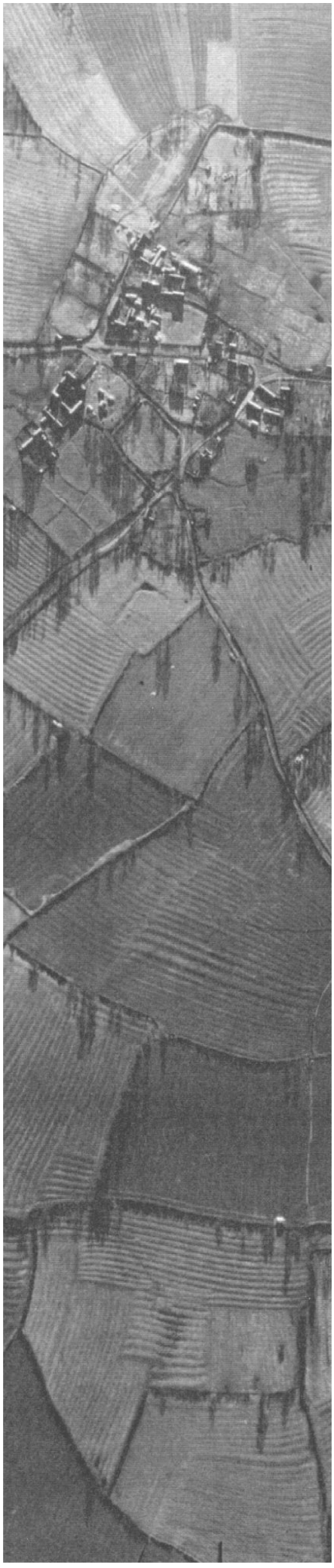

ARCHAEOLOGICAL SURVEYS LTD

GEOPHYSICAL SURVEY REPORT

Gore End Farm
Shepton Mallet
Somerset

Magnetometer Survey

for

J S Bloor (Swindon) Ltd and
B & R Thorner Ltd

David Sabin and Kerry Donaldson

January 2008

Ref. no. 219

ARCHAEOLOGICAL SURVEYS LTD

Gore End Farm, Shepton Mallet, Somerset

Magnetometer Survey

for

J S Bloor (Swindon) Ltd and B & R Thorner Ltd

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

Survey date - **28th January 2008**
Ordnance Survey Grid Reference – **ST 625 423**

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SUMMARY

A magnetometry survey was carried out over 2ha at Gore End Farm, Shepton Mallet, Somerset prior to an extension of a housing development. The survey located a number of positive linear and discrete anomalies that relate to cut features such as ditches and pits. The location of prehistoric features, during previous survey and excavation on land immediately to the north of the survey area, would tend to indicate a high archaeological potential for these anomalies. A number of anomalies could not be confidently interpreted but may also represent features with archaeological potential. The survey area contained linear anomalies associated with agricultural activity possibly indicating former ridge and furrow field systems. Two buried services cross the survey area and have created zones of severe magnetic disturbance.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by Archaeological Consultant Peter Leach on behalf of J S Bloor (Swindon) Ltd and B & R Thorner Ltd to undertake a geophysical survey of an area of land at Gore End Farm, Shepton Mallet that has been outlined for an extension to the Field Farm housing development. This survey formed part of an assessment of any potential archaeology that may be affected by the development.

1.1.2 Previous geophysical survey immediately to the north of the survey area (Substrata, 2002) followed by archaeological investigations (Leach, 2002 and 2004) revealed a number of prehistoric features. The results of the survey are considered within the context of the previous works.

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 Magnetometry is a highly effective and efficient means of archaeological prospection recommended for survey over large areas. The survey and report generally follow the recommendations set out by English Heritage, 1995: *Geophysical survey in archaeological field evaluation. Research and Professional Service Guideline No. 1.*

1.3 Site location, description and survey conditions

1.3.1 The site is located to the south of the Field Farm housing estate on the southern side of Shepton Mallet in Somerset at Ordnance Survey Grid Reference ST 625 423.

1.3.2 The geophysical survey covers an area of approximately 2 ha within two pasture fields separated by a hedgerow, fields are referred to as western and eastern, see Figure 02. The land to the north was under the construction phase of the housing development and soil and debris had been dumped in the north western section of the survey area.

1.4 Site history and archaeological potential

1.4.1 Previous geophysical survey in 2002 (Substrata, unpublished client report) immediately to the north, revealed several positive anomalies that indicated archaeological features; subsequent excavations between 2002 and 2004 (Leach, unpublished client report) confirmed the presence of prehistoric cut features. In the field to the south of the survey area, a watching brief carried out in 2006 found one prehistoric linear feature and earlier excavations in 1996, on the site of the Cannards Grave roundabout, located an Iron Age Farmstead and part of an extensive Romano-British settlement that extends along the Fosse Way to the northeast. A brief summary of the archaeological context has been compiled by Peter Leach and should be referred to for further information (see Appendix A).

1.5 Geology and soils

1.5.1 The underlying geology is Lower Lias (BGS 2001).

1.5.2 The overlying soils across the site are from the Sherborne association which are brown rendinzas. These consist of shallow well drained brashy calcareous clayey soils over limestone (Soil Survey of England and Wales 1983).

1.5.3 Magnetometry is particularly effective over Jurassic limestones, although clayey soils can produce moderate to poor results. Previous geophysical survey carried out by Substrata in 2002 immediately to the north indicated that the conditions were favourable for detailed magnetometry.

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 B.

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 can produce magnetic anomalies that can

be mapped during magnetic prospection.

