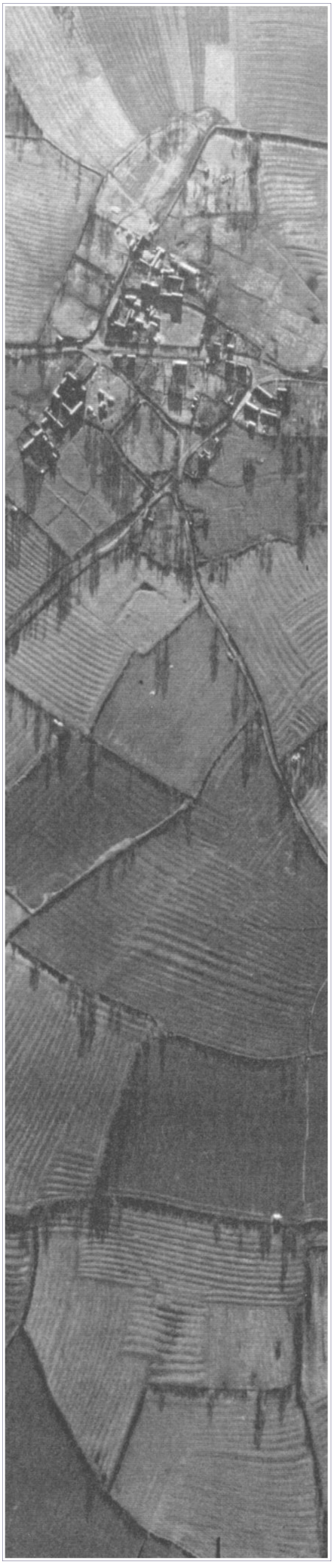

ARCHAEOLOGICAL SURVEYS LTD

GEOPHYSICAL SURVEY REPORT

Land South of Wellow Lane
Peasedown St John
Bath and North East Somerset

Magnetometer Survey

for

Environmental Dimension Partnership

David Sabin and Kerry Donaldson

January 2009

Ref. no. J249

ARCHAEOLOGICAL SURVEYS LTD

Land South of Wellow Lane
Peasedown St John
Bath and North East Somerset

Magnetometer Survey

for

David Wilson Homes

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

Survey date - **9th October 2008 and 9th January 2009**
Ordnance Survey Grid Reference – **ST 692 561**

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SUMMARY

Magnetometry was carried out on agricultural land to the south of Peasedown St John in Bath and North East Somerset. The survey located a penannular 'ring ditch' feature, 14m in diameter, with a 6m gap on the south western side located between two possible terminal pit-like features. The 'ring ditch' has been highlighted as a feature of archaeological potential. Parallel linear anomalies extending across the width of the survey areas may relate to ditch-like features however their origin cannot be confidently interpreted.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by the Environmental Dimension Partnership (EDP), on behalf of David Wilson/Barratt Homes, to undertake a geophysical survey of an area of land on the southern edge of Peasedown St John. The area has been outlined for residential development. The survey formed part of an assessment of any potential archaeology that may be affected by the development.

1.1.2 The geophysical survey was carried out in accordance with a Method Statement produced by Archaeological Surveys (Archaeological Surveys, 2008) and approved by Richard Sermon of Bath and North East Somerset Council.

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, 2008: *Geophysical survey in archaeological field evaluation.*

1.3 Site location, description and survey conditions

1.3.1 The site is located to the south of Wellow Lane on the southern edge of Peasedown St John, Bath and North East Somerset and centred on Ordnance Survey NGR ST 7038 5692.

1.3.2 The geophysical survey covers an area of approximately 2 hectares of agricultural land within two separate fields. Area 1, to the east, was surveyed in October and at the time of survey contained recently mown grass. Area 2, to the west, was surveyed in January and contained maize stubble.

1.3.3 The ground conditions within Area 1 to the east, were considered favourable for the collection of magnetometry data. Although Area 2 to the west contained very deep ruts and maize stubble that created very difficult survey conditions, the quality of the data was not badly affected.

1.4 Site history and archaeological potential

1.4.1 An Archaeological Desk-Based Assessment, produced by EDF, has identified significant prehistoric and medieval remains to the east and an Iron Age burial to the south. The site also lies close to the Fosse Way Roman road.

1.5 Geology and soils

1.5.1 The underlying solid geology is Jurassic limestone (BGS, 1967). The overlying soils across the survey area are from the Sherborne association which are brown rendzinas (Soil Survey of England and Wales, 1983).

1.5.2 The underlying solid geology and associated soils are likely to provide good conditions for magnetic survey.

2 METHODOLOGY

2.1 Technical synopsis

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

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

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

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

2.2 Equipment configuration, data collection and survey detail

2.2.1 The detailed magnetic survey was carried out using a 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 may be 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.

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

Date of calibration/service	16th May 2008
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, 2008).

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.

2.3 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 B 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 ±10nT 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 details on the processing used for each survey area).

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 each survey area.

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 (.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 anticlockwise to restore north to the top of the image. Greyscale images are rotated by 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 C 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 2ha. Geophysical anomalies located can be generally classified as positive linear responses of archaeological potential, positive and negative anomalies of an uncertain origin, linear anomalies of an agricultural origin, areas of magnetic debris and strong discrete dipolar anomalies relating to ferrous objects. Anomalies located within each survey area have been numbered.

3.1.2 Data collection was affected by very difficult ground conditions in Area 2 where maize stubble and deep agricultural ruts hindered surveying progress. However, data quality was not greatly influenced by the poor ground conditions.

