

**Griffins Farm  
Stockton  
Warwickshire**

**MAGNETOMETER SURVEY REPORT**

for

**Cotswold Archaeology**

Kerry Donaldson & David Sabin

September 2015

Ref. no. 628

ARCHAEOLOGICAL SURVEYS LTD

**Griffins Farm  
Stockton  
Warwickshire**

Magnetometer Survey Report

for

**Cotswold Archaeology**

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Primary archive location - Archaeological Surveys Ltd, Yatesbury, Wiltshire

Survey date – 11th September 2015

Ordnance Survey Grid Reference – **SP 42790 63500**



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## SUMMARY

A detailed magnetometer survey was undertaken by Archaeological Surveys Ltd, within two land parcels at Griffins Farm, near Stockton in Warwickshire. The results of the survey show a small number of positive linear anomalies which are generally weak and indistinct. However, at least one positive linear anomaly does appear to relate to a cut, ditch-like feature, that may have been truncated by ridge and furrow. A small number of discrete positive responses has also been located and it is possible that they relate to pit-like features or are associated with burning. Evidence for ridge and furrow, modern cultivation and land drainage has also been located.

## 1 INTRODUCTION

### 1.1 *Survey background*

- 1.1.1 Archaeological Surveys Ltd was commissioned by Cotswold Archaeology, on behalf of CEMEX UK, to undertake a magnetometer survey of an area of land at Griffins Farm, Stockton, Warwickshire. The site has been outlined for a proposed development of the Griffins Farm Conveyor Access Solution to the east of Southam Quarry and the A426. The scheme proposes to build a new tunnel for vehicular access and a conveyor to transport clay and limestone between Griffins Farm and Southam Quarry to the west. The site will also contain car parking, offices, workshops and welfare facilities. The survey forms part of an archaeological assessment of the site.
- 1.1.2 The geophysical survey was carried out in accordance with a Written Scheme of Investigation (WSI) produced by Archaeological Surveys (2015) and issued to Anna Stocks, Planning Archaeologist for Warwickshire County Council, by Richard Young of Cotswold Archaeology, prior to commencing the survey.

### 1.2 *Survey objectives and techniques*

- 1.2.1 The objective of the survey was to use magnetometry to locate geophysical anomalies that may be archaeological in origin so that they may be assessed prior to development of the site. The methodology is considered an efficient and effective approach to archaeological prospection.
- 1.2.2 The survey and report generally follow the recommendations set out by: English Heritage (2008) *Geophysical survey in archaeological field evaluation*; and Institute for Archaeologists (2002) *The use of Geophysical Techniques in Archaeological Evaluations*. The work has been carried out to the Chartered Institute for Archaeologists (2014) *Standard and Guidance for Archaeological Geophysical Survey*.

### 1.3 Site location, description and survey conditions

- 1.3.1 The site is located at Griffins Farm, 1.5km north east of Southam and 500m south west of Stockton in Warwickshire. It is centred on Ordnance Survey National Grid Reference (OS NGR) SP 42790 63500, see Figures 01 and 02.
- 1.3.2 The geophysical survey covers approximately 3.5ha covering the north western part of two arable fields, Areas 1 and 2, that had been recently harvested. The land was generally flat but the south western field (Area 1) was rutted by agricultural vehicles. The A426 Southam to Rugby road bounds the north western edge of the site.



*Plate 1: Area 1 looking towards the north east*

- 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 fine.

### 1.4 Site history and archaeological potential

- 1.4.1 The Warwickshire online Historic Environment Record shows that the survey area is located close to a number of archaeological sites and findspots. These include cropmarks recorded from aerial photographs of rectangular enclosures and linear features 400m to the south (MWA 6796), with further cropmark features 600m to the south east (MWA13389) and a possible Iron Age banjo enclosure 900m east (MWA 7253). A Roman coin hoard was discovered 500m to the south east (MWA940) and a Romano-British settlement recorded at School Street, Stockton, 900m to the north east (MWA13271). Ridge and furrow has also been recorded 700m to the north east (MWA7248)

(Warwickshire County Council, 2013).