2.1.3 Magnetic thermoremnance can occur when ferrous minerals have been heated to high temperatures such as in a kiln, hearth or associated with other industrial processes. 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 Bartington Grad601-2 gradiometer. This instrument effectively measures a magnetic gradient between two fluxgate sensors mounted vertically 1m apart. Two sets of sensors are mounted on a single frame 1m apart horizontally. The instrument is extremely sensitive and is able to measure magnetic variation to 0.1nanoTesla (nT). All readings are saved to an integral data logger for analysis and presentation

2.2.2 The instrument is 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. It is often very difficult to obtain optimum balance for the sensors due to localised magnetic vectors that can 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. Archaeological Surveys use a non-magnetic tripod with an additional supporting structure to raise the instrument during the set-up procedure, this has been found to improve the sensor balance.

2.2.3 The Bartington gradiometer undergoes regular servicing and calibration which is carried out by the manufacturer. A current assessment of the instrument is shown in Table 1 below.

Date of calibration/service	21st May 2007
Sensor type	Bartington Grad - 01 – 1000 Nos. 084 and 085
Bandwidth	12Hz (100nT range) both sensors
Noise	<100pT peak to peak
Adjustable errors	<2nT

Table 1: Bartington fluxgate gradiometer sensor calibration results

The instrument was considered to be in good working order prior to the survey with no known faults or defects.

2.2.4 Data were collected at 0.25m centres along traverses 1m apart. The survey area was separated into 30m by 30m grids 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, 1995).

2.2.5 The survey grids were set out to the Ordnance Survey OSGB36 datum using a Penmap RTK GPS. 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.

2.2.6 The fixed orientation of survey grids based on the OSGB36 datum was considered appropriate given that the orientation of land boundaries and obstructions was variable and consequently partial survey grids were unavoidable. In addition there is an optimum north – south traverse direction for magnetic survey (English Heritage,1995). Survey in this direction exploits the greater contrast of magnetic features which is a function of their presence within the Earth's magnetic field. A fixed grid across the site also simplifies its relocation should that be required.

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 ±20nT to improve greyscale resolution,
- clipping of processed data at ±3nT to enhance low magnitude anomalies,
- clipping of trace plots at ±100nT in order to minimise strong readings obscuring low magnitude responses,
- de-stagger is used to enhance linear anomalies,
- zero median/mean traverse is applied in order to balance readings along each traverse.

Data processing explanation notes:

Clipping
Clipping replaces the values outside the specified minimum and maximum with those values. The process is useful for displaying detail as extreme values are removed allowing greyscale shades to be allocated to a narrower range of values which improves the definition of anomalies.

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.

De-stagger
Compensates for small positional errors within data collection by shifting the position of the readings along each traverse by a specified amount.

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 assessment of features within the survey area. Where further interpretation is possible or where a number of possible origins should be considered, more detailed discussion is set out in Section 4.

2.3.4 The main form of data display used in this report is the greyscale plot. Magnetic data are also displayed as a trace plot. Both 'raw' and 'processed' data have been shown followed by an abstraction and interpretation plot.

2.3.5 Graphic raster images in Bitmap format are initially prepared in ArcheoSurveyor. Regardless of survey orientation, data captured along each traverse is displayed and processed by ArcheoSurveyor from left to right. This corresponds to a direction of south to north in the field for the survey. Prior to displaying against base mapping, raster graphics require a rotation of 90° anticlockwise to restore north to the top of the image. Greyscale images are rotated upon insertion into AutoCAD, traceplots are rotated using ArcheoSurveyor. Rotated traceplots are derived from interpolated datasets

and can be considered as representative only as the raw data will have been modified to a minor degree.

2.3.6 The raster images are combined with base mapping using 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 including raster images is produced with this report allowing separate analysis if necessary, see Appendix D.

3 RESULTS

3.1 General overview

3.1.1 The detailed magnetic survey was carried out over 2ha. Geophysical anomalies located can be generally classified as positive linear and discrete positive responses of archaeological origin, positive linear and discrete anomalies of an uncertain origin, 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 the survey area have been numbered and will be outlined below with subsequent discussion in Section 4.

3.1.2 Survey conditions were generally considered to be moderate to good. The grass cover was variable but mainly short. Parts of the site were not accessible for survey; these include a section of land along the northern part of the western field which had been used for dumping soil and building materials and a track running along the western side of the eastern field. Severe magnetic disturbance was noted from dwellings immediately adjacent to the southern boundary of the western field and from buried services within both fields. Weather conditions were overcast but very suitable for survey.

3.1.3 The listing 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 reference to the abstraction and interpretation plot. Sub-headings are then used to group anomalies with similar characteristics for each survey area.

Anomalies with an archaeological origin

Positive anomalies

The category is used where anomalies have the characteristics of a range of

archaeological features such as pits, ring-ditches, enclosures etc..

Anomalies with an uncertain origin

Positive anomalies
Negative anomalies

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.

Anomalies with an agricultural origin

Agricultural anomalies
Former ridge and furrow

Where confidence is high that anomalies have been caused by agricultural features this category is applied. 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.

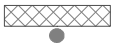
Anomalies with a modern origin

Magnetic disturbance
Strong multiple dipolar linear anomaly - pipeline/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.

Anomalies associated with magnetic debris

Magnetic debris
Strong discrete dipolar anomaly



The response often appears as areas containing many small dipolar anomalies that may range from weak to very strong in magnitude. Magnetic debris 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.

