



**Site of Jubilee Wood  
Hannington Wick  
Swindon**

**MAGNETOMETER SURVEY REPORT**

for

**The Thomas Freke & Lady Norton Charity**

Kerry Donaldson & David Sabin

February 2022

Ref. no. J908

ARCHAEOLOGICAL SURVEYS LTD

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Primary archive location - Archaeological Surveys Ltd, Yatesbury, Wiltshire

Survey date – 4<sup>th</sup> February 2022  
Ordnance Survey Grid Reference – **SU 17275 94830**



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## SUMMARY

Detailed magnetometry was carried out by Archaeological Surveys Ltd at Hannington Wick near Swindon, ahead of a proposed tree planting scheme. The results indicate the presence of a small number of pit-like anomalies with an uncertain origin. A small number of weakly positive and negative linear anomalies have also been located, but these are generally short and not well defined.

## 1 INTRODUCTION

### 1.1 *Survey background*

- 1.1.1 Archaeological Surveys Ltd was commissioned by Mike Scott, on behalf of The Thomas Freke & Lady Norton Charity, to undertake a magnetometer survey of an area of land outlined for the site of a proposed Jubilee Wood at Hannington Wick in Swindon, with grant funding from Swindon Borough Council as part the Great Western Community Forest.

### 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 Archaeological Surveys Ltd is a Registered Organisation with the Chartered Institute for Archaeologists and both company directors are Members of the Chartered Institute for Archaeologists (MCIfA) and have therefore been assessed for their technical competence and ethical suitability and abide by the CfA Codes of Conduct. 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 opposite Box Hedge Farm in Hannington Wick within the parish of Hannington, Swindon. It is centred on Ordnance Survey National Grid Reference (OS NGR) SU 17275 94830, see Figs 01 and 02.
- 1.4.2 The geophysical survey covers approximately 2ha within two paddocks separated by a track running north south through the site to allow access to stables in the south eastern part of the area. The field boundaries are a mixture of hedgerows, post and rail fencing and electric fencing. The larger western paddock contained grass of variable length, the eastern paddock was grazed, although somewhat poached. The land is generally flat but very low undulations relating to drainage and former ridge and furrow cultivation were noted. Sources of magnetic disturbance include steel water troughs, gates and corrugated steel sheeting associated with the stables.
- 1.4.3 The ground conditions across the site were generally considered to be suitable for the collection of magnetometry data. However, traversing was difficult in the western paddock due to areas of long and rough grass. Poached ground in the eastern field also created difficult conditions for traversing. Weather conditions during the survey were fine.

#### 1.5 *Site history and archaeological potential*

- 1.5.1 The site does not contain any designated or undesignated heritage assets although extant ridge and furrow can be seen within the site. Hannington Wick is a settlement with medieval origins and a number of 19<sup>th</sup> century farmsteads

are located within the hamlet. The site is located 750m north of a medieval and post medieval settlement situated between Hannington and Hannington Wick and 1km south west of the location of Hannington Wick villa and a number of enclosures and ring ditches. Further ring ditch features associated with Bronze Age barrows and a field system and trackways are located to the east of Blackford Farm 1.2km to the north west.

## 1.6 *Geology and soils*

- 1.6.1 The underlying geology is mudstone from the Oxford Clay Formation with overlying alluvial deposits (BGS, 2017). The overlying soil is from the Thames association and is a calcareous alluvial gley soil. It consists of a stoneless, mainly calcareous, clayey soil affected by ground water (Soil Survey of England and Wales, 1983).
- 1.6.2 The underlying mudstone geology and alluvial soils are frequently 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. 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 thermoremanence (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 thermoremanence 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 thermoremanence.
- 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  $\pm 8000\text{nT}$ , although the recorded range is  $\pm 3000\text{nT}$ , and resolution is around  $0.1\text{nT}$ . 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  $<100\text{s}$ .

## 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  $\pm 3000\text{nT}$  and clipped for display at  $\pm 3\text{nT}$ . Data are interpolated to a resolution of effectively 0.5m between tracks and 0.15m along each survey track.
- 2.3.4 Additional data processing has been carried out in the form of high pass filtering. This effectively removes low frequency variation along a traverse that has been caused by large magnetic bodies, cultivation or rapid temperature change. Data treated to additional processing have been compared to unprocessed data to ensure that no significant anomalies have been removed. The processed data are clipped for display at  $\pm 2\text{nT}$ .
- 2.3.5 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.
- 2.3.6 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.