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 archaeological potential

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 

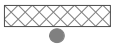
The category applies to a range of anomalies where there is not enough evidence to confidently suggest an origin. Anomalies in this category may well be related to archaeologically significant features but equally relatively modern features, geological/pedological features and agricultural features should be considered.

Anomalies with an agricultural origin

Agricultural anomalies

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.

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 Area 1 (eastern section)

Area centred on OS NGR 370575 156930, see Figures 03 – 06.

Anomalies with an uncertain origin

(1) – A positive linear anomaly extends across the width of the survey area and may be a response to a ditch-like feature. The archaeological potential of this anomaly cannot be determined.

(2) – A short, weak positive linear anomaly of uncertain origin.

(3) – A wide positive linear anomaly, parallel to the southern boundary of the survey area, may indicate a ditch-like or pit-like feature; however, it is parallel to anomalies caused by agricultural activity and it is possible that it has a similar origin.

(4) – Discrete positive anomalies may indicate pit-like features.

(5) – A negative linear anomaly parallel with, and located 14m to the west of, anomaly (1). It is possible that this anomaly is a response to material with a lower magnetic susceptibility than the surrounding soil, such as subsoil or stone.

Anomalies with an agricultural origin

(6) – A series of parallel linear anomalies caused by agricultural activity.

Anomalies associated with magnetic debris

(7) – Zones of magnetic debris are responses to magnetically thermoremnant material such as brick or tile. This material is likely to have been introduced onto the site in recent times, evidence for modern tipping was apparent. The areas are unlikely to have obscured more subtle anomalies.

(8) – Strong discrete dipolar anomalies indicate the presence of ferrous objects within the topsoil.

3.3 Area 2 (western section)

Area centred on OS NGR 370245 156950, see Figures 07 – 10.

Anomalies with archaeological potential

(9) – A positive curvilinear anomaly forms a penannular feature. It appears as an incomplete 'ring ditch' possibly with two terminal pits. The gap between them is towards the south west. The external diameter is 14m, with the curvilinear elements approximately 2.5m wide and the terminal pits measuring 4m by 6m.

Anomalies with an uncertain origin

(10) – Four parallel, weakly positive, linear anomalies extend across the width of the survey area. Although it is possible that they relate to ditch-like features, it is not possible to determine if they relate to former field boundaries, or if they have a more modern origin, such as land drains.

(11) – Discrete positive anomalies may indicate pit-like features, although it is possible that they have been caused by agricultural activity.

(12) – A negative linear anomaly in the western part of the survey area may be a response to material less magnetically enhanced than the surrounding soil.

Anomalies with an agricultural origin

(13) – A series of parallel linear anomalies caused by agricultural activity.

Anomalies associated with magnetic debris

(14) – A small patch of magnetic debris located near the eastern edge of Area 2 is a response to magnetically thermoremnant material.

(15) – Strong discrete dipolar anomalies indicate the presence of ferrous objects within the topsoil.

4 CONCLUSION

4.1.1 The detailed magnetometer survey located a positive curvilinear anomaly that relates to a penannular 'ring ditch' feature within the western part of the site (Area 2). This feature measures approximately 14m in diameter and has an intentional gap of 6m, on the south western side, located between two possible terminal pits.

4.1.2 Linear anomalies extend across the width of both survey surveys and although they may appear ditch-like, it is not possible to determine whether they relate to former land divisions or land drains.

5 REFERENCES

British Geological Survey, 1967. Bristol District. England and Wales Special Sheet. Solid and Drift Edition. One Inch Series.

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

EDP, 2006. *Land South of Wellow Lane, Peasedown St John, Bath and North-East Somerset. Archaeological Desk-Based Assessment* (Unpublished typescript report H_EDP256_01_12th September 2006 RC/ht).

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 – survey and data information

Area 1 raw

COMPOSITE
Filename: Area1-raw.xcp
Instrument Type: Grad 601 (Magnetometer)
Units: nT
Surveyed by: on 09/10/2008
Assembled by: on 09/10/2008
Direction of 1st Traverse: 0 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702
Origin: Zero

Dimensions
Composite Size (readings): 240 x 240
Survey Size (meters): 60 m x 240 m
Grid Size: 30 m x 30 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 30.00
Min: -30.00
Std Dev: 6.91
Mean: -0.78

Processes: 2
1 Base Layer
2 Clip from -30 to 30

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

Area 1 processed

Stats
Max: 10.00
Min: -10.00
Std Dev: 3.90
Mean: -0.31

Processes: 4
1 Base Layer
2 Clip from -30 to 30
3 DeStripe Mean Traverse: Grids: All Threshold: 1 SDs
4 Clip from -10 to 10

Source Grids: 16 as Area 1 raw

Area 2 raw

COMPOSITE
Filename: Area2-raw.xcp
Instrument Type: Grad 601 (Magnetometer)
Units: nT
Surveyed by: on 09/01/2009
Assembled by: on 09/01/2009
Direction of 1st Traverse: 0 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702
Origin: Zero

Dimensions
Composite Size (readings): 240 x 360
Survey Size (meters): 60 m x 360 m
Grid Size: 30 m x 30 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 30.00
Min: -30.00
Std Dev: 3.45
Mean: 0.57

Processes: 2
1 Base Layer
2 Clip from -30 to 30

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

Area 2 processed

COMPOSITE
Filename: Area2-proc2.xcp

Stats
Max: 10.00
Min: -10.00
Std Dev: 2.50
Mean: 0.01

Processes: 4
1 Base Layer
2 Clip from -30 to 30
3 DeStripe Median Traverse: Grids: All
4 Clip from -10 to 10

Source Grids: 24 as Area 2 raw

Appendix C – 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:

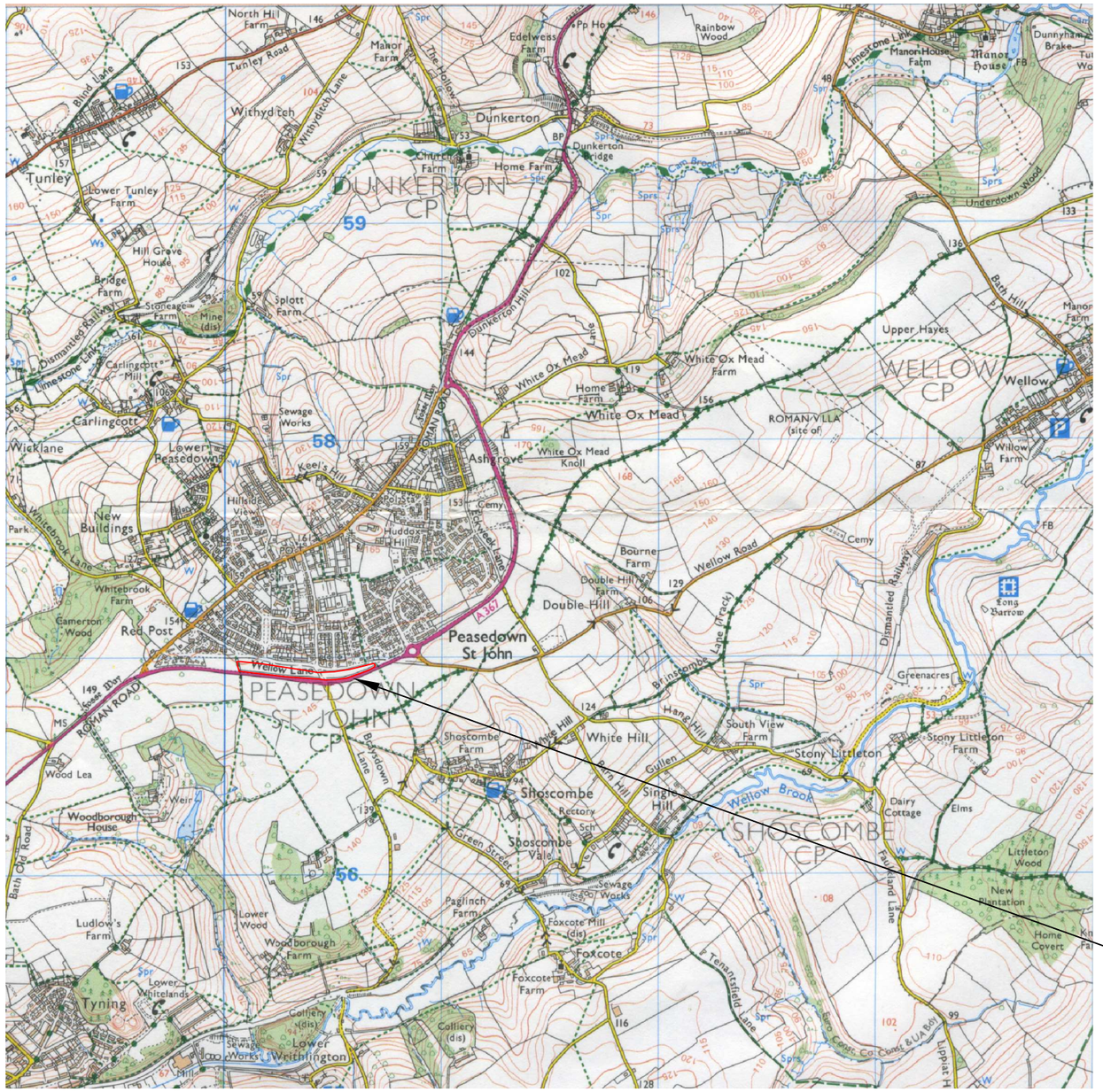
- ArcheoSurveyor version 2.3.3.1 (geophysical data analysis),
- AutoCAD LT 2007 (report figures),
- OpenOffice.org 3.0.0 Writer (document text),
- PDF Creator version 0.9 (PDF archive).

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,
- photographic record in JPEG format.

The CD ROM structure is formed from a tree of directories under the title J249 Peasedown – CD. Directory titles include Data, Documentation, CAD, PDFs and Photos. 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).



