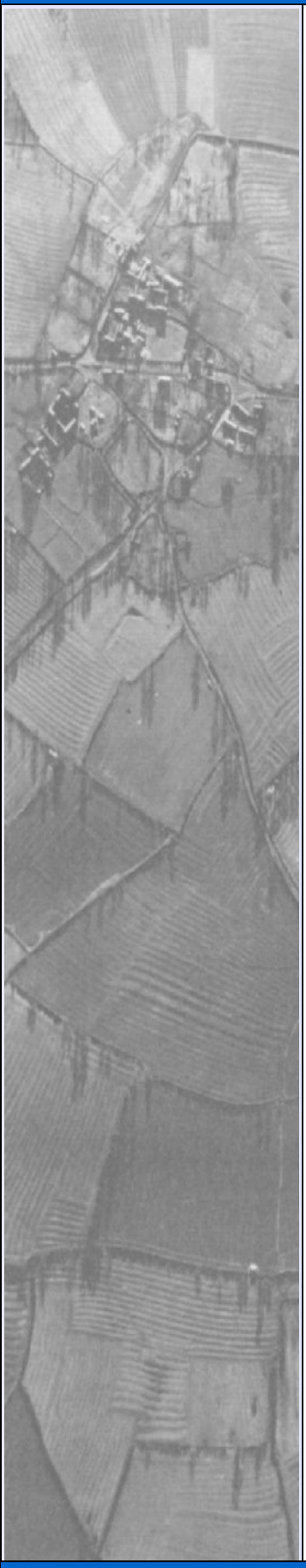

Norbury Camp
Hill House Farm, Farmington
Gloucestershire

MAGNETOMETER SURVEY REPORT

for

Mr Clive Slatter

David Sabin and Kerry Donaldson

August 2014

Ref. no. 561

ARCHAEOLOGICAL SURVEYS LTD

Norbury Camp
Hill House Farm, Farmington
Gloucestershire

Magnetometer Survey Report

for

Mr Clive Slatter

Fieldwork by David Sabin
Report by David Sabin BSc (Hons) MIFA and Kerry Donaldson BSc (Hons)

Survey date – 8th August 2014
Ordnance Survey Grid Reference – **SP 12690 15445**

Archaeological Surveys Ltd
1 West Nolands, Nolands Road, Yatesbury, Calne, Wiltshire, SN11 8YD
Tel: 01249 814231 Fax: 0871 661 8804
Email: info@archaeological-surveys.co.uk
Web: www.archaeological-surveys.co.uk

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SUMMARY

A detailed magnetometer survey was carried out by Archaeological Surveys Ltd within a small part of the interior of Norbury Camp Iron Age hillfort, at the request of landowner, Mr Clive Slatter of Hill House Farm, near Farmington, Gloucestershire. The survey was carried out prior to the development of a new agricultural building within the centre of the hillfort, which contains a number of agricultural and residential buildings and tracks. The development area is approximately 0.5ha in extent, but the survey was also carried out in an extended zone to the west and south in order to gain a wider understanding of potential features. The results of the survey show evidence for possible quarrying, with a number of pits and other pit-like responses. It is possible that the quarrying and other pits have an archaeological origin, and although a number of weakly positive linear anomalies were located, these lack a coherent morphology and cannot be confidently interpreted as cut, ditch-like features. A cluster of positive discrete and short positive linear anomalies are located within the development zone but the majority of the anomalies located, including the possible quarry pits, lie outside of this zone.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by Mr Clive Slatter of Hill House Farm, near Farmington, Gloucestershire, to undertake a magnetometer survey of an area of land at Norbury Camp Iron Age hillfort. The farmhouse and associated agricultural buildings are located within the central part of the hillfort. The site has been outlined for a proposed development of a new agricultural building.

1.1.2 The survey area lies within the Scheduled Monument of Norbury Camp Iron Age hillfort (GC 209/1003350). A licence under Section 42 of the 1979 Ancient Monuments and Archaeological Areas Act (as amended by the National Heritage Act 1983) was granted by English Heritage prior to commencing the fieldwork. The geophysical survey was carried out in accordance with a Written Scheme of Investigation (WSI) produced by Archaeological Surveys (2014) in support of the application of the Section 42 licence.

1.2 Survey objectives and techniques

1.2.1 The objective of the survey was to use magnetometry to locate geophysical anomalies that may be archaeological in origin so that they may be assessed prior to development of the site. The methodology is considered an efficient and effective approach to archaeological prospection.

1.2.2 The survey and report generally follow the recommendations set out by:

English Heritage (2008) *Geophysical survey in archaeological field evaluation;* and Institute for Archaeologists (2002) *The use of Geophysical Techniques in Archaeological Evaluations*. The work has been carried out to the Institute for Archaeologists (2011) *Standard and Guidance for Archaeological Geophysical Survey.*

1.3 Site location, description and survey conditions

1.3.1 The site is located at Hill House Farm which lies close to the village of Farmington but is within the parish of Northleach and Eastington in Gloucestershire. It is centred on Ordnance Survey National Grid Reference (OS NGR) SP 12690 15445, see Figures 01 and 02.

1.3.2 The development area is approximately 0.5ha and covers an area of pasture land to the west of the existing farm buildings, see Plate 1. The geophysical survey was extended to cover approximately 1.2ha in order to gain a wider understanding of any potential anomalies within the development area.

