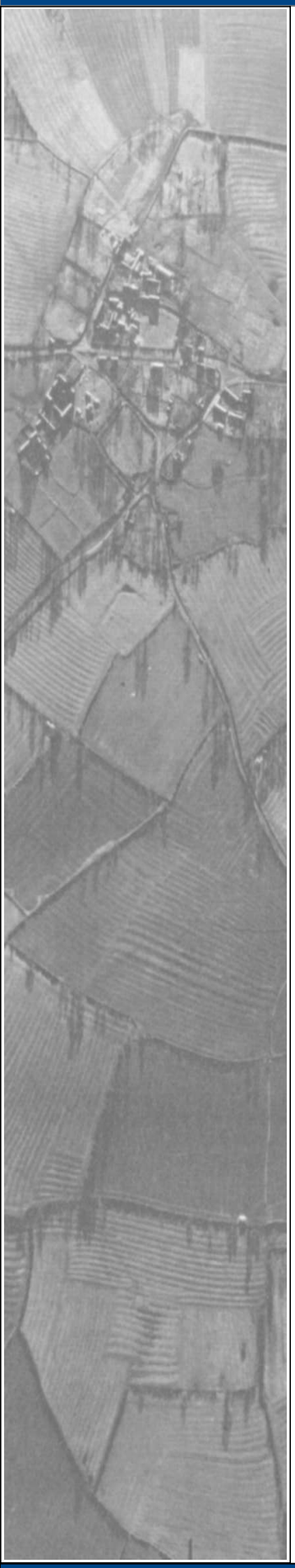


Land at Hillworth Road
Devizes
Wiltshire

UPDATED MAGNETOMETER SURVEY REPORT

for

SLR Consulting

Kerry Donaldson & David Sabin

January 2022

Ref. no. J886a

ARCHAEOLOGICAL SURVEYS LTD

Land at Hillworth Road
Devizes
Wiltshire

UPDATED MAGNETOMETER SURVEY REPORT

for

SLR Consulting

Fieldwork by David Sabin BSc (Hons) MCIfA
Report by Kerry Donaldson BSc (Hons)
Report checked by David Sabin
Primary archive location - Archaeological Surveys Ltd, Yatesbury, Wiltshire

Survey dates – 4th November 2021 & 26th January 2022
Ordnance Survey Grid Reference – **ST 99790 60930**

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

CONTENTS

LIST OF FIGURES

LIST OF PLATES

LIST OF TABLES

SUMMARY

Detailed magnetometry was carried out by Archaeological Surveys Ltd over an area of land at Hillworth Road, Devizes, Wiltshire. The survey was carried out in two phases as an additional area to the south was outlined for an attenuation pond at a later date to the initial survey. The results in this southern area revealed a number of positive linear and rectilinear anomalies that appear to relate to cut features with archaeological potential. Elsewhere the site contains a number of linear, curvilinear and discrete anomalies, but they are weak and poorly defined and are of uncertain origin. Other anomalies relate to magnetic debris from ground make-up, and magnetic disturbance from an underground service has also been located in the northern part of the site.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by SLR Consulting to undertake a magnetometer survey of an area of land at Hillworth Road on the western edge of Devizes in Wiltshire. The site has been outlined for a proposed residential development and the survey forms part of an archaeological assessment.

1.1.2 This report has been updated from an earlier issue (Archaeological Surveys, 2021b), to include an area outlined for a surface water attenuation pond and swale outfall to the south west of the main development area. This report includes the results for the entire site.

1.1.3 The geophysical survey was carried out in accordance with a Written Scheme of Investigation (WSI) produced by Archaeological Surveys (2021a) and approved by Neil Adam, Assistant County Archaeologist for Wiltshire Council, prior to commencing the fieldwork.

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 Geophysical survey can provide useful information on the archaeological potential of a site; however, the outcome of any survey relies on a number of factors and as a consequence results can vary. The success in meeting the aims and objectives of a survey is, therefore, often impossible to predetermine.

