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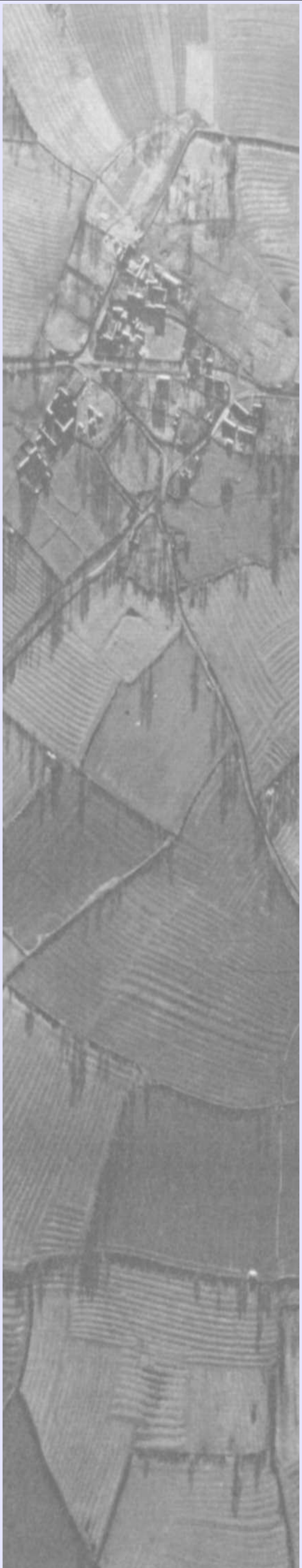

Land adjacent to Salisbury Road, Marlborough, Wiltshire

MAGNETOMETER SURVEY REPORT

for

AMEC Environment and Infrastructure UK Ltd

David Sabin and Kerry Donaldson

December 2011

Ref. no. 388

ARCHAEOLOGICAL SURVEYS LTD

Land adjacent to Salisbury Road, Marlborough, Wiltshire

Magnetometer Survey

for

AMEC Environment and Infrastructure UK Ltd

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

Survey date – **from 20th to 22nd December 2011**
Ordnance Survey Grid Reference – **SU 19220 68370**

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SUMMARY

A magnetometer survey was carried out by Archaeological Surveys Ltd at land adjacent to Salisbury Road, Marlborough, Wiltshire. The results of the survey demonstrate the presence of a small number of positive anomalies of uncertain origin. A broad positive response in the eastern part of the site (Area 1), and three similarly broad positive responses in the western part of the site (Area 2), were located. It has not been possible to determine if these have an anthropogenic origin, such as cut features, or a possible trackway, although it is possible that they have a natural origin from colluviation or former fluvial activity as they lie close to the base of a shallow dry valley.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by AMEC Environment and Infrastructure UK Ltd (AMEC) to undertake a magnetometer survey of an area of land adjacent to Salisbury Road, Marlborough, Wiltshire. The survey forms part of an archaeological assessment of the site.

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.

1.2.2 The methodology is considered an efficient and effective approach to archaeological prospection. The survey and report generally follow the recommendations set out by: English Heritage, 2008, *Geophysical survey in archaeological field evaluation;* Institute for Archaeologists, 2002, *The use of Geophysical Techniques in Archaeological Evaluations*.

1.3 Site location, description and survey conditions

1.3.1 The site is located west of Salisbury Road to the south of Marlborough in Wiltshire and is centred on Ordnance Survey National Grid Reference (OS NGR) SU 19220 68370, see Figures 01 and 02.

1.3.2 The geophysical survey covers approximately 6ha of arable land within two fields, labelled Areas 1 and 2 for the purposes of this report, see Plates 1 and 2. Area 1 covers approximately 4ha, and Area 2 covers approximately 2ha within a 8ha field. The survey area within both fields crosses an east-west valley with land sloping up to the south and north. It is bordered to the east by Salisbury Road and to the west by the disused branch line of the Midland and South Western Junction Railway.

Plate 1: Survey Area 1 looking north east

Plate 2: Survey Area 2 looking north east

1.3.3 The ground conditions across the site were considered to be favourable for the collection of magnetometry data. Ground cover consisted of short stubble. Weather conditions during the survey were variable but generally fine.

