THAMES VALLEY

ARCHAEOLOGICAL

SERVICES

Land adjacent to The Rozzers, Arlington, Bibury, Gloucestershire

Geophysical Survey (Magnetic)

by Marta Buczek and Tim Dawson

Site Code: RBG12/200
(SP 1072 0666)

Land adjacent to The Rozzers, Arlington, Bibury, Gloucestershire

Geophysical Survey (Magnetic) Report

For Hills Property Limited and Cirencester Housing Society

by Marta Buczek and Tim Dawson

Thames Valley Archaeological Services Ltd

Site Code RBG 12/200

February 2013

Summary

Site name: Land adjacent to The Rozzers, Arlington, Bibury, Gloucestershire

Grid reference: SP 1072 0666

Site activity: Magnetometer survey

Date and duration of project: 13th February 2013

Project manager: Steve Ford

Site supervisor: Tim Dawson

Site code: RBG 12/200

Area of site: 0.38ha

Summary of results: A small number of positive magnetic anomalies were recorded which may represent features of archaeological origin. However, these are either weak or lacking a definite shape and are therefore most likely to be geological. A pipe line was identified running across the centre of the site parallel to the road.

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✓ 19.02.13
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Land adjacent to The Rozzers, Arlington, Bibury, Gloucestershire
A Geophysical Survey (Magnetic)

by Marta Buczek and Tim Dawson

Report 12/200b

Introduction

This report documents the results of a geophysical survey (magnetic) carried out at a small plot of land adjacent to The Rozzers, Arlington, Bibury, Gloucestershire (SP 1072 0666) (Fig. 1). The work was commissioned by Mr Colin Woodhouse of Hills Homes, Ailesbury Court, High Street, Marlborough, Wiltshire SN8 1AA.

As a consequence of the possible presence of archaeological deposits on the site which would be under threat of damaged by development, identified by a recent heritage assessment (Preston 2013), a phased evaluation has been requested by the Gloucestershire Archaeological Officer comprising geophysical survey followed by trial trenching which would target any identifiable anomalies. This investigation was carried out to a specification approved by Mr Charles Parry, Senior Archaeological Officer at Gloucestershire County Council. The fieldwork was undertaken by Marta Buczek and Tim Dawson on 13th February 2013 and the site code is RBG 12/200.

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

Location, topography and geology

The site is located at the western end of the village of Arlington, *c*.1km west of Bibury, a village on the River Coln *c*.9km northeast of Cirencester (Fig. 1). The survey area itself is located in the south-eastern corner of a larger field bordered to the east by The Rozzers and the south by the B4425, road from Cirencester. The field in which the survey was undertaken is at a height of *c*.129m above Ordnance Datum sloping gradually downhill from the northwest. It is under rough pasture and the ground surface is generally smooth although there are areas of longer grass around the field boundaries as well as patches of thorn bushes and small trees, particularly in the south and east of the survey area which prevented some areas from being surveyed (Plates 1 and 2). The underlying geology is described as Signet Member rubbly limestone with mudstone beds (BGS 1998).

Weather and ground conditions at the time of the survey were cold. The ground was slightly frozen with small patches of snow. It started snowing lightly towards the end of the survey.

Site history and archaeological background

The archaeological potential of the site has been highlighted in a desk-based assessment (Preston 2013). In summary, the site does not contain any known heritage assets but it lies within an area of archaeological potential, being close to an Iron Age hillfort (a scheduled monument) and other sites including a possible Neolithic henge and long barrow. Various historic elements of the medieval village of Arlington lie to the northeast with the hamlet of Bibury adjacent to the site.

Methodology

Sample interval

Data collection required a temporary grid to be established across the survey area using wooden pegs at 30m intervals with further subdivision where necessary. Readings were taken at 0.25m intervals along traverses 1m apart. This provides 3600 sampling points across a full 30m × 30m grid (English Heritage 2008), providing an appropriate methodology balancing cost and time with resolution. A grid comprising of six squares was originally planned to cover the majority of the survey area (Fig. 2). The majority of the southern parts of the grids 1, 3 and 6 and the eastern part of grid 5 were not possible to survey due to the inhibitive amounts of vegetation present.

