

**Land at Romsey Road  
Whiteparish  
Wiltshire**

**MAGNETOMETER SURVEY REPORT**

for

**Macra Limited**

Kerry Donaldson & David Sabin

February 2023

Ref. no. J955

ARCHAEOLOGICAL SURVEYS LTD

**Land at Romsey Road  
Whiteparish  
Wiltshire**

**MAGNETOMETER SURVEY REPORT**

for

**Macra Limited**

Fieldwork by David Sabin BSc (Hons) MCIfA  
Report by Kerry Donaldson BSc (Hons) MCIfA  
Report checked by David Sabin

Primary archive location - Archaeological Surveys Ltd, Yatesbury, Wiltshire

Survey date – 8<sup>th</sup> February 2023  
Ordnance Survey Grid Reference – **SU 25250 23640**



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](mailto:info@archaeological-surveys.co.uk)  
Web: [www.archaeological-surveys.co.uk](http://www.archaeological-surveys.co.uk)

## CONTENTS

SUMMARY.....	1
1 INTRODUCTION.....	1
1.1 Survey background.....	1
1.2 Survey objectives and techniques.....	1
1.3 Standards, guidance and recommendations for the use of this report.....	1
1.4 Site location, description and survey conditions.....	2
1.5 Site history and archaeological potential.....	3
1.6 Geology and soils.....	3
2 METHODOLOGY.....	4
2.1 Technical synopsis.....	4
2.2 Equipment configuration, data collection and survey detail.....	4
2.3 Data processing and presentation.....	5
3 RESULTS.....	7
3.1 General assessment of survey results.....	7
3.2 Data quality and factors affecting the interpretation or formation of anomalies.....	7
3.3 Data interpretation.....	7
3.4 List of anomalies.....	8
4 CONCLUSION.....	9
5 REFERENCES.....	10
Appendix A – basic principles of magnetic survey.....	11
Appendix B – data processing notes.....	11
Appendix C – survey and data information.....	12
Appendix D – digital archive.....	12

Appendix E – CAD layers for abstraction and interpretation plots.....12

Appendix F – copyright and intellectual property.....13

LIST OF FIGURES

Fig 01 Map of survey area (1:25 000)

Fig 02 Referencing information (1:1000)

Fig 03 Greyscale plot of minimally processed magnetometer data (1:1000)

Fig 04 Greyscale plot of filtered magnetometer data (1:1000)

Fig 05 Abstraction and interpretation of magnetic anomalies (1:1000)

LIST OF PLATES

Plate 1: Survey area looking north.....3

LIST OF TABLES

Table 1: List and description of interpretation categories.....8

Table 2: Archive metadata.....12

Table 3: CAD layering.....13

## SUMMARY

A geophysical survey, comprising detailed magnetometry, was carried out by Archaeological Surveys Ltd within a small area of pasture on the eastern edge of Whiteparish in Wiltshire. The results indicate the presence of a small number of discrete, pit-like anomalies, but it is not possible to determine if they are natural or anthropogenic features with archaeological potential. A linear, ditch-like anomaly may also relate to a former field boundary and evidence for possible ridge and furrow has also been encountered.

## 1 INTRODUCTION

### 1.1 *Survey background*

1.1.1 Archaeological Surveys Ltd was commissioned by Foundations Heritage, on behalf of Macra Limited, to undertake a magnetometer survey of an area of land at Whiteparish in Wiltshire. The site has been outlined for a proposed residential development and the survey forms part of an archaeological assessment.

### 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 (CIfA) 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 CIfA 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 to the south of the A27 Romsey Road, Whiteparish in the south east of Wiltshire. It is centred on Ordnance Survey National Grid Reference (OS NGR) SU 25250 23640, see Figs 01 and 02.
- 1.4.2 The geophysical survey covers approximately 1.5ha within a single pasture field. The land slopes down towards the south east from just below 70m AODN near the north western boundary to just over 60m AODN near the south eastern boundary. Field boundaries are mainly post and wire fencing with a hedgerow alongside the A27 Romsey Road and wooden fencing adjacent to residential properties to the east. A short section of hedgerow is located in the south western side of the site and is the remnant of a former boundary, a small clump of trees and bushes is located in the south eastern part of the site.
- 1.4.3 The ground conditions across the site were generally considered to be favourable for the collection of magnetometry data. A number of sources of magnetic disturbance were identified and include a steel gate, fencing, electricity poles and associated stays as well as several steel drums within the section of hedge in the western part of the site. Weather conditions during the survey were fine.