Plate 1: Survey area looking towards the east

1.3.3 The ground conditions across the site were generally considered to be favourable for the collection of magnetometry data. However, several sources of magnetic disturbance were present within and immediately adjacent to the survey area. These included electric fencing, machinery, troughs, gates, barns and a small pumping house. Weather conditions during the survey were fine.

1.4 Site history and archaeological potential

1.4.1 The survey area lies within the Scheduled Monument (No. 1003350) of Norbury Camp, a univallate Iron Age hillfort which encloses 20.5ha in total. The site has been partly investigated through geophysical survey and excavations in the 1970s and 1990s which revealed Iron Age and Romano-British occupation in the form of ditches, pits, enclosures, structural remains, burials and industrial activity. A ploughed out long barrow is also recorded in the south western part of the site, approximately 250m west of the survey area.

1.4.2 Small areas of open soil within and adjacent to the survey area were observed during the course of the work. The grass cover had been eroded by cows along a trackway and around water troughs. No cultural remains were evident and the soil cover appeared thin as the oolitic bedrock was exposed around one of the troughs.

1.4.3 The location of the survey area within an Iron Age hillfort, together with evidence for Iron Age and Romano-British occupation in the immediate vicinity indicates a high potential for the geophysical survey to locate anomalies that may relate to further archaeological features.

1.5 Geology and soils

1.5.1 The underlying solid geology across the site is from the Taynton Limestone Formation (Great Oolite Group) (BGS, 2014).

1.5.2 The overlying soil across the survey area is from the Sherborne association, which is a brown rendzina. It consists of a shallow, well drained, brashy, calcareous, clayey soil over limestone (Soil Survey of England and Wales, 1983).

1.5.3 Magnetometry survey carried out across similar soils has produced good results, although numerous pit-like anomalies are often encountered and it can be difficult to distinguish those with a natural origin from those with an anthropogenic origin. The underlying geology and soils are therefore considered acceptable for magnetic survey.

2 METHODOLOGY

2.1 Technical synopsis

2.1.1 Magnetometry survey records localised magnetic fields that can be associated with features formed by human activity. Magnetic susceptibility and magnetic thermoremnance are factors associated with the formation of localised fields. Additional details are set out below and within Appendix A.

2.1.2 Iron minerals within the soil may become altered by burning and the break down of biological material; effectively the magnetic susceptibility of the soil is increased, and the iron minerals become magnetic in the presence of the Earth's magnetic field. Accumulations of magnetically enhanced soils within features, such as pits and ditches, may produce magnetic anomalies that can be mapped by magnetic prospection.

2.1.3 Magnetic thermoremnance can occur when ferrous minerals have been heated to high temperatures such as in a kiln, hearth, oven etc. On cooling, a permanent magnetisation may be acquired due to the presence of the Earth's magnetic field. Certain natural processes associated with the formation of some igneous and metamorphic rock may also result in magnetic thermoremnance.

2.1.4 The localised variations in magnetism are measured as sub-units of the Tesla, which is a SI unit of magnetic flux density. These sub-units are nano Teslas (nT), which are equivalent to 10^{-9} Tesla (T).

2.2 Equipment configuration, data collection and survey detail

2.2.1 The detailed magnetic survey was carried out using a SENSYS MAGNETO®MXPDA 5 channel cart-based system. The instrument has 5 fluxgate gradiometers spaced 0.5m apart with readings recorded at 20 Hz. The gradiometers have a range of recording data between 0.1nT and 10,000nT. They are linked to a Leica GS10 RTK GPS with data recorded by SENSYS MAGNETO®MXPDA software on a rugged PDA computer system.

2.2.2 Data are collected along a series of parallel survey transects wherever possible. The length of each transect is variable and relates to the size of the survey area and other factors including ground conditions. A visual display allows accurate placing of transects and helps maintain the correct separation between adjacent traverses.

2.3 Data processing and presentation

2.3.1 Magnetic data collected by the MAGNETO®MXPDA cart-based system are initially prepared using SENSYS MAGNETO®DLMGPS software. Georeferenced data are then exported in ASCII format for compensation (destriping), interpolation and clipping using TerraSurveyor. Greyscale images are also produced using TerraSurveyor.

2.3.2 Appendix C contains specific information concerning the survey and data attributes and is derived directly from TerraSurveyor; this should be used in conjunction with information provided by Figure 02.

2.3.3 Only minimal processing is carried out in order to enhance the results of the survey for display. Raw data are always analysed, as processing can modify anomalies. The following schedule sets out the data and image processing used in this survey for the SENSYS MAGNETO data:

- clipping of processed data at ±20 nT to enhance low magnitude anomalies,
- zero median traverse is applied in order to balance readings along each traverse.

2.3.4 An abstraction and interpretation is offered for all geophysical anomalies located by the survey. A brief summary of each anomaly, with an appropriate reference number, is set out in list form within the results (Section 3) to allow a rapid and objective assessment of features within the survey area.

2.3.5 Reference should be made to Appendix B for further information on the specific processes carried out on the data. Appendix C metadata includes details on the processing sequence used.

2.3.6 The main form of data display prepared for this report is the 'processed' greyscale plot followed by an abstraction and interpretation plot. Anomalies are abstracted using colour coded points, lines and polygons. All plots are scaled to landscape A3 for paper printing.

