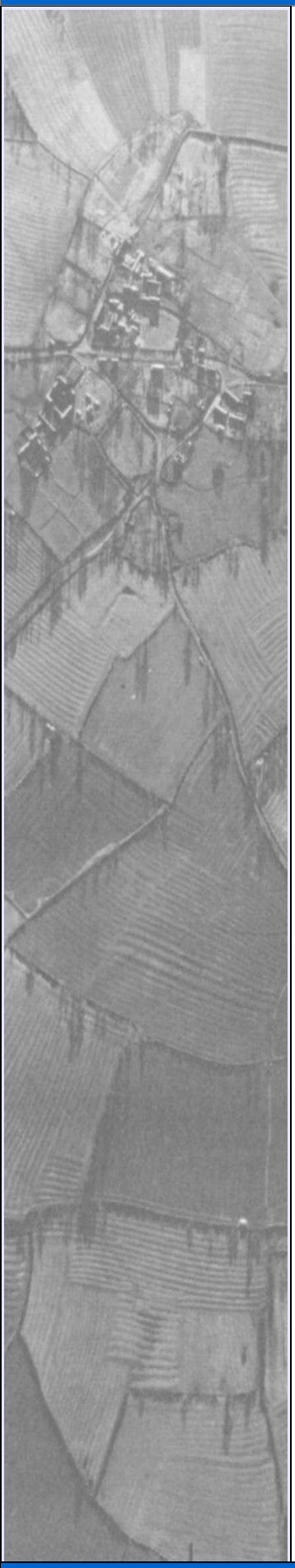

Bugley Barton Farm
Warminster
Wiltshire

MAGNETOMETER SURVEY REPORT

for

Persimmon Homes Wessex

Kerry Donaldson & David Sabin

October 2016

Ref. no. J692

ARCHAEOLOGICAL SURVEYS LTD

Bugley Barton Farm
Warminster
Wiltshire

Magnetometer Survey Report

for

Persimmon Homes Wessex

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 – 28th & 31st October 2016
Ordnance Survey Grid Reference – **ST 85310 44645**

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SUMMARY

Magnetometry was carried out by Archaeological Surveys Ltd within two survey areas at Bugley Barton Farm on the south western edge of Warminster in Wiltshire. The survey located a number of weakly positive linear, curvilinear and discrete responses with both survey areas; however they are poorly defined, short and lack a coherent morphology preventing confident interpretation. The underlying Upper Greensand geology can be associated with poor magnetic contrast between the fill of cut features and the material into which they are cut, and it is possible that the anomalies could relate to ditch-like and pit-like features. A number of formerly mapped field boundaries, land drains and ridge and furrow have also been located. The entire site contains magnetic contamination, concentrated into zones close to the farm, pond and gateways but also widespread indicating that ferrous material has been incorporated into the topsoil through the process of manuring.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by Persimmon Homes Wessex to undertake a magnetometer survey of an area of land at Bugley Barton Farm, Warminster. The site has been outlined for residential development as part of the West Warminster Urban Expansion (Application no.16/01323/MAS). The survey forms part of an archaeological assessment of the site.

1.1.2 The geophysical survey was carried out in accordance with a Written Scheme of Investigation (WSI) produced by Archaeological Surveys (2016) and approved by Rachel Foster, Assistant Archaeologist for Wiltshire Council, prior to commencing the survey.

1.2 Survey objectives and techniques

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

1.2.2 The survey and report generally follow the recommendations set out by: English Heritage (2008) *Geophysical survey in archaeological field evaluation;* 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) *Standard and Guidance for Archaeological Geophysical Survey.*

1.3 Site location, description and survey conditions

1.3.1 The site is located at Bugley Barton Farm, to the south of Victoria Road on the south western edge of Warminster in Wiltshire. The site is centred on Ordnance Survey National Grid Reference (OS NGR) ST 85310 44645; however, this part of the site was unsurveyable and the survey areas are centred on ST 85470 44680 for Area 1 in the east and ST 85160 44580 for Area 2 in the west, see Figs 01 and 02.

1.3.2 The two survey areas are separated by the farm yard that contains several large barns and sheds surrounded by areas of hard standing. A slurry/ drainage pond is located to the south of the yard on lower ground. Residential dwellings are located to the north and east of Area 1 with Victoria Road bounding the northern and western sides of Area 2. Agricultural land is located to the south of the site.