*Plate 1: Survey area looking north*

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

1.5.1 A Heritage Impact Assessment has been carried out by Foundations Heritage (2022). It outlines that there are no designated or undesignated heritage assets within the site, and although it lies outside of the medieval core of Whiteparish, there is evidence for medieval activity and settlement within the vicinity. This includes an extensive medieval settlement at Cowesfield Green, approximately c300m to the east and the site of Blaxwell Farm, c300m to the south west. The site lies immediately south west of Bushy Cottages, a farmstead which dates to the 19<sup>th</sup> century, while 19<sup>th</sup> and 20<sup>th</sup> century mapping show a number of smaller land parcels in the eastern part of the site which have been removed in recent years.

1.5.2 Although there are a lack of archaeological features and findspots within the site, it has not been subject to previous archaeological investigation. There is always potential for the survey to locate anomalies that may relate to archaeological features, should they be present within the site.

## **1.6 Geology and soils**

1.6.1 The underlying geology is Palaeogene sand from the Reading Formation (BGS, 2023).

1.6.2 The overlying soil across the site is from the Fyfield 4 association (571g) and is a typical argillic brown earth. It consists of a deep, well drained, often stoneless, coarse loamy and sandy soil (Soil Survey of England and Wales,

1983).

- 1.6.3 Magnetometry carried out over similar geology and soil has produced acceptable results. The site is, therefore, considered suitable 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 (also known as thermoremanence) are factors associated with the formation of localised magnetic 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 positive magnetic anomalies that can be mapped by magnetic prospection. In addition, where soil is displaced by material of comparatively low magnetic susceptibility, such as many types of sedimentary rock, anomalies of negative value may occur which could be indicative of structural remains.
- 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



recorded range of  $\pm 3000\text{nT}$  and resolution is approximately  $0.1\text{nT}$ . They are linked to a Leica GS10 RTK GNSS with data recorded by SENSYS MonMX software on a rugged notebook 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  $<60\text{s}$ .

### 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.
- 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. 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 the 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 approximately 1.5ha.

3.1.2 Magnetic anomalies located can be generally classified as positive and negative anomalies of an uncertain origin, anomalies associated with land management, 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. Anomalies located within each survey area have been numbered and are described in 3.4 below.

#### 3.2 Data quality and factors affecting the interpretation or formation 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 results infer useful magnetic contrast between topsoil and underlying subsoil and solid geology as attested by a number of linear and discrete positive anomalies. Small zones of magnetic disturbance and debris, particularly in the eastern part of the site, have the potential to obscure weak anomalies.

#### 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 425250 123640, see Figs 03 – 05.

#### *Anomalies with an uncertain origin*

(1) – A group of weakly positive anomalies form an arc in the centre of the site. Two of the anomalies are 2.6m long, though they range in length from 1.6m-3.3m long, and 0.7m-1m wide. Although it is possible for them to relate to naturally formed features, the circular grouping and dimensions could indicate that they relate to cut features with archaeological potential.

(2) – Situated approximately 17m to the south west of anomalies (1) are a smaller group of discrete pit-like features. One has similar 2.6m by 1m dimensions to two forming part of anomalies (1) and they could relate to similar features.

(3) – The site contains a number of other discrete, pit-like anomalies but they lack a coherent morphology.

(4) – A positive linear anomaly extends across much of the site and relates to a cut, linear, ditch-like feature. It does not appear to correspond to any mapped field boundary.

(5) – A group of positive linear and discrete responses are situated towards the north western corner of the survey area. It is not clear if they relate to a series of cut features laid out with very close spacing or if this is a response to a larger, magnetically enhanced anomaly that has been truncated through agricultural activity.