- 1.4.2 A previous geophysical survey carried out prior to quarrying on land immediately to the north of the site, located a linear ditch and pit-like features which appeared to pre-date the ridge and furrow (Archaeological Surveys, 2006).
- 1.4.3 Although there are a lack of recorded heritage assets directly within the site, the number of archaeological sites, findspots and cropmarks in the wider area may indicate that there is some potential for the site to contain previously unrecorded archaeological remains.

## 1.5 *Geology and soils*

- 1.5.1 The underlying solid geology across the site is interbedded limestone and mudstone from the Rugby Limestone Member (BGS, 2015).
- 1.5.2 The overlying soil across the survey area is from the Evesham 2 association and is a typical calcareous pelosol. It consists of a slowly permeable, calcareous, clayey soil (Soil Survey of England and Wales, 1983)
- 1.5.3 Magnetometry carried out over similar geology and soil has produced good results. The site is, therefore, considered suitable for magnetic survey.

## 2 METHODOLOGY

### 2.1 *Technical synopsis*

- 2.1.1 Magnetometry survey records localised magnetic fields that can be associated with features formed by human activity. Magnetic susceptibility and magnetic thermoremnance are factors associated with the formation of localised fields. Additional details are set out below and within Appendix A.
- 2.1.2 Iron minerals within the soil may become altered by burning and the break down of biological material; effectively the magnetic susceptibility of the soil is increased, and the iron minerals become magnetic in the presence of the Earth's magnetic field. Accumulations of magnetically enhanced soils within features, such as pits and ditches, may produce magnetic anomalies that can be mapped by magnetic prospection.
- 2.1.3 Magnetic thermoremnance can occur when ferrous minerals have been heated to high temperatures such as in a kiln, hearth, oven etc. On cooling, a permanent magnetisation may be acquired due to the presence of the Earth's magnetic field. Certain natural processes associated with the formation of some igneous and metamorphic rock may also result in magnetic thermoremnance.
- 2.1.4 The localised variations in magnetism are measured as sub-units of the Tesla,

which is a SI unit of magnetic flux density. These sub-units are nano Teslas (nT), which are equivalent to  $10^{-9}$  Tesla (T).

## *2.2 Equipment configuration, data collection and survey detail*

- 2.2.1 The detailed magnetic survey was carried out using a SENSYS MAGNETO®MXPDA 5 channel cart-based system. The instrument has 5 fluxgate gradiometers spaced 0.5m apart with readings recorded at 20Hz. The gradiometers have a range of recording data between 0.1nT and 10,000nT. The system is linked to a Leica GS10 RTK GPS with data recorded by SENSYS MAGNETO®MXPDA software on a rugged computer.
- 2.2.2 Data are collected along a series of parallel survey tracks wherever possible. The length of each track is variable and relates to the size of the survey area and other factors including ground conditions. A visual display aids accurate placing of tracks and their separation.
- 2.2.3 Data are not collected within fixed grids and data points are considered to be random even though the data are collected in a systematic manner covering all accessible areas (Aspinall, Gaffney and Schmidt, 2009).

## *2.3 Data processing and presentation*

- 2.3.1 Magnetic data collected by the MAGNETO®MXPDA cart-based system are initially prepared using SENSYS MAGNETO®DLMGPS software. Survey tracks are analysed and georeferenced raw data (UTM Z30N) are then exported in ASCII format for further analysis and display using TerraSurveyor.
- 2.3.2 The data are collected between limits of  $\pm 10000$ nT and clipped for display at  $\pm 4$ nT. Data are interpolated to a resolution of effectively 0.5m between tracks and 0.15m along each survey track. A zero median traverse function is required in order to remove fixed offset values present within the sensors which do not undergo a zeroing procedure in the field. The approach ensures that the gradiometer sensors are very accurately aligned and fixed to the vertical magnetic field and are not influenced by localised magnetic fields or disturbed by vibration. Although a zero median traverse algorithm can remove anomalies aligned with the survey tracks, in practice this rarely occurs due to the use of long traverses, high resolution measurement and variability within the magnetic susceptibility of long linear features.
- 2.3.3 Appendix C contains metadata concerning the survey and data attributes and is derived directly from TerraSurveyor. Reference should be made to Appendix B for further information on any processes, such as clipping, carried out on the data.
- 2.3.4 A TIF file is produced by TerraSurveyor software along with an associated world file (.TFW) that allows automatic georeferencing (OSGB36 datum) when using GIS or CAD software. The main form of data display used in the report



is the minimally processed greyscale plot.

