

**Land off Birmingham Road
Stratford-upon-Avon
Warwickshire**

MAGNETOMETER SURVEY REPORT

for

Gallagher Estates

Kerry Donaldson & David Sabin

March 2015

Ref. no. 599

ARCHAEOLOGICAL SURVEYS LTD

**Land off Birmingham Road
Stratford-upon-Avon
Warwickshire**

Magnetometer Survey Report

for

Gallagher Estates

Fieldwork by David Sabin (Hons) MCI(A)

Report by Kerry Donaldson BSc (Hons)

Report checked by David Sabin

Primary archive location - Archaeological Surveys Ltd, Yatesbury, Wiltshire

Survey date – 24th March 2015

Ordnance Survey Grid Reference – **SP 19280 56570**



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SUMMARY

A detailed magnetometer survey was carried out by Archaeological Surveys Ltd, on behalf of Gallagher Estates, within a single arable field on the north eastern edge of Stratford-upon-Avon, Warwickshire. The survey was undertaken as part of an archaeological assessment of the site which has been outlined for a proposed residential development. The results indicate the presence of former ridge and furrow and a small number of positive responses of uncertain origin. A very strongly enhanced buried water main also crosses the survey area.

1 INTRODUCTION

1.1 *Survey background*

- 1.1.1 Archaeological Surveys Ltd was commissioned by the Environmental Dimension Partnership (EDP), on behalf of Gallagher Estates, to undertake a magnetometer survey of an area of land off Birmingham Road, Stratford-upon-Avon. The site has been outlined for a proposed residential development and 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, prior to commencing the fieldwork.
- 1.1.3 This site has been outlined as a second phase of works in the area, with a previous phase of geophysical survey (ASWYAS, 2013) and evaluation (Headland Archaeology, 2015) on land immediately to the north west.

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 lies on the north western edge of Stratford-upon-Avon in Warwickshire. It is located to the east of the Birmingham Road, although it is surrounded by agricultural land on all sides, except at the south eastern edge and north western corner where it is bounded by gardens associated with residential properties. It is centred on Ordnance Survey National Grid Reference (OS NGR) SP 19280 56570, see Figures 01 and 02.
- 1.3.2 The geophysical survey covers approximately 3.6ha within a single arable field that had been ploughed in the autumn and left fallow, see Plate 1. The surface was dry and very uneven.



Plate 1: Survey area looking south

- 1.3.3 The ground conditions across the site were generally considered to be less than optimum for the collection of magnetometry data. Weather conditions during the survey were variable with sunny spells and hail showers.

1.4 Site history and archaeological potential

- 1.4.1 There are no archaeological sites or findspots within the site or the immediate vicinity. There is very limited evidence for prehistoric or Roman period activity. Documentary evidence suggests the crossing of two late Saxon roads close to the medieval settlement of Bishopton. A number of areas of ridge and furrow are recorded in the immediate vicinity and it is likely that the site has also been in agricultural use for a long period of time. A previous geophysical survey carried out by Archaeological Services WYAS (2013) on the field immediately to the north west located ridge and furrow and no potential cut

features. Subsequent evaluation also recorded ridge and furrow and land drains but no features of archaeological origin (Headland Archaeology, 2015). The site of the pleasure gardens associated with the former Royal Victoria Spa are located south west of the north western corner of the site.

- 1.4.2 The lack of recorded heritage assets within the site may indicate a low potential for there to be archaeological features; however, there is always potential for the geophysical survey to locate anomalies with an archaeological origin, should they be present within the site. It is also likely that anomalies associated with modern cultivation and ridge and furrow may be encountered.
- 1.4.3 Surface observations were made during the course of the survey. No significant scatters of cultural material were observed. Occasional late or post-medieval pottery sherds appeared worn and are considered likely to have been associated with manuring.