(6) – Two small magnetically enhanced zones are located in the central part of the

site. It is not clear if the magnetic enhancement relates to natural features or anthropogenic activity.

(7) – Two negative curvilinear anomalies are located in the north west and south east of the site. The origin of the anomalies is not clear, but similar responses can be caused by vehicle ruts.

*Anomalies associated with land management*

(8) – A linear series of strongly magnetic responses relate to removed fence posts along the line of a former field boundary.

*Anomalies with an agricultural origin*

(9) – A series of parallel linear anomalies relates to former ridge and furrow cultivation.

*Anomalies associated with magnetic debris*

(10) – Magnetic debris in the north eastern part of the site relates to dumped material and ground make-up within former small land parcels.

(11) – Strong, discrete, dipolar anomalies are responses to ferrous and other magnetically thermoremanent objects, such as brick and tile, within the topsoil.

*Anomalies with a modern origin*

(12) – A strong, multiple dipolar, linear anomaly crosses the site and is a response to a buried water pipe.

(13) – A negative linear anomaly extends through the southern part of the site parallel with the southern land boundary and then extends to the north east. The anomaly is indicative of a response to a buried, non-magnetic service.

## 4 CONCLUSION

4.1.1 The geophysical survey located a number of discrete, weakly positive anomalies within the site. One group forms an arc of features and while it is not possible to determine their origin, their archaeological potential should be considered. Other pit-like anomalies are situated nearby to the south west and these could have a similar origin. A group of very closely spaced, short linear anomalies has also been located, but it is not possible to determine if they relate to cut features or to a truncated magnetically enhanced feature. A linear ditch-like anomaly crosses the site which may relate to a former, unmapped field boundary. Other linear anomalies appear to relate to ridge and furrow cultivation.

## 5 REFERENCES

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

British Geological Survey, 2022. *Geology Viewer*, [online] available from <https://geologyviewer.bgs.ac.uk> [accessed 15/2/2023].

Chartered Institute for Archaeologists, 2014 (updated 2020). *Standard and Guidance for archaeological geophysical survey*. ClfA, 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.

Foundations Heritage, 2022. *Land at Romsey Road, Whiteparish, Wiltshire, Heritage Impact Assessment*. Report no: 1535.

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.

Soil Survey of England and Wales, 1983. *Soils of England and Wales, Sheet 6 South East 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 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.

## Appendix C – survey and data information

Minimally processed data	466527		Filtered data
Filename: J955-mag-proc.xcp	Stats		Filename: J955-mag-proc-hpf.xcp
Description: Imported as Composite from:	Max: 3.32		Stats
J955-mag.asc	Min: -3.30		Max: 3.32
Instrument Type: Sensys DLMGPS	Std Dev: 1.67		Min: -3.30
Units: nT	Mean: -0.05		Std Dev: 1.51
UTM Zone: 30U	Median: 0.04		Mean: -0.07
Survey corner coordinates (X/Y): OSGB36	Composite Area: 2.7448 ha		Median: -0.02
Northwest corner: 425167.50, 123729.17 m	Surveyed Area: 1.5483 ha		GPS based Proce5
Southeast corner: 425321.40, 123550.82 m	PROGRAM		1 Base Layer.
Collection Method: Randomised	Name: TerraSurveyor		2 Unit Conversion Layer (UTM to OSGB36).
Sensors: 5	Version: 3.0.37.0		3 DeStripe Median Traverse:
Dummy Value: 32702	GPS based Proce4		4 High pass Uniform (median) filter: Window dia: 201
Dimensions	1 Base Layer.		5 Clip from -3.00 to 3.00 nT
Survey Size (meters): 154 m x 178 m	2 Unit Conversion Layer (UTM to OSGB36).		
X&Y Interval: 0.15 m	3 DeStripe Median Traverse:		
Source GPS Points: Active: 466522, Recorded:	4 Clip from -3.00 to 3.00 nT		

## 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	J955-mag.asc J955-mag.xcp J955-mag-proc.xcp J955-mag-proc-hpf.xcp	Raw data as ASCII CSV TerraSurveyor raw data TerraSurveyor minimally processed data
Graphics	J955-mag-proc.tif J955-mag-proc-hpf.tif	Image in TIF format
Drawing	J955-[version number].dwg	CAD file in 2018 dwg format
Report	J955 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)
AS-ABST MAG POS UNCERTAIN	 255,127,0	Polygon (cross hatched ANSI37)
<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)
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 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.