1.3 Standards, guidance and recommendations for the use of this report

1.3.1 The survey and report follow the recommendations set out by: European Archaeological Council (2015) *Guidelines for the Use of Geophysics in Archaeology;* Institute for Archaeologists (2002) *The use of Geophysical Techniques in Archaeological Evaluations.* The work has been carried out to the Chartered Institute for Archaeologists (2014) (updated 2020) *Standard and Guidance for Archaeological Geophysical Survey.*

1.3.2 Archaeological Surveys Ltd provide a detailed geophysical survey report and it is recommended that where possible the contents should be considered in full. The Summary provides a brief overview of the results with more detail available in the Discussion and/or Conclusion. The *List of anomalies* within the Results provides a detailed assessment of the anomalies within separate categories which can be useful in inferring a level of confidence to the interpretation. Quality and factors influencing the interpretation of anomalies is also set out within the results.

1.3.3 It is recommended that the full report should always be considered when using data and interpretation plots; where this is not possible, in the field for example, the abstraction and interpretation plots should retain their colour coding and be used with a corresponding legend.

1.3.4 Where targeting of anomalies by excavation is to be carried out, care should be taken to place trenches over solid lines or features visible on the abstraction and interpretation plots. Archaeological Surveys abstraction and interpretation avoids the use of dashed or dotted line formats, and broken or fragmented lines used in interpretive plots may well correspond closely with truncation of archaeological features.

1.4 Site location, description and survey conditions

1.4.1 The site is located within an area of pasture at the western end of Hillworth Road, Devizes. It is centred on Ordnance Survey National Grid Reference (OS NGR) ST 99790 60930, see Figs 01 and 02.

1.4.2 The site covers 4.3ha in total and the geophysical survey covers approximately 3ha within three areas of pasture. A small part of the site adjacent to the field entrance at the north eastern corner was subject to ground make-up, and it was not suitable for geophysical survey due to depth of the made ground and the presence of highly magnetic material within the subsurface, and associated with steel fencing, gates, etc. The central part of the site contains trees and a very steep slope that was also unsuitable for survey. The southern part of the site lies on lower, undulating ground to the south of the steep slope.

1.4.3 The ground conditions across the site were generally considered to be favourable for the collection of magnetometry data, although there were parts of the site that were boggy or contained sloping ground that was difficult to

traverse. Weather conditions during the survey were fine.

Plate 1: Eastern part of site looking south west

1.5 Site history and archaeological potential

1.5.1 A draft Heritage Desk-Based Assessment has been prepared by SLR Consulting (2021). It outlines that the site lies less than 380m south west of the Scheduled Monument of Devizes Castle. A number of prehistoric and Roman findspots are recorded within 500m of the site, including two Roman coins found 60m and 120m to the north east. The site lies within the medieval deer park, associated with the castle, and the park pale is located approximately 260m to the south and east at its nearest points.

1.6 Geology and soils

1.6.1 The underlying solid geology across the site is sandstone from the Upper Greensand Formation (BGS, 2017). The site sits on the western edge of the Upper Greensand plateau on which the town of Devizes is located. The land slopes down very steeply between Areas 1 and 3 and along the southern edge of Area 2, Area 1 also slopes down towards the west with a more moderate gradient. The sloping ground relates to the transition from the Upper Greensand to mudstone belonging to the Gault formation. LiDAR imagery indicates that the south western part of the site (Area 3), located on the Gault clay, appears to have been subject to land slippage, probably of considerable age, which has created undulating ground (Fig 05).

1.6.2 The overlying soil across the survey area is from the Wickham 3 association and is a typical stagnogley soil. It consists of a slowly permeable, seasonally waterlogged, fine loamy over clayey soil (Soil Survey of England and Wales, 1983).

1.6.3 Magnetometry survey carried out across similar geology and soils has produced variable results as they are often associated with low magnetic contrast and low levels of magnetic susceptibility. However, cut features of archaeological potential may be located where human activity has altered the magnetic characteristics of the soil sufficiently.

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 (also known as thermoremanence) are factors associated with the formation of localised fields.

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). Additional details are set out in 2.2 below and within Appendix A.

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 (FGM650) spaced 0.5m apart with readings recorded at 20Hz. The cart is pushed at walking speed and not towed. Each sensor is not zeroed in the field as the vertical axis alignment is precisely fixed leaving sensor offsets that are removed during data processing. The fixing of the vertical alignment ensures the sensors are not unduly influenced by localised magnetic fields and that the vertical component of a magnetic anomaly is measured. The gradiometers have a measurement range of ±8000nT, although the recorded range is ±3000nT, and resolution is around 0.1nT. They are linked to a Leica GS10 RTK GNSS with data recorded by SENSYS MAGNETO®MXPDA software on a rugged PDA computer system.