- 2.3.5 The raster images are combined with base mapping using ProgeCAD Professional 2014, creating DWG (2010) file formats. All images are externally referenced to the CAD drawing in order to maintain good graphical quality. The CAD plots are effectively georeferenced facilitating relocation of features using GPS, resection method, etc.
- 2.3.6 An abstraction and interpretation is also drawn and plotted for all geophysical anomalies located by the survey. Anomalies are abstracted using colour coded points, lines and polygons. All plots are scaled to landscape A3 for paper printing.
- 2.3.7 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.
- 2.3.8 A digital archive is produced with this report, see Appendix D below. The main archive is held at the offices of Archaeological Surveys Ltd.

## 3 RESULTS

### 3.1 *General assessment of survey results*

- 3.1.1 The detailed magnetic survey was carried out over a total of two survey areas covering approximately 3.5ha.
- 3.1.2 Magnetic anomalies located can be generally classified as positive anomalies of an uncertain origin, anomalies associated with land management, linear anomalies of an agricultural origin, areas of magnetic debris and strong discrete dipolar anomalies relating to ferrous objects. Anomalies located within each survey area have been numbered and are described in 3.4 and 3.5 below.

### 3.2 *Statement of data quality*

- 3.2.1 Data are considered representative of the magnetic anomalies present within the site. There are no significant defects within the dataset. A very small patch of missing data in the south western part of Area 1 was due to the presence of a straw bale.

### 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
<p><b>Anomalies with an uncertain origin</b></p> <p>AS-ABST MAG POS LINEAR UNCERTAIN </p> <p>AS-ABST MAG POS DISCRETE UNCERTAIN </p>	<p>The category applies to a range of anomalies where <u>there is not enough evidence to confidently suggest an origin</u>. Anomalies in this category <u>may well be related to archaeologically significant features, but equally relatively modern features, geological/pedological features and agricultural features should be considered</u>. 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.</p>
<p><b>Anomalies relating to land management</b></p> <p>AS-ABST MAG LAND DRAIN </p>	<p>Anomalies are mainly linear and may be indicative of the magnetically enhanced fill of cut features (i.e. ditches). The anomalies may be long and/or form rectilinear elements and they may relate to topographic features or be visible on early mapping. Associated agricultural anomalies (e.g. headlands, plough marks and former ridge and furrow) may support the interpretation. Land drains can appear in a classic herringbone pattern of interconnected multiple dipolar linear anomalies, or as parallel linear anomalies. The multiple dipolar response indicates a ceramic land drain.</p>
<p><b>Anomalies with an agricultural origin</b></p> <p>AS-ABST MAG AGRICULTURAL </p> <p>AS-ABST MAG RIDGE AND FURROW </p>	<p>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.</p>
<p><b>Anomalies associated with magnetic debris</b></p> <p>AS-ABST MAG DEBRIS </p> <p>AS-ABST MAG STRONG DIPOLAR </p>	<p>Magnetic debris often appears as areas containing many small dipolar anomalies that may range from weak to very strong in magnitude. It often occurs where there has been dumping or ground make-up and is related to magnetically thermoremnant materials such as brick or tile or other small fragments of ferrous material. This type of response is occasionally associated with kilns, furnace structures, or hearths and <u>may therefore be archaeologically significant</u>. 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.</p>
<p><b>Anomalies with a modern origin</b></p> <p>AS-ABST MAG DISTURBANCE </p>	<p>The magnetic response is often strong and dipolar indicative of ferrous material and may be associated with extant above surface features such as wire fencing, cables, pylons etc.. Often a significant area around such features has a strong magnetic flux which may create magnetic disturbance; such disturbance can effectively obscure low magnitude anomalies if they are present. Fluxgate sensors may respond erratically and with hysteresis adjacent to strong magnetic sources.</p>

Table 1: List and description of interpretation categories

### 3.4 List of anomalies - Area 1

Area centred on OS NGR 442720 263445, see Figures 03 & 04.