- 2.3.7 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.
- 2.3.8 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.
- 2.3.9 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.
- 2.3.10 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 two survey areas covering approximately 2ha.
- 3.1.2 Magnetic anomalies located can be generally classified as positive and negative responses of an uncertain origin, anomalies associated with land management, linear anomalies of an agricultural origin, areas of magnetic debris and disturbance and strong discrete dipolar anomalies relating to ferrous objects. Anomalies located within each survey area have been numbered and are described in 3.4 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 The soil within the site is considered likely to be associated with low levels of magnetic susceptibility and, as a consequence, poor magnetic contrast. The land is subject to frequent and prolonged waterlogging which may also be detrimental to the enhancement of soil magnetic susceptibility. However, several anomalies were located and imply that useful magnetic anomalies associated with anthropogenic activity may occur within the site.
- 3.2.3 The survey located several small zones of high magnitude magnetic disturbance, relating to modern above surface ferrous objects, that have the

potential to obscure weak anomalies should they occur. However, no significant anomalies were located in adjacent parts of the site.

### 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
<b>Anomalies with an uncertain origin</b>	The category applies to a range of anomalies where <u>there is not enough evidence to confidently suggest an origin</u> . Anomalies in this category <u>may well be related to archaeologically significant features, but equally relatively modern features, geological/pedological features and agricultural features should be considered</u> . 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.
<b>Anomalies relating to land management</b>	Anomalies are mainly linear and may be indicative of the magnetically enhanced fill of cut features (i.e. ditches). The anomalies may be long and/or form rectilinear elements and they may relate to topographic features or be visible on early mapping. Associated agricultural anomalies (e.g. headlands, plough marks and former ridge and furrow) may support the interpretation.
<b>Anomalies with an agricultural origin</b>	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 <u>does not include</u> agricultural features of early date or considered to be of archaeological potential (e.g. animal stockades, enclosures, farmsteads, etc).
<b>Anomalies associated with magnetic debris</b>	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 thermoremanent 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 <u>may, therefore, be archaeologically significant</u> . 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.
<b>Anomalies with a modern origin</b>	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

Area centred on OS NGR 417275 194830, see Figs 03 & 04.

#### *Anomalies with an uncertain origin*

(1) – The northern part of the site contains a small number of discrete positive responses. Such responses are usually indicative of pit-like features; however, it is not possible to determine if they relate to naturally formed features, such as tree

throw pits, or if they have an anthropogenic or archaeological origin.

(2 & 3) – A small number of very weakly positive (2) and negative (3) linear anomalies have been located. They are generally short and lack a coherent morphology preventing confident interpretation.

#### *Anomalies associated with land management*

(4) – A number of linear anomalies associated with magnetic debris relate to the former positions of a number of internal fences that divided the site into small paddocks until recently.

#### *Anomalies with an agricultural origin*

(5) – Parallel linear anomalies relate to extant ridge and furrow.

#### *Anomalies associated with magnetic debris*

(6) – Magnetic debris, relating to dumped material used for ground consolidation, is located in the south eastern part of the site adjacent to the stables.

(7) – The site contains numerous and widespread strong, discrete, dipolar anomalies that are a response to buried ferrous and other magnetically thermoremanent objects, such as brick or tile, within the topsoil.

#### *Anomalies with a modern origin*

(8) – Magnetic disturbance from ferrous material and objects within and surrounding the site.

## 4 CONCLUSION

4.1.1 The geophysical survey located a small number of pit-like anomalies in the northern part of the site. It is not possible to determine if they are natural or anthropogenic features. A small number of weakly positive and negative linear anomalies have also been located, but these are indistinct and lack a coherent morphology. Other anomalies relate to former ridge and furrow cultivation, recently removed internal paddock fencing and disturbance from ferrous material.

## 5 REFERENCES

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## 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 thermoremanent 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. Thermoremanent 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. Thermoremanent features include ovens, hearths, and kilns. In addition thermoremanent 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.

### *High Pass Filter*

Removes low frequency anomalies within the data that are not considered to be archaeologically significant and may be natural in origin. A window passes over the data, the mean of all the data within the window is subtracted from the centre value. The size of the window is adjusted as is the weighting which may be uniform or Gaussian. The process is used to improve the visibility of anomalies of interest.