2.2.2 Due to the fixed offsets within the fluxgate sensors, as a result of the manufacturing and tensioning process, the survey data do not provide a visually useful dataset until a zero median traverse algorithm is applied. It is recognised that this has the potential to affect some anomalies detrimentally by removing linear features orientated parallel to survey transects. However, this has not been noted as a particular problem with the system due to the high resolution data collection, generally long length of traverses and variability within the magnetic characteristics of a linear anomaly.

2.2.3 Data are collected along a series of parallel survey transects to achieve 100% coverage of the surveyable land. 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. Data are not collected within fixed grids and data points are considered to be random even though the data are collected in a systematic manner covering all accessible areas (Aspinall, Gaffney and Schmidt, 2009).

2.2.4 Fluxgate sensors are highly sensitive to temperature change and this manifests as drift during the course of a survey. This can be particularly noticeable during the morning as temperatures rise and the equipment warms or cools. Sensor drift within the course of a traverse will appear as a line trending from negative to positive after processing with a zero median traverse algorithm. To remove the potential for temperature drift, data were collected after a 20 minute stabilisation period and traverses were limited to a time of generally <100s.

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. The software effectively allocates a geographic position for each data point and can compensate for fixed offsets present within the FGM650 sensors. The offsets are positive or negative values present on all fluxgate gradiometer sensors. Some systems use manual or electronic balancing to effectively zero the sensors; however, this is a short term measure that is prone to drift through temperature changes and vibration and can easily be incorrectly set due to localised magnetic fields. The FGM650 sensors are very accurately aligned to the vertical magnetic gradient and are highly stable showing negligible drift on long traverses. The offset values are removed using TerraSurveyor software.

2.3.2 Survey tracks are analysed and georeferenced raw data (UTM Z30N) are then exported in ASCII format for further analysis and display within TerraSurveyor. The removal of the offset values (compensation) of the sensors is also carried out in TerraSurveyor using a zero median traverse function. Data are then considered to be minimally processed. Note: without the zero median traverse function it is not possible to create a meaningful data plot as all sensors have

a different offset value. Although a zero median traverse algorithm can remove anomalies aligned with the survey tracks, in practice this rarely occurs due to the use of long traverses, high resolution measurement and variability within the magnetic susceptibility of long linear features.

2.3.3 The minimally processed data are collected between limits of ±3000nT and clipped for display at ±5nT and ±3nT for Area 3. Data are interpolated to a resolution of effectively 0.5m between tracks and 0.15m along each survey track.

2.3.4 Appendix C contains metadata concerning the survey and data attributes and is derived directly from TerraSurveyor. Reference should be made to Appendix B for further information on processing.

2.3.5 A TIF file is produced by TerraSurveyor software along with an associated world file (.TFW) that allows automatic georeferencing (OSGB36 datum) when using GIS or CAD software. The main form of data display used in the report is the minimally processed greyscale plot. With regard to the Sensys MXPDA, minimally processed data are considered by the manufacturer to be data that are compensated by SENSYS MAGNETO DLMGPS software, see 2.3.1 and 2.3.2. Note: traceplots are not considered to be appropriate as they do not provide an accurate or useful assessment of the magnetic anomalies due to the very high density of data collection. In addition, traceplots cannot be meaningfully plotted against base mapping and in areas of complexity traces may be lost or highly confused. Traceplots may be used to demonstrate characteristic magnetic profiles across discrete features where it is considered beneficial.

2.3.6 The raster images are combined with base mapping using ProgeCAD Professional 2021, creating DWG (2018) file formats. All images are externally referenced to the CAD drawing in order to maintain good graphical quality. The CAD plots are effectively georeferenced facilitating relocation of features using GNSS, resection method, etc.

2.3.7 An abstraction and interpretation is drawn and plotted for all geophysical anomalies located by the survey. Anomalies are abstracted using colour coded points, lines and polygons. All plots are scaled to landscape A3 for paper printing. Appendix E sets out CAD layer names with colour and graphic content for each interpretation category, see 3.3.

2.3.8 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 each survey area.

2.3.9 The abstraction and interpretation procedure has been supported by analysis of a digital terrain model plot derived from the Environment Agency's LiDAR data. Shaded relief plots and contours are created using Surfer 15 (Azimuth:110, Altitude:265, Z factor:10), (Fig 05).

2.3.10 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 a total of three survey areas covering approximately 3ha.