Archaeological Surveys Ltd

Geophysical Survey
Land South of Wellow Lane
Peasedown St John

Map of survey area

● Survey location

Site centred on OS NGR
ST 7038 5692

SCALE 1:25 000

0m 500m 1000m

SCALE TRUE AT A3

FIG 01

Archaeological Surveys Ltd

Geophysical Survey
Land South of Wellow Lane
Peasedown St John

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

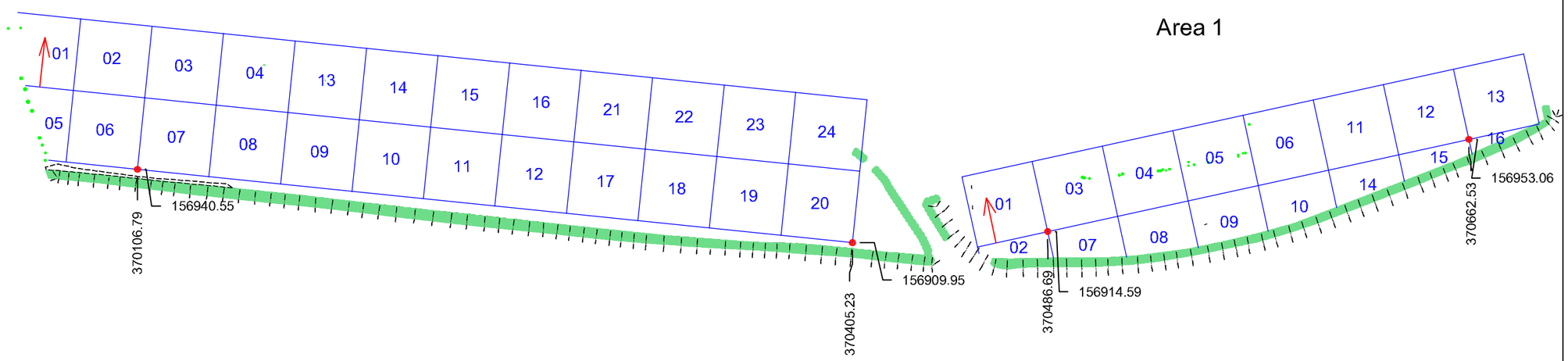
Survey start and traverse direction

10 Grid reference number and filename

N

Area 2

Area 1



SCALE 1:2000

0m 20 40 60 80 100m

SCALE TRUE AT A3

FIG 02

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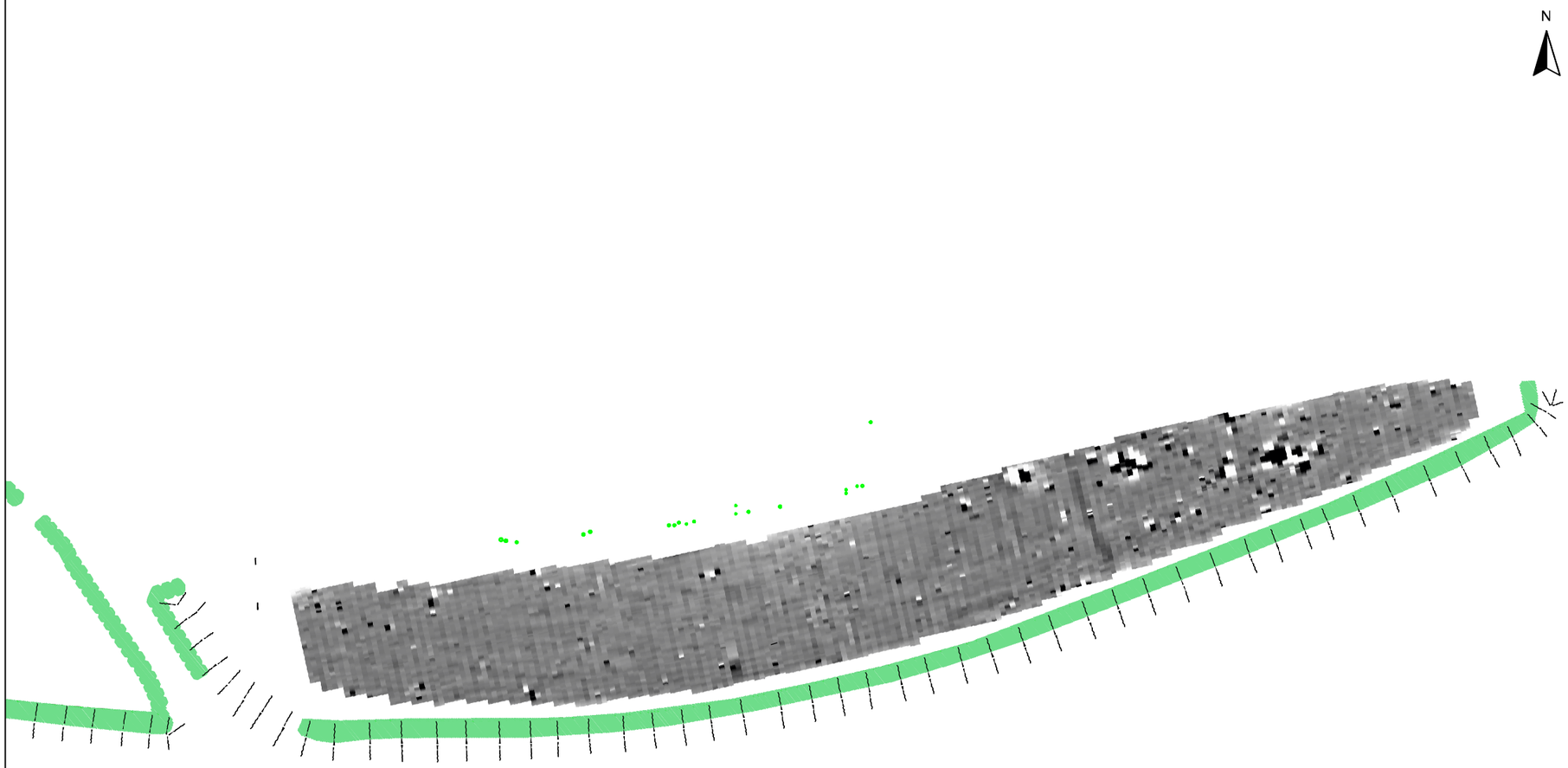
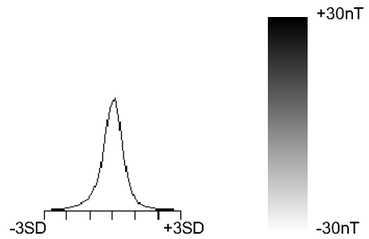
Geophysical Survey
Land South of Wellow Lane
Peasedown St John