1.4 Site history and archaeological potential

1.4.1 Prior to development of land to the east of Salisbury Road, an evaluation recorded Bronze Age flint flakes and Romano-British pottery sherds. The Roman town of Cunetio is located 2km to the north east and the Wiltshire SMR lists several Roman sites and findspots within and around Marlborough. The town of Marlborough is known to have Medieval origins and includes a motte and bailey castle.

1.4.2 The town and surrounding environs of Marlborough contain many archaeological sites and findspots; there is therefore some potential to locate geophysical anomalies with an archaeological origin.

1.5 Geology and soils

1.5.1 The underlying geology is chalk with overlying river terrace deposits of sands and gravels (BGS, 2011). The overlying soils across the site are from the Upton 1 association which are grey rendzinas. These consist of shallow, well drained, calcareous, silty soils over chalk (Soil Survey of England and Wales, 1983).

1.5.2 Although chalk and its associated soils often have suppressed magnetic susceptibility, where cut features are present, there is usually a good magnetic contrast between the fill of the cut feature and the material into which it has been cut.

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 Bartington Grad 601-2 gradiometers. The instruments effectively measure a magnetic gradient between two fluxgate sensors mounted vertically 1m apart. Two sets of sensors are mounted on a single frame 1m apart horizontally.

2.2.2 The instruments are extremely sensitive and are able to measure magnetic variation to 0.01nanoTesla (nT), with an effective resolution of 0.03nT. The data are limited to ±100nT when surveying with the highest sensitivity. All readings are saved to an integral data logger for analysis and presentation.

2.2.3 The instruments are operated according to the manufacturer's instructions with consideration given to the local conditions. An adjustment procedure is required, prior to collection of data, in order to balance the sensors and remove the effects of the Earth's magnetic field; further adjustment is required during the survey due to instrument drift often associated with temperature change.

2.2.4 It can be very difficult to obtain optimum balance for the sensors due to localised magnetic vectors that may be associated with large ferrous objects, geological/pedological features, 'magnetic debris' within the topsoil and natural temperature fluctuations. Imperfect balance results in a heading error often visible as striping within the data; this can be effectively removed by software processing and generally has little effect on the data unless extreme.

2.2.5 The Bartington gradiometers undergo regular servicing and calibration by the manufacturer. A current assessment of the instruments is shown in Table 1 below.

Sensor type and serial numbers	Bartington Grad - 01 – 1000 Nos. 084, 085, 242 and 396
Date of certified calibration/service	Sensors 084 and 085 - 6th August 2010 (due Aug 2012) Sensors 242 and 396 - 14th October 2011 (due Oct 2013)
Bandwidth	12Hz (100nT range) both sensors
Noise	<100pT peak to peak
Adjustable errors	<2nT

Table 1: Bartington fluxgate gradiometer sensor calibration results

The instruments were considered to be in good working order prior to the survey, with no known faults or defects.

2.2.6 Data were collected at 0.25m centres along traverses 1m apart. The survey area was separated into 40m by 40m grids (1600m²) giving 6400 measurements per grid. This sampling interval is very effective at locating archaeological features and is the recommended methodology for archaeological prospection (English Heritage, 2008).

2.2.7 The survey grids were set out to the Ordnance Survey OSGB36 datum using a Penmap RTK GPS and oriented parallel to the north western field boundary in Area 1 and with the indicative development boundary in Area 2. The GPS is used in conjunction with Leica's SmartNet service, where positional corrections are sent via a mobile telephone link. Positional accuracy of around 10 – 20mm is possible using the system. The instrument is regularly checked against the ETRS89 reference framework using Ordnance Survey ground marker C1ST7784 (Horton).

2.3 Data processing and presentation

2.3.1 Magnetometry data downloaded from the Grad 601-2 data logger are analysed and processed in specialist software known as ArcheoSurveyor. The software allows greyscale and trace plots to be produced for presentation and display. Survey grids are assembled to form an overall composite of data (composite file) creating a dataset of the complete survey area. Appendix C contains specific information concerning the survey and data attributes and is derived directly from ArcheoSurveyor; this should be used in conjunction with information provided by Figure 02.

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

- clipping of the raw data at ±30nT to improve greyscale resolution,
- clipping of processed data at ±5nT for Area 1 and ±3nT for Area 2 to enhance low magnitude anomalies,
- zero median/mean traverse is applied in order to balance readings along each traverse.