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

3.1.3 Anomalies located within each survey area have been numbered and are described in 3.4 & 3.5 below.

3.2 Statement of data quality and factors influencing the interpretation of anomalies

3.2.1 Data are considered representative of the magnetic anomalies present within the site. There are no significant defects within the dataset.

3.2.2 Areas of magnetic debris in the north eastern part of the site are associated with modern magnetic material spread with rubble etc. as part of ground make-up and surface consolidation. A small zone of debris is also located at the southern tip of the survey area and this may relate to a zone of dumped material visible immediately to the south. The high magnitude anomalies associated with these zones have the potential to obscure weak archaeological anomalies should they be present in these parts of the site. Magnetic disturbance associated with an underground electricity cable, and steel wire used to support a wooden pole for overhead cables, also has the potential to obscure weak anomalies within a very localised area in the north western part of the site.

3.2.3 Soil magnetic susceptibility on the Upper Greensand geology is often low and anomalies often have poor contrast; however, due to the relatively close location of the site to the core part of Devizes, it is likely that soils have been subject to anthropogenic activity that has significantly increased the magnetic susceptibility. Anomalies of uncertain origin and agricultural origin were located by the survey and infer that the soils are capable of supporting useful magnetic enhancement.

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 general explanation of the characteristics of the magnetic anomalies is set out for each category in order to justify interpretation, see Table 1.

Interpretation category	Description and origin of anomalies
Anomalies with archaeological potential	Anomalies have the characteristics (mainly morphological) of a range of archaeological features such as pits, ring ditches, enclosures, etc. The category is used where there is a high level of confidence which may be due to additional supporting information where morphology is unclear or uncharacteristic.
Anomalies with an uncertain origin	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. Morphology may be unclear or uncharacteristic and there may be a lack of additional supporting information. 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 with an agricultural origin	The anomalies are often linear and form a series of parallel responses or are parallel to extant land boundaries. Where the response is broad, former ridge and furrow is likely; narrow response is often related to modern ploughing. This category does not include agricultural features of early date or considered to be of archaeological potential (e.g. animal stockades, enclosures, farmsteads, etc).
Anomalies associated with magnetic debris	Magnetic debris often appears as areas containing many small dipolar anomalies that may range from weak to very strong in magnitude. They often occur where there has been dumping or ground make-up and are related to magnetically thermoremnant materials such as brick or tile or other small fragments of ferrous material. This type of response is occasionally associated with kilns, furnace structures, hearths and nail spreads from former wooden structures or rooves and may, therefore, be archaeologically significant. It is also possible that the response may be caused by natural material such as certain gravels and fragments of igneous or metamorphic rock. Strong discrete dipolar anomalies are responses to ferrous objects within the topsoil.
Anomalies with a modern origin	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 these 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 adjacent to strong magnetic sources. Buried services may produce characteristic multiple dipolar anomalies dependant upon their construction.

Table 1: List and description of interpretation categories

3.4 List of anomalies – Areas 1 & 2

Area centred on OS NGR 399790 160930, see Figs 03 & 04.

Anomalies with an uncertain origin

(1) – Located towards the centre of the site are a number of positive and negative anomalies of uncertain origin. They are situated partially on the edge and on a south east facing slope of an undulation within the field and may be associated with magnetic debris. Although a zone of magnetic debris with a modern origin is located to the north (4), it cannot be assumed that the separate area in the central part of the site is related and an archaeological origin is possible.

(2) – The site contains a number of positive linear, possible curvilinear, discrete and weak, amorphous anomalies with several clustered in the east and the north western corner. They are very weak and poorly defined and it is not clear if they relate to cut features.

Anomalies with an agricultural origin

(3) – The site contains two series of parallel linear anomalies most apparent in the western half. It is possible that there is an association with former ridge and furrow.

Anomalies associated with magnetic debris

(4) – Strongly magnetic debris is evident in the north eastern part of the site. This is a response to highly magnetic material used in ground make-up.

(5) – The entire site contains a large number of discrete, dipolar anomalies. These are a response to ferrous and other magnetically thermoremnant objects, such as brick and tile within the topsoil.

Anomalies with a modern origin

(6) – A strong, multiple dipolar, linear anomaly extends across the north western corner of the site and probably relates to a buried electricity cable.

3.5 List of anomalies – Area 3

Area centred on OS NGR 399670 160840, see Figs 03 & 04.