3.2 List of anomalies

Anomalies with an archaeological origin

(1) – A broadly curvilinear anomaly extends across the north eastern part of the site for approximately 120m. The form and magnitude of this anomaly suggests a response to the magnetically enhanced fill of a cut feature. A second parallel linear anomaly can be seen towards its north western end. The main curvilinear anomaly appears to bound pit-like anomalies (4) and may be associated with them.

(2 & 3) –Two positive linear anomalies. Anomaly (2) appears to cross anomaly (1) from the northeast, where it then turns to the south, anomaly (3) is parallel to the northern part of anomaly (2) and extends towards but not beyond anomaly (1).

(4) –The survey area contains many positive responses that indicate pit-like features. These are bounded to the south by anomaly (1) and it is possible that they are associated. They range in size from discrete pits of 1.7m in diameter to linear pits of up to 18m in length. It is possible that some are related to former quarrying, however their fill is magnetically enhanced. Some of these anomalies may have been disturbed by the ridge and furrow in the north of the site.

Anomalies with an uncertain origin

(5) – Close to the western edge of the survey area is a discontinuous positive curvilinear anomaly. It appears that the eastern part of this anomaly has been disturbed by the pipeline (15) that crosses this part of the site. Although uncertain in origin, it is possible that this relates to a cut feature with an archaeological origin.

(6) – Several positive linear anomalies are located in the western half of the survey area. They do not form any coherent pattern, partly due to the presence of former ridge and furrow, and although they may relate to cut features, an archaeological origin cannot be confidently stated.

(7) – A positive “L” shaped anomaly located in the western half of the survey area.

(8) – Discrete low magnitude positive anomalies located very close to the western edge of the survey area.

(9) – A negative linear anomaly extends across the western part of the survey area with an approximate east to west orientation. It extends westwards beyond the service and appears to have been cut by anomaly (5).

Anomalies with an agricultural origin

(10) – A series of linear anomalies in the eastern half of the survey area are oriented east to west. Towards the north, they appear to have disturbed deposits within the pit-like features (4). It is likely that these relate to former ridge and furrow.

(11) – A series of linear anomalies oriented north-north-west to south-south-east in the western half of the survey area are also likely to be a response to former ridge and furrow.

Anomalies associated with magnetic debris

(12) – Along the north western edge of the survey area is a patch of magnetic debris which is likely to be a response to dumped magnetically thermoremnant or ferrous material.

(13) – The site contains many strong discrete dipolar anomalies which indicate the presence of ferrous or thermoremnant material within the topsoil.

Anomalies with a modern origin

(14) – A double negative curvilinear anomaly along the north western corner of the survey area is a response to ruts caused by construction vehicles.

(15 & 16) – Two buried services or pipelines cross the survey area and are likely to have disturbed archaeological features.

(17) – Magnetic disturbance caused by ferrous material.

4 DISCUSSION

4.1

4.1.1 The north eastern corner of the survey area contains a substantial number of discrete and linear pit-like anomalies that appear to be bounded by a long broadly curvilinear ditch. Although natural features, such as solution hollows and tree throw pits may also appear similar, it is likely that the majority of these have been formed by anthropogenic activity. Two low magnitude positive linear anomalies extending from the north are also likely to be responses to the magnetically enhanced fill of ditches. Previous geophysical survey and excavation immediately to the north found similar cut features which have been assigned to the middle or late Bronze Age (see Appendix A); it is therefore likely that these anomalies relate to a continuation of the archaeological features previously located to the north.

4.1.2 The western part of the survey area contains several positive anomalies. A positive curvilinear anomaly appears to have been disturbed by a modern pipeline and may be indicative of a ring-ditch feature. Several other linear and discrete responses can also be seen but their morphology and low magnitude precludes confident interpretation.

4.1.3 Two sets of former ridge and furrow have been located possibly suggesting a long standing boundary between the two fields that make up the survey area. The larger eastern field contains parallel linear responses oriented east to west and the western field contains parallel linear anomalies oriented north-north-west to south-south-east.

5 CONCLUSION

5.1

5.1.1 The detailed magnetometer survey located a number of positive linear and discrete anomalies that appear to relate to cut features such as ditches and pits with an archaeological origin. Interpretation is aided by the location of archaeological features immediately to the north of the survey area during previous investigations. It is possible that the anomalies located by this survey are similar in nature or relate to those discovered to the north.

5.1.2 The western part of the survey area contains several positive discrete, linear and curvilinear anomalies and a negative linear anomaly. It has not been possible to confidently interpret these anomalies as they have been partially disturbed by a modern service and former ridge and furrow; their archaeological potential should be considered.

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Appendix A – Gore End Farm Survey:Archaeological Context

By Peter Leach

The two surveyed areas south of Gore End Farm are the last to be investigated within the Field Farm development site. Geophysical survey and evaluation by trial trenching in the three fields to the north and east of the farm site (Fields 1, 2 & 3) encountered a scatter of below-ground, man-made features, the majority of prehistoric origin (Substrata 2002, Leach 2002). These discoveries led to a further phase of more extensive excavations in 2004 to target specific areas, and a watching brief during the development programme thereafter, the results of which are currently being prepared for final publication (Leach 2004, Bagwell & Webster 2005). In 2006 a watching brief maintained during topsoil removal in the adjacent field to the south of the current survey site encountered only one suspected prehistoric linear feature. This triangular plot abuts the Cannards Grave roundabout junction with Cannards Grave Road (A371), Whitstone Road (A37) and Fosse Lane (A361) to the south east. Archaeological excavations in advance of its construction in 1996 revealed remains of an Iron Age farmstead and the southern boundary of an extensive Romano-British settlement (Birbeck 2002). The latter extends northwards for almost 1km along both sides of Fosse Lane (Leach 2001).