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

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

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

2.3.5 Graphic raster images in bitmap format (.BMP) are initially prepared in ArcheoSurveyor. Regardless of survey orientation, data captured along each traverse are displayed and processed by ArcheoSurveyor from left to right. Prior to displaying against base mapping, raster graphics require a rotation of 33.738° anticlockwise for Area 1 and 28.007° anticl ockwise for Area 2 to restore north to the top of the image. Greyscale images are rotated upon insertion into AutoCAD.

2.3.6 The raster images are combined with base mapping using ProgeCAD Professional 2009 and AutoCAD LT 2007, creating DWG file formats. All images are externally referenced to the CAD drawing in order to maintain good graphical quality. Quality can be compromised by rotation of graphics in order to allow the data to be orientated with respect to grid north; this is considered acceptable as the survey results are effectively georeferenced allowing relocation of features using GPS, resection method etc.. A digital archive is produced with this report, see Appendix D below.

3 RESULTS

3.1 General overview

3.1.1 The detailed magnetic survey was carried out over a total of two survey areas covering approximately 6ha. Geophysical anomalies located can be generally classified as positive anomalies of an uncertain origin, linear anomalies relating to 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. Anomalies located within each survey area have been numbered and are described below.

3.1.2 Data are considered representative of the magnetic conditions within the survey areas. High levels of magnetic disturbance were associated with services crossing both survey areas, and although this has the potential to obscure more minor anomalies, it is considered unlikely that significant low magnitude anomalies have been missed.

3.1.3 Area 1 contained widespread magnetic debris probably from small fragments of ferrous material spread during manuring and cultivation. The exact source could not be confirmed from surface observation. Area 1 data were clipped at a slightly higher magnitude than Area 2 (±5nT instead of ±3nT) in order to lower the more 'noisy' appearance of the data and improve contrast.

3.1.4 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 POS AREA 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	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.
Anomalies with an agricultural origin AS-ABST MAG AGRICULTURAL	The anomalies are often linear and form a series of parallel responses or are parallel to extant land boundaries.
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 2: List and description of interpretation categories

3.2 List of anomalies - Area 1

Area centred on OS NGR 419280 168425 see Figures 03 to 05.

Anomalies with an uncertain origin

(1) – A broad, linear zone of magnetic enhancement within the centre of the survey area. It is not possible to determine if the anomaly is of anthropogenic origin, or if it is natural in origin, such as a fluvial or colluvial feature.

(2) – A weak, broad, positive response is located in the eastern part of the survey area and oriented east-west. It is not possible to determine the origin of this anomaly.

(3) – A weak, circular, positive anomaly located in the southern part of Area 1. This type of response suggests a former pit or depression; however, its origin is uncertain.

(4) – A weak, possible curvilinear anomaly located in the northern part of the survey area. It is not possible to ascertain if this relates to a cut feature. Other weak linear anomalies located within the survey area are also of uncertain origin.

(5) – A positive linear anomaly is located close to the southern field boundary. Although it is possible that this relates to agricultural activity, its orientation and response is slightly different to other agricultural anomalies visible in the data.

Anomalies associated with land management

(6) – A linear anomaly containing dipolar responses appears to correlate with the line of a former field boundary, removed between 1961 and 1970. It is possible that the response is to a buried pipe.

Anomalies with an agricultural origin

(7) – A series of linear anomalies, parallel with the northern field boundary, relate to agricultural activity.

Anomalies associated with magnetic debris

(8) – A widespread zone of magnetic debris distributed from the eastern field boundary, along the line of anomaly (6). This is a response to magnetically thermoremnant material, such as brick or tile, possibly used for ground consolidation.

(9) – A patch of magnetic debris is located adjacent to the western field boundary. This contains some very strong dipolar responses indicating the presence of ferrous material.

(10) – Strong discrete dipolar anomalies have been located within both survey

areas and relate to ferrous objects within the topsoil.

Anomalies with a modern origin

(11) – Three strong, multiple dipolar, linear anomalies extend across the survey area causing magnetic disturbance. These relate to buried services or pipelines.

3.3 List of anomalies - Area 2

Area centred on OS NGR 419100 168280 see Figures 3 to 5.

Anomalies with an uncertain origin

(12) – Three broad positive anomalies extend across the centre of Area 2. It is not possible to determine if these have a natural origin, such as colluvial features, or if they are anthropogenic in origin, such as cut features, or a former trackway.

(13) – Two weakly positive linear anomalies of uncertain origin are located in the southern part of the survey area.