#### *Anomalies with an uncertain origin*

(1) - The survey area contains a small number of very weakly positive linear anomalies. They are short, indistinct and lack a coherent morphology.

(2) - A small number of discrete positive responses can be seen in the survey area. It is not possible to determine if they relate to cut, pit-like features.

#### *Anomalies associated with land management*

(3) - A number of weakly, multiple dipolar, linear anomalies are located within the survey area. These are typical of ceramic land drains.

#### *Anomalies with an agricultural origin*

(4) - A series of broad, alternate positive and negative linear anomalies can be seen within the survey area. These relate to ridge and furrow, with the positive responses being abstracted and likely to relate to the former ridges.

(5) - A series of parallel, narrow, linear anomalies, parallel with the ridge and furrow, are a response to modern agricultural activity.

### 3.5 List of anomalies - Area 2

Area centred on OS NGR 442890 263570, see Figures 03 & 04.

#### *Anomalies with an uncertain origin*

(6) - A positive linear anomaly extends northwards from the southern edge of the survey area. It appears to have been truncated by former ridge and furrow.

(7) - The survey area contains a number of very weakly positive linear anomalies. Their weak response (0.5nT) and short or fragmented appearance prevents confident interpretation.

(8) - The survey area contains a number of discrete positive responses, with a cluster of them along the southern edge. The magnitude of some of these anomalies is 10-20nT, indicating that they may relate to cut, pit-like features, or are associated with burning.

### *Anomalies associated with land management*

(9) - A single, weakly dipolar, linear anomaly extends across the western part of the survey area. This type of response may indicate a ceramic land drain or pipe.

### *Anomalies with an agricultural origin*

(10) - The survey area contains evidence for former ridge and furrow.

### *Anomalies associated with magnetic debris*

(11) - A band of magnetic debris is located close to the western edge of the survey area. This type of response indicates magnetically thermoremanent material, such as brick/tile, that may have been used in ground consolidation.

(12) - Strong, discrete, dipolar anomalies are a response to ferrous and other magnetically thermoremanent objects within the topsoil.

## 4 CONCLUSION

- 4.1.1 The detailed magnetometer survey located a small number of weakly positive linear responses. The majority are very weak, short or fragmented and lack a coherent pattern or morphology preventing confident interpretation as cut features. However, at least one positive linear anomaly may relate to a cut feature that appears to have been truncated by ridge and furrow in the eastern part of the site. A small number of discrete positive responses have also been located, some of these are relatively moderately enhanced, which may indicate the magnetically enhanced fill of pit-like features or an association with burning.
- 4.1.2 Evidence for a number of land drains has also been recorded as well as former ridge and furrow across the whole site along with the more modern cultivation trend.

## 5 REFERENCES

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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 thermoremanent 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.

Thermoremanent 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. Thermoremanent features include ovens, hearths, and kilns. In addition thermoremanent material such as tile and brick may also be associated with human activity and settlement.

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

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

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

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

## Appendix B – data processing notes

### Clipping

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

### Zero (destripe) Median/Mean Traverse

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

### High Pass Filtering

A mathematical process used to remove low frequency anomalies relating to survey tracks and modern agricultural features.

## Appendix C – survey and data information

### Area 1

COMPOSITE  
 Path: C:\Business\Jobs\J628 Stockton\Data\Area 1\comps\  
 Filename: J628-mag-Area1-proc.xcp  
 Description: Imported as Composite from: J628-mag-Area1.asc  
 Instrument Type: Sensys DLMGPS  
 Units: nT  
 UTM Zone: 30U  
 Survey corner coordinates (X/Y): OSGB36  
 Northwest corner: 442592.32760122, 263535.718071005 m  
 Southeast corner: 442845.40760122, 263340.958071005 m  
 Collection Method: Randomised  
 Sensors: 5  
 Dummy Value: 32702