In the context of a so prolific local focus of archaeological sites there is thus a high probability of further remains surviving within the current survey area. This appears to be confirmed most strongly in the larger eastern field by a set of linear anomalies, and the irregular scatter of discrete anomalies towards its northeast corner. Survey and excavation results from the fields immediately to the north invite the closest comparisons (Substrata 2002, Leach 2004, etc.). The strongest linear feature on a northwest – southeast alignment, most nearly resembles some of the prehistoric rock-cut ditches found in Field 3, notably that towards its northern end. Most of these were identified as of Middle or Late Bronze Age origin (*c.*1400-1000 BC), laid out as parts of a more extensive system of fields. These were linked to a contemporary sub-circular enclosure of several phases located in the southwest corner of Field 3. The two less prominent linear features in the eastern field may also be associated with this layout. The scattered group of more irregular discrete anomalies may be compared to a similar group in the northeast corner of Field 3. Where investigated, the majority were proven as rock-cut pits of varied prehistoric origin, although natural solution hollows or tree root pits also occur within the limestone bedrock here. The manmade pits in Field 3 were of Neolithic, Early and Middle Bronze Age date, the earliest with a radiocarbon date around 2900 BC.

Results from the smaller western field are less clear, and further obscured by a modern metal pipe crossing the area. One indistinct semicircular anomaly to the west and crossed by the modern pipeline, has some potential as an archaeological feature. This is conceivably part of a circular enclosure or ring ditch of prehistoric origin, comparable with the Bronze Age enclosures in Field 3 (Leach 2004) or the Iron Age remains at Cannards Grave (Birbeck 2002).

The survey appears to demonstrate the potential for surviving archaeological features in both areas covered. In the context of remains already found and investigated elsewhere in the locality it is recommended that a further stage of investigation is required to ascertain

the presence and character of any suspected remains in this area. This could be achieved most effectively by a programme of trial trenching, as applied elsewhere within the Field Farm Development site. The results of such an evaluation, combined with this survey, could then be used to devise an appropriate strategy, in consultation with the Local Planning Authority and Historic Environment Service of Somerset County Council, to mitigate the impact of any proposed development in this area upon the surviving archaeology.

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Appendix B – 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 C – survey and data information

Raw magnetometry

Filename: Mag-raw.xcp
Instrument Type: Grad 601 (Magnetometer)
Units: nT
Surveyed by: on 28/01/2008
Assembled by: on 28/01/2008
Direction of 1st Traverse: 0 deg
Collection Method: ZigZag
Sensors: 2 @ 0.00 m spacing.
Dummy Value: 32702
Origin: Zero

Dimensions
Composite Size (readings): 480 x 270
Survey Size (meters): 120 m x 270 m
Grid Size: 30 m x 30 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 20.00
Min: -20.00
Std Dev: 5.32
Mean: -0.39

Processes: 3
1 Base Layer
2 Search & Replace From: -3000 To: 3000 With: 32702 (Area: Top 0, Left 0, Bottom 29, Right 119)
3 Clip from -20 to 20

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

Processed magnetometry

Filename: Mag-proc.xcp
Instrument Type: Grad 601 (Magnetometer)
Units: nT
Surveyed by: on 28/01/2008
Assembled by: on 03/02/2008
Direction of 1st Traverse: 0 deg
Collection Method: ZigZag
Sensors: 2 @ 0.00 m spacing.
Dummy Value: 32702
Origin: Zero

Dimensions
Composite Size (readings): 480 x 270
Survey Size (meters): 120 m x 270 m
Grid Size: 30 m x 30 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 3.00
Min: -3.00
Std Dev: 1.61
Mean: -0.09

Processes: 11
1 Base Layer
2 Clip from -10 to 10
3 DeStripe Median Traverse: Grids: 09.xgd 21.xgd 22.xgd 23.xgd 29.xgd 17.xgd 18.xgd 19.xgd 20.xgd 30.xgd
4 DeStripe Median Traverse: Grids: 25.xgd 26.xgd 27.xgd 28.xgd
5 DeStripe Median Traverse: Grids: 03.xgd 06.xgd
6 DeStripe Mean Traverse: Grids: 24.xgd Threshold: 1 SDs
7 DeStripe Mean Traverse: Grids: 13.xgd 14.xgd 15.xgd 16.xgd 31.xgd Threshold: 1 SDs
8 DeStripe Mean Traverse: Grids: 10.xgd 11.xgd 12.xgd Threshold: 0.5 SDs
9 DeStripe Mean Traverse: Grids: 07.xgd 08.xgd 09.xgd Threshold: 1 SDs
10 DeStripe Mean Traverse: Grids: 01.xgd 02.xgd 04.xgd 05.xgd Threshold: 1 SDs
11 Clip from -3 to 3

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

Appendix D – digital archive

Survey results are produced in hardcopy using A4 for text and A3 for plots (all plots are scaled for A3). In addition digital data created during the survey are supplied on CD. Further information on the production of the report and the digital formats involved in its creation are set out below.

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

- ArcheoSurveyor version 2.1.4.4 (geophysical data analysis),
- AutoCAD LT 2007 (report figures),
- OpenOffice.org 2.3 Writer (document text),
- PDF Creator version 0.9 (PDF archive).

Digital data are supplied on CD ROM which includes 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 CD ROM structure is formed from a tree of directories under the title J219 Gore End Farm – CD. Directory titles include Data, Documentation, CAD and PDFs. Multiple directories exist under Data and hold Grid, Composite and Graphic files with CSV composite data held in Export.