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.

Equipment

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 set out by both English Heritage (2008) and the Institute for Archaeologists (2002).

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 GeoXH 6000 handheld GPS system with sub-decimetre 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 ArcheoSurveyorLite 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**
De-stripe: median, all sensors	Removes the striping effect caused by differences in sensor calibration, enhancing the visibility of potential archaeological anomalies.
Clip from -10.00 to 10.00 nT	Enhance the contrast of the image to improve the appearance of possible archaeological anomalies.

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.7.22.01, 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 ArcheoSurveyorLite in 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 rotated to orientate it to north and

combined with grid and site plans 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

Several magnetic anomalies were recorded by the survey across the area studied (Figs. 3 and 4). The most apparent of these is a strong linear bipolar anomaly (composed of alternating positive and negative responses) located the centre of the survey area and running in a roughly east-west direction. The magnetic signature identifies this as a modern ferrous pipeline **[Fig. 4: 1]**.

Parallel to the south of the pipe is a weak positive area anomaly which appears along the edge of the area surveyed **[2]**. It appears to curve slightly at its eastern end but its overall path is not clear. It may represent a shallow linear feature of archaeological origin or, more likely, may be associated with a geological feature or the ground disturbance caused by the vegetation to the south.

To the north of the pipeline several positive anomalies were identified **[3]**. These are either very weak linear anomalies but are more likely, given the geology, to be the product of natural origin such as tree boles or naturally occurring depressions or faults in the underlying limestone.

Several others bipolar anomalies can be seen to the northern part of the area which are most likely caused by buried metal objects **[4]**. A small collection of other magnetic disturbances can be seen along the site's eastern edge which may be caused by hidden services or buried ferrous objects **[5]**.

Conclusion

While the survey did locate magnetic anomalies of possible archaeological origin, these are either weak or lacking a definite shape and are most likely to be natural geological features. The modern pipe and areas of magnetic disturbance in the eastern part of the survey may also have a masking effect on any anomalies of archaeological origin. These factors will be taken into account to produce a targeted test trench evaluation of the site to investigate these anomalies and sample non surveyable areas.

References

BGS, 1998, *British Geological Survey*, 1:50,000, Sheet 235, 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

Preston, S, 2013, 'Land adjacent to The Rozzers, Arlington Farm, Bibury, Gloucestershire: a Desk-based Heritage Assessment', Thames Valley Archaeological Services report 12/200, Reading

Appendix 1. Survey and data information

Raw data
COMPOSITE
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: Tim Dawson, Marta Buczek on 13/02/2013
Assembled by: Tim Dawson on 13/02/2013
Direction of 1st Traverse: 0 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32000

Dimensions
Composite Size (readings): 240 x 90
Survey Size (meters): 60 m x 90 m
Grid Size: 30 m x 30 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 16.85
Min: -16.13
Std Dev: 4.59
Mean: -0.08
Median: 0.00
Composite Area: 0.54 ha
Surveyed Area: 0.25765 ha

PROGRAMME
Name: ArcheoSurveyor
Version: 2.5.19.6

Source Grids: 6
1 Col:0 Row:0 grids\01.xgd
2 Col:0 Row:1 grids\03.xgd
3 Col:0 Row:2 grids\06.xgd
4 Col:1 Row:0 grids\02.xgd
5 Col:1 Row:1 grids\04.xgd
6 Col:1 Row:2 grids\05.xgd

Processed data
Stats
Max: 10.00
Min: -10.00
Std Dev: 3.55
Mean: -0.13
Median: 0.00

Processes: 3
1 Base Layer
2 DeStripe Median Sensors: All
3 Clip from -10.00 to 10.00 nT

