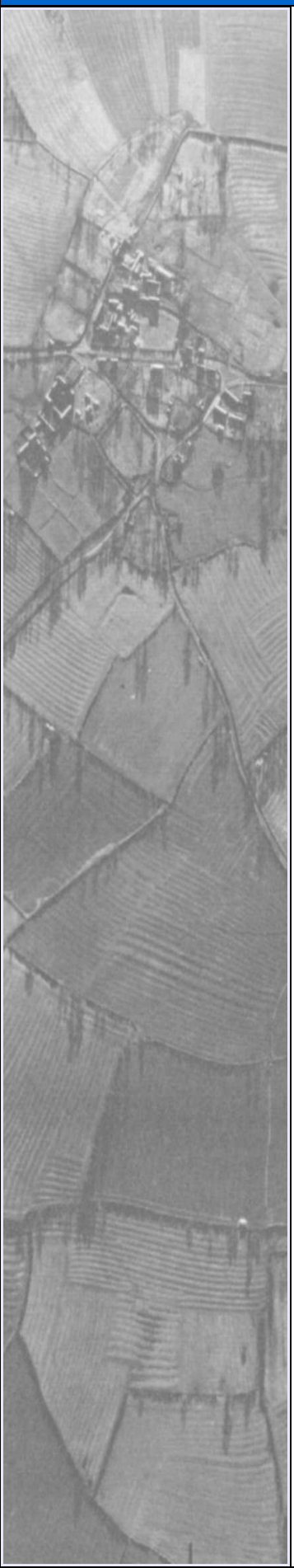

Wind turbine site
The Beacon, South Petherwin
Cornwall

MAGNETOMETER SURVEY REPORT

for

Mr C Parsons

David Sabin and Kerry Donaldson

April 2012

Ref. no. 406

ARCHAEOLOGICAL SURVEYS LTD

Wind turbine site
The Beacon, South Petherwin
Cornwall

Magnetometer Survey

for

Mr C Parsons

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

Survey date – 20th April 2012
Ordnance Survey Grid Reference – **SX 31555 81972**

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CONTENTS

LIST OF FIGURES

LIST OF TABLES

SUMMARY

Archaeological Surveys Ltd carried out a detailed magnetometer survey, at the request of Mr Chris Parsons, over an area of land at The Beacon to the east of South Petherwin in Cornwall. The survey was conducted as part of an archaeological assessment of land proposed for the construction of a single wind turbine and associated cable route and was carried out within five parcels of land. The survey located many positive discrete, linear and curvilinear anomalies in all of the survey areas; however, due to their fragmented nature, lack of coherent morphology and narrow width of the survey corridor, it is not possible to determine if they are anthropogenic in origin, or relate to natural features. Two former Cornish Hedges were located within the eastern part of the site, with a possible third boundary at the western end of the cable route. These boundaries were recorded on Ordnance Survey mapping until the mid-late 20th century.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by Mr Chris Parsons to undertake a magnetometer survey of an area of land at The Beacon, South Petherwin in Cornwall. The site has been outlined for a proposed single wind turbine and associated cable route.

1.1.2 The geophysical survey was carried out in accordance with a Written Scheme of Investigation (WSI) produced by Archaeological Surveys (2012). The WSI considers the requirements of a Brief for geophysical survey issued by the Cornwall Council Historic Environment Planning Advice Officer (2012).

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;* and 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 lies within pasture land immediately east of South Petherwin and

approximately 1.5km south west of Launceston in Cornwall. The survey area extends from Ordnance Survey National Grid Reference (OS NGR) SX 31198 82022 to SX31890 82083.

1.3.2 The geophysical survey covers approximately 2.7ha, comprising of a 580m by 30m cable route and an additional 1ha centred over the turbine location (SX 31836 82045) within five pasture fields, some of which contained cattle at the time of survey.

1.3.3 The ground conditions across the site were generally considered to be favourable for the collection of magnetometry data. Weather conditions during the survey were mainly fine.

1.4 Site history and archaeological potential

1.4.1 The brief supplied by Cornwall Council Historic Environment Service states that "the development area has been recorded on the Cornwall and Scilly Historic Environment Record (HER) as within 'Anciently Enclosed Land' with a high potential for the survival of buried archaeological remains."

1.4.2 Within the same field and immediately adjacent to the turbine site, the HER records MCO29682 an undated field system visible as a crop mark on aerial photographs. To the north are two Bronze Age barrows, MCO2576 and MCO 2575, located 260m and 360m away respectively.