2.3.7 Data captured with the SENSYS MAGNETO cart-based system are resampled to a resolution of effectively 0.5m between tracks and 0.2m along each survey track. A TIFF file (OSGB36) is produced by TerraSurveyor software along with an associated world file (.TFW) that allows automatic georeferencing when using GIS or CAD software.

2.3.8 The raster images are combined with base mapping using ProgeCAD Professional 2014 and AutoCAD LT 2007, creating DWG file formats. All images are externally referenced to the CAD drawing in order to maintain good graphical quality. Quality can be compromised by rotation of graphics in order to allow the data to be orientated with respect to grid north; this is considered acceptable as the survey results are effectively georeferenced allowing relocation of features using GPS, resection method, etc.

2.3.9 A digital archive is produced with this report, see Appendix D below. The main archive is held at the offices of Archaeological Surveys Ltd.

3 RESULTS

3.1 General assessment of survey results

3.1.1 The detailed magnetic survey was carried out over approximately 1.2ha within three conjoined survey areas. Area 1 is in the northern part of the site and covers the development area and an extension to the west, Area 2 is along a farm track enclosed by electric fencing and Area 3 lies to the south of the track. The survey was extended beyond the development area to assess whether any archaeological features were immediately adjacent and to aid interpretation of any potential anomalies extending beyond the limit of the site.

3.1.2 Magnetic anomalies located can be generally classified as anomalies associated with possible quarrying, positive and negative anomalies of an uncertain origin, anomalies associated with agricultural tracks, areas of magnetic disturbance, strong discrete dipolar anomalies relating to ferrous objects and strong multiple dipolar linear anomalies relating to buried services or pipelines.

3.2 Statement of data quality

3.2.1 Data are considered representative of the magnetic anomalies present within the site. Magnetic disturbance has been caused by modern ferrous material within and adjacent to the survey area. The disturbance has the potential to obscure low magnitude anomalies and create artefacts within the dataset.

3.3 Data interpretation

3.3.1 The list of sub-headings below attempts to define a number of separate categories that reflect the range and type of features located during the survey. A basic explanation of the characteristics of the magnetic anomalies is set out for each category in order to justify interpretation, a basic key is indicated to allow cross referencing to the abstraction and interpretation plot. CAD layer names are included to aid reference to associated digital files (.dwg/.dxf). Sub-headings are then used to group anomalies with similar characteristics within the survey area.

Report sub-heading CAD layer names and plot colour	**Description and origin of anomalies**
Anomalies associated with quarrying AS-ABST MAG QUARRYING	Magnetically variable anomalies, which may be negative, indicating a response to geology/drift deposits and/or positive indicating an increased depth of topsoil.
Anomalies with an uncertain origin AS-ABST MAG POS LINEAR UNCERTAIN AS-ABST MAG NEG LINEAR UNCERTAIN AS-ABST MAG POS DISCRETE UNCERTAIN	The category applies to a range of anomalies where there is not enough evidence to confidently suggest an origin. Anomalies in this category may well be related to archaeologically significant features, but equally relatively modern features, geological/pedological features and agricultural features should be considered. Positive anomalies are indicative of magnetically enhanced soils that may form the fill of 'cut' features or may be produced by accumulation within layers or 'earthwork' features; soils subject to burning may also produce positive anomalies. Negative anomalies are produced by material of comparatively low magnetic susceptibility such as stone and subsoil.
Anomalies associated with magnetic debris AS-ABST MAG STRONG DIPOLAR	Strong discrete dipolar anomalies are responses to ferrous objects within the topsoil.
Anomalies with a modern origin AS-ABST MAG DISTURBANCE AS-ABST MAG SERVICE AS-ABST MAG TRACK	The magnetic response is often strong and dipolar indicative of ferrous material and may be associated with extant above surface features such as wire fencing, cables, pylons etc.. Often a significant area around such features has a strong magnetic flux which may create magnetic disturbance; such disturbance can effectively obscure low magnitude anomalies if they are present. Fluxgate sensors may respond erratically and with hysteresis adjacent to strong magnetic sources. Buried services may produce characteristic multiple dipolar anomalies dependant

	upon their construction. Single or multiple linear anomalies associated with present trackway and or vehicle tracks.

Table 1: List and description of interpretation categories

3.4 List of anomalies

Area centred on OS NGR 412690 215445, see Figures 03 & 04.

Note: the list and assessment of anomalies below considers all three survey areas as a single conjoined area.

Anomalies associated with possible quarrying

(1) – A large amorphous magnetically variable response is located in the north western part of the survey area. It has dimensions of over 52m by 9m and a response of up to 5nT towards the margins. It does not appear to relate to any depression within the ground surface, but it is possible that it relates to former quarrying. It lies outside of the proposed development area.

(2) – An irregularly shaped positive response is located 10m to the south of anomaly (1). It appears to be formed of at least two conjoined pits with overall dimensions of 17m by 6m and a response of up to 13nT at the eastern end. This may indicate a fill of a cut, or cut features, and an archaeological origin should be considered.

(3) – Located at the southern edge of the survey area is an irregularly shaped positive response. It has dimensions of at least 9m by 5m at the southern end and 6.5m wide at the northern end and a response of between 4nT and 17nT.

Anomalies with an uncertain origin

(4) – Towards the centre of the survey area is a discrete positive response with a diameter of approximately 5m and a response of generally 3nT, with some stronger enhancement at the south west edge. This anomaly underlies the farm track (13), and is located partly within the development area. It appears to relate to a large pit and an archaeological origin should be considered.