### *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

Minimally processed data		Stats		3 DeStripe Median Traverse:
Filename: J906-mag-proc.xcp		Max: 3.32		4 Clip from -3.00 to 3.00
Instrument Type: Sensys DLMGPS		Min: -3.30		
Units:		Std Dev: 0.87		Filtered data
UTM Zone: 30U		Mean: 0.01		Stats
Survey corner coordinates (X/Y): OSGB36		Median: -0.01		Max: 2.21
Northwest corner: 417203.93, 194920.56 m		Composite Area: 2.6937 ha		Min: -2.20
Southeast corner: 417354.08, 194741.16 m		Surveyed Area: 2.0894 ha		Std Dev: 0.60
Collection Method: Randomise				Mean: 0.00
Sensors: 5		PROGRAM		Median: 0.00
Dummy Value: 32702		Name: TerraSurveyorPre		GPS based Proce5
		Version: 3.0.36.24		1 Base Layer.
Dimensions		Processes: 1		2 Unit Conversion Layer (Lat/Long to UTM).
Survey Size (meters): 150 m x 179 m		1 Base Layer		3 DeStripe Median Traverse:
X&Y Interval: 0.15 m				4 High pass Uniform (median) filter: Window dia: 250
Source GPS Points: Active: 731291, Recorded: 731291		GPS based Proce4		5 Clip from -2.00 to 2.00
		1 Base Layer.		
		2 Unit Conversion Layer (Lat/Long to UTM).		

## 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	J908-mag-[area number/name].asc J908-mag-[area number/name].xcp J908-mag-[area number/name]-proc.xcp	Raw data as ASCII CSV TerraSurveyor raw data TerraSurveyor minimally processed data
Graphics	J908-mag-[area number/name]-proc.tif	Image in TIF format
Drawing	J908-[version number].dwg	CAD file in 2018 dwg format
Report	J908 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
<b>Anomalies with an uncertain origin</b>		
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)
<b>Anomalies relating to land management</b>		
AS-ABST MAG BOUNDARY	 127,0,0	Line, polyline or polygon (solid or cross hatched ANSI37)

<b>Anomalies with an agricultural origin</b>			
AS-ABST MAG RIDGE AND FURROW		0,127,63	Line, polyline or polygon (cross hatched ANSI37)
<b>Anomalies associated with magnetic debris</b>			
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)
<b>Anomalies with a modern origin</b>			
AS-ABST MAG DISTURBANCE		132, 132, 132	Polygon (hatched ANSI31)

Table 3: CAD layering

## Appendix F – copyright and intellectual property

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**Geophysical Survey  
Site of Jubilee Wood  
Hannington Wick  
Swindon**