1.4.3 To the southwest is a large Iron Age/Romano British 'Round' and enclosure, MCO8487, located 220m away. To the east is another Iron Age/Romano British 'Round' and enclosure, MCO21732, located 230m distant. Further afield are several more 'Rounds', one located 1360m to the northeast, another 1370m to the southeast, with a third located 1240m to the southwest.

1.4.4 Located 1440m directly to the south, and on the opposite side of the valley is MCO7675 'Battle Ring', a large Iron Age/Romano British 'Round', which is a Scheduled Monument east of Brockle Farm. Another two Bronze Age barrows lie 1500m and 1700m to the southwest, the latter known as 'Trecogo' barrow, and visible as four concentric circular ditches on recent aerial photographs.

1.4.5 As the site lies within an area with a high number of archaeological sites and features, including a field system immediately adjacent to the wind turbine site, there is a high potential to locate geophysical anomalies that may relate to archaeological features.

1.5 Geology and soils

1.5.1 The underlying bedrock across the site is a central zone of unnamed igneous intrusion of microgabbro from the Devonian to Carboniferous periods with Lezant Slate Formation at the eastern and western ends of the site (BGS, 2012).

1.5.2 The overlying soil across the survey area is from the Denbigh 1 association, which is a typical brown earth. These consist of well drained, fine loamy and fine silty soils over rock (Soil Survey of England and Wales, 1983).

1.5.3 Magnetometry survey carried out across similar soils and geology has produced good results; however, igneous intrusions can be highly magnetic causing disturbance and creating anomalies that may appear anthropogenic in origin.

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 areas were separated into 30m by 30m grids (900m²) giving 3600 recorded 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. A 30m wide corridor was centred on the line of the cable route and a single hectare centred on the turbine. 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 processed data at ±20nT to enhance low magnitude anomalies,
- de-stagger is used to enhance linear 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 of processed data 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 to restore north to the top of the image 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.

2.3.7 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 five survey areas covering approximately 2.7ha.

3.1.2 Magnetic anomalies located can be generally classified as positive and negative anomalies of an uncertain origin, anomalies relating to land management, linear anomalies of an agricultural origin 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.

3.2 Statement of data quality

3.2.1 Data are considered representative of the magnetic anomalies present within the site. Magnetic anomalies are notably high in magnitude suggesting high levels magnetic susceptibility relating to a natural abundance of ferrous minerals within the soil.

3.2.2 The underlying soils and solid geology have formed natural anomalies of strong contrast with a high frequency. Set up and balancing of the magnetometer may not be optimum due to the consequent lack of magnetically quiet areas in which to carry out instrument adjustment. However, any degradation of sensitivity is more than offset by the high magnitude of the anomalies across the site.

3.3 Data interpretation

3.3.1 The list of sub-headings below attempts to define a number of separate categories that reflect the range and type of features located during the survey. A 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 DISCRETE UNCERTAIN AS-ABST MAG NEG 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. Cornish Hedges often have distinctive double positive linear anomalies flanking a negative linear anomaly.
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 with a modern origin AS-ABST MAG SERVICE	Buried services may produce characteristic multiple dipolar anomalies dependant upon their construction.

Table 2: List and description of interpretation categories

3.4 List of anomalies - Area 1 turbine

Area centred on OS NGR 231836 82045, see Figures 03 & 04.

Anomalies with an uncertain origin

(1) – Two fragmented positive curvilinear anomalies are located in the southern part of the survey area. They appear in the vicinity of several pit-like anomalies.

(2) – A positive linear anomaly is located between anomalies (1) and (9). It extends in a west-south-westerly direction from anomaly (9) and has dimensions of approximately 18m by 2.5m. It may relate to a ditch-like feature.

(3) – A series of positive linear, rectilinear and curvilinear linear anomalies are located to the north of anomalies (1) and (9). It is uncertain as to whether they relate to cut features or if they have been formed naturally or by agricultural activity.

(4) – Located towards the north eastern corner of the survey area is a broad positive anomaly and other positive linear and curvilinear anomalies of uncertain origin.

(5) – A positive linear anomaly extends across the centre of the survey area with an east-west orientation.

(6) – The survey area contains numerous positive linear and curvilinear anomalies. Whilst it is possible that they relate to cut features, they lack a coherent morphology and agricultural or natural features are a possibility.

(7) - Discrete positive anomalies may indicate pit-like features. There are several large anomalies in the northern part of the survey area with dimensions of up to 7m by 4m. Although they may relate to cut features, a natural origin cannot be ruled out.

(8) – A broad, negative anomaly extends across the eastern part of the survey area and is a response to material with low magnetic susceptibility. It is approximately parallel with, and 10-12m west of, the eastern field boundary which may suggest an agricultural origin.