1.5 *Geology and soils*

- 1.5.1 The underlying solid geology across the site is Mercia Mudstone (BGS, 2015).
- 1.5.2 The overlying soil across the survey area is from the Whimple 3 association and is a stagnogleyic argillic brown earth. It consists of a reddish, fine loamy or fine silty over clayey soil (Soil Survey of England and Wales, 1983).
- 1.5.3 Magnetometry survey carried out across similar soils has produced variable results, at times anomalies can be very weak and indistinct. However, there can be good magnetic contrast within areas of former occupation. The underlying geology and soils are therefore considered acceptable 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 20 Hz. 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 PDA computer system.
- 2.2.2 Data are collected along a series of parallel survey transects wherever possible. The length of each transect is variable and relates to the size of the survey area and other factors including ground conditions. A visual display allows accurate placing of transects and helps maintain the correct separation between adjacent traverses.
- 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 ± 10000 nT and clipped for display. Data are interpolated to a resolution of effectively 0.5m between tracks and 0.15m along each survey track. A compensation function is automatically carried out 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. A high pass filter has also been applied to remove magnetic disturbance extending laterally from the pipeline that crosses the site.

- 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 processed greyscale plot.
- 2.3.5 The raster images are combined with base mapping using ProgeCAD Professional 2014, creating DWG 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 offered 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. 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 the survey area.
- 2.3.7 A digital archive is produced with this report, see Appendix D below. The main archive is held at the offices of Archaeological Surveys Ltd.

3 RESULTS

3.1 *General assessment of survey results*

- 3.1.1 The detailed magnetic survey was carried out over a total 3.6ha within a single arable field.
- 3.1.2 Magnetic anomalies located can be generally classified as positive 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 have been numbered and are described in 3.4 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 despite very poor ground conditions. Very high magnitude magnetic disturbance has been caused by a service crossing the field and sensor compensation has been improved using a high pass filter.

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 within the survey area.





Report sub-heading CAD layer names and plot colour	Description and origin of anomalies
<p>Anomalies with an uncertain origin</p> <p>AS-ABST MAG POS LINEAR UNCERTAIN AS-ABST MAG POS DISCRETE UNCERTAIN AS-ABST MAG POS 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.</p>
<p>Anomalies with an agricultural origin</p> <p>AS-ABST MAG RIDGE AND FURROW AS-ABST MAG AGRICULTURAL</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>Anomalies associated with magnetic debris</p> <p>AS-ABST MAG DEBRIS 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>Anomalies with a modern origin</p> <p>AS-ABST MAG DISTURBANCE AS-ABST MAG SERVICE</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. Buried services may produce characteristic multiple dipolar anomalies dependant upon their construction.</p>

Table 1: List and description of interpretation categories

3.4 List of anomalies

Area centred on OS NGR 419280 256570, see Figures 03 & 04.

Anomalies with an uncertain origin

(1) – The northern part of the survey area contains two weak, broad, positive responses. It is not possible to determine if they “cut” or have been “cut” by the ridge and furrow (4) and the origin of this magnetic enhancement is not certain.

(2) – A number of positive linear anomalies have been located; however, they are generally short, weak and lack a coherent morphology. It is possible that some are associated with ridge and furrow and more modern cultivation.

(3) – A small number of weak, discrete anomalies have been located. It is not possible to determine if they relate to pit-like features with an anthropogenic or natural origin.

Anomalies with an agricultural origin

(4) – A series of parallel linear anomalies, oriented north east to south west, extend across the northern and south western part of the survey area. These relate to former ridge and furrow.

(5) – A number of narrow, parallel linear anomalies, oriented north north west to south south east relate to a modern cultivation trend.

Anomalies associated with magnetic debris

(6) – Along the south eastern edge of the survey area is a zone of magnetic debris. This is in the region of a footpath and garden boundaries and is likely to relate to dumped magnetically thermoremanent material. Just on the very edge, the response is stronger, relating to a buried electric cable which lies just beyond the limits of the surveyed area within the field margin.

