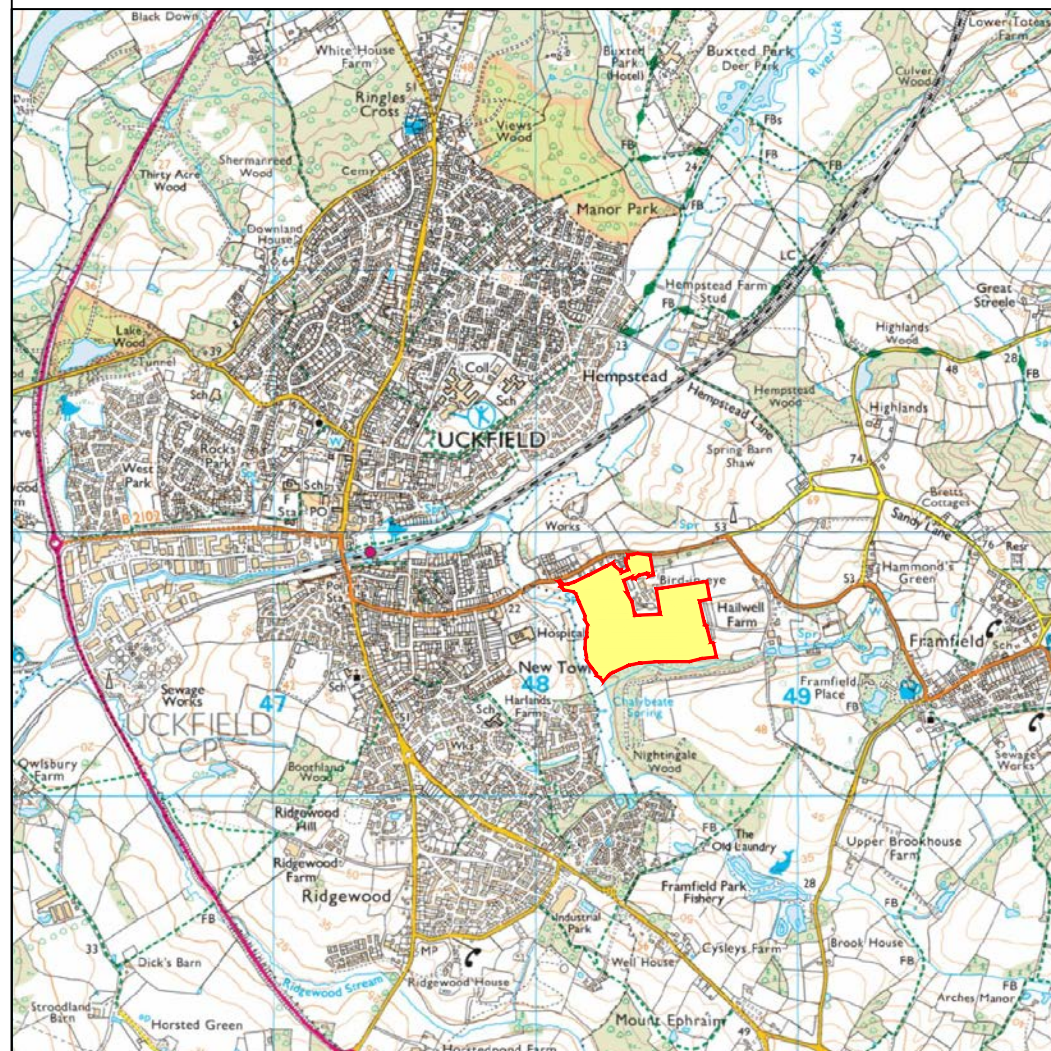
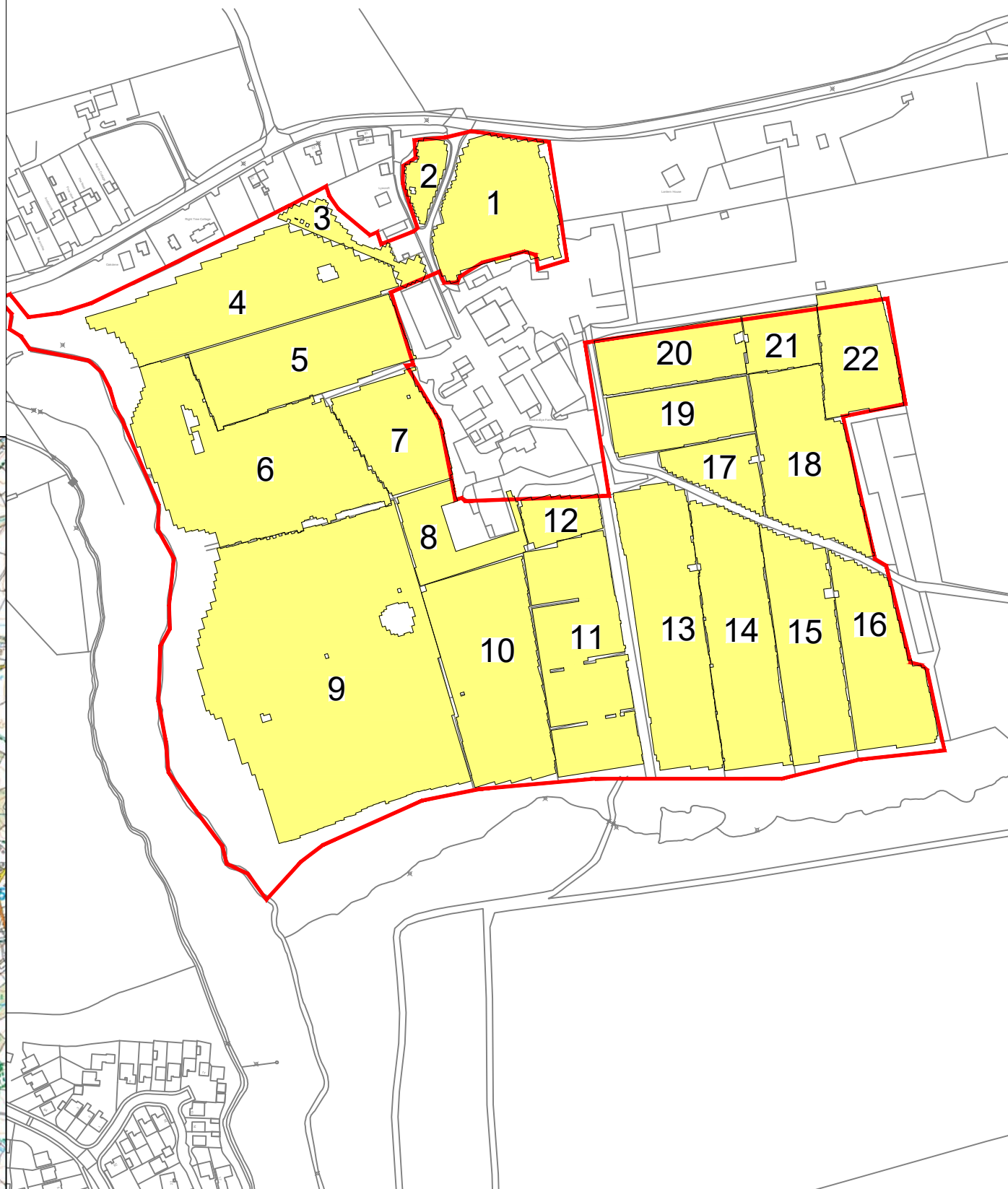
- 6.1 Historic England guidelines (EH 2008) Table 4 states that the typical magnetic response on the local soils / geology is variable. The results from this survey indicate the presence of a former field boundary and natural responses; as a consequence, there is no *a priori* reason why archaeological features would not have been detected, if present.