Source GPS Points: 798100

Dimensions  
 Composite Size (readings): 1406 x 1082  
 Survey Size (meters): 253 m x 195 m  
 Grid Size: 253 m x 195 m  
 X Interval: 0.18 m  
 Y Interval: 0.18 m

Stats  
 Max: 4.00  
 Min: -4.00  
 Std Dev: 1.10  
 Mean: 0.02  
 Median: -0.01  
 Composite Area: 4.929 ha  
 Surveyed Area: 2.0684 ha

PROGRAM  
 Name: TerraSurveyor  
 Version: 3.0.23.0

Processes: 2  
 1 Base Layer  
 2 Clip from -4.00 to 4.00 nT

GPS based Proce4  
 1 Base Layer.  
 2 Unit Conversion Layer (Lat/Long to OSGB36).  
 3 DeStripe Median Traverse:

4 Clip from -5.00 to 5.00 nT

### Area 2

COMPOSITE  
 Path: C:\Business\Jobs\J628 Stockton\Data\Area 2\comps\  
 Filename: J628-mag-Area2-proc.xcp  
 Description: Imported as Composite from: J628-mag-Area2.asc  
 Instrument Type: Sensys DLMGPS  
 Units: nT  
 UTM Zone: 30U  
 Survey corner coordinates (X/Y): OSGB36  
 Northwest corner: 442789.101043568, 263649.969320879 m  
 Southeast corner: 442982.601043568, 263494.719320879 m  
 Collection Method: Randomised  
 Sensors: 5  
 Dummy Value: 32702

Source GPS Points: 464700

Dimensions  
 Composite Size (readings): 1290 x 1035  
 Survey Size (meters): 194 m x 155 m  
 Grid Size: 194 m x 155 m  
 X Interval: 0.15 m  
 Y Interval: 0.15 m

Stats  
 Max: 4.00  
 Min: -4.00  
 Std Dev: 1.31  
 Mean: 0.08  
 Median: 0.05  
 Composite Area: 3.0041 ha  
 Surveyed Area: 1.3886 ha

Processes: 2  
 1 Base Layer  
 2 Clip from -4.00 to 4.00 nT

GPS based Proce4  
 1 Base Layer.  
 2 Unit Conversion Layer (Lat/Long to OSGB36).  
 3 DeStripe Median Traverse:  
 4 Clip from -4.00 to 4.00 nT

## Appendix D – digital archive

Archaeological Surveys Ltd hold the primary digital archive at their offices in Wiltshire. Data are backed-up onto an on-site data storage drive and at the earliest opportunity data are copied to CD ROM for storage on-site and off-site.

A PDF copy will be supplied to the Warwickshire Historic Environment Record and printed copies on request. The report will also be uploaded to the Online Access to the Index of archaeological investigations (OASIS).

Archive contents:

<b>Geophysical data Area 1 - path: J628 Stockton\Data</b>				
<b>Path and Filename</b>	<b>Software</b>	<b>Description</b>	<b>Date</b>	<b>Creator</b>
stockton1\MX\ .prm .dgb .disp	Sensys MXPDA	Proprietary data formats representing magnetometer survey traverses logged to a PDA.	11/09/15	D.J.Sabin
stockton1\MX\J628-mag-Area1.asc	Sensys DLMGPS	ASCII CSV (tab) file representing survey Area 1 in eastings, northings (UTM Z30N), magnetic measurement, traverse file and sensor number.	14/09/15	K.T.Donaldson
Area1\comps\J628-mag-Area1.xcp	TerraSurveyor 3.0.23.0	Composite data file derived from ASCII CSV.	24/09/15	K.T.Donaldson
Area1\comps\J628mag-Area1-proc.xcp	TerraSurveyor 3.0.23.0	Processed composite data file (zmt and clipping to $\pm 4nT$ ).	24/09/15	K.T.Donaldson
<b>Geophysical data Area 2 - path: J628 Stockton\Data</b>				
stockton2\MX\ .prm .dgb .disp	Sensys MXPDA	Proprietary data formats representing magnetometer survey traverses logged to a PDA at.	11/09/15	D.J.Sabin
stockton2\MX\J628-mag-Area2.asc	Sensys DLMGPS	ASCII CSV (tab) file representing survey Area 2 in eastings, northings (UTM Z30N), magnetic measurement, traverse file and sensor number.	14/09/15	K.T.Donaldson
Area2\comps\J628-mag-Area2.xcp	TerraSurveyor 3.0.23.0	Composite data file derived from ASCII CSV.	24/09/15	K.T.Donaldson
Area2\comps\J628-mag-Area2-proc.xcp	TerraSurveyor 3.0.23.0	Processed composite data file (zmt and clipping to $\pm 4nT$ ).	24/09/15	K.T.Donaldson
<b>Graphic data - path: J628 Stockton\Data</b>				
Area1\graphics\ J628-mag-Area1-proc.tif	TerraSurveyor 3.0.23.0	TIF file showing a minimally processed greyscale plot clipped to $\pm 4nT$ .	24/09/15	K.T.Donaldson
Area1\graphics\ J628-mag-Area1-proc.tfw	TerraSurveyor 3.0.23.0	World file for georeferencing TIF to OSGB36.	24/09/15	K.T.Donaldson
Area2\graphics\ J628-mag-Area2-proc.tif	TerraSurveyor 3.0.23.0	TIF file showing a minimally processed greyscale plot clipped to $\pm 4nT$ .	24/09/15	K.T.Donaldson
Area2\graphics\ J628-mag-Area2-proc.tfw	TerraSurveyor 3.0.23.0	World file for georeferencing TIF to OSGB36.	24/09/15	K.T.Donaldson
<b>CAD data - path: J628 Stockton\CAD\</b>				
J628 version 1.dwg	ProgeCAD 2014	CAD file for creating plots of greyscales, abstraction, interpretation and mapping. Grid coordinates as OSGB. AutoCAD 2010 format.	09/09/15	K.T.Donaldson
<b>Text data - path: J628 Stockton\Documentation\</b>				
J628 report.odt	OpenOffice.org 3.0.1 Writer	Report text as an Open Office document.	22/09/15	K.T.Donaldson



## Appendix E – copyright and intellectual property

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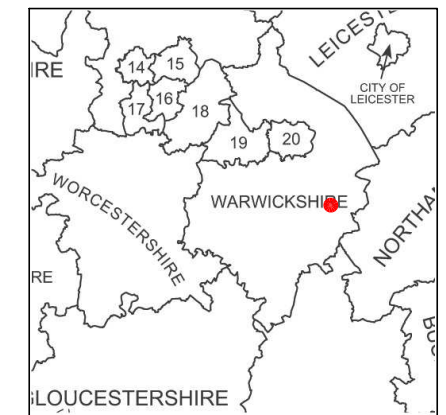
**Geophysical Survey  
Griffins Farm  
Stockton  
Warwickshire**

**Map of survey area**

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Survey location



● Survey location

Site centred on OS NGR  
SP 42790 63500

SCALE 1:25 000



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**Geophysical Survey  
Griffins Farm  
Stockton  
Warwickshire**