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

Anomalies with a modern origin

(8) – A linear zone of magnetic disturbance extends across the survey area and is a response to a buried water main.

4 CONCLUSION

- 4.1.1 The detailed magnetometry survey located a small number of positive linear, broad linear and discrete responses within the site. The broad linear responses are within the northern part of the site, and it is not clear if they cross or have been crossed by the ridge and furrow which is also evident in the results. The positive linear anomalies are generally very short, and lack any coherent morphology or pattern, some may be related to agricultural activity. A few discrete anomalies may represent pit-like features, but it is not possible to determine if they are of anthropogenic or natural origin.

5 REFERENCES

Archaeological Surveys, 2015. *Land off Birmingham Road, Stratford-upon-Avon, Warwickshire, Geophysical Survey Written Scheme of Investigation*. Unpublished typescript document.

ASWYAS, 2013. *Land to the east of Birmingham Road, Stratford-upon-Avon, Warwickshire. Geophysical Survey*. Report no.2548. Unpublished typescript document.

Aspinall, A., Gaffney, C. and Schmidt, A., *Magnetometry for Archaeologists*. Lanham (US), AltaMira Press.

British Geological Survey, 2015. *Geology of Britain viewer, 1:50 000 scale [online]* available from <http://mapapps.bgs.ac.uk/geologyofbritain/home.html> [accessed 19/3/2015].

Chartered Institute for Archaeologists, 2014. *Standard and Guidance for archaeological geophysical survey*. IfA, University of Reading.

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

Headland Archaeology, 2015. *Land to the east of Birmingham Road, Stratford-upon-Avon, Archaeological Evaluation*. Unpublished typescript document.

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

Soil Survey of England and Wales, 1983. *Soils of England and Wales, Sheet 3 Midland and Western 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 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 $\pm 20\text{nT}$ and $\pm 10\text{nT}$ 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

COMPOSITE

Filename: J599-mag.xcp
Description: Imported as Composite from: J599-mag.asc
Instrument Type: Sensys DLMGPS
Units: nT
UTM Zone: 30U
Survey corner coordinates (X/Y): OSGB36
Northwest corner: 419146.793589291, 256745.407937989 m
Southeast corner: 419395.043589291, 256411.357937989 m
Collection Method: Randomised
Sensors: 5
Dummy Value: 32702

Source GPS Points: 1252300

Dimensions

Composite Size (readings): 1655 x 2227
Survey Size (meters): 248 m x 334 m
X Interval: 0.15 m
Y Interval: 0.15 m

Stats

Max: 3.00
Min: -3.00
Std Dev: 0.99
Mean: 0.05
Median: 0.06
Composite Area: 8.2928 ha
Surveyed Area: 3.1433 ha

Processes: 4

- 1 Base Layer
- 2 Clip from -10.00 to 10.00 nT
- 3 Clip from -5.00 to 5.00 nT
- 4 Clip from -3.00 to 3.00 nT

GPS based Proce3

- 1 Base Layer.
- 2 Unit Conversion Layer (to OSGB36).
- 3 High pass Uniform (median) filter: Window dia: 250

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.

Three printed copies of the report and a PDF copy will be supplied to the Warwickshire Historic Environment Record. The report will also be uploaded to the Online AccesS to the Index of archaeological investigationS (OASIS). A summary of the survey will also be supplied to *West Midlands Archaeology*.