Anomalies with an archaeological origin

(7) – Positive linear and rectilinear anomalies appear to relate to an enclosure ditch. The longest east – west section is situated in the central part of a naturally formed mound which appears to have been formed by ancient land slippage. Associated anomalies appear to extend northwards and southwards. Other anomalies nearby could be associated features (9). The magnetic response is consistent with the fill of a former cut feature of anthropogenic origin, rather than cracks or channels of natural origin.

(8) – Two positive curvilinear anomalies appear to cross anomaly (7). Their form is indicative of cut features, and topographically they appear to extend across or cut the western section of the broad low mound of probable landslip upon which anomaly (7) is situated.

Anomalies with an uncertain origin

(9) – Short, positive linear anomalies could be examples of further cut features associated with anomalies (7) & (8).

(10) – Positive amorphous and linear anomalies could relate to cut features; however, some are located within natural gullies and edges incised into the slope and may relate to the build-up of colluvium.

4 CONCLUSION

4.1.1 The geophysical survey was carried out in two phases, and the earlier phase located a number of weakly positive anomalies with a cluster in the northern part of the site that are generally weak and lack a coherent morphology preventing confident interpretation. Other anomalies relate to modern ground make-up as well as a number of agricultural anomalies. However, the later phase of survey in the south western part of the site located a number of linear and rectilinear anomalies that appear to relate to an enclosure and associated ditches. Other linear anomalies within this part of the site are short and poorly defined, but could relate to further cut features.

5 REFERENCES

Archaeological Surveys, 2021a. *Land at Hillworth Road, Devizes, Wiltshire, Geophysical Survey Written Scheme of Investigation.* Unpublished typescript document.

Archaeological Surveys, 2021b. *Land at Hillworth Road, Devizes, Wiltshire, Magnetometer Survey Report.* Ref: J886. Unpublished typescript document.

Aspinall, A., Gaffney, C. and Schmidt, A. 2009. *Magnetometry for Archaeologists*. Lanham (US), AltaMira Press.

British Geological Survey, 2017. *Geology of Britain 3D (Beta version), 1:50 000 scale [online]* available from http://mapapps.bgs.ac.uk/geologyofbritain3d/index.html? [accessed 2/11/2021].

Chartered Institute for Archaeologists, 2014. *Standard and Guidance for archaeological geophysical survey*. CIfA, University of Reading.

European Archaeological Council, 2015. *EAC Guidelines for the Use of Geophysics in Archaeology: Questions to Ask and Points to Consider.* Europae Archaeologia Consilium and Association Internationale sans But Lucratif, Belgium.

Historic England, 2018. Geophysical Survey Advice [online] available from https://historicengland.org.uk/advice/technical-advice/archaeological-science/geophysics/ [accessed July 2018].

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

Schmidt, A., 2013. *Geophysical Data in Archaeology: A Guide to Good Practice.* Oxbow Books.

SLR Consulting, 2021. *Land at Hillworth Road, Devizes, Wiltshire, Heritage Desk-Based Assessment.* SLR ref: 407.12462.00001. Draft typescript document.

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 magnetic field. The difference between the two sensors will relate to the strength of the magnetic field created by the buried feature.

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. 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 data from 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 differences between the offset values of the gradiometer sensors. The process can remove archaeological features that run along a traverse but with the high resolution datasets created by the Sensys FGM650 sensors and the method of data collection this has not been a notable problem. In fact, the removal of offsets using software avoids carrying out a balancing procedure on site, which inevitably can never be done in magnetically clean conditions and results in improperly aligned fluxgate sensors and/or electronic adjustment values.

Appendix C – survey and data information

Filename: J886-mag-Area1-proc.xcp
Description: Imported as Composite from: J886-mag-Area1.asc
Instrument Type: Sensys DLMGPS
Units:
UTM Zone: 30U
Survey corner coordinates (X/Y):OSGB36
Northwest corner: 399652.88, 161017.31 m
Southeast corner: 399846.83, 160874.81m
Collection Method: Randomised
Sensors: 5
Dummy Value: 32702
Dimensions
Survey Size (meters): 194 m x 143 m
X&Y Interval: 0.15 m
Source GPS Points: Active: 514660, Recorded: 515200
Stats
Max: 5.53
Min: -5.50
Std Dev: 2.07
Mean: 0.05
Median: 0.02
Composite Area: 2.7638 ha
Surveyed Area: 1.681 ha
PROGRAM
Name: TerraSurveyorPre
Version: 3.0.36.24
GPS based Proce4
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStripe Median Traverse:
4 Clip from -5.00 to 5.00