Greyscale plot of raw magnetometer data - Area 1

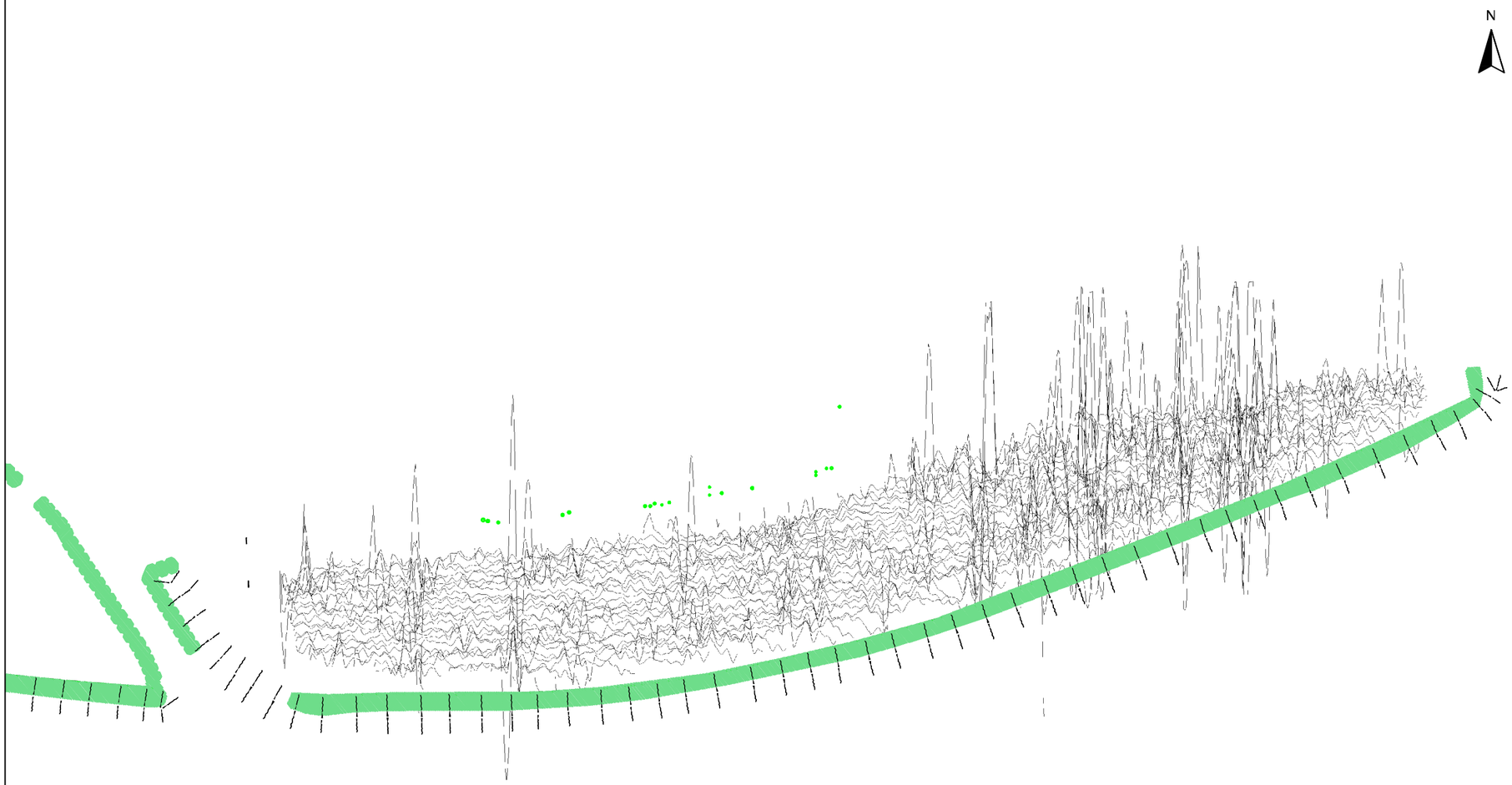


SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 03



Archaeological Surveys Ltd

Geophysical Survey
Land South of Wellow Lane
Peasedown St John

Traceplot of raw magnetometer data - Area 1

+50nT
+25nT
0nT
-25nT
-50nT

Approx 25nT/ cm vertical displacement.