Anomalies associated with land management

(9) – Two positive linear anomalies flank a negative linear anomaly and extend across the survey area from the eastern to the western field boundary. There appears to be a gap approximately 17m west of the eastern field boundary. This anomaly relates to a former Cornish Hedge field boundary recorded on OS mapping from 1884, but removed by 1953.

Anomalies with an agricultural origin

(10) – A series of parallel linear anomalies extend across the survey area with a north-north-west to south-south-east orientation. These relate to former plough marks and only the trend has been shown.

3.5 List of anomalies - Area 2

Area centred on OS NGR 231261 82009, see Figures 05 & 06.

Anomalies with an uncertain origin

(11) – A positive linear anomaly extends across the north western part of the survey area. It is in the vicinity of a former field boundary marked on OS mapping from 1884 onwards which was removed after 1993. It is possible that it is associated with this removed field boundary.

(12) – A positive linear anomaly extends across the north western corner of the survey area. It is possible that it relates to agricultural activity.

(13) – The survey area contains several positive linear anomalies, some of which

are oriented north east to south west, while others are oriented north west to south east. It is not possible to determine the origin of these anomalies.

(14) – Discrete positive anomalies appear to relate to pit-like features; however, their origin is uncertain.

Anomalies with an agricultural origin

(15) – A series of parallel linear anomalies extend across the survey area and relate to former agricultural activity.

Anomalies with a modern origin

(16) – A strong, multiple dipolar, linear anomaly extends across the survey area. It is parallel with, and 3m north of anomaly (11), indicating that this relates to a buried service, possibly put in along the line of the removed field boundary.

3.6 List of anomalies - Area 3

Area centred on OS NGR 231383 81983, see Figures 05 & 06.

Anomalies with an uncertain origin

(17) – A series of fragmented positive anomalies appear to form a partially curvilinear feature.

(18) – A positive linear anomaly extends across the survey area and is parallel with the western field boundary.

(19) – The survey area contains many fragmented positive linear, curvilinear and discrete responses. It is possible that they are natural in origin.

(20) – A positive linear anomaly extends across the south eastern part of the survey area and is parallel with the southern field boundary. It is possible that it relates to agricultural activity.

3.7 List of anomalies - Area 4

Area centred on OS NGR 231540 81971, see Figures 07 & 08.

Anomalies with an uncertain origin

(21) – A broad, positive linear anomaly extends across the western part of the survey area and is oriented north west to south east. It appears to have been

disturbed by a service (25), and it is possible that it relates to a cut feature.

(22) – A positive linear anomaly is located close to the north western edge of the survey area. It is possible that it relates to a cut feature.

(23) – A positive linear anomaly is located close to the southern edge of the survey area and is parallel with the southern field boundary. An agricultural origin is possible.

(24) – The survey area contains several short or fragmented positive linear and discrete anomalies.

Anomalies with a modern origin

(25) – A strong, multiple dipolar linear anomaly extends north eastwards from the south western field entrance and relates to a buried service.

3.8 List of anomalies - Area 5

Area centred on OS NGR 231702 82004, see Figures 07 & 08.

Anomalies with an uncertain origin

(26) – A positive curvilinear anomaly, located within the western half of the survey area. It is possible that it relates to a cut ditch-like feature, but this is uncertain.

(27) – Positive linear anomalies located at the eastern end of the survey area are uncertain in origin.

Anomalies associated with land management

(28) – Two positive linear anomalies flanking a negative linear anomaly, relate to a former field boundary indicated on OS mapping in 1884 and removed prior to 1983.

Anomalies with an agricultural origin

(29) – The general trend of agricultural activity is parallel with the eastern field boundary.

4 CONCLUSION

4.1.1 The detailed magnetometer survey located many geophysical anomalies the majority of which are uncertain in origin. Linear, curvilinear and discrete positive anomalies may represent former cut features but it is likely that many are related to natural features and agricultural activity.

4.1.2 Within Area 1, the turbine site, the line of a former field boundary was located. It appears to have a gap although it is uncertain whether this was originally intended or constructed at a later date. Other positive curvilinear and discrete anomalies in Area 1 may relate to cut features, although it is likely that the underlying geology has formed many.

4.1.3 The cable route, comprising Areas 2 to 5, contains evidence for ditch-like and pit-like anomalies; however, it is not possible to determine if these have an anthropogenic or natural origin. A positive linear anomaly within Area 2 appears to correspond with the line of a removed field boundary. Within Area 4 there appears to be two broad positive linear anomalies, one of which may have been disturbed by a service. These may relate to cut ditch-like features. Area 5 contains evidence for a removed field boundary as well as curved and linear anomalies.