(5) – The survey area contains a number of weak, discrete, positive responses, with a cluster of them within the north eastern part that relates to the development site. A number of short, positive linear responses are also located in the vicinity. The discrete anomalies have a response of 2-3nT, and although they appear to relate to pit-like features, their origin cannot be confidently interpreted.

(6) – A possible positive curvilinear anomaly is located in the northern part of the survey area immediately south of anomaly (1). It is approximately 5.5m in diameter and has a response of <2nT. It is not possible to ascertain if this relates to a cut

ditch or archaeological feature due to the weak and diffuse response. Several other short or fragmented possible curvilinear anomalies can also be seen within the western part of the survey area, and again, their origin is uncertain.

(7) – A fragmented positive linear anomaly is located in the central southern part of the survey area. Although it is possible that it relates to a cut feature, it does appear to extend from an agricultural track and an association is possible.

(8) – A positive linear anomaly is located in the eastern part of the survey area. It is possible that this relates to former agricultural activity.

(9) – A weakly positive linear anomaly is oriented north west to south east in the northern part of the site. It is not possible to determine if it relates to a cut feature.

(10) – Three negative linear anomalies extend south-south-eastwards from the northern part of the survey area. This type of anomaly is generally a response to vehicle ruts or to material that is of low magnetic susceptibility, such as stone, plastic or subsoil. It is not possible to determine their origin.

(11) – A negative linear anomaly is orientated east-west in the central western part of the survey area and may relate to agricultural activity.

Anomalies associated with magnetic debris

(12) – The survey area contains a number of strong, discrete, dipolar anomalies. These are a response to ferrous and other magnetically thermoremnant objects within the topsoil.

Anomalies with a modern origin

(13) – A negative linear response extends east-west within the centre of the survey area and relates to an agricultural track.

(14) – Negative linear anomalies extend northwards from the south eastern corner of the survey area and then turn towards the north east. These relate to agricultural vehicle ruts.

(15) – A number of strong, multiple dipolar, linear anomalies converge towards the north eastern corner of the site. Within this area lies a water pump house and these anomalies relate to water pipes that extend from it.

(16) – Magnetic disturbance has been caused by ferrous fencing, buildings, and services, within and adjacent to the edges of the survey area.

4 CONCLUSION

4.1.1 The detailed magnetometer survey was conducted over 1.2ha covering the 0.5ha area outlined for the development of a new agricultural building as well as an extension to the west and south in order to gain more detail regarding potential anomalies within the development area.

4.1.2 The results demonstrate that there are a number of amorphous and irregularly shaped areas that appear to relate to possible former quarrying, all of which lie outside of the development zone. The anomalies do not relate to depressions in the land surface, and although it is not possible to determine a date, they may have been cut and infilled in antiquity.

4.1.3 In the central part of the site, underlying a modern agricultural track, is a sub-circular anomaly that may relate to a pit-like feature and an archaeological origin should be considered. Several other pit-like responses can be seen within the site, with a cluster in the north eastern part within the development zone. A number of short or fragmented weakly positive linear anomalies are also evident within this area, but it is not possible to determine if they relate to cut features.

5 REFERENCES

Archaeological Surveys, 2014. *Hill House Farm, Farmington, Gloucestershire, Geophysical Survey Written Scheme of Investigation.* Unpublished typescript document.

British Geological Survey, 2014. *Geology of Britain viewer, 1:50 000 scale [online]* available from http://mapapps.bgs.ac.uk/geologyofbritain/home.html [accessed 27/7/2014].

English Heritage, 2008. *Geophysical survey in archaeological field evaluation. Research and Professional Service Guideline No.1.* 2nd ed. Swindon: English Heritage.

Institute for Archaeologists, 2002. *The use of Geophysical Techniques in Archaeological Evaluations*. IfA Paper No. 6. IfA, University of Reading.

Institute for Archaeologists, 2011. *Standard and Guidance for archaeological geophysical survey*. IfA, University of Reading.

Soil Survey of England and Wales, 1983. *Soils of England and Wales, Sheet 5 South West England.*

Appendix A – basic principles of magnetic survey

Iron minerals are always present to some degree within the topsoil and enhancement associated with human activity is related to increases in the level of magnetic susceptibility and thermoremnant material.

Magnetic susceptibility is an induced magnetism within a material when it is in the presence of a magnetic field. This can be thought of as effectively permanent due to the presence of the Earth's magnetic field.

Thermoremnant magnetism occurs when ferrous material is heated beyond a specific temperature known as the Curie Point. Demagnetisation occurs at this temperature with re-magnetisation by the Earth's magnetic field upon cooling.

Enhancement of magnetic susceptibility can occur in areas subject to burning and complex fermentation processes on biological material; these are frequently associated with human settlement. Thermoremnant features include ovens, hearths, and kilns. In addition thermoremnant material such as tile and brick may also be associated with human activity and settlement.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil can create an area of enhancement compared with surrounding soils and subsoils into which the feature is cut. Mapping enhanced areas will produce linear and discrete anomalies allowing an assessment and characterisation of hidden subsurface features.

It should be noted that areas of negative enhancement can be produced from material having lower magnetic properties compared to the topsoil. This is common for many sedimentary bedrocks and subsoils which were often used in the construction of banks and walls etc. Mapping these 'negative' anomalies may also reveal archaeological features.