1.3.3 The geophysical survey covers approximately 7.2ha with grass cover in Area 1 and stubble in Area 2. A shallow dry valley crosses through both survey areas with an east west orientation. The base of the valley contained a small patch of waterlogged ground within the southern part of Area 1, but generally the soil was dry and the site appeared well drained.

Plate 1: Area 2 looking south

1.3.4 The ground conditions across the site were generally considered to be favourable for the collection of magnetometry data. Weather conditions during the survey were fine with some fog at times.

1.4 Site history and archaeological potential

1.4.1 An Archaeological Desk-Based Assessment is under preparation by EDP at the time of writing; however, the land immediately to the north of the site and Victoria Road has been subject to investigation through desk-based assessment (CgMs, 2013), geophysical survey (ArchaeoPhysica, 2013) and fieldwalking, (Wessex Archaeology, 2012). The fieldwalking recovered one sherd of prehistoric pottery and forty nine pieces of worked flint. Unsystematic fieldwalking by a local resident located large quantities of pottery, but this area was not available to Wessex Archaeology to carry out systematic fieldwalking and so this could not be verified. The geophysical survey did not locate any anomalies that could be defined as archaeological features within the site, although there was evidence for previous land division and agricultural practices.

1.4.2 Land immediately to the south has also been subject to geophysical survey and archaeological evaluation (Wessex Archaeology, 2014a & 2014b). The geophysical survey located numerous anomalies associated with agricultural activity, some possible ridge and furrow and land drainage and a number of pit-like anomalies that were uncertain in origin. The evaluation recorded a number of post medieval boundary ditches.

1.4.3 The Wiltshire Historic Environment Record lists that the origins of Bugley date back to the medieval period with the first record of *Buggele* in 1236 (MWI1139). A partly demolished 19th century outfarm is recorded at Bugley Farm (MWI656576/MWI65656) and seven Roman coins were located by a metal detectorist immediately south of the present survey area (MWI1122). Further Roman finds are located approximately 500m to the west (north west of Tascroft Court (MWI1233)), where a number of Romano-British pottery sherds, tile, stone, brooches, buckles and coins were located indicating a settlement with at least one building. The nearest scheduled monument is Cley Hill, 1km to the west (List entry no. 1017296) which includes a hillfort, two bowl barrows, medieval strip lynchets and a cross dyke.

1.4.4 The site is likely to have been used for agricultural purposes since at least medieval times, and former Ordnance Survey mapping indicates that a number of field boundaries have been removed from the site within the 20th century. The survey may locate anomalies associated with former land boundaries, ridge and furrow, modern agricultural activity and other features should they be present.

1.4.5 The surface conditions within Area 2 were suitable for the observation of cultural material during the course of the survey. No significant finds were noted.

1.5 Geology and soils

1.5.1 The underlying solid geology across the site is Cretaceous sandstone from the Boyne Hollow Chert Member (Upper Greensand) (BGS, 2016). Greensand

and chert fragments were frequently observed during the survey across Area 2.

1.5.2 The overlying soil across the survey area is from the Bearsted 2 association and is a typical brown earth. These consist of deep, well drained, coarse, loamy soils (Soil Survey of England and Wales, 1983).

1.5.3 Magnetometry survey carried out across similar soils has produced variable results as there can be very low magnetic susceptibility and magnetic contrast between cut features and the material into which they are cut. However, where there has been long term occupation and/or industrial activity there can be sufficient magnetic contrast within cut features. Although not optimum, the underlying geology and soils are considered acceptable for magnetic survey.

2 METHODOLOGY

2.1 Technical synopsis

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

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

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

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

2.2 Equipment configuration, data collection and survey detail

2.2.1 The detailed magnetic survey was carried out using a SENSYS MAGNETO®MXPDA 5 channel cart-based system. The instrument has 5 fluxgate gradiometers (FGM650) spaced 0.5m apart with readings recorded at 20 Hz. 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 range of recording data between ±0.1nT and ±10,000nT. They are linked to a Leica GS10 RTK GPS with data recorded by SENSYS MAGNETO®MXPDA software on a rugged PDA computer system.