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 04

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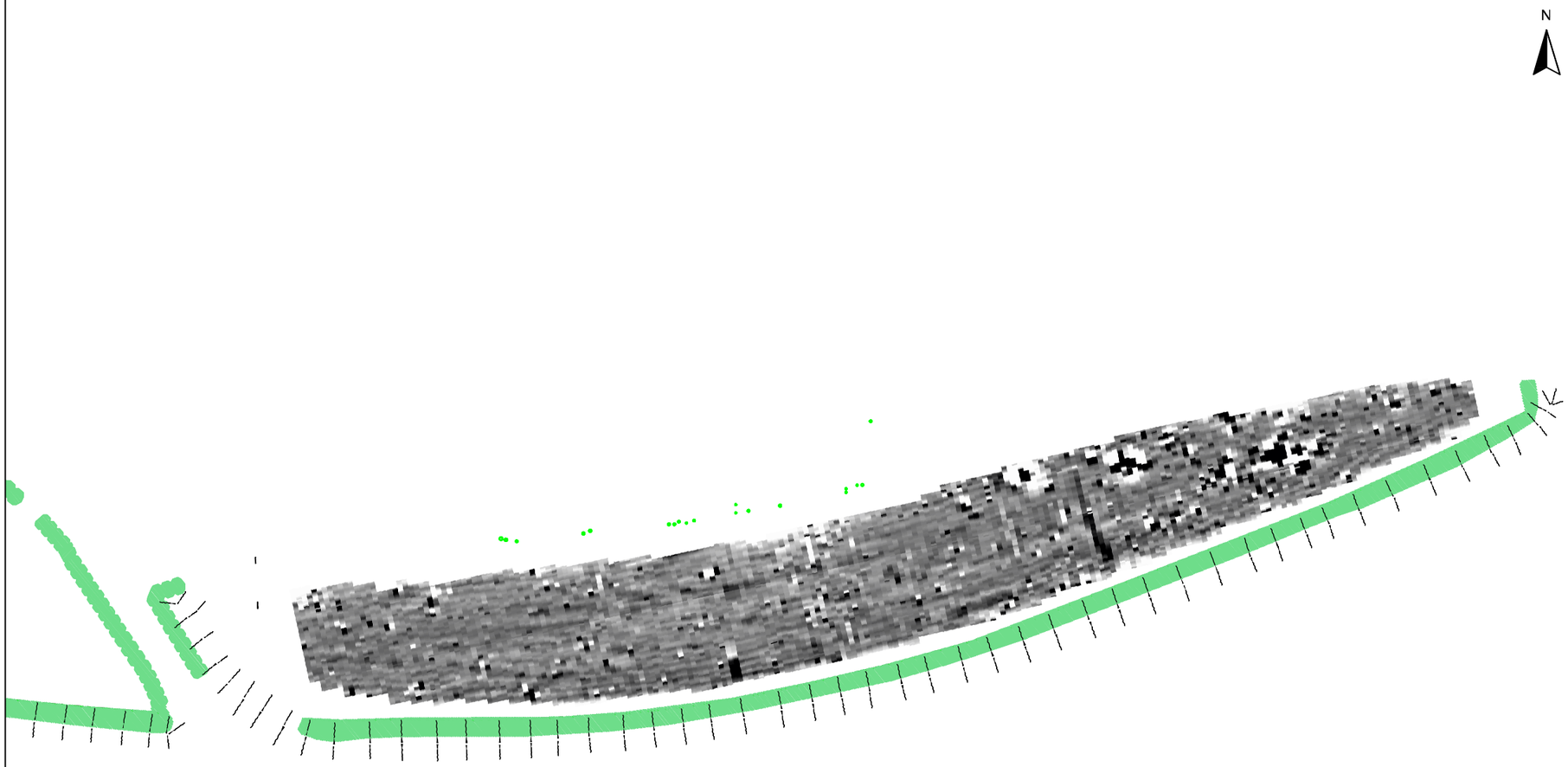
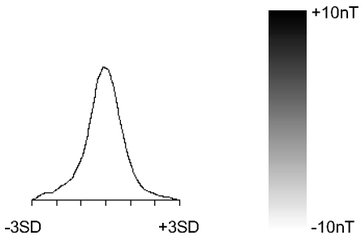
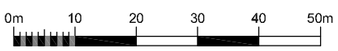
Geophysical Survey
Land South of Wellow Lane
Peasedown St John



Greyscale plot of processed magnetometer data - Area 1



SCALE 1:1000



SCALE TRUE AT A3

FIG 05

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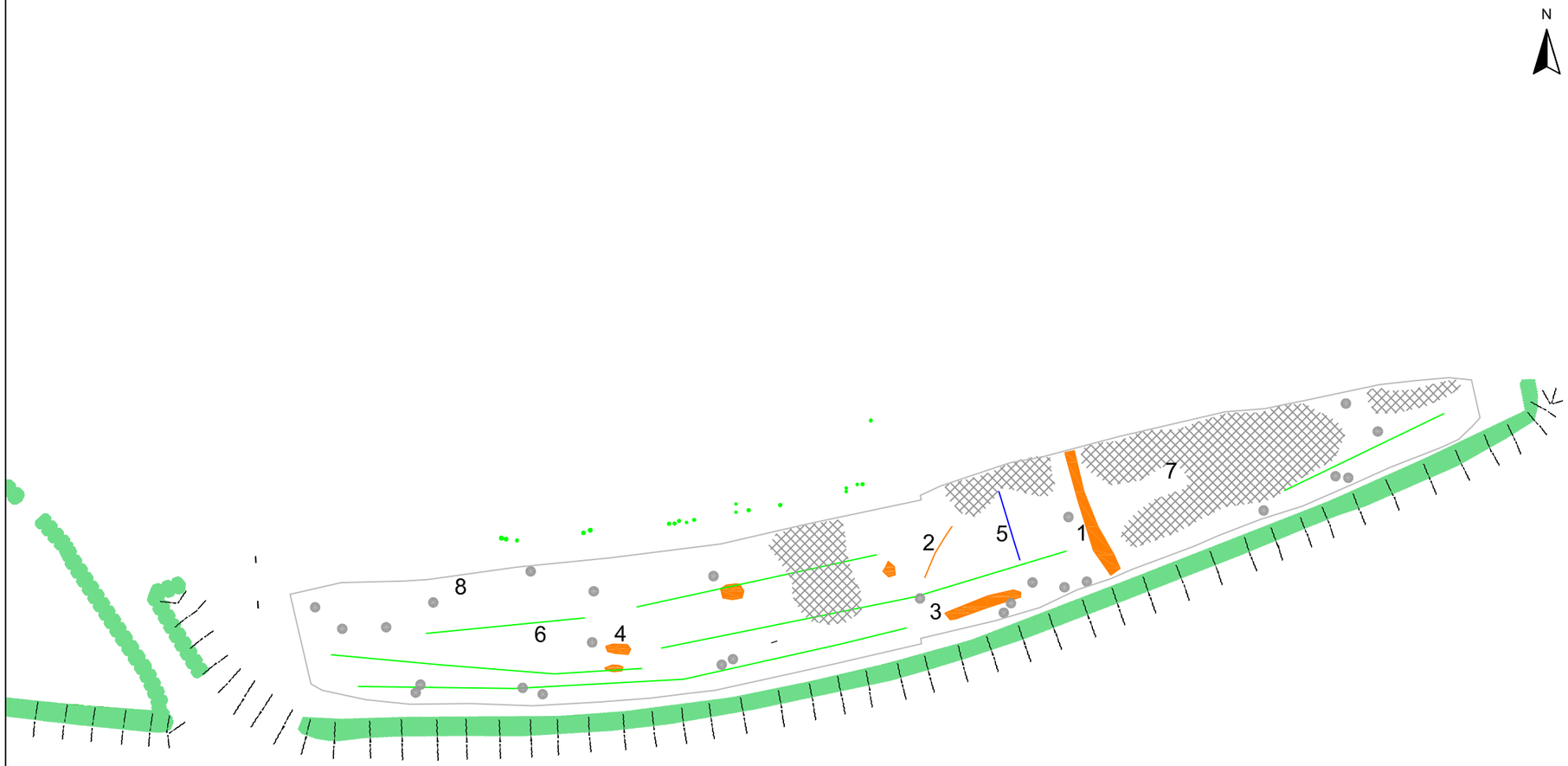
Abstraction and interpretation of magnetometer anomalies - Area 1