A non-exclusive licence will also be granted to the local authority for planning use and within the Historic Environment Record for public dissemination upon payment by the client.

Please note that a non-exclusive licence does not transfer full copyright which remains with Archaeological Surveys Ltd. A non-exclusive licence also does not allow the licensee to pass on usage rights to third parties.

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.

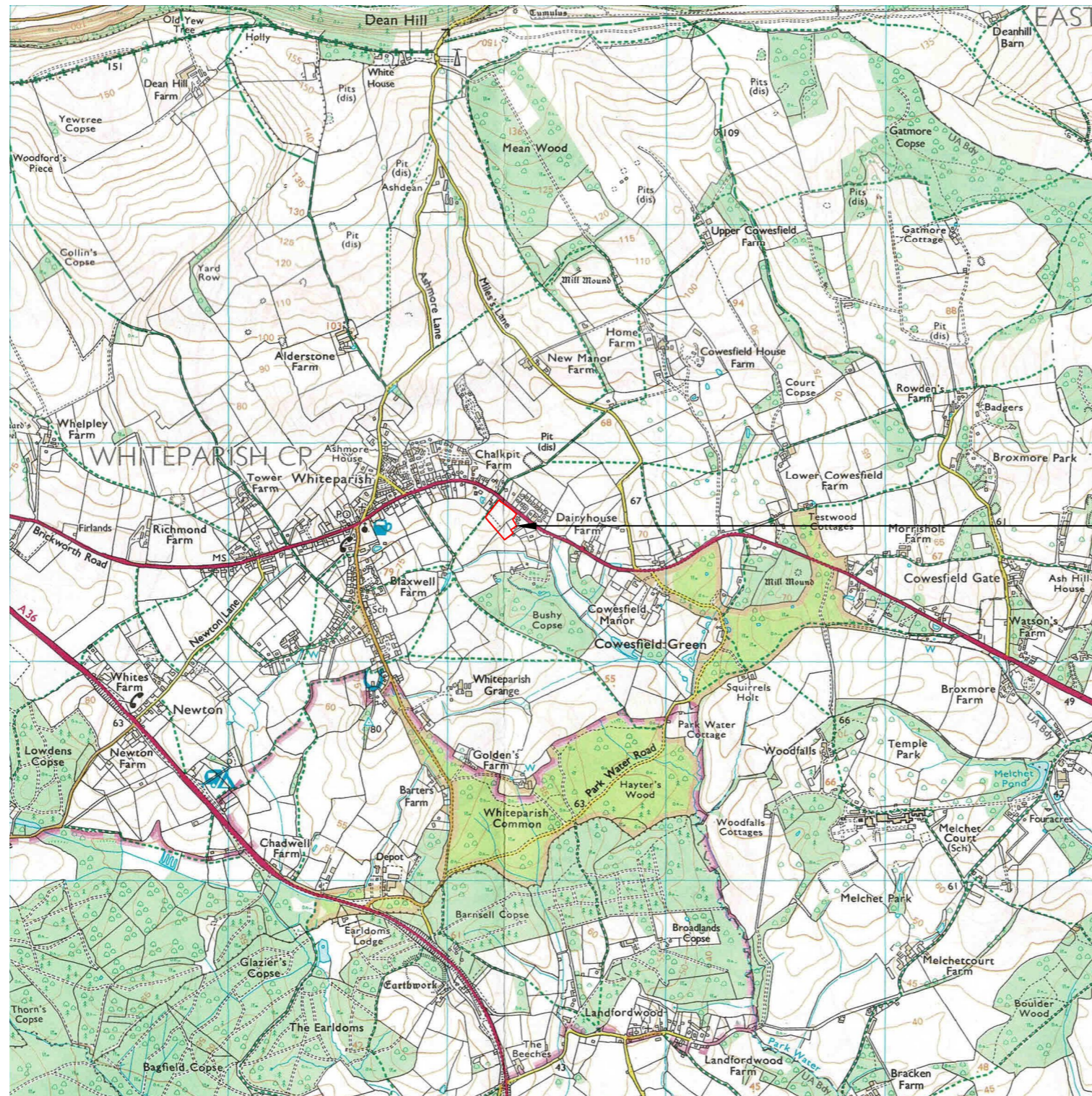
The report, data and any associated material produced by Archaeological Surveys Ltd cannot be freely used for any commercial activity other than those set out above. Any unauthorised use will be considered to be in breach of copyright including the use of graphic items by third parties unless an additional non-exclusive licence has been granted by Archaeological Surveys Ltd.