7 CONCLUSION

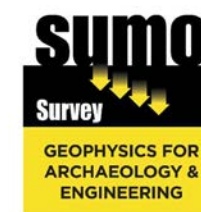
- 7.1 The magnetometer survey has not recorded any magnetic responses that could be interpreted as being of definite archaeological interest. A number of discrete responses and linear trends have been assigned to the category of uncertain; they are likely to be a product of modern agricultural or natural processes. A former field boundary is visible in the dataset along with three pipes. Magnetic disturbance within three of the survey areas is likely to be due to historic agricultural processes.

8 REFERENCES

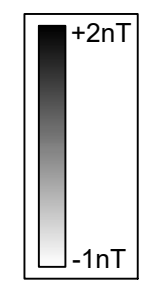
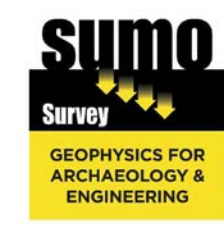
- BGS 2021 British Geological Survey, Geology of Britain viewer [accessed 16/05/2021] *website*: (<http://www.bgs.ac.uk/opengeoscience/home.html?Accordion1=1#maps>)
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<https://content.historicengland.org.uk/images-books/publications/geophysical-survey-in-archaeological-field-evaluation/geophysics-guidelines.pdf/>
- RPS 2020 *ARCHAEOLOGICAL DESK BASED ASSESSMENT Land at Bird in Eye Farm, Framfield Road, Uckfield, East Sussex (DRAFT)*. RPS, London.