Magnetic survey or magnetometry can be carried out using a fluxgate gradiometer and may be referred to as gradiometry. The SENSYS gradiometer is a passive instrument consisting of two fluxgate sensors mounted vertically 65cm apart. The instrument is carried about 10-20cm above the ground surface and the upper sensor measures the Earth's magnetic field as does the lower sensor but this is influenced to a greater degree by any localised buried field. The difference between the two sensors will relate to the strength the magnetic field created by the buried feature. If no enhanced feature is present the field measured by both sensors will be similar and the difference close to zero.

There are a number of factors that may affect the magnetic survey and these include soil type, local geology and previous human activity. Situations arise where magnetic disturbance associated with modern services, metal fencing, dumped waste material etc., obscures low magnitude fields associated with archaeological features.

Appendix B – data processing notes

Clipping

Minimum and maximum values are set and replace data outside of the range with those values. Extreme values are removed improving colour or greyscale contrast associated with data values that may be archaeologically significant. It has been found that clipping data to ranges between ±15nT and ±10nT often improves the appearance of features associated with archaeology. Different ranges are applied to data in order to determine the most suitable for anomaly abstraction and display.

Zero Median/Mean Traverse

The median (or mean) of each traverse is calculated ignoring data outside a threshold value, the median (or mean) is then subtracted from the traverse. The process is used to equalise slight differences between the set-up and stability of gradiometer sensors and can remove striping. The process can remove archaeological features that run along a traverse so data analysis is also carried out prior its application.

High Pass Filtering

A mathematical process used to remove low frequency anomalies relating to survey tracks and modern agricultural features.

Appendix C – survey and data information

Area 1

COMPOSITE
Filename: J561-mag-Area1-proc.xcp
Description: Imported as Composite from: J561-mag-Area1.asc
Instrument Type: Sensys DLMGPS
Units: nT
UTM Zone: 30U
Survey corner coordinates (X/Y):
Northwest corner: 412638.256171775, 215521.587594336 m
Southeast corner: 412747.816171775, 215439.747594336 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 1
Dummy Value: 32702

Source GPS Points: 282600

Dimensions
Composite Size (readings): 913 x 682
Survey Size (meters): 110 m x 81.8 m
Grid Size: 110 m x 81.8 m
X Interval: 0.12 m
Y Interval: 0.12 m

Stats
Max: 22.10
Min: -22.00
Std Dev: 9.59
Mean: 0.19
Median: -0.14
Composite Area: 0.89664 ha
Surveyed Area: 0.72853 ha

Processes: 1
1 Base Layer

GPS based Proce3
1 Base Layer.
2 Unit Conversion Layer (to OSGB36).
3 Clip from -20.00 to 20.00 nT

Area 2

COMPOSITE
Filename: J561-mag-Area2.xcp
Description: Imported as Composite from: J561-mag-Area2.asc
Instrument Type: Sensys DLMGPS
Units: nT
UTM Zone: 30U
Survey corner coordinates (X/Y):
Northwest corner: 412647.048510505, 215443.62079774 m
Southeast corner: 412744.608510505, 215426.70079774 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 1
Dummy Value: 32702

Source GPS Points: 27200

Dimensions
Composite Size (readings): 813 x 141
Survey Size (meters): 97.6 m x 16.9 m
Grid Size: 97.6 m x 16.9 m
X Interval: 0.12 m
Y Interval: 0.12 m

Stats
Max: 22.10
Min: -22.00
Std Dev: 13.44
Mean: 1.41
Median: 0.49
Composite Area: 0.16507 ha
Surveyed Area: 0.065619 ha

Processes: 1
1 Base Layer

GPS based Proce3
1 Base Layer.
2 Unit Conversion Layer (to OSGB36).
3 Clip from -20.00 to 20.00

Area 3

COMPOSITE
Filename: J561-mag-Area3.xcp
Description: Imported as Composite from: J561-mag-Area3.asc
Instrument Type: Sensys DLMGPS
Units: nT
UTM Zone: 30U
Survey corner coordinates (X/Y):
Northwest corner: 412644.563238117, 215435.715774874 m
Southeast corner: 412707.803238117, 215359.155774874 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 1
Dummy Value: 32702

Source GPS Points: 122700

Dimensions
Composite Size (readings): 527 x 638
Survey Size (meters): 63.2 m x 76.6 m
Grid Size: 63.2 m x 76.6 m
X Interval: 0.12 m
Y Interval: 0.12 m

Stats
Max: 22.10
Min: -22.00
Std Dev: 8.09
Mean: 0.50
Median: -0.17
Composite Area: 0.48417 ha
Surveyed Area: 0.34422 ha

Processes: 1
1 Base Layer

GPS based Proce3
1 Base Layer.
2 Unit Conversion Layer (to OSGB36).
3 Clip from -20.00 to 20.00

Appendix D – digital archive

Archaeological Surveys Ltd hold the primary digital archive at their offices in Wiltshire (see inside cover for address). Data are backed-up onto an on-site data storage drive and at the earliest opportunity data are copied to CD ROM for storage on-site and off-site.

Surveys are reported on in hardcopy (recycled paper) using A4 for text and A3 for plots (all plots are scaled for A3). A digital copy of the report will be provided to the Gloucestershire County Archaeology Service in PDF/A format together with a dxf of the survey location for the Gloucestershire Historic Environment Service. A hard copy and PDF copy of the report sent to the client as well as the south west casework team at English Heritage and a PDF copy sent to the geophysics team in Portsmouth. A PDF copy will also be uploaded to Oasis.