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.



**Geophysical Survey  
Land at Romsey Road  
Whiteparish  
Wiltshire**

**Map of survey area**



Survey location



● Survey location

Site centred on OS NGR  
SU 25250 23640

**SCALE 1:25 000**



SCALE TRUE AT A3

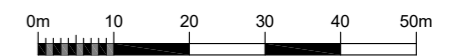
**Geophysical Survey  
Land at Romsey Road  
Whiteparish  
Wiltshire**

**Referencing information**

Referencing grid to OSGB36 datum at 50m intervals

- 425250 123650
- Survey tracks
- - - Survey track start
- - - Survey track stop

**SCALE 1:1000**



SCALE TRUE AT A3

DRAWN BY  
**KTD**

CHECKED BY  
**DJS**

**FIG 02**



123500

123600

123650

123700

123750

425100

425150

425200

425250

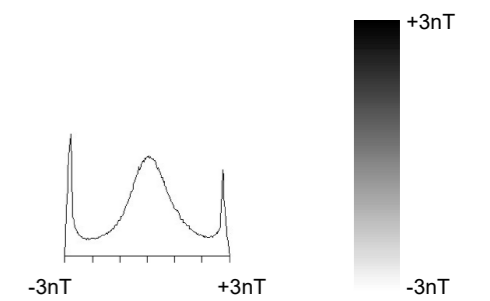
425300

425350

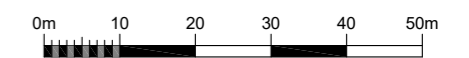
425400

**Geophysical Survey  
Land at Romsey Road  
Whiteparish  