2.2.2 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 is manifest 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 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 ±10000nT and clipped for display at ±5nT. 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 is considered by the manufacturer to be data that is 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 very high density of data collection.

2.3.6 The raster images are combined with base mapping using ProgeCAD Professional 2016, creating DWG (2010) 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 GPS, resection method, etc.

2.3.7 An abstraction and interpretation is also 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.

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 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 7.2ha.

3.1.2 Magnetic anomalies located can be generally classified as positive 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 or pipelines.

3.1.3 Anomalies located within each survey area have been numbered and are described below.

3.2 Statement of data quality

3.2.1 Data are considered representative of the magnetic anomalies present within the site. There are no significant defects within the dataset. Steel-framed agricultural buildings have created small zones of magnetic disturbance adjacent to the the farm yard. Some localised zones of magnetic debris are also present within the vicinity of the yard and adjacent to a small pond in the south eastern corner of the site. It is unlikely that the debris and disturbance have obscured weak anomalies of archaeological potential, although a zone of magnetic debris in the northern part of Area 2 may be associated with widespread dumping, former agricultural structures and/or made ground.

3.3 Data interpretation

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

Report sub-heading **CAD layer names and plot colour**	**Description and origin of anomalies**
Anomalies with an uncertain origin AS-ABST MAG POS LINEAR UNCERTAIN AS-ABST MAG NEG LINEAR UNCERTAIN AS-ABST MAG POS DISCRETE UNCERTAIN 	The category applies to a range of anomalies where there is not enough evidence to confidently suggest an origin. Anomalies in this category may well be related to archaeologically significant features, but equally relatively modern features, geological/pedological features and agricultural features should be considered. Positive anomalies are indicative of magnetically enhanced soils that may form the fill of 'cut' features or may be produced by accumulation within layers or 'earthwork' features; soils subject to burning may also produce positive anomalies.

	Negative anomalies are produced by material of comparatively low magnetic susceptibility such as stone and subsoil.
Anomalies relating to land management AS-ABST MAG BOUNDARY AS-ABST MAG LAND DRAIN	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. Land drains can appear in a classic herringbone pattern of interconnected multiple dipolar linear anomalies, or as parallel linear anomalies. The multiple dipolar response indicates a ceramic land drain.
Anomalies with an agricultural origin AS-ABST MAG RIDGE AND FURROW	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.
Anomalies associated with magnetic debris AS-ABST MAG DEBRIS AS-ABST MAG STRONG DIPOLAR	Magnetic debris often appears as areas containing many small dipolar anomalies that may range from weak to very strong in magnitude. It often occurs where there has been dumping or ground make-up and is 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, or hearths 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 AS-ABST MAG DISTURBANCE AS-ABST MAG SERVICE	The magnetic response is often strong and dipolar indicative of ferrous material and may be associated with extant above surface features such as wire fencing, cables, pylons etc.. Often a significant area around such features has a strong magnetic flux which may create magnetic disturbance; such disturbance can effectively obscure low magnitude anomalies if they are present. Fluxgate sensors may respond erratically and with hysteresis adjacent to strong magnetic sources. Buried services may produce characteristic multiple dipolar anomalies dependant upon their construction.

Table 1: List and description of interpretation categories

3.4 List of anomalies - Area 1

Area centred on OS NGR 385470 144680, see Figs 03 – 06.

Anomalies with an uncertain origin

(1) - The central part of the survey area contains a number of very weakly positive and short linear anomalies. The response is around 1nT and they are very poorly defined; it is, therefore, not possible to determine their origin.

(2) - Situated immediately north of a hedge within the eastern part of the field are two discrete positive anomalies with a response of around 10nT. Although they appear pit-like, their origin is uncertain.

Anomalies associated with land management

(3-5) - Linear anomalies associated with magnetic debris (3) & (4) relate to field boundaries removed during the late 20th century. A negative linear anomaly corresponds to a low bank in the field and relates to a field boundary removed by the early 19th century.

(6) - The southern part of the survey area contains a series of ceramic land drains in a herringbone formation leading towards a pond at the eastern edge of the site.