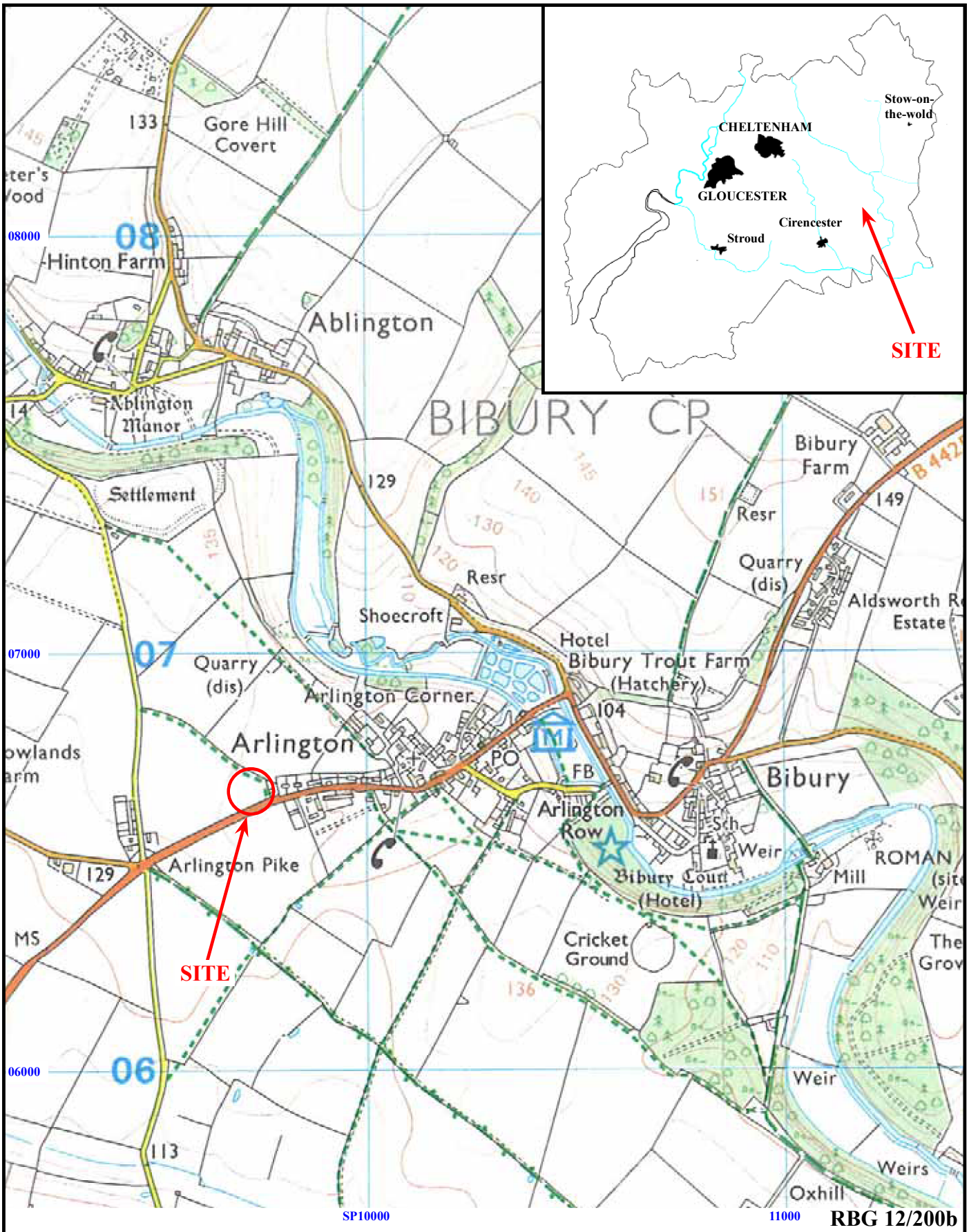

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Figure 1. Location of site within Bibury and Gloucestershire.