Archaeological Surveys Ltd shall retain intellectual property rights for the materials and records created as part of this project. A non-exclusive, transferable, sub-licensable, perpetual, irrevocable and royalty-free licence shall be granted to the client in order for them to use, reproduce and enhance the reports, documentation, graphics and illustrations produced as part of this project for the purpose for which they were commissioned. Copyright licence will also be granted to the local authority for planning use and within in the Historic Environment Record for public dissemination upon instruction by the client. Archaeological Surveys Ltd shall retain the right to be identified as the author and originator of the material.

This report has been prepared using the following software on a Windows XP platform:

- TerraSurveyor version 3.0.23.0 (geophysical data analysis),
- SENSYS MAGNETO®ARCH version 1.00-04(geophysical data analysis),
- ProgeCAD Professional 2014 (report graphics),
- AutoCAD LT 2007 (report figures),
- OpenOffice.org 3.0.1 Writer (document text),
- PDF Creator version 0.9 (PDF archive).

Digital data produced by the survey and report include the following files:

- TerraSurveyor grid and composite files for all geophysical data,
- CSV files for raw and processed composites,
- geophysical composite file graphics as Bitmap images,
- AutoCAD DWG files in 2000 and 2007 versions,
- report text as OpenOffice.org ODT file,
- report text as Word 2000 doc file,
- report text as rich text format (RTF),
- report text as PDF,
- PDFs of all figures.

ENGLISH HERITAGE

English Heritage Geophysical Survey Database Questionnaire

Survey Details

Name of Site: Norbury Camp, Hill House Farm, Farmington

County: Gloucestershire

NGR Grid Reference (Centre of survey to nearest 100m):

SP 12690 15445

Start Date: 8th August 2014 **End Date: 8th August 2014**

Geology at site (Drift and Solid):

Taynton Limestone Formation (Great Oolite Group)

Known archaeological Sites/Monuments covered by the survey
(Scheduled Monument No. or National Archaeological Record No. if known)

Norbury Camp, Farmington, Cotswold, Northleach with Eastington, Gloucestershire.
Monument No: 1003350

Archaeological Sites/Monument types detected by survey
(Type and Period if known. "?" where any doubt).

?

Surveyor (Organisation, if applicable, otherwise individual responsible for the survey):

Archaeological Surveys Ltd (Kerry Donaldson & David Sabin)

Name of Client, if any:

Mr Clive Slatter

ENGLISH HERITAGE

Purpose of Survey:

Planning application for development of new farm building within the scheduled area

Location of:

a) Primary archive, i.e. raw data, electronic archive etc: Archaeological Surveys Ltd, 1 West Nolands, Nolands Road, Yatesbury, Calne, SN11 8YD

b) Full Report: As above. PDF/A copy and dxf of survey boundary also sent to Gloucestershire Historic Environment Record

ENGLISH HERITAGE

Technical Details

(Please fill out a separate sheet for each survey technique used)

Type of Survey (Use term from attached list or specify other):

Magnetometer

Area Surveyed, if applicable (In hectares to one decimal place):

1.2ha

Traverse Separation, if regular: 0.5m **Reading/Sample Interval:20Hz**

Type, Make and model of Instrumentation:

SENSYS MAGNETO®MXPDA 5 channel cart-based system.

For Resistivity Survey:

Probe configuration:

Probe Spacing:

Land use at the time of the survey (Use term/terms from the attached list or specify other):

Grassland - Pasture

Additional Remarks (Please mention any other technical aspects of the survey that have not been covered by the above questions such as sampling strategy, non standard technique, problems with equipment etc.):

List of terms for Survey Type

Magnetometer (includes gradiometer)