- Positive linear anomaly - of uncertain origin
- Linear anomaly - of agricultural origin
- Negative linear anomaly - of uncertain origin
- Discrete positive response - uncertain origin
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Strong dipolar anomaly - ferrous object

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 06

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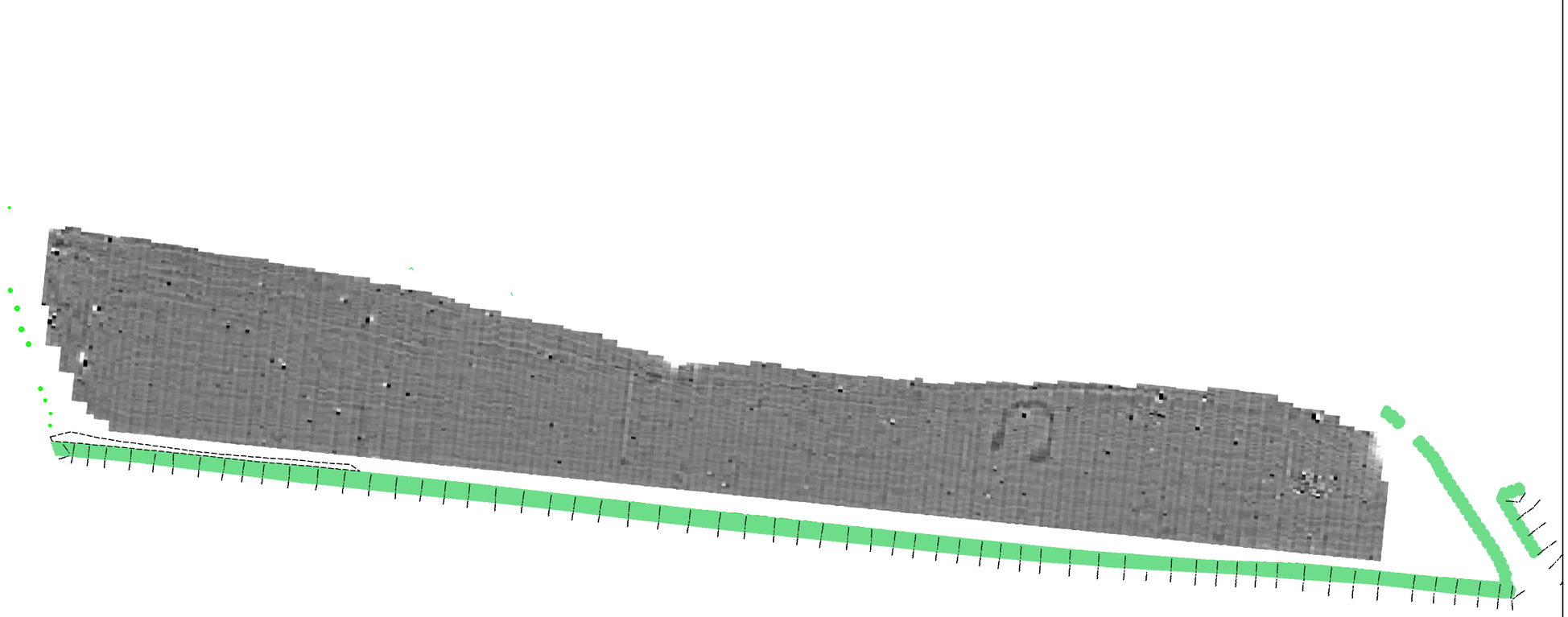
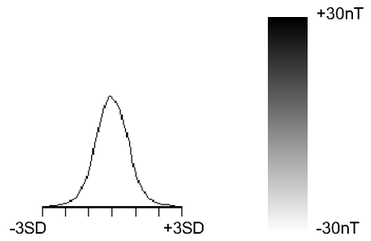
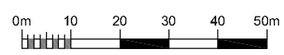
Greyscale plot of raw magnetometer data - Area 2