Anomalies associated with magnetic debris

(7) - The survey area contains zones of magnetic debris. These are mainly associated with dumped material close to farm buildings, gateways, former field boundaries and the pond.

(8) - A circular zone of magnetic debris is associated with a low mound within the south eastern corner of the field. The strength of the response indicates ferrous and other magnetically thermoremnant material, possibly associated with dumped material removed during creation of an adjacent pond.

(9) - The site is highly contaminated with magnetic debris, with numerous strong, discrete dipolar anomalies across both survey areas. This is generally spread through the process of manuring and is likely to have been carried out over a long period.

Anomalies with a modern origin

(10) - A linear zone of magnetic disturbance extending across the centre of the survey area with a south west to north east orientation, may relate to a buried service, drain or pipe.

(11) - A linear zone of magnetic disturbance in the south western corner of the survey area is located in the vicinity of a recently removed field boundary, but is likely to be a response to a pipe or service.

(12) - A strong, multiple dipolar, linear anomaly relates to a steel or iron buried service or pipe.

3.5 List of anomalies - Area 2

Area centred on OS NGR 385160 144580, see Figs 03, 04, 07 & 08.

Anomalies with an uncertain origin

(13) - In the southern part of the survey area is a very weakly positive curvilinear

anomaly. A number of other very weakly positive linear and curvilinear anomalies are also located within the vicinity. The positive responses are very weak (<1nT) and poorly defined; however, it is possible that they relate to cut, ditch-like features.

(14) - In the eastern part of the survey area is a weakly positive curvilinear anomaly, located close to a negative curvilinear anomaly (16). Again, the weak response prevents confident interpretation, but a cut feature should be considered.

(15) - There are several other very weakly positive, short, linear anomalies. They lack a coherent morphology which prevents interpretation.

(16) - The survey area contains a small number of negative curvilinear anomalies. The response is to material with lower magnetic enhancement than the surrounding soils, such as subsoil or stone.

(17) - In the northern part of the survey area there is a positive linear anomaly. Other linear anomalies may extend towards it, possibly indicating an association with land drainage, but this is not certain. It is parallel with the nearby field boundary and an association with a buried service or pipe, or agricultural activity is possible.

(18) - A small number of discrete anomalies are located within the survey area. They appear to relate to pit-like features and have a response of 3-8nT, indicating moderate levels of magnetic enhancement.

Anomalies associated with land management

(19) - A weakly positive linear anomaly corresponds to a low bank in the field and, therefore, appears to relate to a former land boundary.

Anomalies with an agricultural origin

(20) - A number of broad, parallel linear anomalies extend across the survey area towards anomaly (19). They appear to relate to former ridge and furrow.

Anomalies associated with magnetic debris

(21) - A zone of magnetic debris in the northern part of the site corresponds to a small paddock area indicated on old Ordnance Survey mapping. It is likely to relate to dumped or demolished magnetically thermoremnant material, such as brick, tile and ferrous material.

Anomalies with a modern origin

(22) - A number of buried services are located in the north eastern part of the survey area.

4 CONCLUSION

4.1.1 The results of the magnetometer survey reveal the presence of several very weak, positive, curvilinear and linear responses within the south western part of the site (Area 2). The very weak response and lack of magnetic contrast prevent confident interpretation; however, it is possible that they relate to cut features. Negative curvilinear anomalies in Area 2 appear to relate to material with lower magnetic enhancement than the surrounding soils, which may relate to subsoil or stone. Several other very weakly positive linear and discrete responses of uncertain origin have been located elsewhere in both parts of the site, but their origin cannot be determined.

4.1.2 The survey also revealed widespread magnetic contamination likely to be associated with ferrous material spread during manuring. A number of formerly mapped field boundaries have also been located as well as land drains, modern services and some evidence for ridge and furrow.

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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 thermoremnant material.

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

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

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

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

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

Magnetic survey or magnetometry can be carried out using a fluxgate gradiometer and may be referred to as gradiometry. The SENSYS gradiometer is a passive instrument consisting of two fluxgate sensors mounted vertically 65cm apart. The instrument is carried about 10-20cm above the ground surface and the upper sensor measures the Earth's magnetic field as does the lower sensor but this is influenced to a greater degree by any localised buried field. The difference between the two sensors will relate to the strength the magnetic field created by the buried feature.