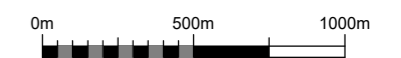
**Map of survey area**



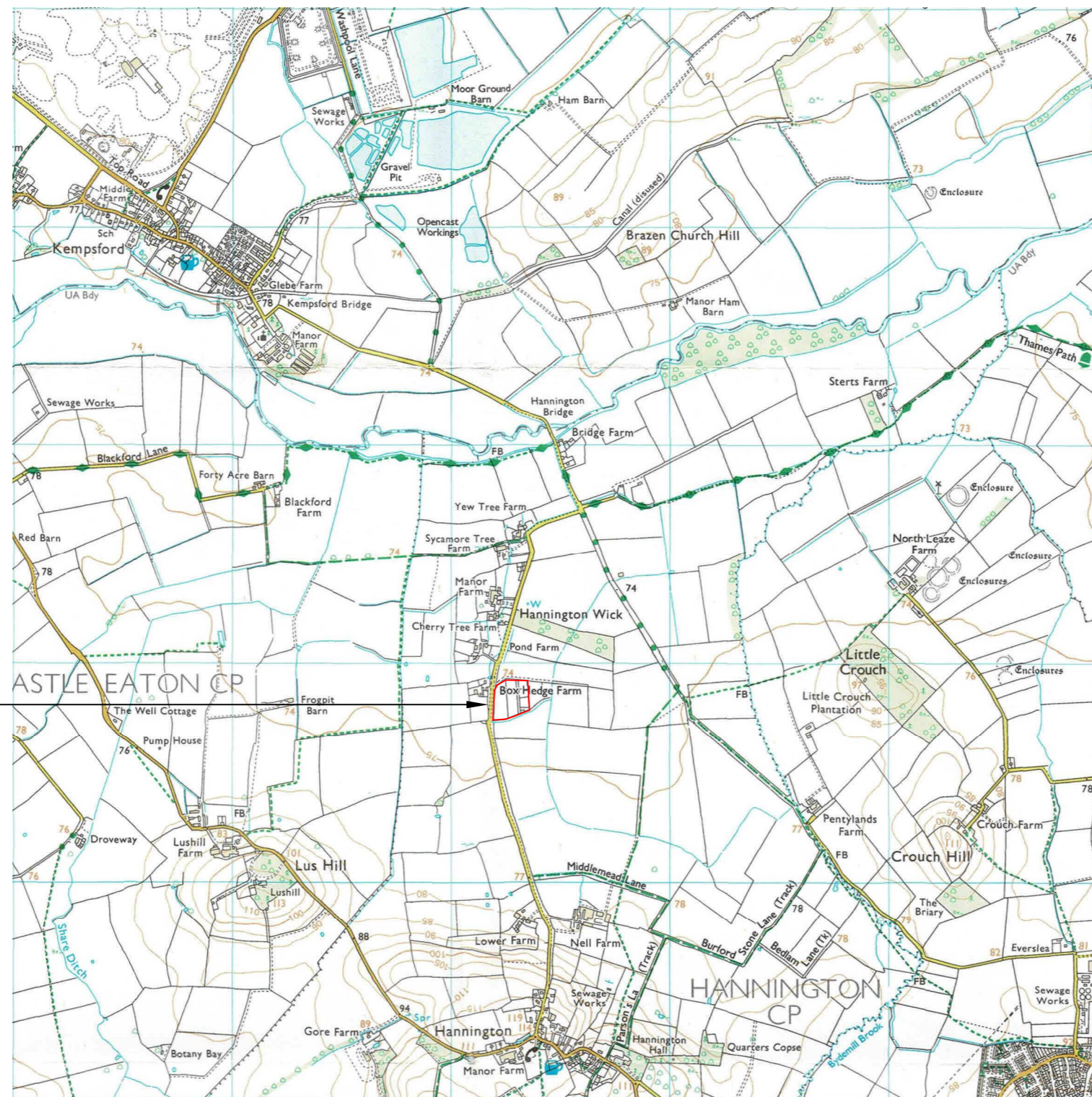
● Survey location

Site centred on OS NGR  
SU 17275 94830

SCALE 1:25 000



SCALE TRUE AT A3



Survey location

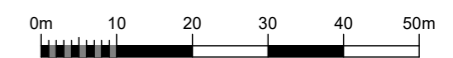
**Geophysical Survey  
Site of Jubilee Wood  
Hannington Wick  
Swindon**