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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 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 processed data

COMPOSITE
Filename: J406-mag-Area1-proc.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 20/04/2012
Assembled by: on 23/04/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00
Dimensions
Composite Size (readings): 360 x 150
Survey Size (meters): 90.00m x 150.00 m
Grid Size: 30.00 m x 30.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 20.27
Min: -20.00
Std Dev: 7.08
Mean: 0.27
Median: 0.00
Composite Area: 1.35 ha
Surveyed Area: 1.04 ha

PROGRAM
Name: ArcheoSurveyor
Version: 2.5.16.0

Processes: 7
1 Base Layer
2 De Stagger: Grids: 12.xgd Mode: Outbound By: 1 intervals
3 De Stagger: Grids: 14.xgd Mode: Both By: 1 intervals
4 Clip from -20.00 to 20.00 nT
5 DeStripe Median Traverse: Grids: All
6 Clip from -20.00 to 20.00 nT
7 De Stagger: Grids: 13.xgd Mode: Outbound By: 1 intervals

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

Area 2 processed data

COMPOSITE
Filename: J406-mag-Area2-proc.xcp
Dimensions
Composite Size (readings): 120 x 150m
Survey Size (meters): 30.00m x 150.00 m
Grid Size: 30.00 m x 30.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 20.00
Min: -20.00
Std Dev: 8.78
Mean: 0.83
Median: 0.46
Composite Area: 0.45 ha
Surveyed Area: 0.35 ha

Processes: 4
1 Base Layer
2 De Stagger: Grids: All Mode: Outbound By: 1 intervals
3 DeStripe Mean Traverse: Grids: All Threshold: 0.5 SDs
4 Clip from -20.00 to 20.00 nT

Source Grids: 5
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\04.xgd
5 Col:0 Row:4 grids\05.xgd

Area 3 processed data

COMPOSITE
Filename: J406-mag-Area3-proc.xcp
Dimensions
Composite Size (readings): 120 x 150
Survey Size (meters): 30.00m x 150.00 m
Grid Size: 30.00 m x 30.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 20.00
Min: -20.00
Std Dev: 7.97
Mean: 0.27
Median: 0.00
Composite Area: 0.45 ha
Surveyed Area: 0.32 ha

Processes: 3
1 Base Layer
2 DeStripe Median Traverse: Grids: All
3 Clip from -20.00 to 20.00 nT

Source Grids: 5
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\04.xgd
5 Col:0 Row:4 grids\05.xgd

Area 4 processed data

COMPOSITE
Filename: J406-mag-Area4-proc.xcp
Dimensions
Composite Size (readings): 120 x 180
Survey Size (meters): 30.00m x 180.00 m
Grid Size: 30.00 m x 30.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 20.00
Min: -20.00
Std Dev: 8.74
Mean: 0.51
Median: 0.00
Composite Area: 0.54 ha
Surveyed Area: 0.41 ha

Processes: 3
1 Base Layer
2 DeStripe Median Traverse: Grids: All
3 Clip from -20.00 to 20.00 nT

Source Grids: 6
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\04.xgd
5 Col:0 Row:4 grids\05.xgd
6 Col:0 Row:5 grids\06.xgd

Area 5 processed data

COMPOSITE
Filename: J406-mag-Area5-proc.xcp
Dimensions
Composite Size (readings): 120 x 150
Survey Size (meters): 30.00m x 150.00 m
Grid Size: 30.00 m x 30.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 20.00
Min: -20.00
Std Dev: 9.01
Mean: 0.49
Median: 0.40
Composite Area: 0.45 ha
Surveyed Area: 0.41 ha

PROGRAM
Name: ArcheoSurveyor
Version: 2.5.16.0

Processes: 7
1 Base Layer
2 Clip from -20.00 to 20.00 nT
3 DeStripe Median Traverse: Grids: 04.xgd
4 DeStripe Median Traverse: Grids: 05.xgd
5 DeStripe Median Traverse: Grids: 01.xgd
6 DeStripe Median Traverse: Grids: 02.xgd
7 Clip from -20.00 to 20.00 nT

Source Grids: 5
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\04.xgd
5 Col:0 Row:4 grids\05.xgd

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.

Surveys are reported on in hardcopy (recycled paper) using A4 for text and A3 for plots (all plots are scaled for A3). A copy will be sent to Cornwall Record Office and the Courtenay Library of the Royal Institution of Cornwall. The report will also be uploaded to to Oasis and the grey literature library.

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

- ArcheoSurveyor version 2.5.16.0 (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 produced by the survey and report 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.