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

Appendix B – data processing notes

Clipping

Minimum and maximum values are set and replace data outside of the range with those values. Extreme values are removed improving colour or greyscale contrast associated with data values that may be archaeologically significant. It has been found that clipping data to ranges between ±5nT and ±3nT often improves the appearance of features associated with archaeology. Different ranges are applied to data in order to determine the most suitable for anomaly abstraction and display.

Zero (destripe) Median/Mean Traverse

The median (or mean) of each traverse is calculated ignoring data outside a threshold value, the median (or mean) is then subtracted from the traverse. The process is used to equalise differences between the baseline value of gradiometer sensors.

High Pass Filtering

A mathematical process used to remove low frequency anomalies relating to survey tracks, modern agricultural features and other large magnetic bodies within or adjacent to survey areas.

Low Pass Filtering

A mathematical process used to remove high frequency anomalies relating to uneven ground, vibration, etc.

Appendix C – survey and data information

Area 1

Filename: J692-mag-Area1-proc.xcp
Description: Imported as Composite from: J692-mag-Area1.asc
Instrument Type: Sensys DLMGPS
Units: nT
UTM Zone: 30U
Survey corner coordinates (X/Y):OSGB36
Northwest corner: 385331.055838189, 144766.3776574 m
Southeast corner: 385600.305838189, 144545.4276574 m
Collection Method: Randomised
Sensors: 5
Dummy Value: 32702
Source GPS Points: 894700
Dimensions
Composite Size (readings): 1795 x 1473
Survey Size (meters): 269 m x 221 m
Grid Size: 269 m x 221 m
X Interval: 0.15 m
Y Interval: 0.15 m
Stats
Max: 5.53
Min: -5.50
Std Dev: 2.09
Mean: -0.05
Median: 0.04
Composite Area: 5.9491 ha
Surveyed Area: 3.2776 ha
PROGRAM
Name: TerraSurveyor
Version: 3.0.23.0
Processes: 1
1 Base Layer
GPS based Proce4
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to OSGB36).
3 DeStripe Median Traverse:
4 Clip from -5.00 to 5.00 nT

Area 2

COMPOSITE
Filename: J692-mag-Area2-proc.xcp
Description: Imported as Composite from: J692-mag-Area2.asc
Instrument Type: Sensys DLMGPS
Units: nT
UTM Zone: 30U
Survey corner coordinates (X/Y):OSGB36
Northwest corner: 385036.482994906, 144718.079773413 m
Southeast corner: 385282.182994906, 144447.629773413 m
Collection Method: Randomised
Sensors: 5
Dummy Value: 32702
Source GPS Points: 1220800
Dimensions
Composite Size (readings): 1638 x 1803
Survey Size (meters): 246 m x 270 m
Grid Size: 246 m x 270 m
X Interval: 0.15 m
Y Interval: 0.15 m
Stats
Max: 5.53
Min: -5.50
Std Dev: 1.91
Mean: -0.04
Median: 0.01
Composite Area: 6.645 ha
Surveyed Area: 3.7919 ha
Processes: 1
1 Base Layer
GPS based Proce4
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to OSGB36).
3 DeStripe Median Traverse:
4 Clip from -5.00 to 5.00 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 printed copy of the report and a PDF copy will be supplied to the Wiltshire Historic Environment Record. The report will also be uploaded to the Online AccesS to the Index of archaeological investigationS (OASIS).

Archive contents:

Geophysical data - path: J692 Warminster\Data				
Path and Filename	**Software**	**Description**	**Date**	**Cr**
warm1\MX\.prm,.dgb,.disp warm2\MX\.prm,.dgb,.disp	Sensys MXPDA	Proprietary data formats representing magnetometer survey traverses logged to a PDA.	28/10/16 31/10/16	D.
warm1\MX\J692-mag-Area1.asc warm2\MX\J692-mag-Area2.asc	Sensys DLMGPS	ASCII CSV (tab) file representing survey area in eastings, northings (UTM Z30N), magnetic measurement, traverse file and sensor number.	04/11/16	K.
Area1\comps\J692-mag-Area1.xcp Area2\comps\J692-mag-Area2.xcp	TerraSurveyor 3.0.23.0	Composite data file derived from ASCII CSV.	04/11/16	K.
Area1\comps\J692-mag-Area1-proc.xcp Area2\comps\J692-mag-Area2-proc.xcp	TerraSurveyor 3.0.23.0	Processed composite data file (zmt and clipping to ±5nT).	04/11/16	K.
Graphic data - path: J692 Warminster\Data				
Area1\graphics\J692-mag-Area1-proc-5nT.tif	TerraSurveyor 3.0.23.0	TIF file showing a minimally processed greyscale plot clipped to ±5nT.	04/11/16	K.
Area1\graphics\J692-mag-Area1-proc-5nT.tfw	TerraSurveyor 3.0.23.0	World file for georeferencing TIF to OSGB36.	04/11/16	K.
Area2\graphics\J692-mag-Area2-proc-5nT.tif	TerraSurveyor 3.0.23.0	TIF file showing a minimally processed greyscale plot clipped to ±5nT.	04/11/16	K.
Area2\graphics\J692-mag-Area2-proc-5nT.tfw	TerraSurveyor 3.0.23.0	World file for georeferencing TIF to OSGB36.	04/11/16	K.
CAD data - path: J692 Warminster\CAD				
J692 version 1.dwg	ProgeCAD 2016	CAD file for creating plots of greyscales, abstraction, interpretation and mapping. Grid coordinates as OSGB. AutoCAD 2010 format.	04/11/16	K.
Text data - path: J692 Warminster\Documentation				
J692 report.odt	OpenOffice.org 3.0.1 Writer	Report text as an Open Office document.	26/10/16	K.

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Survey location

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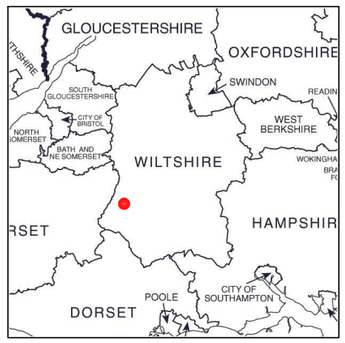
Bugley Barton Farm
Warminster
Wiltshire