**Referencing information**

Referencing grid to OSGB36 datum at 50m intervals

- 417250 194850
- Survey tracks
- ⋯ Survey track start
- ⋯ Survey track stop

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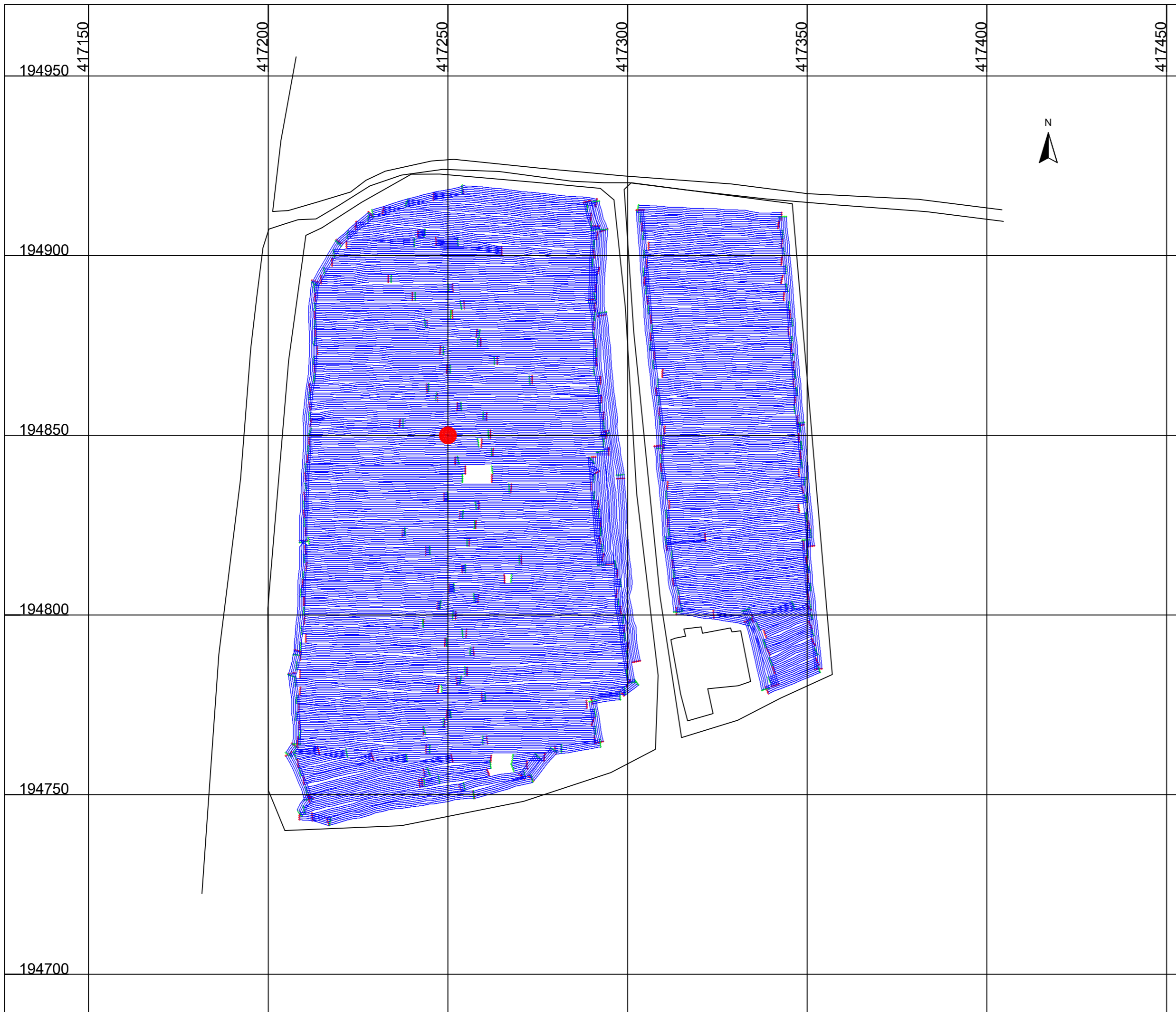