Area 2

Filename: J886-mag-Area2-proc.xcp
Northwest corner: 399841.67, 160956.99 m
Southeast corner: 399929.72, 160896.84 m
Dimensions
Survey Size (meters): 88.1 m x 60.2 m
X&Y Interval: 0.15 m
Source GPS Points: Active: 116697, Recorded: 116697
Stats
Max: 5.53
Min: -5.50
Std Dev: 2.35
Mean: 0.02
Median: 0.06
Composite Area: 0.52962 ha
Surveyed Area: 0.3916 ha
GPS based Proce4
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStripe Median Traverse:
4 Clip from -5.00 to 5.00

Area 3
Filename: J886-mag-Area3-proc.xcp
Description: Imported as Composite from: J886-mag-Area3.asc
Instrument Type: Sensys DLMGPS
Units:
UTM Zone: 30U
Survey corner coordinates (X/Y):
Northwest corner: 399578.61, 160890.51 m
Southeast corner: 399747.51, 160760.16 m
Dimensions
Survey Size (meters): 169 m x 130 m
X&Y Interval: 0.15 m
Source GPS Points: Active: 269100, Recorded: 269100
Stats
Max: 3.32
Min: -3.30
Std Dev: 1.04
Mean: 0.03
Median: 0.01
Composite Area: 2.2016 ha
Surveyed Area: 0.9402 ha
GPS based Proce5
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStripe Median Traverse:
4 Clip from -5.00 to 5.00
5 Clip from -3.00 to 3.00

Appendix D – digital archive

Archaeological Surveys Ltd hold the primary digital archive at their offices in Wiltshire. 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.

A PDF copy will be supplied to the Wiltshire Historic Environment Record with greyscale images and abstraction layers made available on request. The report will also be uploaded to the Online AccesS to the Index of archaeological investigationS (OASIS).

Archive contents:

File type	Naming scheme	Description
Data	J886a-mag-**[area number/name]**.asc J886a-mag-**[area number/name]**.xcp J886a-mag-**[area number/name]**-proc.xcp	Raw data as ASCII CSV TerraSurveyor raw data TerraSurveyor minimally processed data
Graphics	J886a-mag-**[area number/name]**-proc.tif	Image in TIF format
Drawing	J886a-**[version number]**.dwg	CAD file in 2018 dwg format
Report	J886a report.odt	Report text in LibreOffice odt format

Table 2: Archive metadata

Appendix E – CAD layers for abstraction and interpretation plots

The table below sets out Archaeological Surveys Ltd CAD layer names with associated colours and graphical content. Where CAD files are available layers may be extracted for further CAD/GIS use. Note: hatched polygon boundaries are contained within layers with the RGB colour code 254, 255, 255 (near white) in order to prevent their visibility.

Report sub-heading and associated CAD layer names	Colour with RGB index	Layer content
Anomalies with archaeological potential		
AS-ABST MAG POS LINEAR ARCHAEOLOGY	Red 255,0,0	Polyline or polygon (solid)
Anomalies with an uncertain origin		
AS-ABST MAG POS LINEAR UNCERTAIN	255,127,0	Line, polyline or polygon (solid)
AS-ABST MAG NEG LINEAR UNCERTAIN	Blue 0,0,255	Line, polyline or polygon (solid)
AS-ABST MAG POS DISCRETE UNCERTAIN	255,127,0	Solid donut, point or polygon (solid)
AS-ABST MAG POS UNCERTAIN	255,127,0	Polygon (cross hatched ANSI37)
Anomalies with an agricultural origin		
AS-ABST MAG AGRICULTURAL	Green 0,255,0	Line or polyline
Anomalies associated with magnetic debris		
AS-ABST MAG DEBRIS	132, 132, 132	Polygon (cross hatched ANSI37)
AS-ABST MAG STRONG DIPOLAR	132, 132, 132	Solid donut, point or polygon (solid)
Anomalies with a modern origin		
AS-ABST MAG DISTURBANCE	132, 132, 132	Polygon (hatched ANSI31)
AS-ABST MAG SERVICE	132, 132, 132	Line or polyline

Table 3: CAD layering

Appendix F – copyright and intellectual property

This report may contain material that is non-Archaeological Surveys Ltd copyright (eg Ordnance Survey, Crown Copyright) or the intellectual property of third parties, which we are able to provide for limited reproduction under the terms of our own copyright licences, but for which copyright itself is non-transferable by Archaeological Surveys Ltd. Users remain bound by the conditions of the Copyright, Design and Patents Act 1988 with regard to multiple copying and electronic dissemination of this report.