Archive contents:

Geophysical data - path: J599 Birmingham Rd, Stratford-upon-Avon\Data\				
Path and Filename	Software	Description	Date	Creator
strat1\MX\ .prm .dgb .disp	Sensys MXPDA	Proprietary data formats representing magnetometer survey traverses logged to a PDA.	27/03/15	D.J.Sabin
strat1\MX\J599-mag.asc	Sensys DLMGPS	ASCII CSV (tab) file representing survey Area 1 in eastings, northings (UTM Z30N), magnetic measurement, traverse file and sensor number.	27/03/15	D.J.Sabin
Mag\comps\J599-mag.xcp	TerraSurveyor 3.0.23.0	Composite data file derived from ASCII CSV.	27/03/15	D.J.Sabin
Mag\comps\J599-mag-proc.xcp	TerraSurveyor 3.0.23.0	Processed composite data file (high pass filtered and clipped to $\pm 3nT$).	27/03/15	D.J.Sabin
Graphic data - path: J599 Birmingham Rd, Stratford-upon-Avon\Data\				
Mag\graphics\ J599-mag-proc.tif	TerraSurveyor 3.0.23.0	TIF file showing a minimally processed greyscale plot clipped to $\pm 3nT$.	27/03/15	K.T.Donaldson
Mag\graphics\ J599-mag-proc.tfw	TerraSurveyor 3.0.23.0	World file for georeferencing TIF to OSGB36.	27/03/15	K.T.Donaldson
CAD data - path: J599 Birmingham Rd, Stratford-upon-Avon\CAD\				
J599 version 1.dwg	ProgeCAD 2014	CAD file for creating plots of greyscales, abstraction, interpretation and mapping. Grid coordinates as OSGB. AutoCAD 2010 format.	19/03/15	K.T.Donaldson
Text data - path: J599 Birmingham Rd, Stratford-upon-Avon\Documentation\				
J599 report.odt	OpenOffice.org 3.0.1 Writer	Report text as an Open Office document.	26/03/15	K.T.Donaldson

Appendix E – copyright and intellectual property

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**Geophysical Survey
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Map of survey area

Reproduced from OS Explorer map no.205 1:25 000
by permission of Ordnance Survey on behalf of The
Controller of Her Majesty's Stationery Office.
© Crown copyright. All rights reserved.
Licence number 100043739.