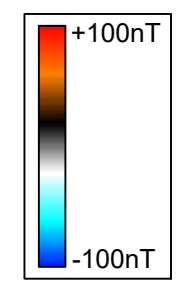
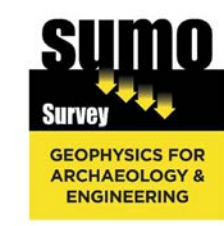
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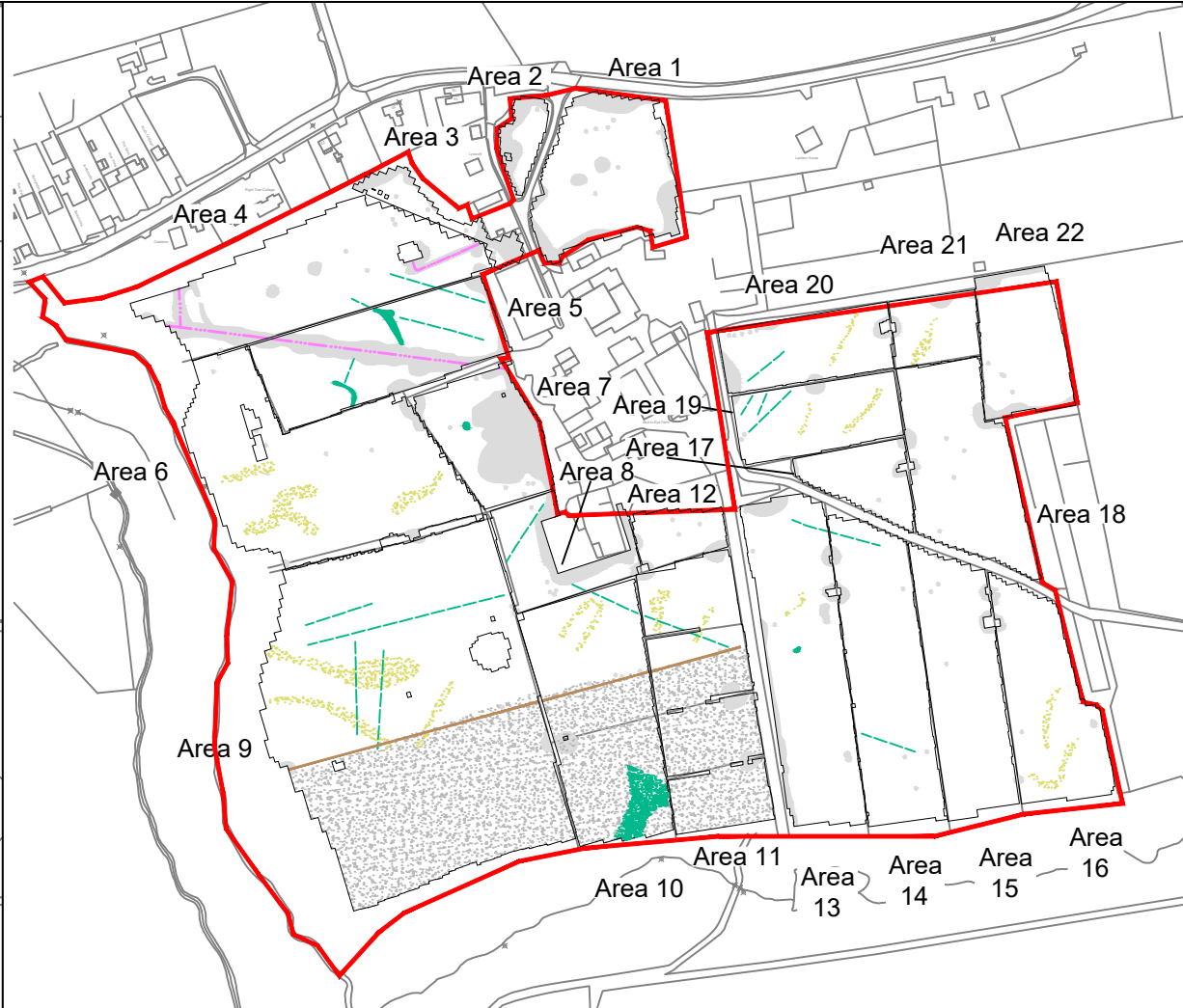
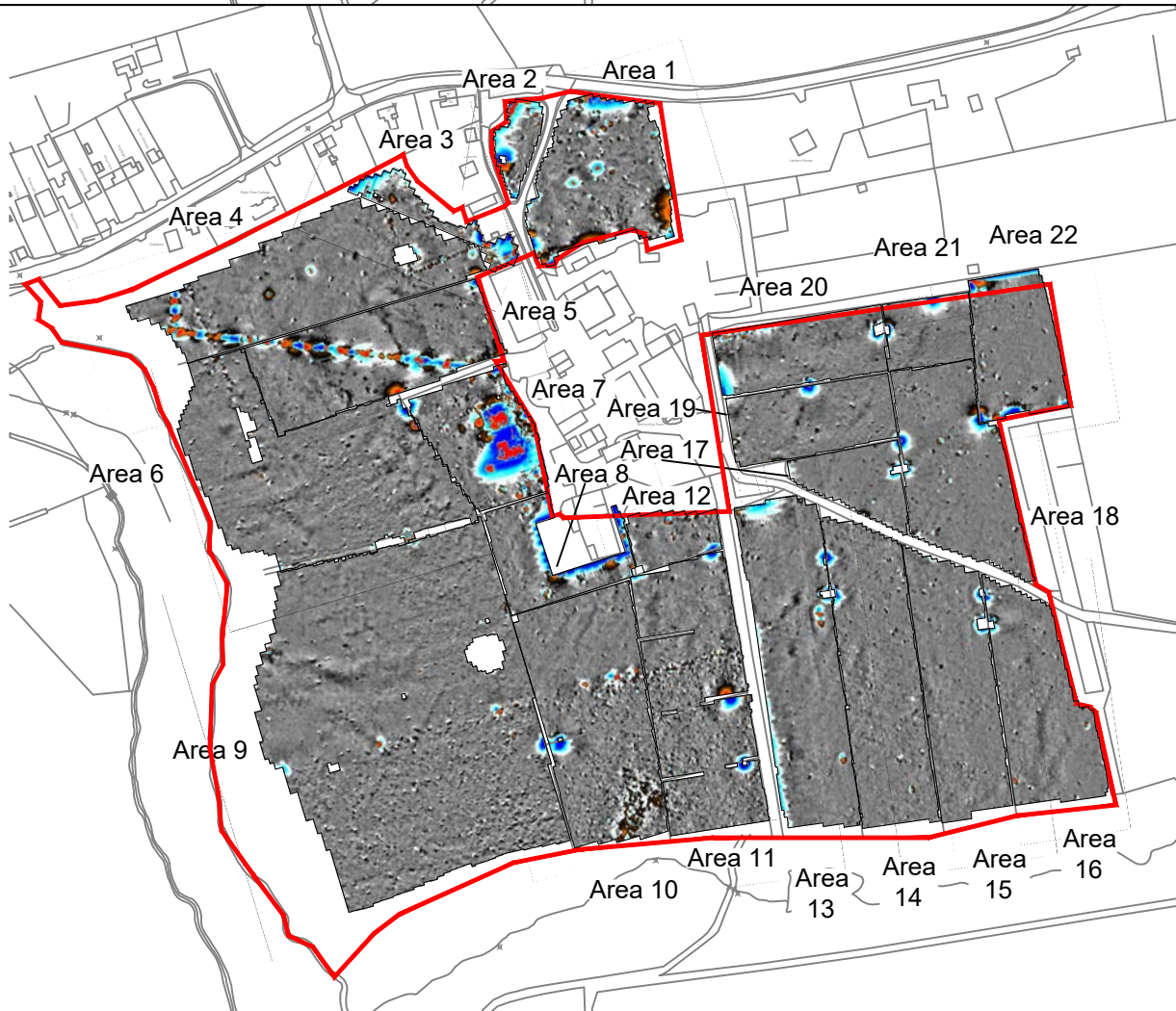
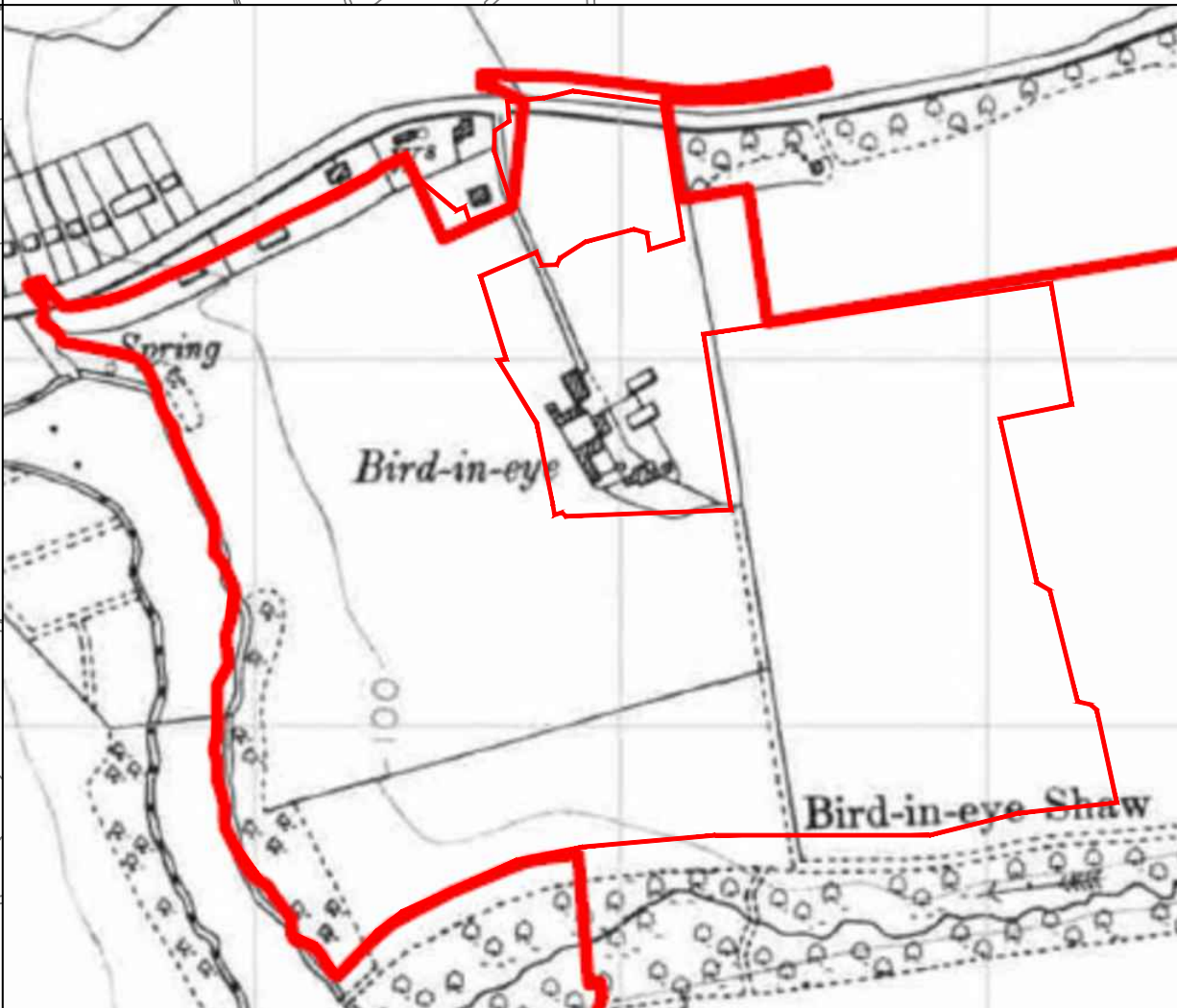
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Client:		Orion Heritage Ltd
Project:		05486 - Land at Bird in Eye Farm, Framfield Road, Uckfield
Scale:	NOT TO SCALE	Fig No: 01