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 and royalty-free licence shall be granted to the client on full payment of works 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 payment by the client. Any document produced to meet planning requirements may be freely copied for planning, development control, research and outreach purposes without recourse to the originator, subject to all due and appropriate acknowledgements being provided and to the terms of the original contract with the client. Archaeological Surveys Ltd shall retain the right to be identified as the author and originator of the material.

The report, data and any associated material produced by Archaeological Surveys Ltd cannot be freely used for any commercial activity other than those set out above. Any unauthorised use will be considered to be in breach of copyright.

Title of Goods remains with Archaeological Surveys Ltd until payment has cleared. Late payment may jeopardise any planning decision as there will be no transfer of title, licensing or any other right of copy or use of this report. Archaeological Surveys Ltd do not give permission for use of the report and associated data in cases of late payment. Any such use will be considered to be in breach of copyright. Late payment may also incur interest at 8% over the Bank of England base rate. Non-payment will be pursued by legal action.

www.archaeological-surveys.co.uk
info@archaeological-surveys.co.uk
Tel: 01249 814 231

Archaeological Surveys
Specialist Geophysical Surveyors

Geophysical Survey
Land at Hillworth Road
Devizes
Wiltshire
(Updated report)

Map of survey area

● Survey location

Site centred on OS NGR
ST 99790 60930

SCALE 1:25 000

0m 500m 1000m

SCALE TRUE AT A3

DRAWN BY	CHECKED BY	
KTD	DJS	FIG 01

Archaeological Surveys
Specialist Geophysical Surveyors

Geophysical Survey
Land at Hillworth Road
Devizes
Wiltshire
(Updated report)

Referencing information

399600 399650 399700 399750 399800 399850 399900 399950

161000 160950 160900 160850 160800 160750 160700

N

Area 1

Area 2

Area 3

Unsurveyable - slope and trees

Unsurveyable - slope and trees

Referencing grid to OSGB36 datum at 50m intervals

399800 160950

Survey tracks

Survey track start

Survey track stop

Development boundary

SCALE 1:1250

0m 10 20 30 40 50m

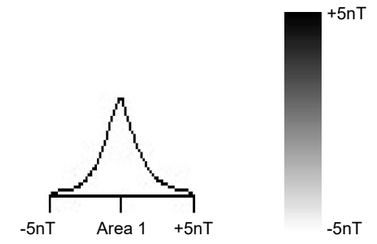
SCALE TRUE AT A3

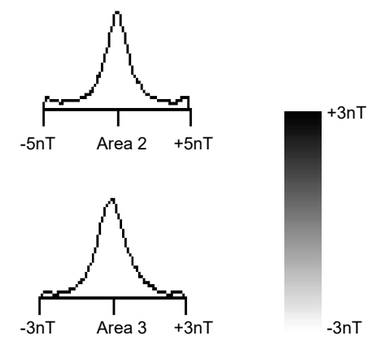
DRAWN BY	CHECKED BY	
KTD	DJS	FIG 02

Archaeological Surveys
Specialist Geophysical Surveyors

Geophysical Survey
Land at Hillworth Road
Devizes
Wiltshire
(Updated report)

Greyscale plot of minimally processed magnetometer data





SCALE 1:1250

0m 10 20 30 40 50m

SCALE TRUE AT A3

DRAWN BY	CHECKED BY	
KTD	DJS	FIG 03

Archaeological Surveys
Specialist Geophysical Surveyors

Geophysical Survey
Land at Hillworth Road
Devizes
Wiltshire
(Updated report)