**Referencing information**

Referencing grid to OSGB36 datum at 50m intervals

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

- 442650 263400
- Development boundary

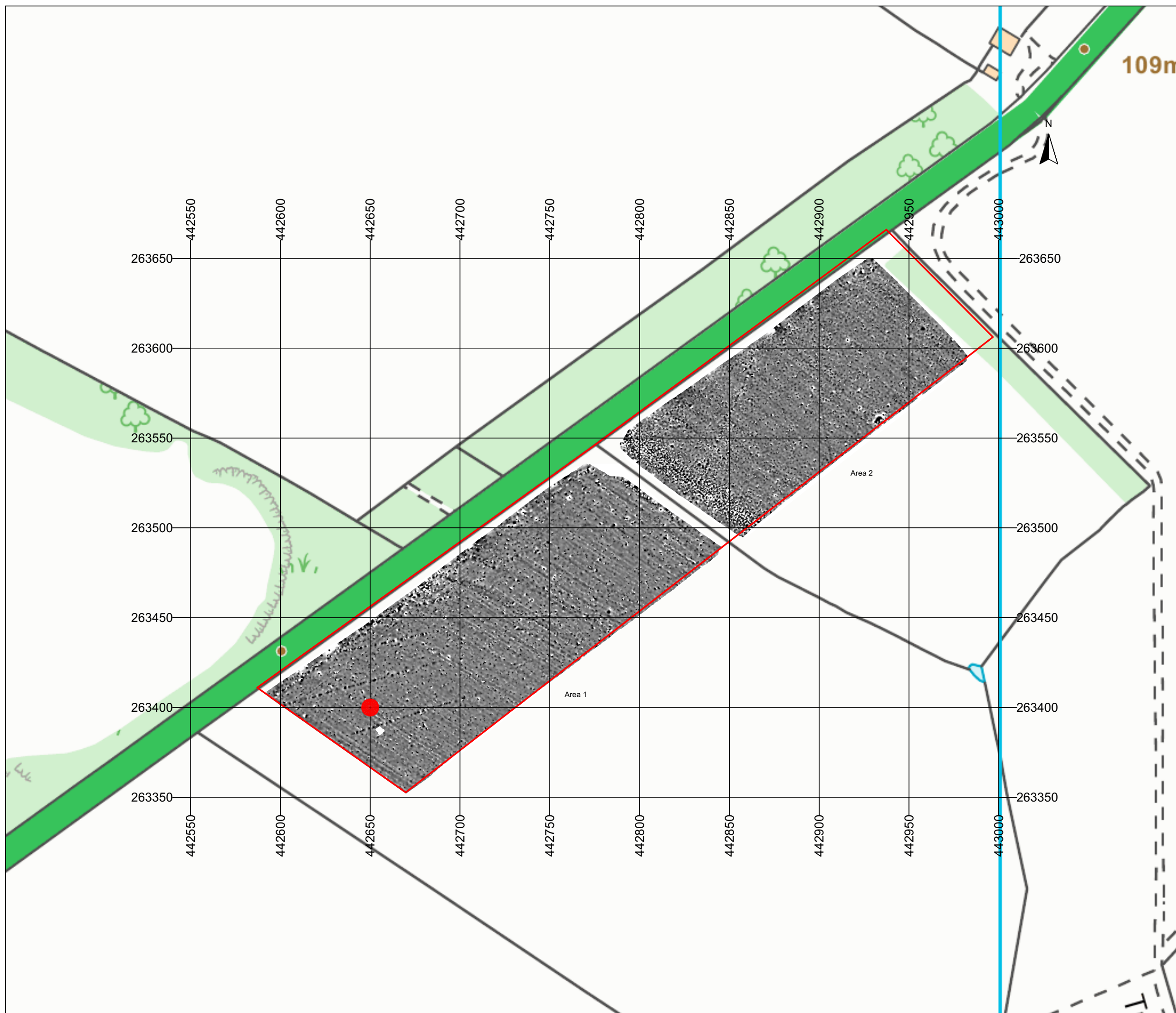
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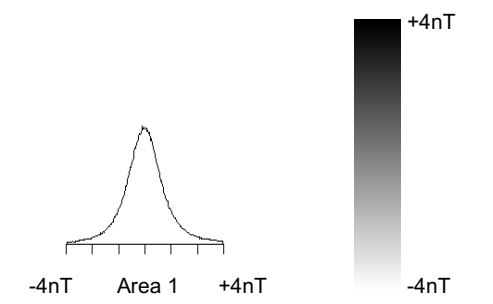
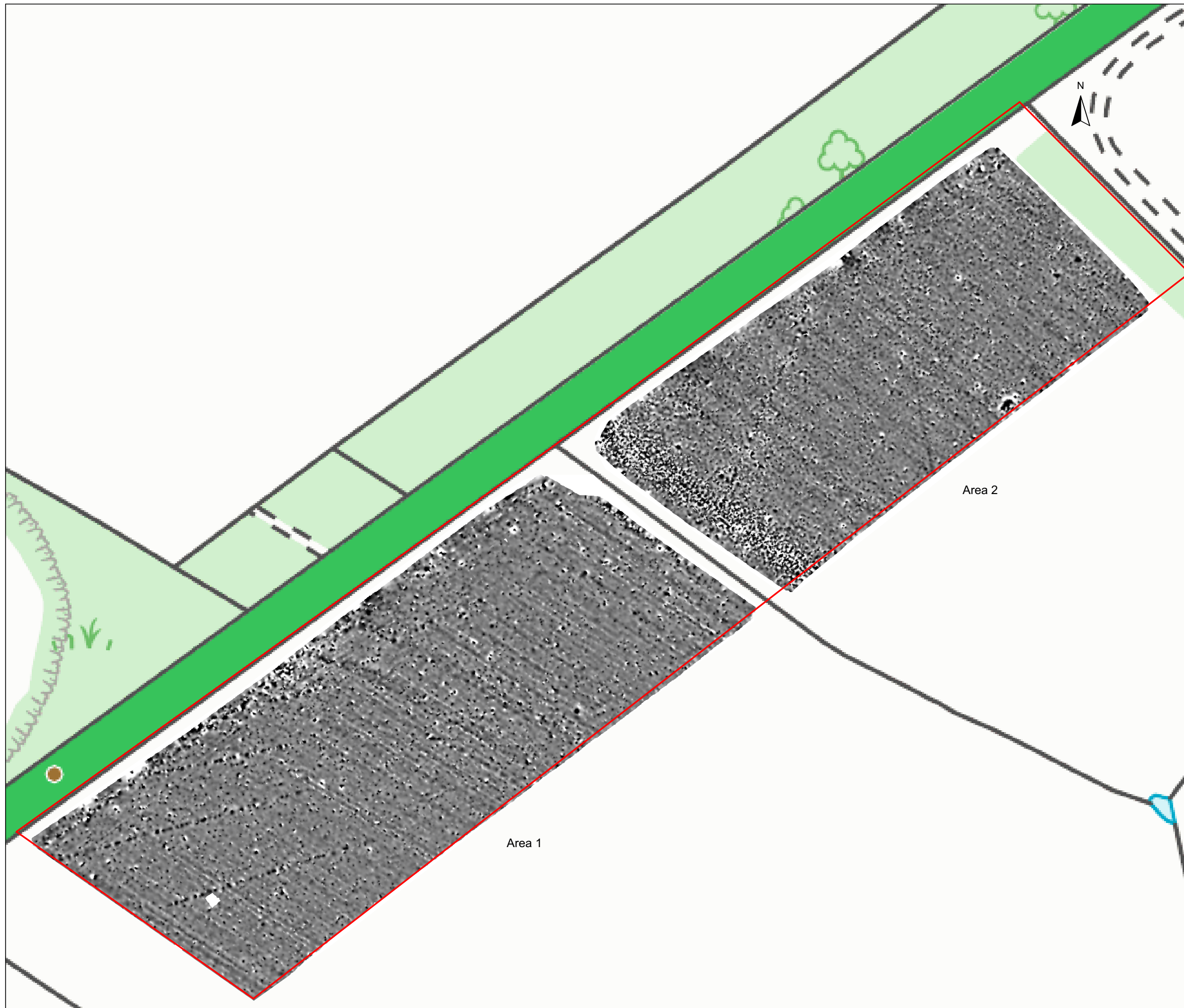
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FIG 02



**Geophysical Survey  
Griffins Farm  
Stockton  
Warwickshire**

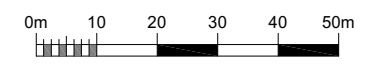
**Greyscale plot of minimally  
processed magnetometer data**



Area 2

Area 1

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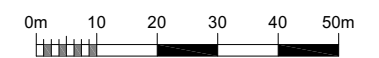
**Geophysical Survey  
Griffins Farm  
Stockton  
Warwickshire**

**Abstraction and interpretation of  
magnetometer anomalies**

-  Positive linear anomaly - possible ditch-like feature
-  Negative linear anomaly - material of low magnetic susceptibility
-  Linear anomaly - of agricultural origin
-  Linear anomaly - ridge and furrow
-  Weakly multi-dipolar linear anomaly - land drain
-  Discrete positive response - possible pit-like feature
-  Magnetic debris - spread of magnetically thermoremanent/ferrous material
-  Strong dipolar anomaly - ferrous object



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