SCALE 1:1250



SCALE TRUE AT A3

FIG 07

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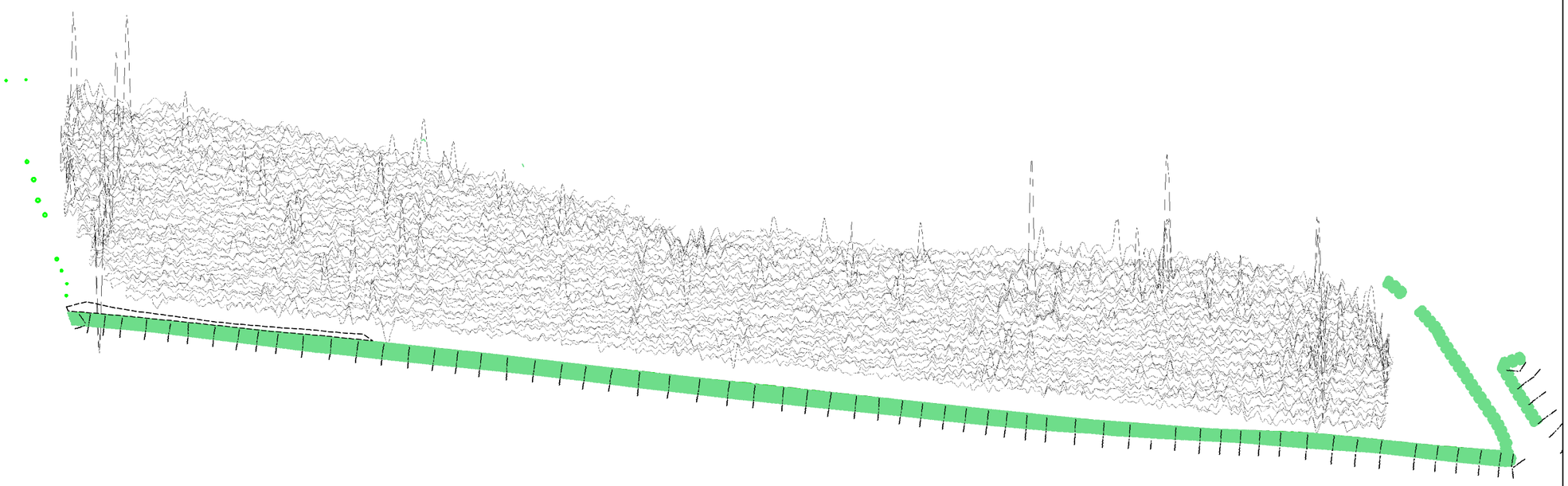
Traceplot of raw magnetometer data - Area 2



+80nT
+40nT
0nT
-40nT
-80nT

Approx 40nT/ cm vertical displacement.

N

SCALE 1:1250

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 08

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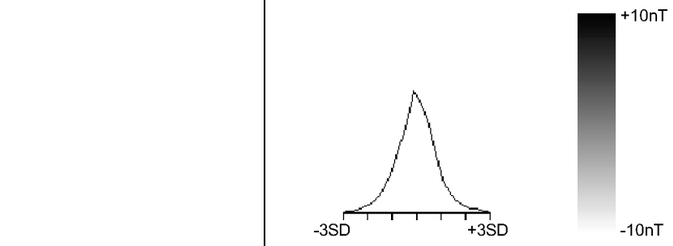
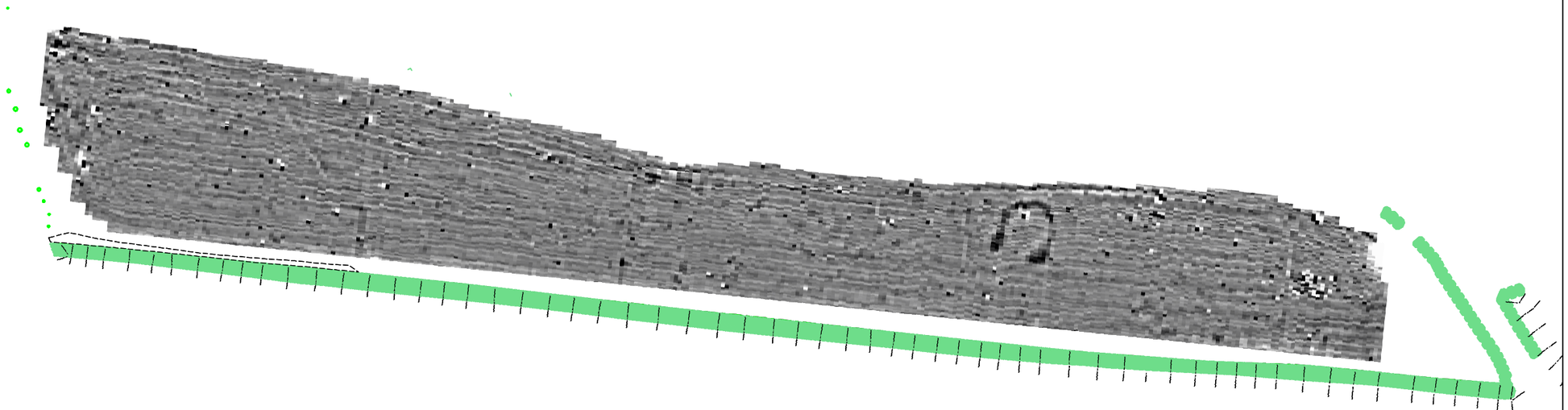
Greyscale plot of processed magnetometer data - Area 2





SCALE 1:1250

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 09

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Abstraction and interpretation of magnetometer anomalies - Area 2

- Positive linear anomaly - cut feature of archaeological potential
- Positive linear anomaly - of uncertain origin
- Linear anomaly - of agricultural origin
- Negative linear anomaly - of uncertain origin
- Discrete positive response - uncertain origin
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Strong dipolar anomaly - ferrous object

SCALE 1:1250

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 10