Title: Magnetometer Survey - Greyscale Plots	
Client: Orion Heritage Ltd	
Project: 05486 - Land at Bird in Eye Farm, Framfield Road, Uckfield	
Scale: 0 100 metres 1:2000 @ A3	Fig No: 02

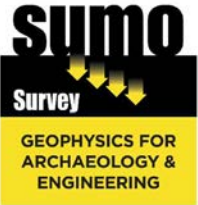


Title: Magnetometer Survey - Colour Plots	
Client: Orion Heritage Ltd	
Project: 05486 - Land at Bird in Eye Farm, Framfield Road, Uckfield	
Scale: 0 100 metres 1:2000 @ A3	Fig No: 03

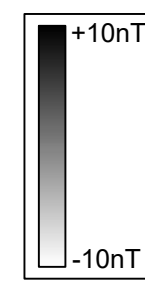
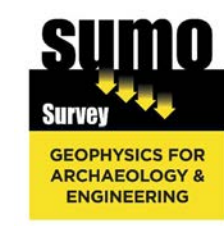


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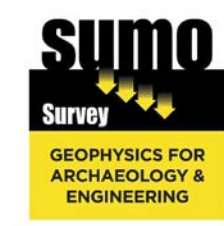
	Uncertain Origin (discrete anomaly / trend / increased response)
	Former field boundary (corroborated)
	Natural (e.g. geological / pedological)
	Magnetic disturbance
	Service
	Ferrous



Title: Magnetometer Survey - Greyscale Plots / Colour Plots / Interpretation / 1957 Ordnance Survey Mapping (RPS 2020)	
Client: Orion Heritage Ltd	
Project: 05486 - Land at Bird in Eye Farm, Framfield Road, Uckfield	
Scale: 0 metres 200 1:4000 @ A3	Fig No: 05



Title: Minimally Processed Data - Greyscale Plots	
Client: Orion Heritage Ltd	
Project: 05486 - Land at Bird in Eye Farm, Framfield Road, Uckfield	
Scale: 0 100 metres 1:2000 @ A3	Fig No: 06



Title: XY Trace Plots (clipped at +/-15nT)	
Client: Orion Heritage Ltd	
Project: 05486 - Land at Bird in Eye Farm, Framfield Road, Uckfield	
Scale: 0 100 metres 1:2000 @ A3	Fig No: 07

Standards & Guidance

This report and all fieldwork have been conducted in accordance with the latest guidance documents issued by Historic England (EH 2008) (then English Heritage), the Chartered Institute for Archaeologists (CIfA 2014) and the European Archaeological Council (EAC 2016).

Grid Positioning

For hand held gradiometers the location of the survey grids has been plotted together with the referencing information. Grids were set out using a Trimble R8 Real Time Kinematic (RTK) VRS Now GNSS GPS system.

An RTK GPS (Real-time Kinematic Global Positioning System) can locate a point on the ground to a far greater accuracy than a standard GPS unit. A standard GPS suffers from errors created by satellite orbit errors, clock errors and atmospheric interference, resulting in an accuracy of 5m-10m. An RTK system uses a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier it measured, and the mobile units compare their own phase measurements with those they received from the base station. This results in an accuracy of around 0.01m.

Technique	Instrument	Traverse Interval	Sample Interval
Magnetometer	Bartington Grad 601-2	1m	0.25m

Instrumentation: **Bartington Grad 601-2**

Bartington instruments operate in a gradiometer configuration which comprises fluxgate sensors mounted vertically, set 1.0m apart. The fluxgate gradiometer suppresses any diurnal or regional effects. The instruments are carried, or cart mounted, with the bottom sensor approximately 0.1-0.3m from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is measured in nanoTesla (nT). The sensitivity of the instrument can be adjusted; for most archaeological surveys the most sensitive range (0.1nT) is used. Generally, features up to 1m deep may be detected by this method, though strongly magnetic objects may be visible at greater depths. The Bartington instrument can collect two lines of data per traverse with gradiometer units mounted laterally with a separation of 1.0m. The readings are logged consecutively into the data logger which in turn is daily down-loaded into a portable computer whilst on site. At the end of each site survey, data is transferred to the office for processing and presentation.