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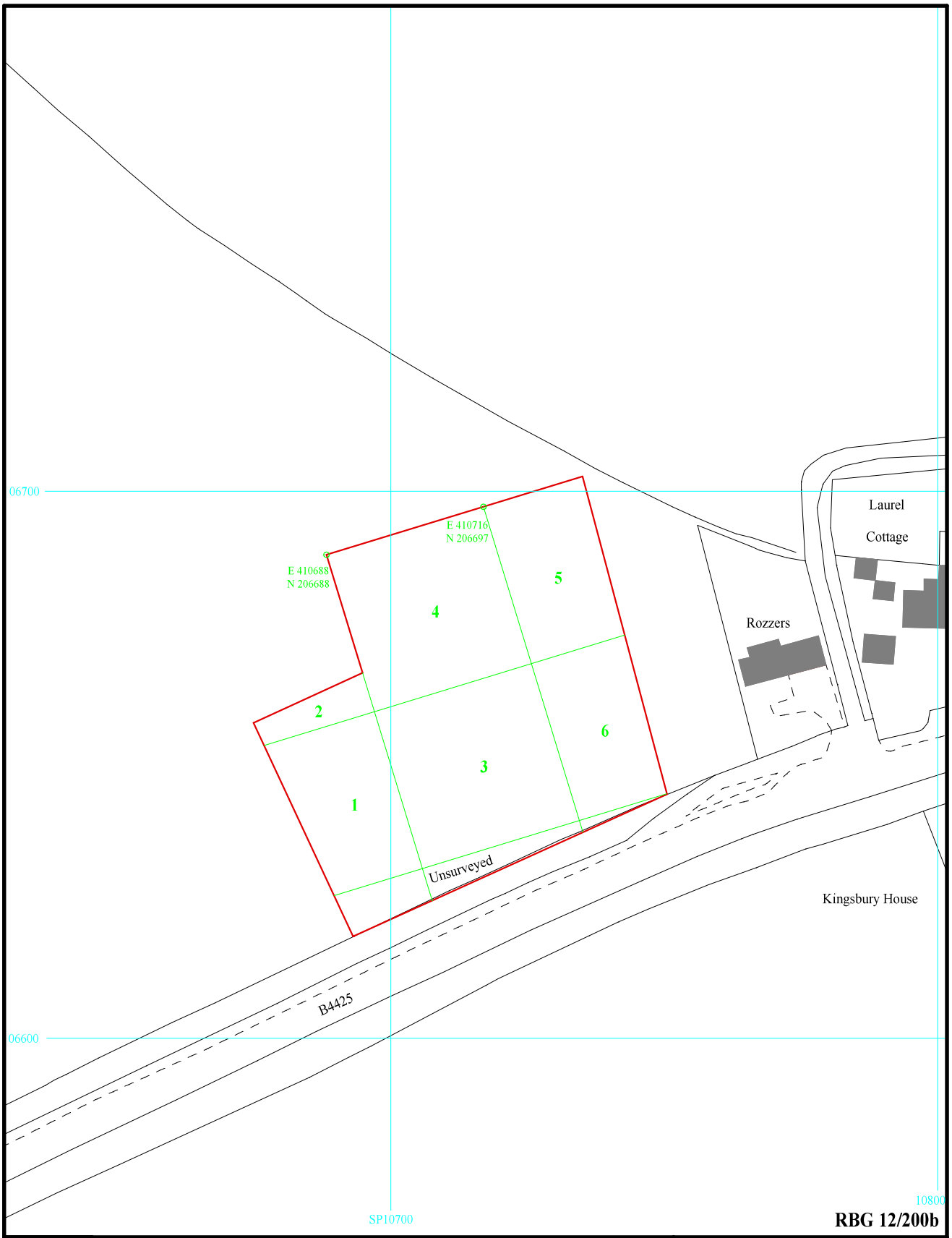

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Figure 2. Grid layout.