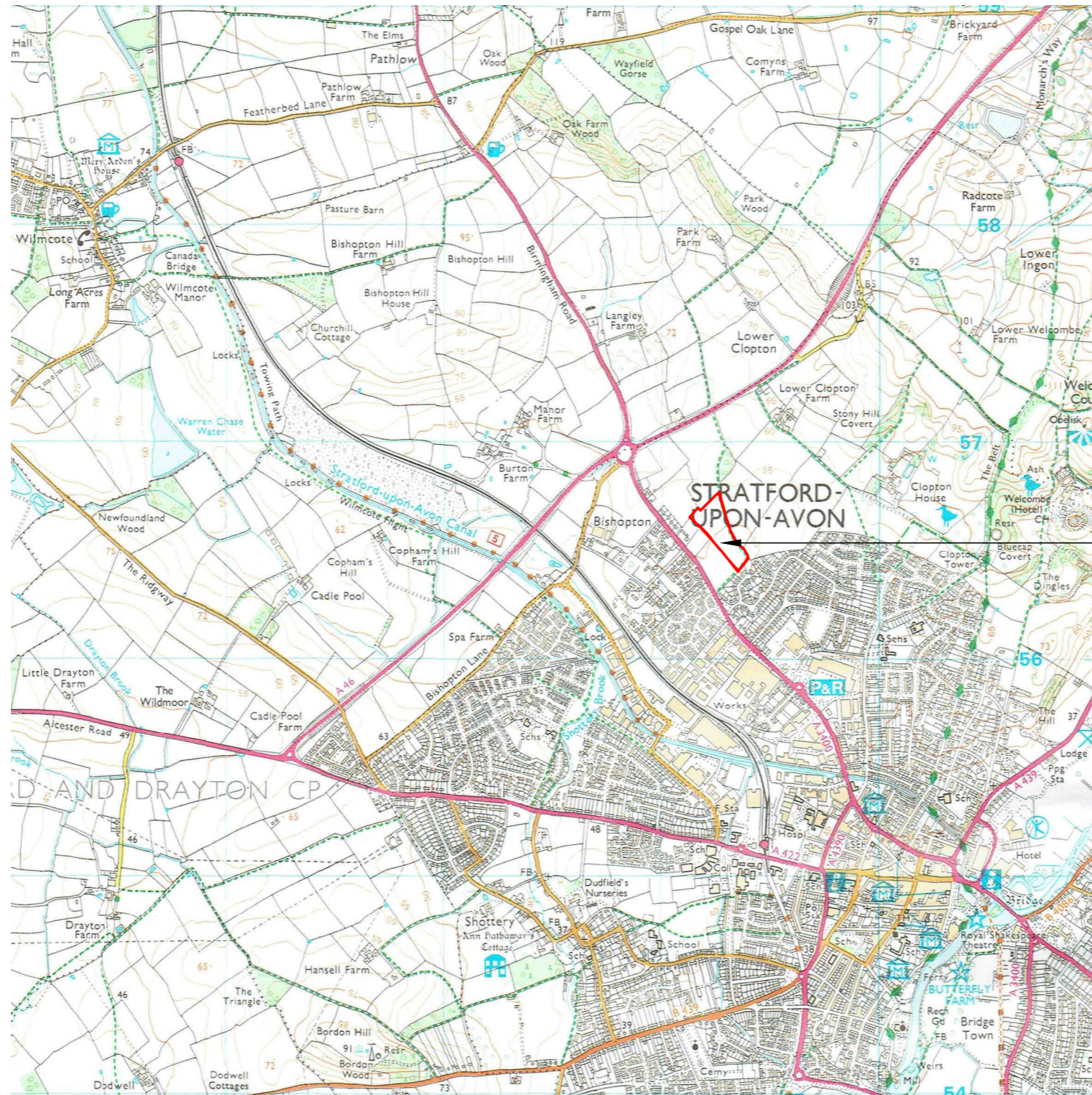
● Survey location

Site centred on OS NGR
SP 19280 56572

SCALE 1:25 000



SCALE TRUE AT A3



Survey location

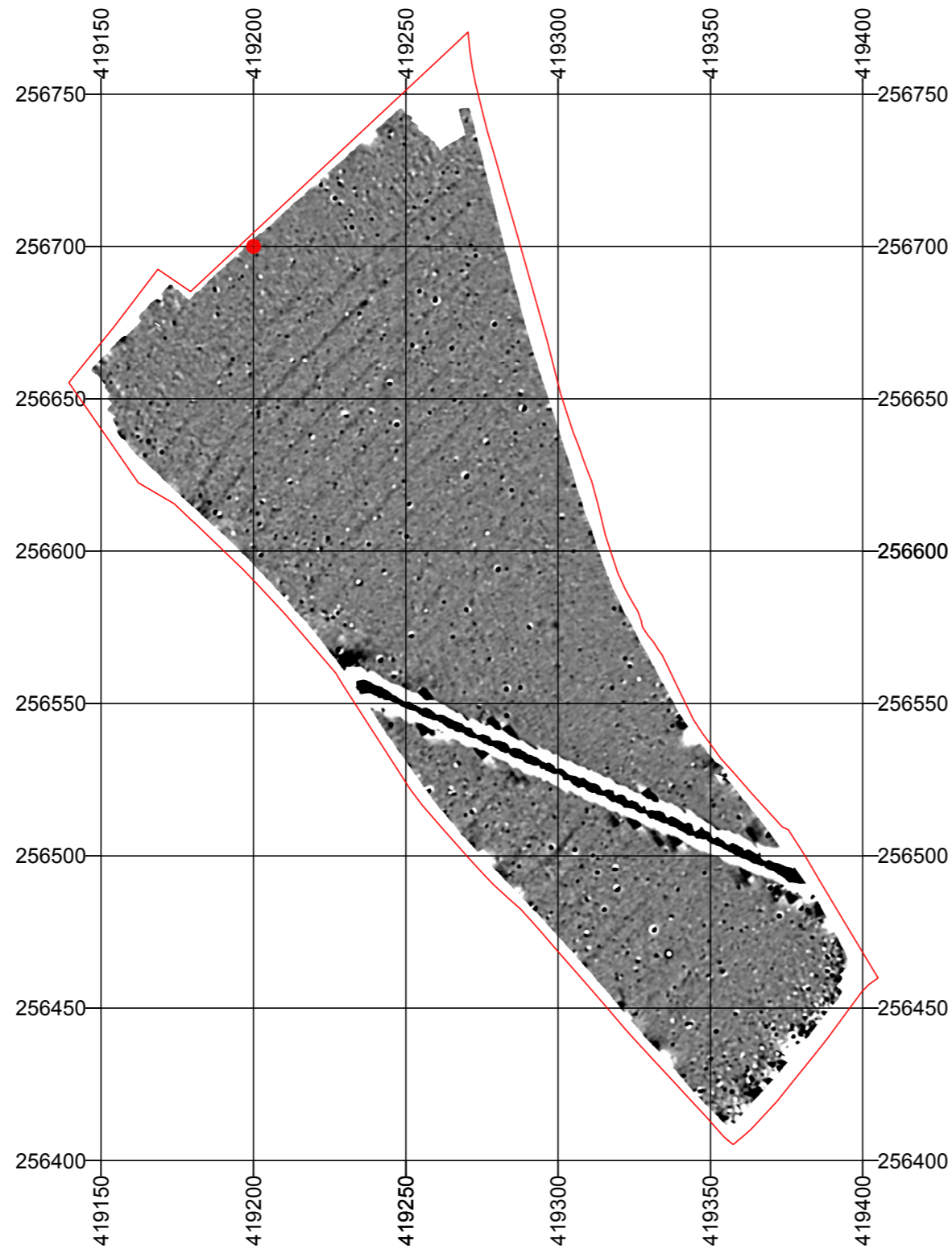
**Geophysical Survey
Land off Birmingham Road
Stratford-upon-Avon
Warwickshire**

Referencing information

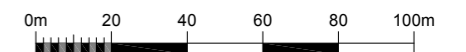
Referencing grid to OSGB36 datum at 50m intervals

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

● 419200 256700



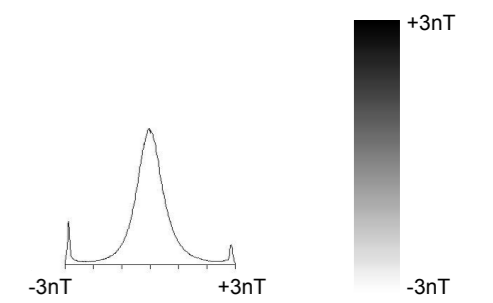
SCALE 1:2000



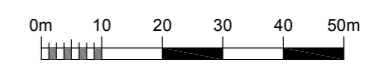
SCALE TRUE AT A3

**Geophysical Survey
Land off Birmingham Road
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Warwickshire**

**Greyscale plot of minimally
processed magnetometer data**



SCALE 1:1250












SCALE TRUE AT AS

FIG 03

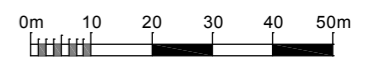
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Warwickshire**

**Abstraction and interpretation of
magnetometer anomalies**

-  Positive linear anomaly - possible ditch-like feature
-  Linear anomaly - ridge and furrow
-  Linear anomaly - modern cultivation trend
-  Discrete positive response - possible pit-like feature
-  Positive anomaly - magnetic enhancement of uncertain origin
-  Magnetic debris - spread of magnetically thermoremnant/ferrous material
-  Magnetic disturbance from ferrous material
-  Strong multiple dipolar linear anomaly - buried water main
-  Strong dipolar anomaly - ferrous object



SCALE 1:1250



SCALE TRUE AT A3