Wiltshire**

**Greyscale plot of minimally  
processed magnetometer data**



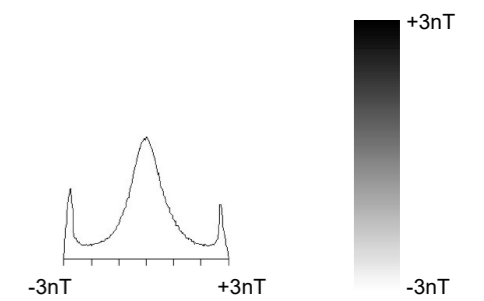
**SCALE 1:1000**



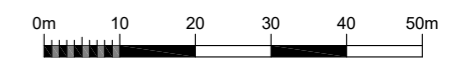
SCALE TRUE AT A3

**Geophysical Survey  
Land at Romsey Road  
Whiteparish  
Wiltshire**

**Greyscale plot of  
filtered magnetometer data**













SCALE 1:1000

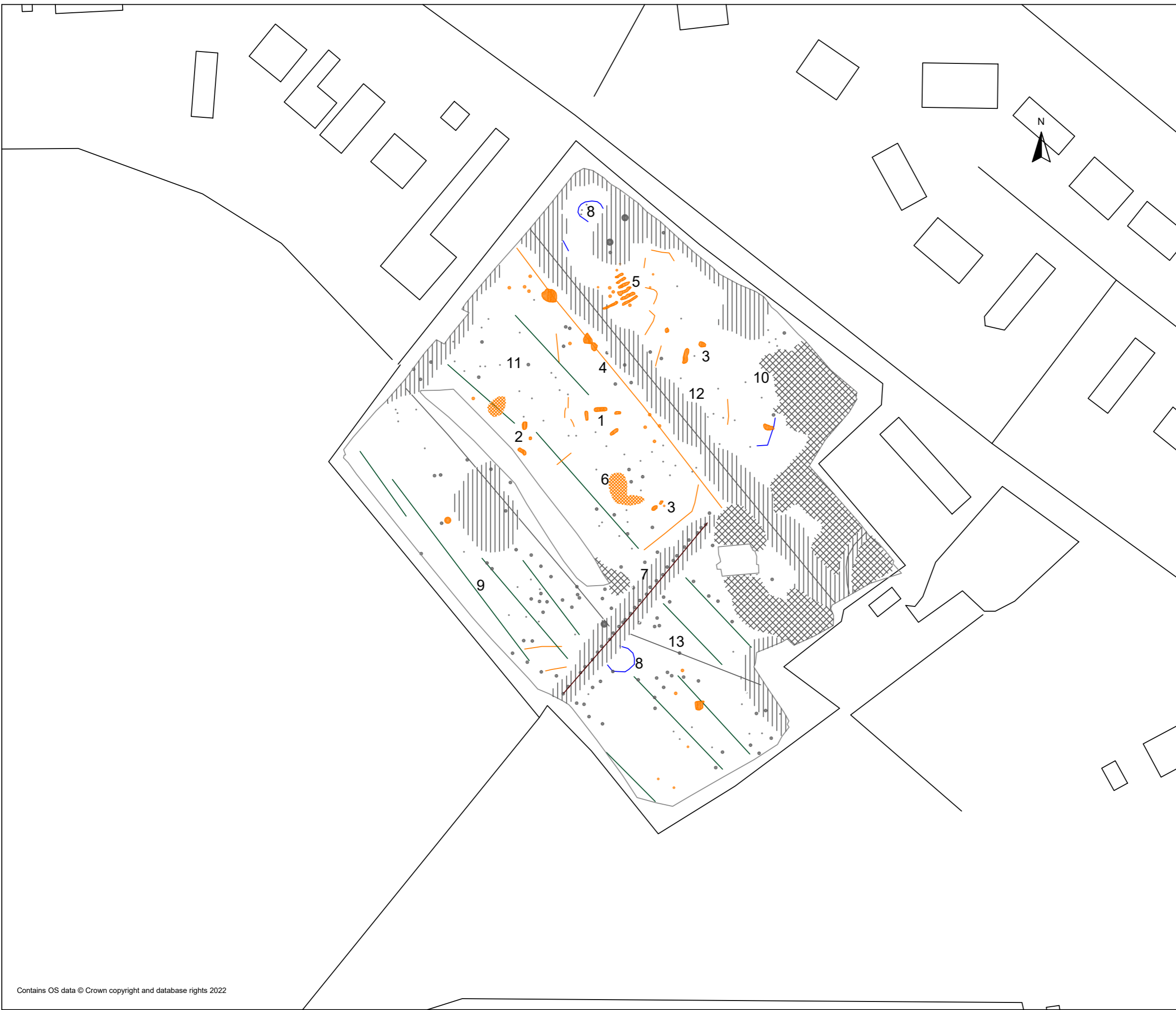


SCALE TRUE AT A3

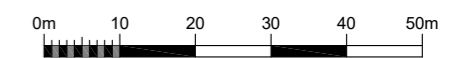
**Geophysical Survey  
Land at Romsey Road  
Whiteparish  
Wiltshire**

**Abstraction and interpretation of  
magnetic anomalies**

-  Positive linear anomaly - possible ditch-like feature
-  Negative linear anomaly - material of low magnetic susceptibility
-  Strong multiple dipolar linear anomaly - former field boundary
-  Linear anomaly - ridge and furrow
-  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 1:1000



SCALE TRUE AT A3