Map of survey area



Survey location

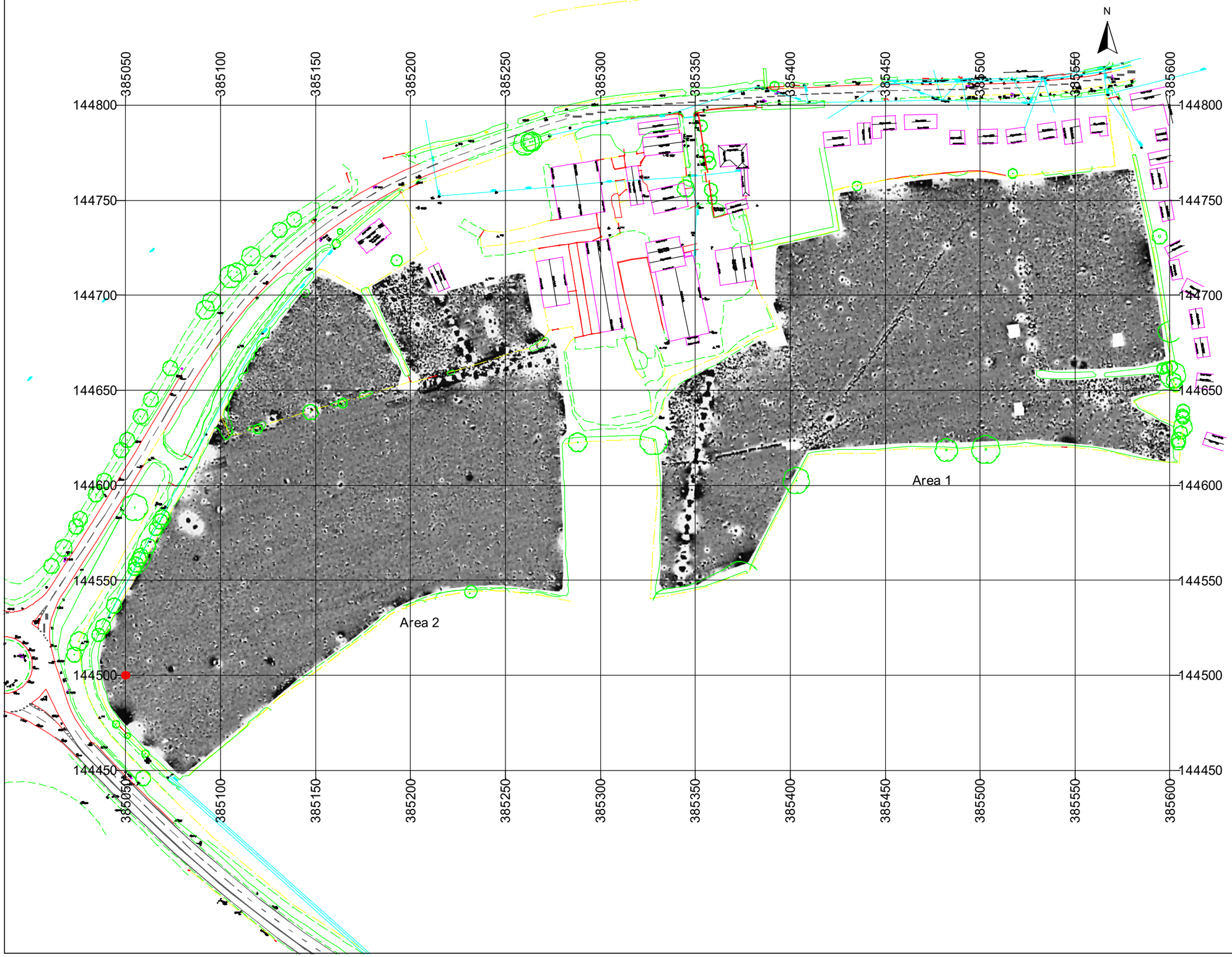
Site centred on OS NGR
ST 85310 44645

SCALE 1:25 000

0m 500m 1000m

SCALE TRUE AT A3

FIG 01



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Referencing information

Referencing grid to OSGB36 datum at 50m intervals

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

● 385050 144500

SCALE 1:2000

0m 20 40 60 80 100m

SCALE TRUE AT A3

FIG 02

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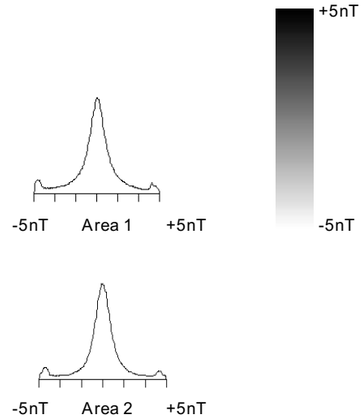
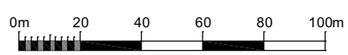
Greyscale plot of minimally processed magnetometer data