0 50m

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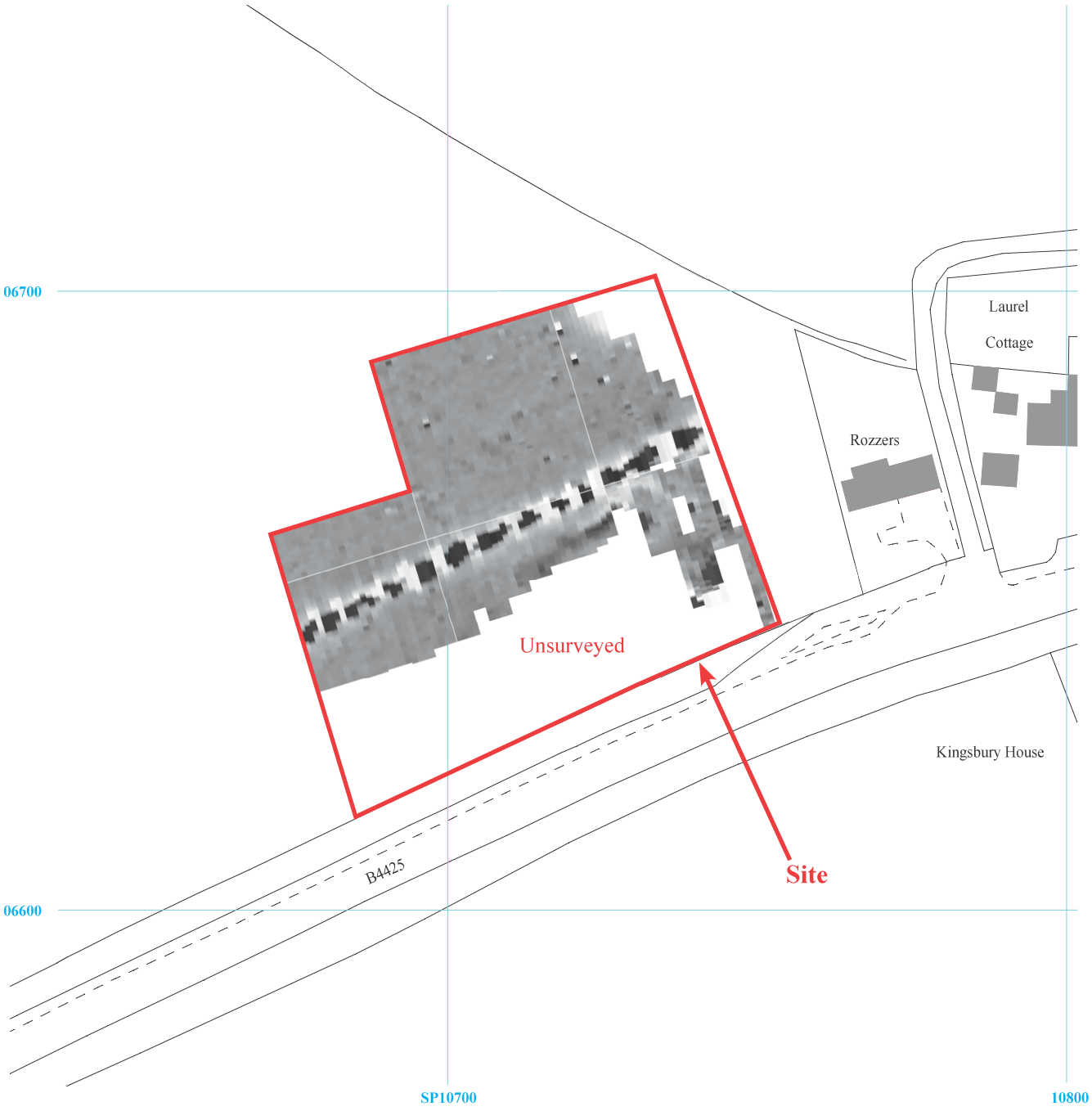

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Figure 3. Plot of minimally processed gradiometer data.