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KTD

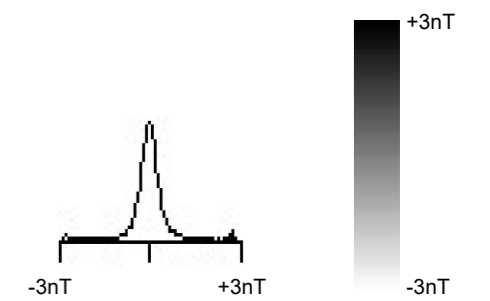
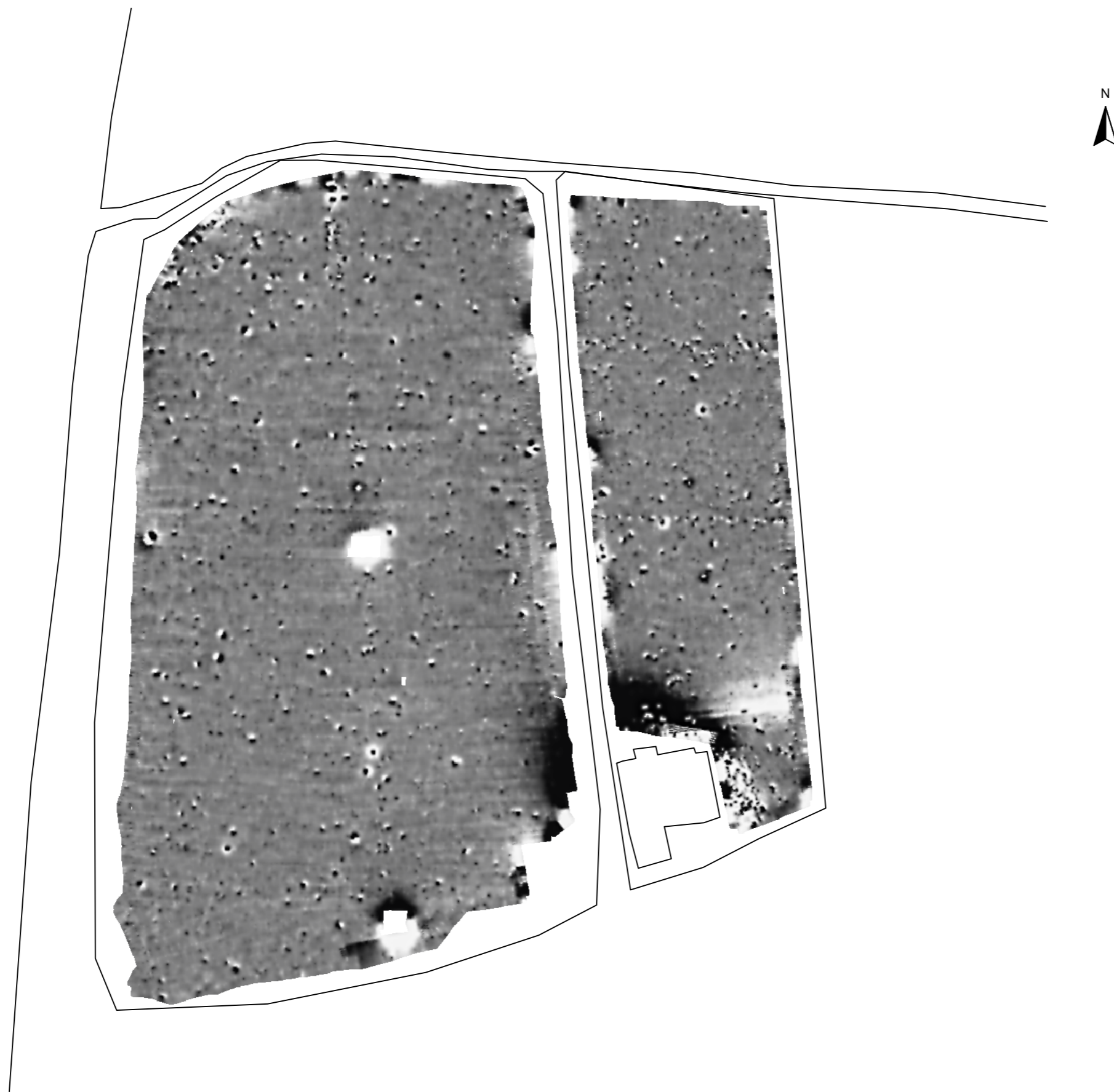
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FIG 02

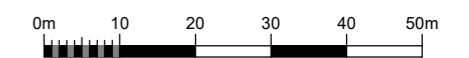


**Geophysical Survey  
Site of Jubilee Wood  
Hannington Wick  
Swindon**

**Greyscale plot of minimally  
processed magnetometer data**



SCALE 1:1000



SCALE TRUE AT AS

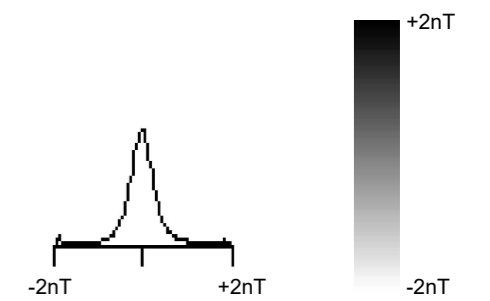
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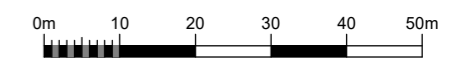
FIG 03