The CAD file contains externally referenced graphics that may be rotated, see 2.3.5, 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).

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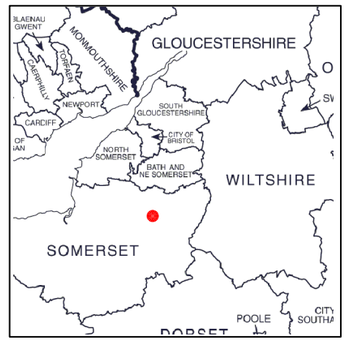
Geophysical Survey
Gore End Farm
Shepton Mallet

Map of survey area



● Survey location

Site centred on OS NGR
ST 625 423

SCALE 1:25 000

0m 500m 1000m

SCALE TRUE AT A3

FIG 01

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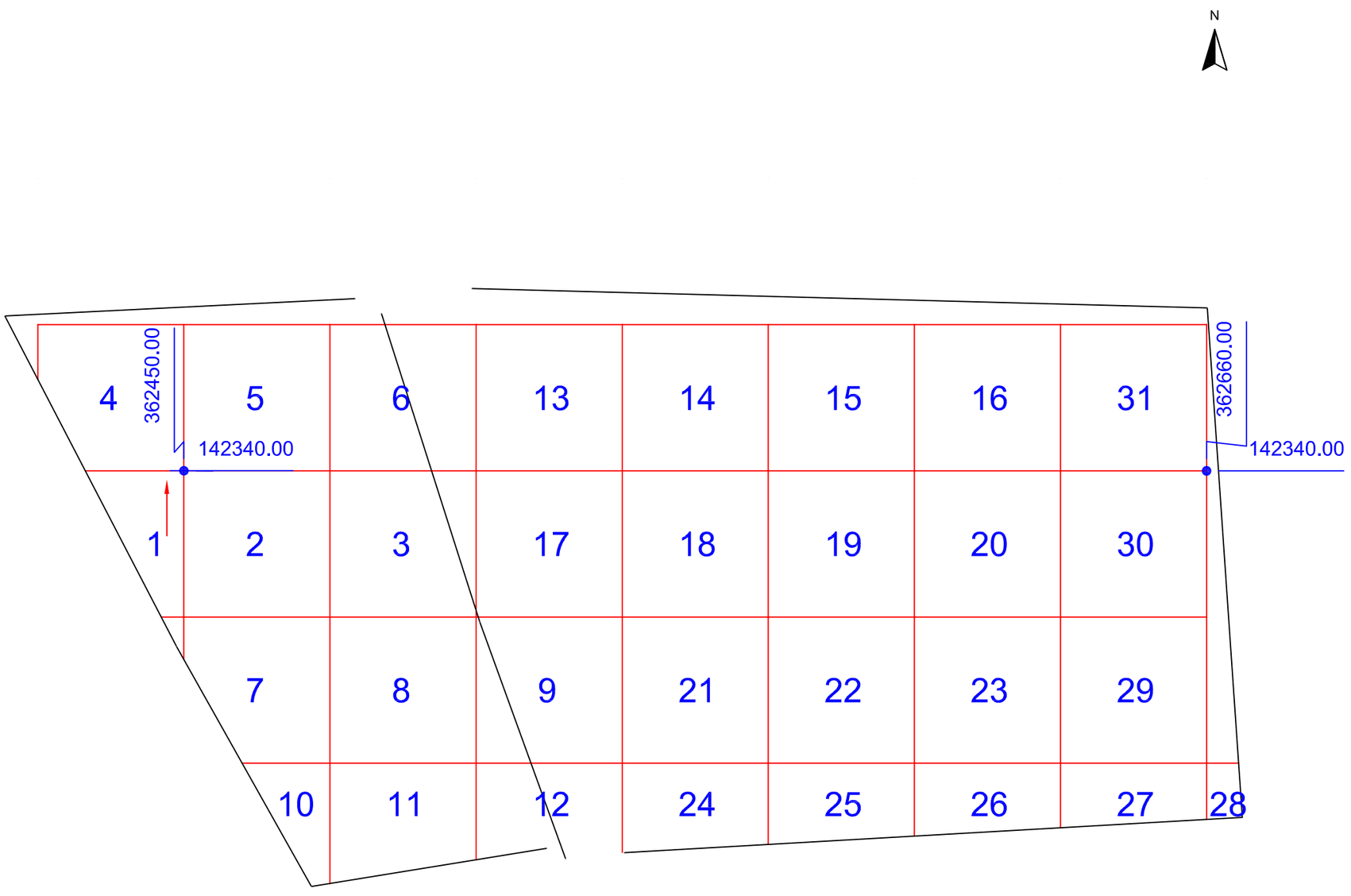