Resistivity

Resistivity Profile

Magnetic Susceptibility

Electro-Magnetic Survey

Ground Penetrating Radar

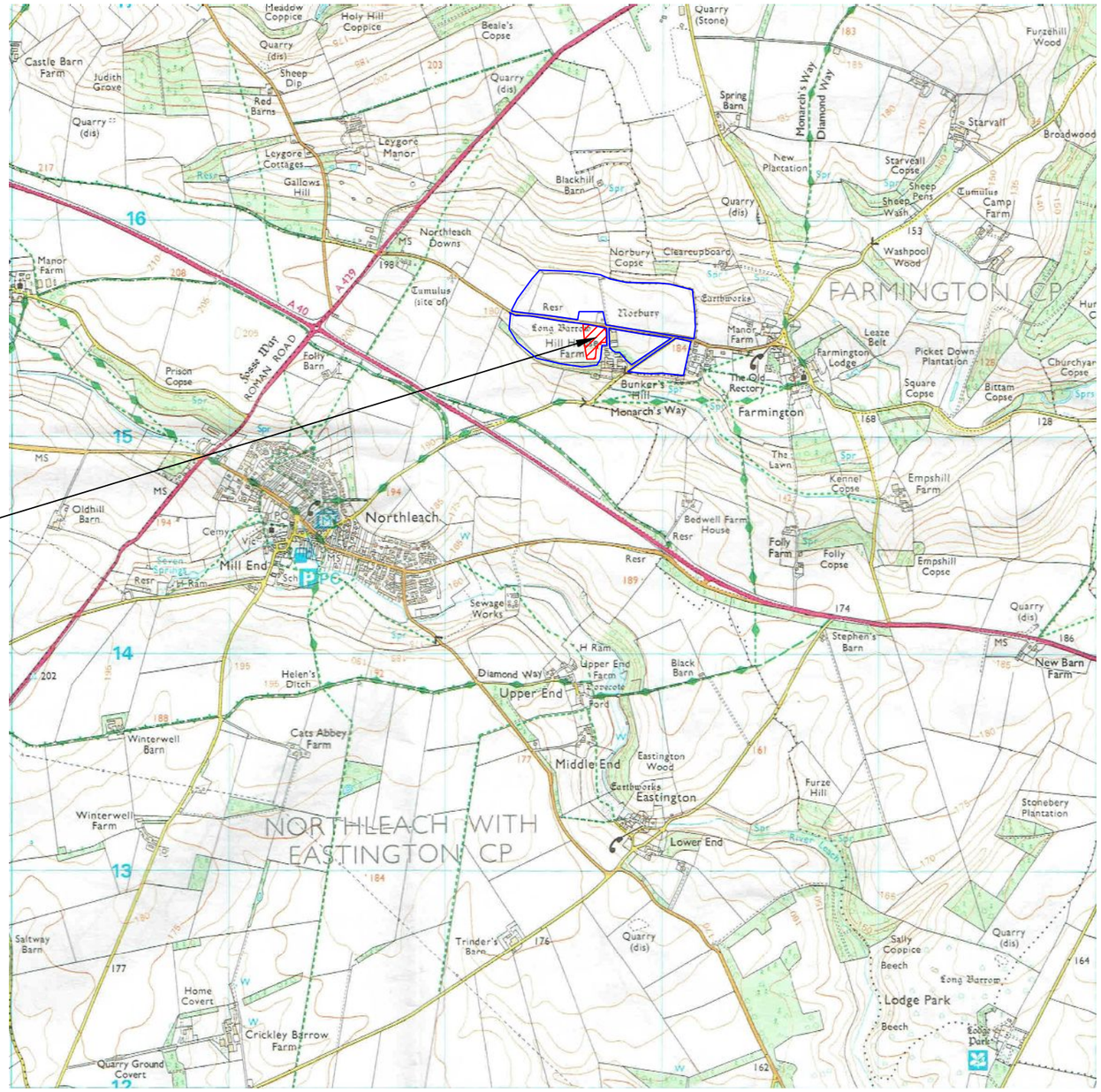
Other (please specify)

ENGLISH HERITAGE

List of terms for Land Use:

Arable
Grassland - Pasture
Grassland - Undifferentiated
Heathland
Moorland
Coastland - Inter-Tidal
Coastland - Above High Water
Allotment
Archaeological Excavation
Garden
Lawn
Orchard
Park
Playing Field
Built-Over
Churchyard
Waste Ground
Woodland
Other (please specify)

Survey location



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Hill House Farm
Farmington
Gloucestershire