**Geophysical Survey  
Site of Jubilee Wood  
Hannington Wick  
Swindon**

**Greyscale plot of high pass  
filtered magnetometer data**



**SCALE 1:1000**



SCALE TRUE AT AS









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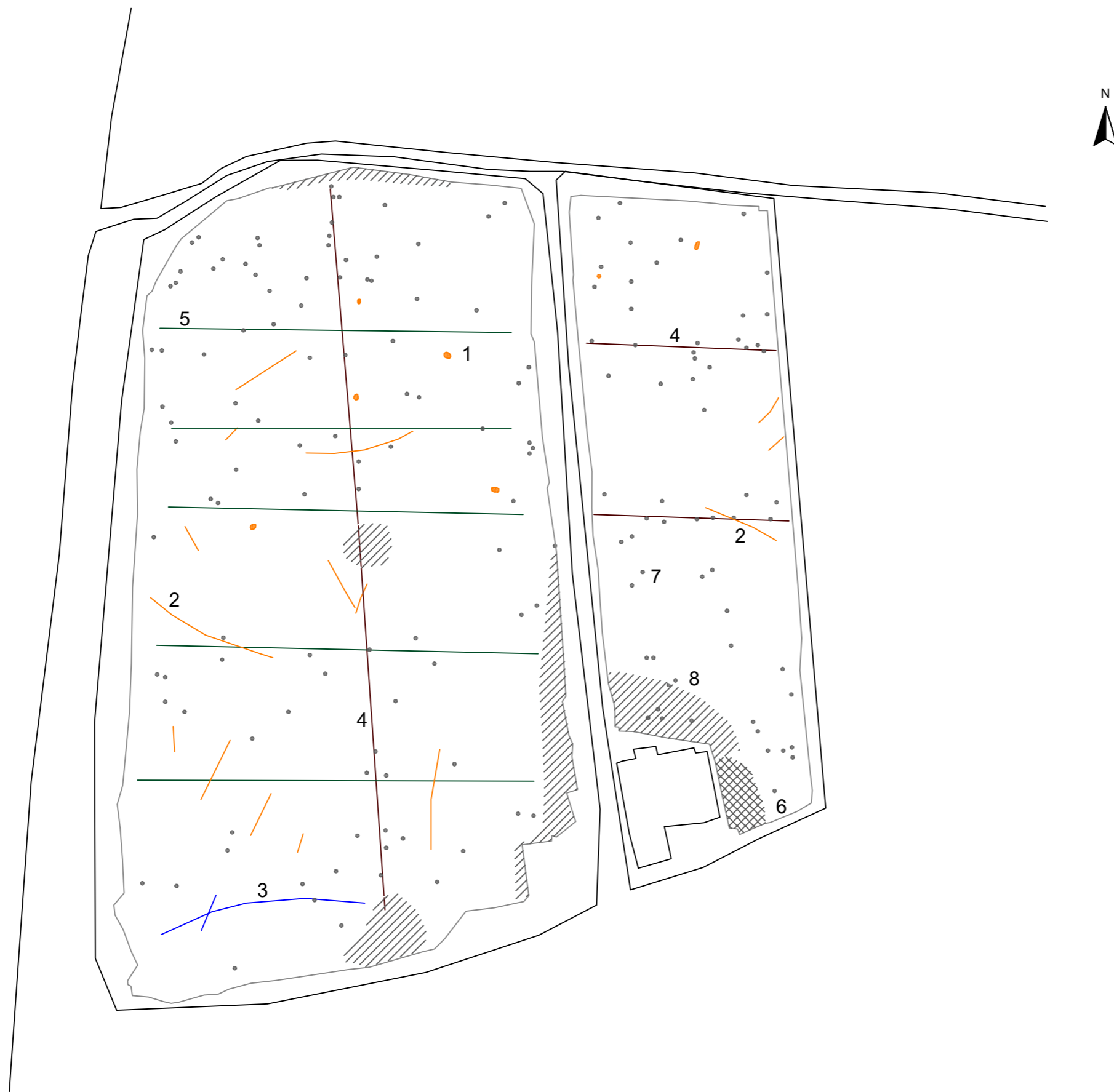
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FIG 04

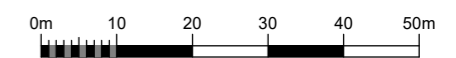
**Geophysical Survey  
Site of Jubilee Wood  
Hannington Wick  
Swindon**

**Abstraction and interpretation of  
magnetic anomalies**

-  Positive linear anomaly - possible ditch-like feature
-  Linear anomaly - ridge and furrow
-  Linear anomaly - former field boundary
-  Negative linear anomaly - material of low magnetic susceptibility
-  Discrete positive response - possible pit-like feature
-  Magnetic debris - spread of magnetically thermoremnant/ferrous material
-  Magnetic disturbance from ferrous material
-  Strong dipolar anomaly - ferrous object



SCALE 1:1000



SCALE TRUE AT A3

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FIG 05