0m 50m

+10 nT
-10 nT

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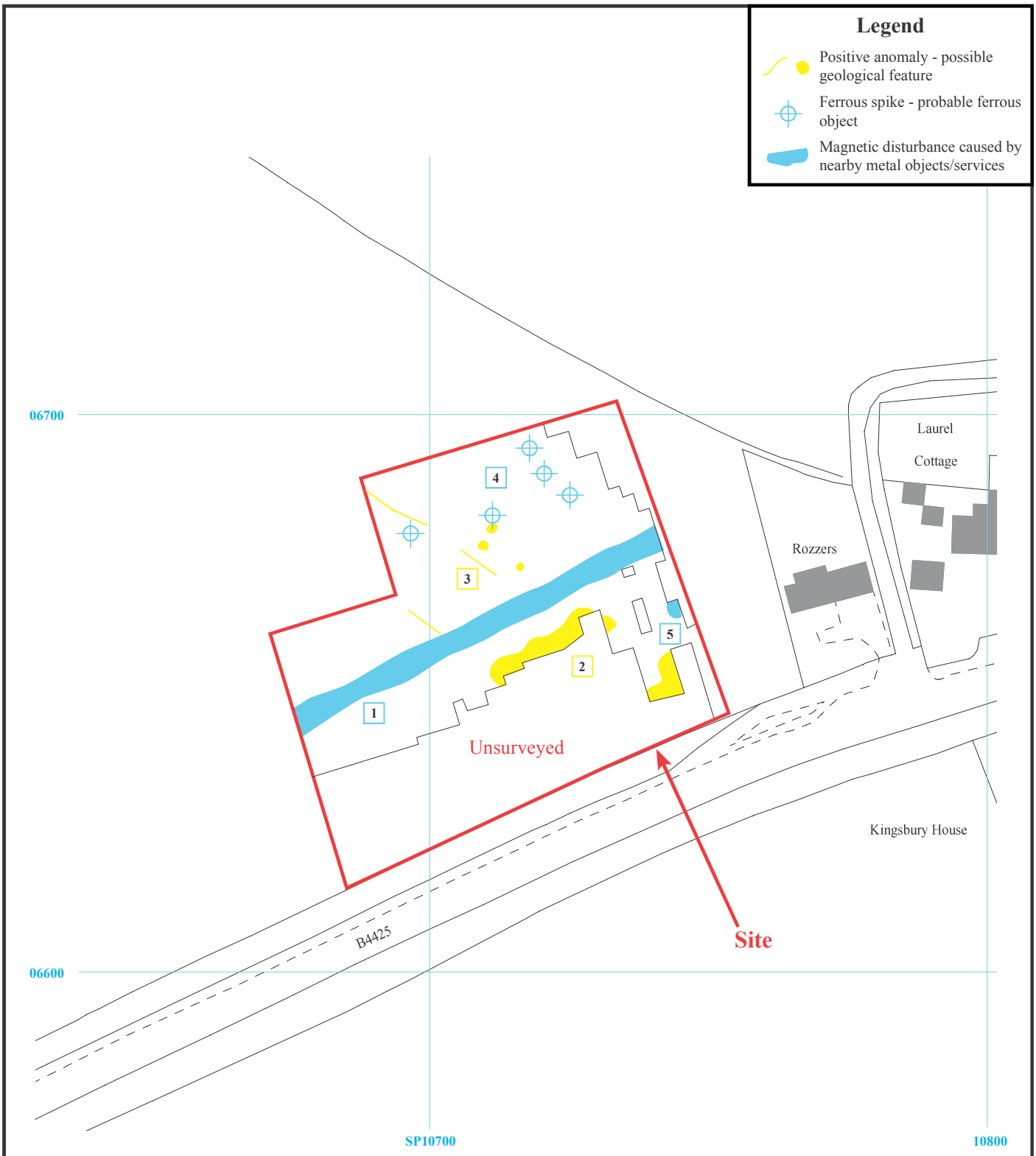

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Figure 4. Interpretation plot.

0m 50m

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Plate 1. South-eastern corner of the site showing low scrub and trees within the survey area, looking southeast.

Plate 2. General view of the survey area, looking south.

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Plates 1 and 2.

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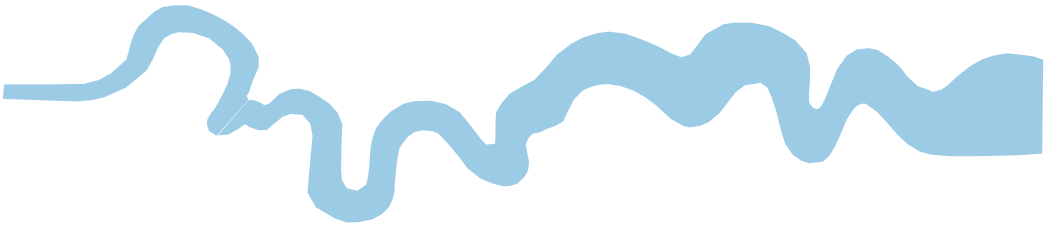
TIME CHART

	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



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