Referencing information

Grid coordinates based on Ordnance Survey OSGB36 datum

Grids set out using RTK GPS with Leica Smartnet correction data RTCMv2 format

Survey grid size = 30m

→ Survey start and traverse direction

1 Grid reference number and filename

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 02

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Gore End Farm
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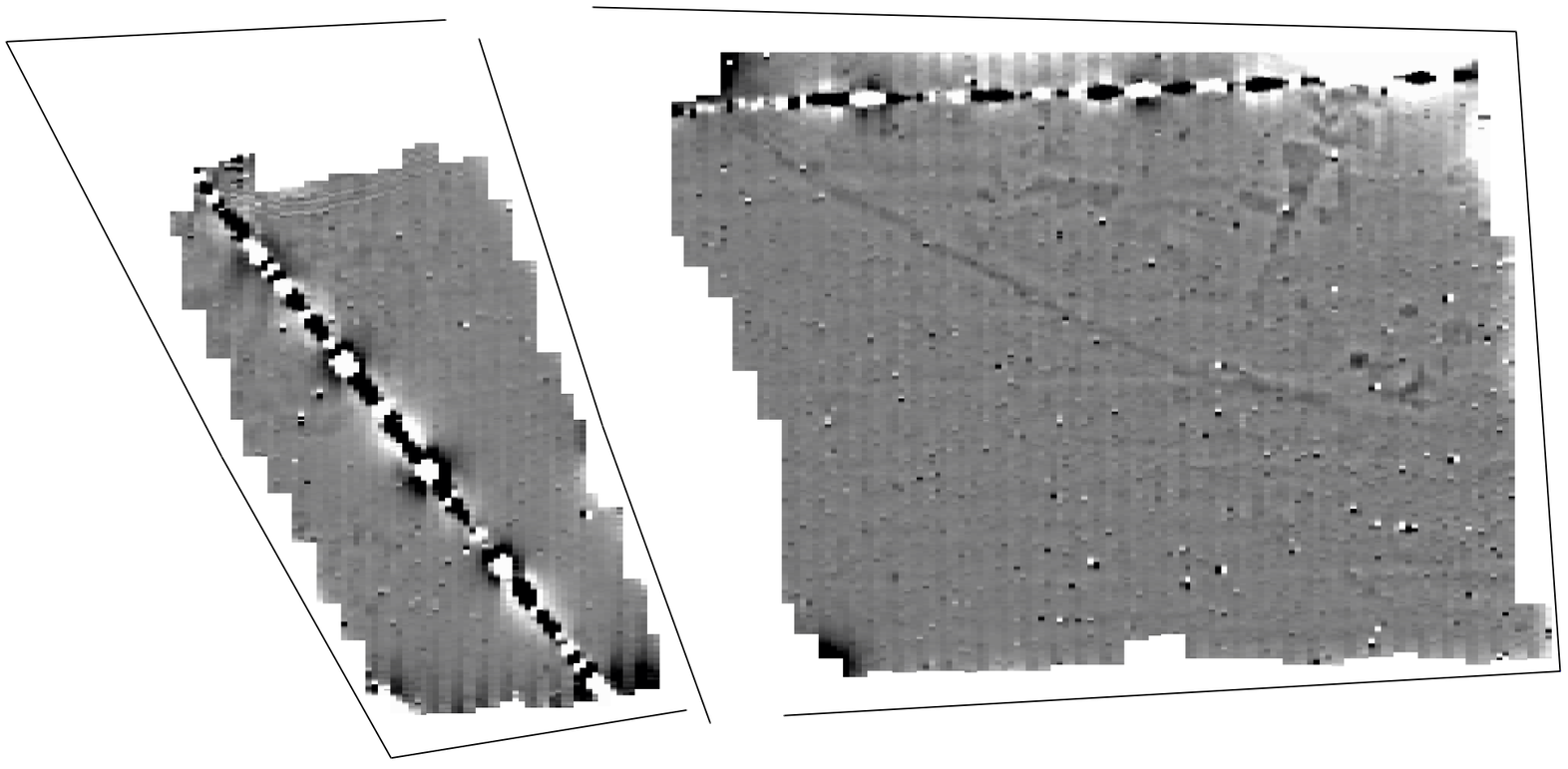
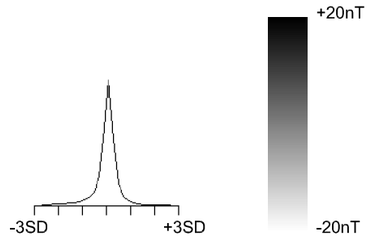
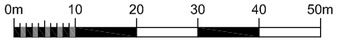
N