Anomalies with an agricultural origin

(14) – A series of linear anomalies, parallel with the western and southern field boundaries, relate to agricultural activity.

Anomalies with a modern origin

(15) – Three strong, multiple dipolar, linear anomalies extend across the survey area causing magnetic disturbance. These converge towards the north western corner of the survey area and relate to buried services or pipelines.

4 CONCLUSION

4.1.1 The detailed magnetometer survey located a number of geophysical anomalies within the site, although none could be confidently interpreted as of archaeological potential. In Area 1 a broad positive response indicates magnetic enhancement, although it is not possible to determine if this is due to anthropogenic activity or through colluviation. In Area 2, to the west, three broad positive anomalies are also of uncertain origin. Again, is it not possible to determine if these relate to cut features, or a former trackway, or if they have a natural origin. These features, within both survey areas, broadly lie within the bottom of a dry valley.

5 REFERENCES

British Geological Survey, 2011. *Geology of Britain viewer, 1:50 000 scale [online]* available from http://maps.bgs.ac.uk/geologyviewer/ [accessed 4/1/2012].

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

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

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

Appendix A – basic principles of magnetic survey

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

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

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

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

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

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

Magnetic survey or magnetometry can be carried out using a fluxgate gradiometer and may be referred to as gradiometry. The gradiometer is a passive instrument consisting of two fluxgate sensors mounted vertically 1m apart. The instrument is carried about 30cm above the ground surface and the upper sensor measures the Earth's magnetic field as does the lower sensor but this is influenced to a greater degree by any localised buried field. The difference between the two sensors will relate to the strength the magnetic field created by the buried feature. If no enhanced feature is present the field measured by both sensors will be similar and the difference close to zero.

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

Appendix B – data processing notes

Clipping

Minimum and maximum values are set and replace data outside of the range with those values. Extreme values are removed improving colour or greyscale contrast associated with data values that may be archaeologically significant. It has been found that clipping data to ranges between ±5nT and ±1nT often improves the appearance of features associated with archaeology. Different ranges are applied to data in order to determine the most suitable for anomaly abstraction and display.

Zero Median/Mean Traverse

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

De-stagger

Compensates for small positional errors within data collection by shifting the position of the readings along each traverse by a specified amount. Data lost at the end of each traverse are extrapolated from adjacent value in the same row.

Deslope

Corrects for striping and distortion caused by metal objects/services etc.. The process calculates a curve based on a polynomial best fit mathematical function for each traverse. This curve is then subtracted from the actual data.

Edge Match

Calculates the mean of the 2 lines (rows or columns) of data either side of the edge to match. It then subtracts the difference between the means from all datapoints in the selected area.

FFT (Fast Fourier Transform) spectral filtering

A mathematical process used to determine the frequency components of a traverse. Repetitive features, such as plough marks, produce characteristic spectral zones that can be suppressed allowing greyscale images to appear clearer.

Appendix C – survey and data information

Area 1 raw data

COMPOSITE
Filename: J388-mag-Area1-raw.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 21/12/2011
Assembled by: on 21/12/2011
Direction of 1st Traverse: 45 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702

Dimensions
Composite Size (readings): 1120 x 200
Survey Size (meters): 280 m x 200 m
Grid Size: 40 m x 40 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 30.00
Min: -30.00
Std Dev: 11.18
Mean: -1.64
Median: -0.55
Composite Area: 5.6 ha
Surveyed Area: 3.9122 ha

Processes: 2
1 Base Layer
2 Clip from -30.00 to 30.00 nT

Source Grids: 32
1 Col:0 Row:0 grids\01.xgd
2 Col:0 Row:1 grids\02.xgd
3 Col:0 Row:2 grids\03.xgd
4 Col:0 Row:3 grids\32.xgd
5 Col:1 Row:0 grids\04.xgd
6 Col:1 Row:1 grids\05.xgd
7 Col:1 Row:2 grids\06.xgd
8 Col:1 Row:3 grids\30.xgd
9 Col:1 Row:4 grids\31.xgd
10 Col:2 Row:0 grids\07.xgd
11 Col:2 Row:1 grids\08.xgd
12 Col:2 Row:2 grids\09.xgd
13 Col:2 Row:3 grids\28.xgd
14 Col:2 Row:4 grids\29.xgd
15 Col:3 Row:0 grids\10.xgd
16 Col:3 Row:1 grids\11.xgd
17 Col:3 Row:2 grids\12.xgd
18 Col:3 Row:3 grids\26.xgd
19 Col:3 Row:4 grids\27.xgd
20 Col:4 Row:0 grids\13.xgd
21 Col:4 Row:1 grids\14.xgd
22 Col:4 Row:2 grids\15.xgd
23 Col:4 Row:3 grids\24.xgd
24 Col:4 Row:4 grids\25.xgd
25 Col:5 Row:0 grids\16.xgd
26 Col:5 Row:1 grids\17.xgd
27 Col:5 Row:2 grids\18.xgd
28 Col:5 Row:3 grids\23.xgd
29 Col:6 Row:0 grids\19.xgd
30 Col:6 Row:1 grids\20.xgd
31 Col:6 Row:2 grids\21.xgd
32 Col:6 Row:3 grids\22.xgd