Map of survey area

Survey location

Site centred on OS NGR
SP 12690 15445

Survey area

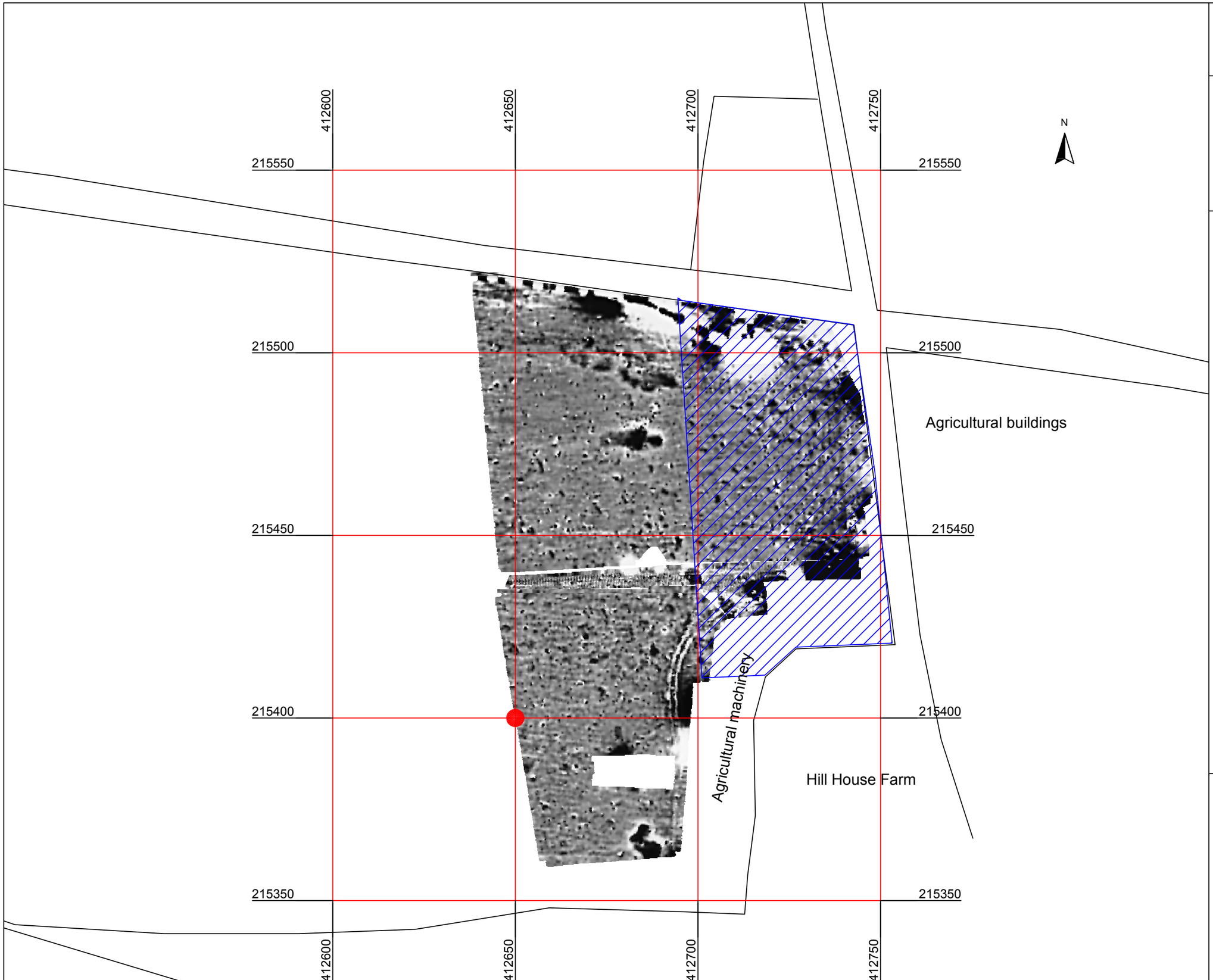
Norbury Camp scheduled area

SCALE 1:25 000

0m 500m 1000m

SCALE TRUE AT A3

FIG 01



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Farmington
Gloucestershire

Referencing information

Referencing grid to OSGB36 datum at 50m intervals

Data collected at 20Hz and georeferenced to ETRS89 zone 30 with conversion to OSGB36 using OSTN02

374090 154640

Approximate location of new farm building development area

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 02

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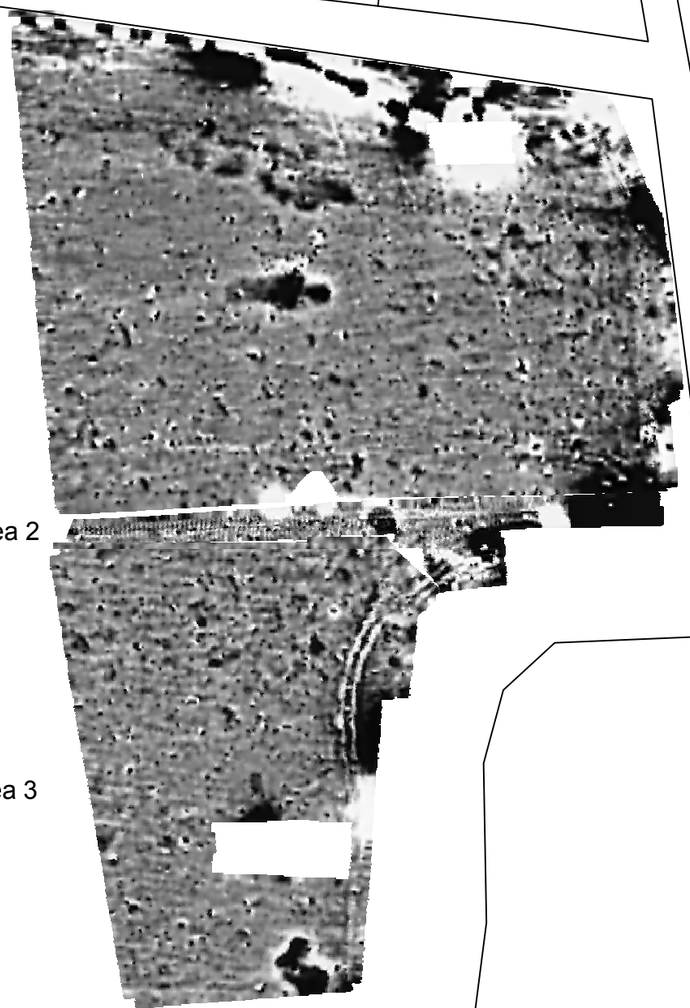
Gloucestershire

N

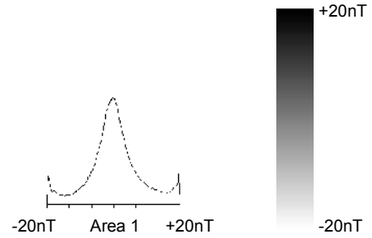


Area 1

Area 2

Area 3

Greyscale plot of processed magnetometer data



SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 03

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Abstraction and interpretation of magnetometer anomalies

- Positive linear anomaly - possible ditch-like feature
- Negative linear anomaly - material of low magnetic susceptibility
- Discrete positive response - possible pit-like feature
- Variable magnetic response - associated with possible quarrying
- Negative magnetic response - agricultural track
- Magnetic disturbance from ferrous materia
- Strong multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 04

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Farmington
Gloucestershire

Abstraction and interpretation of magnetometer anomalies showing development area

- Positive linear anomaly - possible ditch-like feature
- Negative linear anomaly - material of low magnetic susceptibility
- Discrete positive response - possible pit-like feature
- Variable magnetic response - associated with possible quarrying
- Negative magnetic response - agricultural track
- Magnetic disturbance from ferrous materia
- Strong multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object
- Development area

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 05