Abstraction and interpretation of magnetic anomalies

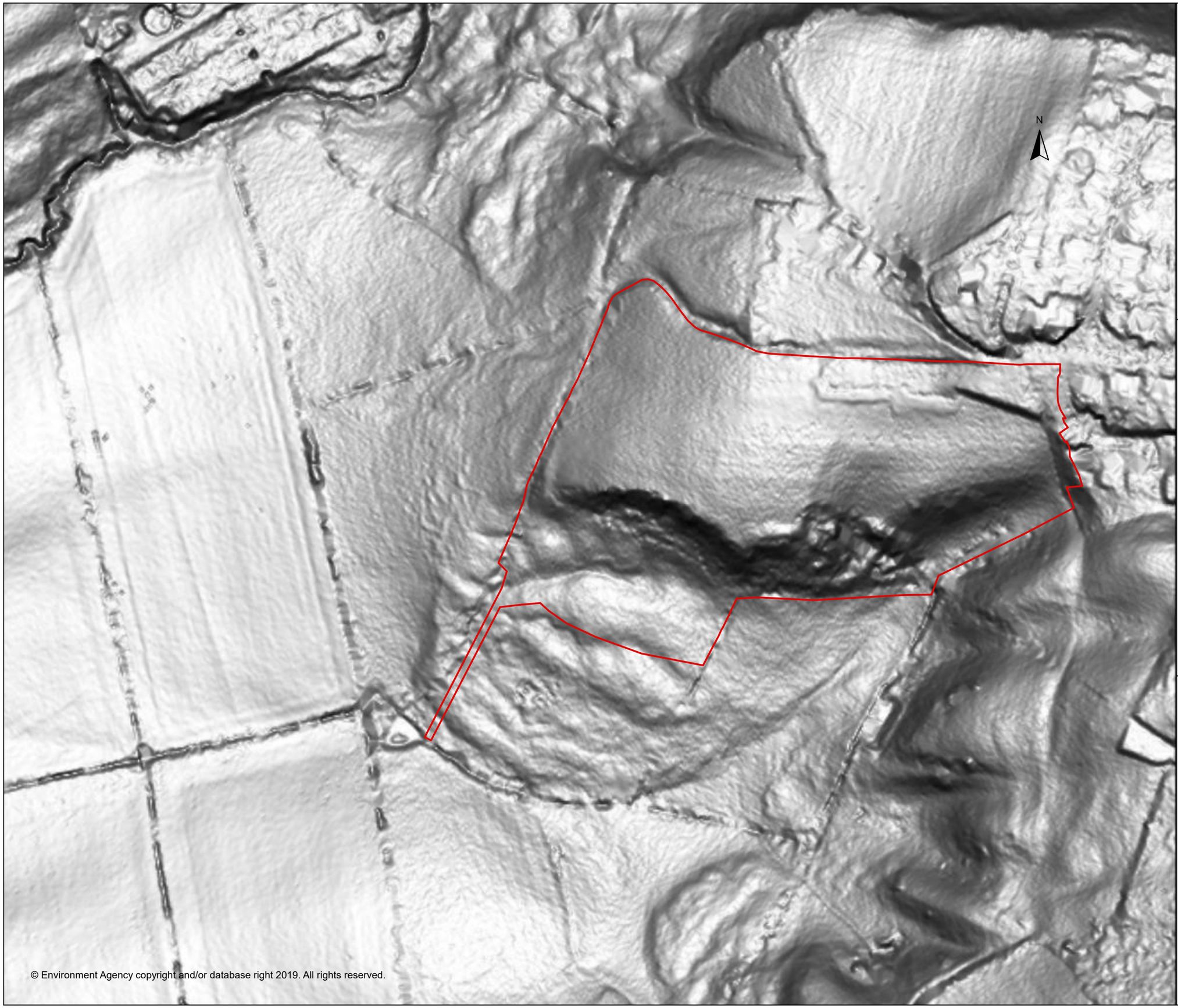
- Positive linear anomaly - of archaeological potential
- Positive linear anomaly - of uncertain origin
- Linear anomaly - of agricultural origin
- Negative linear anomaly - material of low magnetic susceptibility
- Discrete positive response - possible pit-like feature
- Positive anomaly - magnetically enhanced material
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Magnetic disturbance from ferrous material
- Strong multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:1250

0m 10 20 30 40 50m

SCALE TRUE AT A3

DRAWN BY	CHECKED BY	
KTD	DJS	FIG 04



Archaeological Surveys
Specialist Geophysical Surveyors

Geophysical Survey
Land at Hillworth Road
Devizes
Wiltshire
(Updated report)

Digital Terrain Model

Derived from Environment Agency's LiDAR data 1m resolution

SCALE 1:1250

0m 10 20 30 40 50m

SCALE TRUE AT A3

DRAWN BY	CHECKED BY	
KTD	DJS	FIG 05