Data Processing

Zero Mean	This process sets the background mean of each traverse within each grid to zero.
Traverse	The operation removes striping effects and edge discontinuities over the whole of the data set.
Step Correction (De-stagger)	When gradiometer data are collected in 'zig-zag' fashion, stepping errors can sometimes arise. These occur because of a slight difference in the speed of walking on the forward and reverse traverses. The result is a staggered effect in the data, which is particularly noticeable on linear anomalies. This process corrects these errors.

Display

Greyscale/ Colourscale Plot	This format divides a given range of readings into a set number of classes. Each class is represented by a specific shade of grey, the intensity increasing with value. All values above the given range are allocated the same shade (maximum intensity); similarly, all values below the given range are represented by the minimum intensity shade. Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. The assigned range (plotting levels) can be adjusted to emphasise different anomalies in the data-set.
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Presentation of results and interpretation

The presentation of the results includes a 'minimally processed data' and a 'processed data' greyscale plot. Magnetic anomalies are identified, interpreted and plotted onto the 'Interpretation' drawings.

When interpreting the results, several factors are taken into consideration, including the nature of archaeological features being investigated and the local conditions at the site (geology, pedology, topography etc.). Anomalies are categorised by their potential origin. Where responses can be related to other existing evidence, the anomalies will be given specific categories, such as: Abbey Wall or Roman Road. Where the interpretation is based largely on the geophysical data, levels of confidence are implied, for example: Probable, or Possible Archaeology. The former is used for a confident interpretation, based on anomaly definition and/or other corroborative data such as cropmarks. Poor anomaly definition, a lack of clear patterns to the responses and an absence of other supporting data reduces confidence, hence the classification Possible.

Interpretation Categories

In certain circumstances (usually when there is corroborative evidence from desk-based or excavation data) very specific interpretations can be assigned to magnetic anomalies (for example, *Roman Road, Wall*, etc.) and where appropriate, such interpretations will be applied. The list below outlines the generic categories commonly used in the interpretation of the results.

<i>Archaeology / Probable Archaeology</i>	This term is used when the form, nature and pattern of the responses are clearly or very probably archaeological and /or if corroborative evidence is available. These anomalies, whilst considered anthropogenic, could be of any age.
<i>Possible Archaeology</i>	These anomalies exhibit either weak signal strength and / or poor definition, or form incomplete archaeological patterns, thereby reducing the level of confidence in the interpretation. Although the archaeological interpretation is favoured, they may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation.
<i>Industrial / Burnt-Fired</i>	Strong magnetic anomalies that, due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metal-working areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies.
<i>Former Field Boundary (probable & possible)</i>	Anomalies that correspond to former boundaries indicated on historic mapping, or which are clearly a continuation of existing land divisions. Possible denotes less confidence where the anomaly may not be shown on historic mapping but nevertheless the anomaly displays all the characteristics of a field boundary.
<i>Ridge & Furrow</i>	Parallel linear anomalies whose broad spacing suggests ridge and furrow cultivation. In some cases, the response may be the result of more recent agricultural activity.
<i>Agriculture (ploughing)</i>	Parallel linear anomalies or trends with a narrower spacing, sometimes aligned with existing boundaries, indicating more recent cultivation regimes.
<i>Land Drain</i>	Weakly magnetic linear anomalies, quite often appearing in series forming parallel and herringbone patterns. Smaller drains may lead and empty into larger diameter pipes, which in turn usually lead to local streams and ponds. These are indicative of clay fired land drains.
<i>Natural</i>	These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions.
<i>Magnetic Disturbance</i>	Broad zones of strong dipolar anomalies, commonly found in places where modern ferrous or fired materials (e.g. brick rubble) are present.
<i>Service</i>	Magnetically strong anomalies, usually forming linear features are indicative of ferrous pipes/cables. Sometimes other materials (e.g. pvc) or the fill of the trench can cause weaker magnetic responses which can be identified from their uniform linearity.
<i>Ferrous</i>	This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes, or above ground features such as fence lines or pylons. Ferrous responses are usually regarded as modern. Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material.
<i>Uncertain Origin</i>	Anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning gives little clue as to their origin. Often the characteristics and distribution of the responses straddle the categories of <i>Possible Archaeology / Natural</i> or (in the case of linear responses) <i>Possible Archaeology / Agriculture</i> ; occasionally they are simply of an unusual form.

Where appropriate some anomalies will be further classified according to their form (positive or negative) and relative strength and coherence (trend: weak and poorly defined).