Area 1 processed data

COMPOSITE
Filename: J388-mag-Area1-proc.xcp

Stats
Max: 5.00
Min: -5.00
Std Dev: 3.04
Mean: -0.39
Median: -0.28
Composite Area: 5.6 ha
Surveyed Area: 3.9122 ha

Processes: 3
1 Base Layer
2 DeStripe Mean Traverse: Grids: All Threshold: 0.25 SDs
3 Clip from -5.00 to 5.00 nT

Area 2 raw data

COMPOSITE
Filename: J388-mag-Area2-raw.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 23/12/2011
Assembled by: on 23/12/2011
Direction of 1st Traverse: 45 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702

Dimensions
Composite Size (readings): 960 x 160
Survey Size (meters): 240 m x 160 m
Grid Size: 40 m x 40 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 30.00
Min: -30.00
Std Dev: 9.79
Mean: -1.37
Median: -0.19
Composite Area: 3.84 ha
Surveyed Area: 1.9732 ha

Processes: 2
1 Base Layer
2 Clip from -30.00 to 30.00 nT

Source Grids: 17
1 Col:0 Row:3 grids\01.xgd
2 Col:1 Row:2 grids\02.xgd
3 Col:1 Row:3 grids\03.xgd
4 Col:2 Row:1 grids\04.xgd
5 Col:2 Row:2 grids\05.xgd
6 Col:2 Row:3 grids\06.xgd
7 Col:3 Row:0 grids\07.xgd
8 Col:3 Row:1 grids\08.xgd
9 Col:3 Row:2 grids\09.xgd
10 Col:3 Row:3 grids\10.xgd
11 Col:4 Row:0 grids\11.xgd
12 Col:4 Row:1 grids\12.xgd
13 Col:4 Row:2 grids\13.xgd
14 Col:4 Row:3 grids\14.xgd
15 Col:5 Row:1 grids\15.xgd
16 Col:5 Row:2 grids\16.xgd
17 Col:5 Row:3 grids\17.xgd

Area 2 processed data

COMPOSITE
Filename: J388-mag-Area2-proc.xcp

Stats
Max: 3.00
Min: -3.00
Std Dev: 1.74
Mean: -0.15
Median: -0.09
Composite Area: 3.84 ha
Surveyed Area: 1.9732 ha

Processes: 8
1 Base Layer
2 Clip from -30.00 to 30.00 nT
3 DeStripe Mean Traverse: Grids: All Threshold: 0.5 SDs
4 Clip from -3.00 to 3.00 nT
5 Edge Match (Area: Top 120, Left 640, Bottom 159, Right 799) to Left edge
6 Edge Match (Area: Top 80, Left 640, Bottom 119, Right 799) to Left edge
7 Edge Match (Area: Top 80, Left 640, Bottom 119, Right 799) to Left edge
8 Clip from -3.00 to 3.00 nT

Appendix D – digital archive

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

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

- ArcheoSurveyor version 2.5.14.0 (geophysical data analysis),
- ProgeCAD Professional 2009 (report graphics),
- AutoCAD LT 2007 (report figures),
- OpenOffice.org 3.0.1 Writer (document text),
- PDF Creator version 0.9 (PDF archive).

Digital data include the following files:

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

The CAD file contains externally referenced graphics that are rotated with separate A3 size layouts for each figure. Layouts are fixed using frozen layers and named views allowing straightforward plotting or analysis on screen. (Note – CAD files are prepared using AutoCAD's e Transmit function to produce a directory containing the digital drawing along with any externally referenced graphics which may need reloading).