Greyscale plot of raw magnetometer data

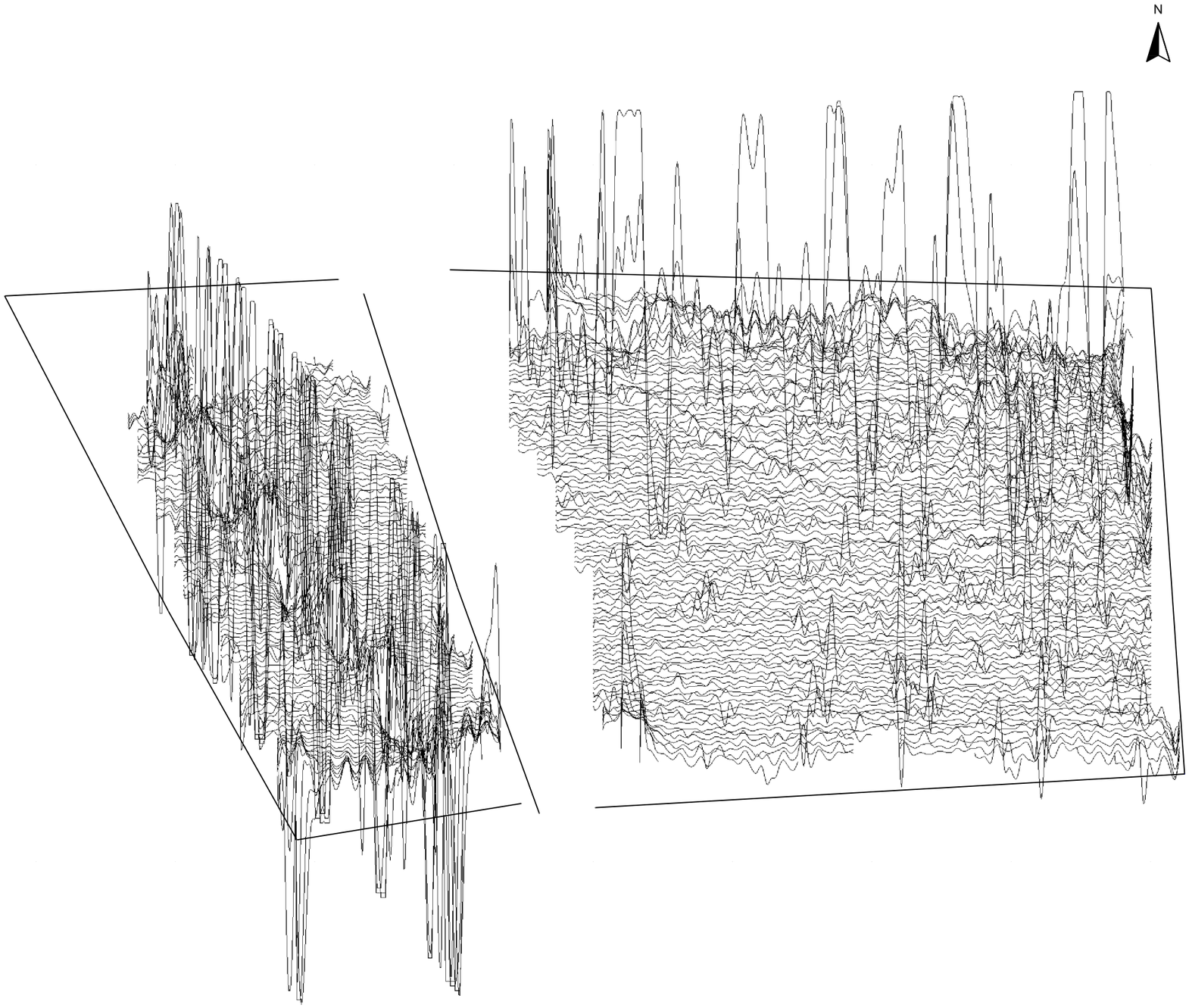


SCALE 1:1000



SCALE TRUE AT A3

FIG 03



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Gore End Farm
Shepton Mallet

Traceplot of raw magnetometer data

+40nT
+20nT
0nT
-20nT
-40nT

Approx 20nT/ cm vertical displacement.

Data have been clipped at ± 100nT.

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 04

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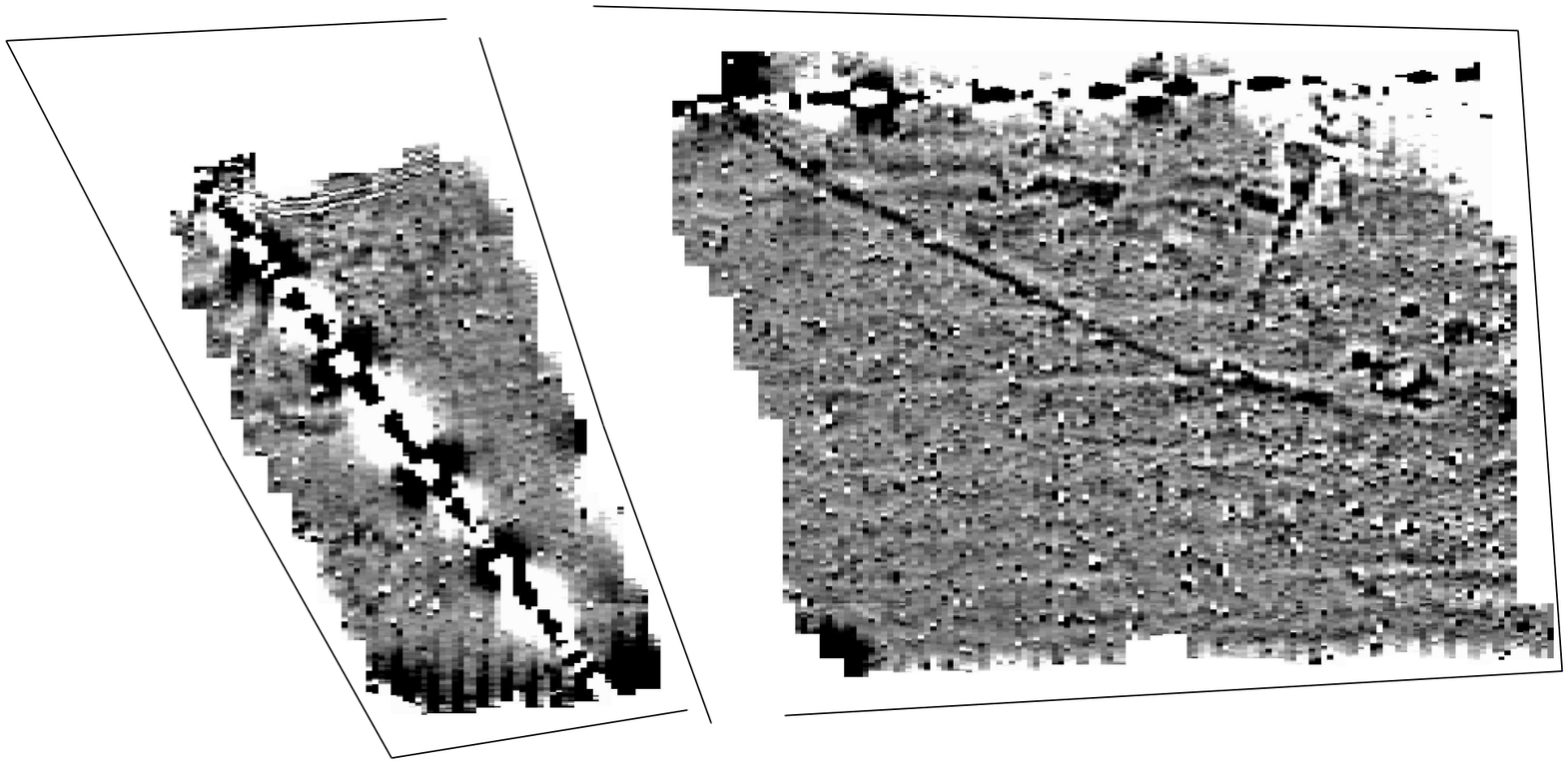
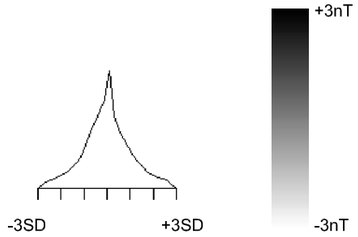
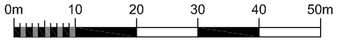
N