SCALE 1:2000



SCALE TRUE AT A3

FIG 03

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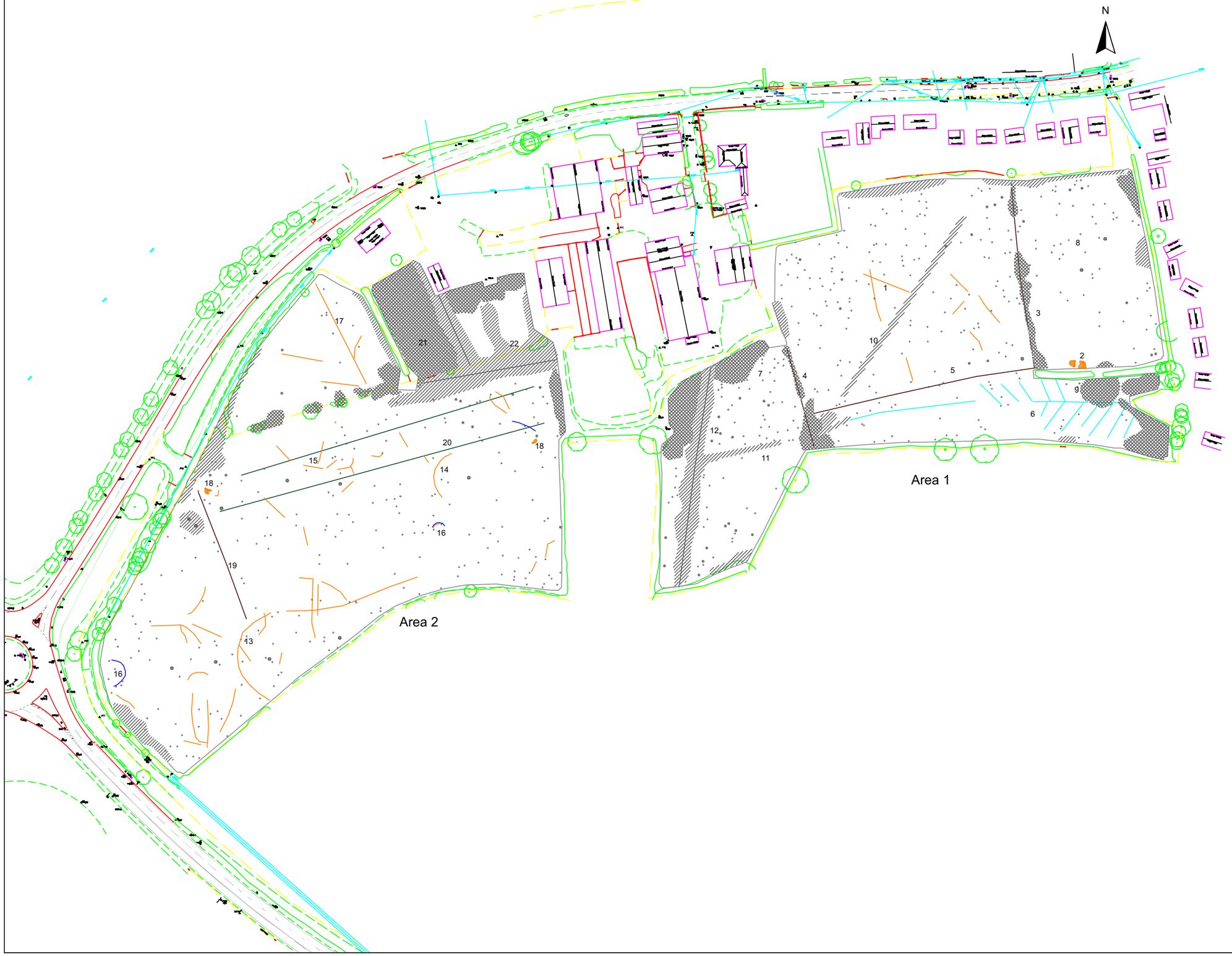
Abstraction and interpretation of magnetometer anomalies



- Positive linear anomaly - possible ditch-like feature
- Linear anomaly - ridge and furrow
- Positive linear anomaly - possible land drain
- Positive 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 multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:2000

0m 20 40 60 80 100m

SCALE TRUE AT A3

FIG 04

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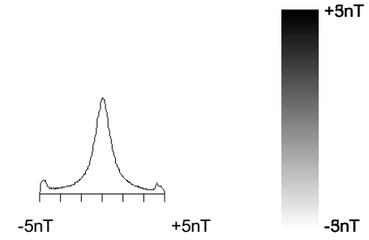
Greyscale plot of minimally processed magnetometer data - Area 1



N

Area 1

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 05

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Abstraction and interpretation of magnetometer anomalies - Area 1

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Area 1

- Positive linear anomaly - possible ditch-like feature
- Weakly dipolar linear anomaly - land drain
- Positive linear anomaly - former field boundary
- Discrete positive response - possible pit-like feature
- 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

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 06

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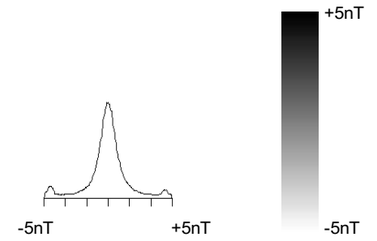
Greyscale plot of minimally processed magnetometer data - Area 2



N

Area 2

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 07

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Abstraction and interpretation of magnetometer anomalies - Area 2

- Positive linear anomaly - possible ditch-like feature
- Linear anomaly - ridge and furrow
- Positive linear anomaly - possible 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 multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 08