Appendix B - Technical Information: Magnetic Theory

Detailed magnetic survey can be used to effectively define areas of past human activity by mapping spatial variation and contrast in the magnetic properties of soil, subsoil and bedrock. Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.1 nanoTeslas (nT) in an overall field strength of 48,000 (nT), can be accurately detected.

Weakly magnetic iron minerals are always present within the soil and areas of enhancement relate to increases in *magnetic susceptibility* and permanently magnetised *thermoremanent* material.

Magnetic susceptibility relates to the induced magnetism of a material when in the presence of a magnetic field. This magnetism can be considered as effectively permanent as it exists within the Earth's magnetic field. Magnetic susceptibility can become enhanced due to burning and complex biological or fermentation processes.

Thermoremanence is a permanent magnetism acquired by iron minerals that, after heating to a specific temperature known as the Curie Point, are effectively demagnetised followed by re-magnetisation by the Earth's magnetic field on cooling. Thermoremanent archaeological features can include hearths and kilns; material such as brick and tile may be magnetised through the same process.

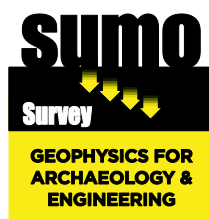
Silting and deliberate infilling of ditches and pits with magnetically enhanced soil creates a relative contrast against the much lower levels of magnetism within the subsoil into which the feature is cut. Systematic mapping of magnetic anomalies will produce linear and discrete areas of enhancement allowing assessment and characterisation of subsurface features. Material such as subsoil and non-magnetic bedrock used to create former earthworks and walls may be mapped as areas of lower enhancement compared to surrounding soils.

Magnetic survey is carried out using a fluxgate gradiometer which is a passive instrument consisting of two sensors mounted vertically 1m apart. The instrument is carried about 30cm above the ground surface and the top sensor measures the Earth's magnetic field whilst the lower sensor measures the same field but is also more affected by any localised buried feature. The difference between the two sensors will relate to the strength of a magnetic field created by this feature, if no field is present the difference will be close to zero as the magnetic field measured by both sensors will be the same.

Factors affecting the magnetic survey may include soil type, local geology, previous human activity and disturbance from modern services.

Summary for sumogeop1-503508

OASIS ID (UID)	sumogeop1-503508
Project Name	Geophysical Survey at Land at Bird in Eye Farm, Framfield Road, Uckfield
Activity type	Geophysical Survey, MAGNETOMETRY SURVEY
Project Identifier(s)	05486
Planning Id	
Reason For Investigation	Planning requirement
Organisation Responsible for work	SUMO Geophysics Ltd.
Project Dates	22-Nov-2021 - 25-Nov-2021
Location	Land at Bird in Eye Farm, Framfield Road, Uckfield NGR : TQ 48400 20707 LL : 50.9666772938695, 0.112024951888832 12 Fig : 548400,120707
Administrative Areas	Country : England County : East Sussex District : Wealden Parish : Framfield
Project Methodology	A temporary grid system will be established over the site and marked out using canes. The location of the grid will be set out using an RTK GPS system theoretically accurate to some 0.01m and referenced to OS co-ordinates. Hand Held: Data will be collected using a Bartington Grad 601-2. The instrument consists of two paired sensors (see below) and readings are logged at 0.25m centres along traverses 1.0m apart across 30m grids. The collection of data at 0.25m centres provides an appropriate methodology balancing cost and time with resolution as per Historic England guidelines. Two sensors mounted 1m horizontally apart and very accurately aligned to nullify the effects of the earth's magnetic field. Readings relate to the difference in localised magnetic anomalies compared with the general magnetic background.
Project Results	The magnetometer survey has not recorded any magnetic responses that could be interpreted as being of definite archaeological interest. A number of discrete responses and linear trends have been assigned to the category of uncertain; they are likely to be a product of modern agricultural or natural processes. A former field boundary is visible in the dataset along with three pipes. Magnetic disturbance within three of the survey areas is likely to be due to historic agricultural processes.
Keywords	Field Boundary - POST MEDIEVAL - FISH Thesaurus of Monument Types Pipeline - UNCERTAIN - FISH Thesaurus of Monument Types
HER	East Sussex HER - noRev - LITE
HER Identifiers	
Archives	



- Archaeological
- Geophysical
- Laser Scanning
- Measured Building
- Topographic
- Utility Mapping

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