Greyscale plot of processed magnetometer data



SCALE 1:1000



SCALE TRUE AT A3

FIG 05

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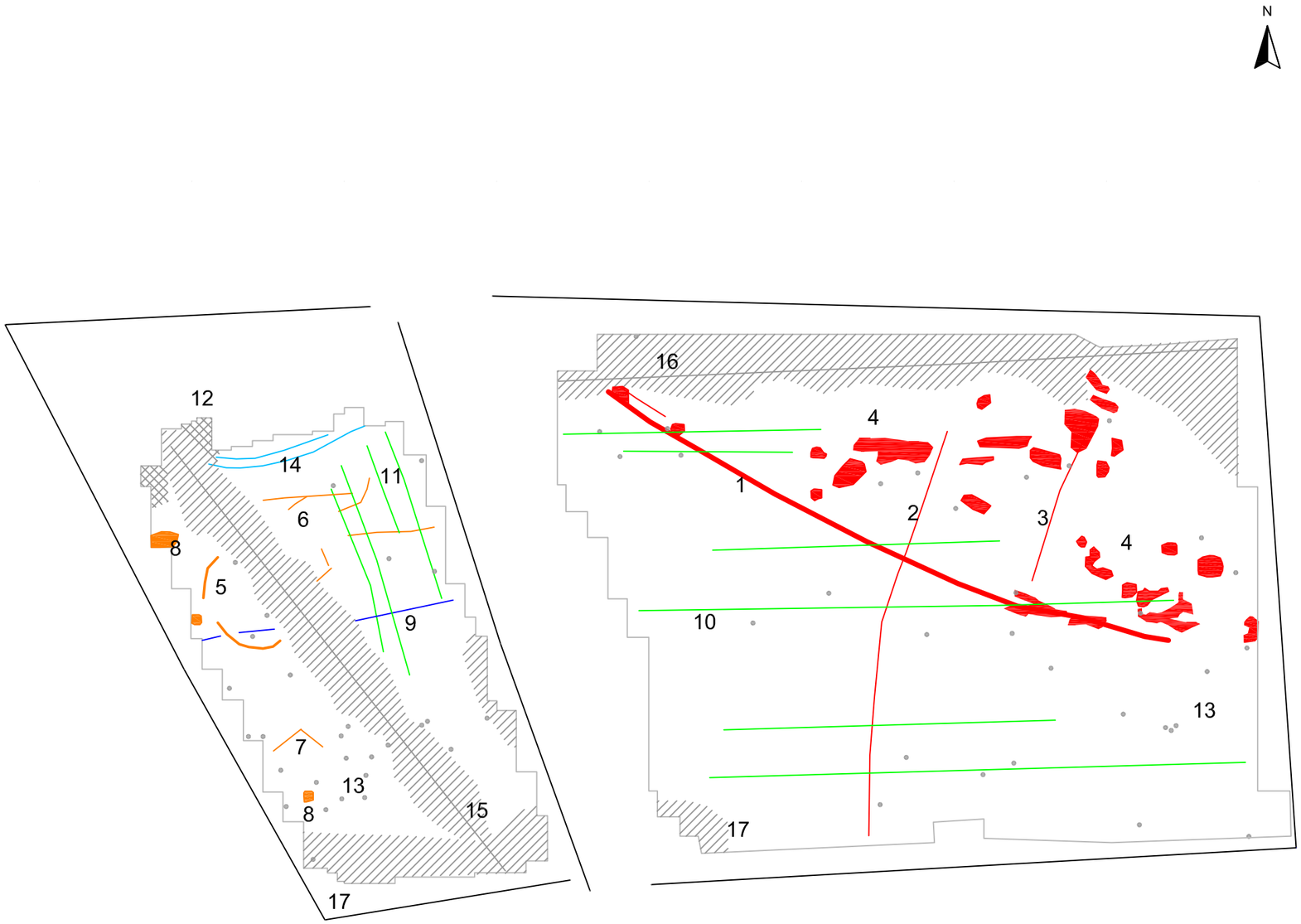

Abstraction and interpretation of magnetometer anomalies

- Positive linear anomaly - cut feature of archaeological origin
- Positive linear anomaly - of uncertain origin
- Negative linear anomaly - response to vehicle ruts
- Linear anomaly - of agricultural origin
- Negative linear anomaly - of uncertain origin
- Discrete positive response - cut feature of archaeological origin
- Discrete positive response - uncertain origin
- 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