THAMES VALLEY

ARCHAEOLOGICAL

SERVICES

NORTH MIDLANDS

Bevington Hall, Salford Priors, Warwickshire

Geophysical Survey (Magnetic)

by Garreth Davey

Site Code: SPW17/22

(SP 0570 5255)

Bevington Hall, Salford Priors, Warwickshire

Geophysical Survey (Magnetic) Report

For Rupert Warren QC

by Garreth Davey

TVAS (North Midlands)

Site Code SPW 17/22

February 2017

Summary

Site name: Bevington Hall, Salford Priors, Warwickshire

Grid reference: SP 0570 5255

Site activity: Magnetometer survey

Date and duration of project: 13th February 2017

Project manager: Steve Ford

Site supervisor: Garreth Davey

Site code: SPW 17/22

Area of site: 1.2 ha

Summary of results: While several magnetic anomalies were recorded by the survey they appear to be agricultural in origin and most likely indicate the presence of ridge and furrow earthworks. Nothing else of likely archaeological origin was detected.

Location of archive: The archive is presently held at TVAS (North Midlands) in accordance with TVAS digital archiving policies.

Report edited/checked by: Steve Ford✓ 27.02.17 Tim Dawson✓ 27.02.17

Bevington Hall, Salford Priors, Warwickshire
A Geophysical Survey (Magnetic)

By Garreth Davey

Report 17/22

Introduction

This report details the results of a detailed gradiometer survey conducted over land at Bevington Hall, Salford Priors, Warwickshire (NGR SP 0570 5255) (Fig.1). The geophysical survey was commissioned by Mr Rupert Warren of Bevington Hall for exploratory purposes prior to potential landscaping of the garden areas.

The fieldwork was undertaken by Garreth Davey and Rebecca Constable on 13th February 2017 and the site code is SPW 16/77. The archive is presently held at TVAS (North Midlands) in accordance with TVAS digital archiving policies.

Location, topography and geology

The Site comprises a single 1.2ha parcel of land, located approximately 2.2km north-west of Salford Priors, Warwickshire. The site lies on a gentle south-east facing slope from approximately 70m above Ordnance Datum (aOD) down to 60m aOD. It is bounded to the south by an unnamed lane, Bevington Hall and a small copse to the north and farmland to the east and west. The land is currently utilised for grazing pasture. The solid geology of the site is recorded as of the Mercia mudstone group with the potential for patchy superficial deposits of Pershore Sand and Gravel (BGS, 1974).

Site history and archaeological background

The aims of the project were to identify magnetic anomalies which may represent buried archaeological features with a view to gaining a more complete understanding of the past activity related to the occupation of Bevington Hall. Within a 1km study area of Bevington Hall, there are a number of historical features recorded. These comprise two potential deserted medieval villages, several areas of ridge and furrow cultivation, a number of undated linear features as well as a grade II listed farm house, two historic milestone markers and an imperial toll road.

The Site lies within an area recorded as the location of Cock Bevington deserted medieval village (DMV) (HER number: MWA 1561). This is recorded as earthwork features with documentary evidence supporting the

location. Surrounding Cock Bevington DMV are several records of visible ridge and furrow cultivation (MWA 12329, 12361, 12364). These areas lie directly to the west of the site and also further to the north and north-west.

A second DMV is located 900m south of the site. This is recorded as the location of Woodchurch (MWA 151) however there is no remaining physical evidence for this. Documentary evidence suggests that this was a small settlement with a possible small medieval chapel (MWA 1494).

An undated enclosure with associated linear features has been recorded 750m west of the Site (MWA 4905-6). This was evident as earthworks and crop marks in aerial photography. Alongside these, several other undated linear features have been recorded to the east of Iron Cross (MWA 6736-7, 4922).

The B4088 550m east of the site is a former imperial toll road profiting from the main route between Evesham and Alchester. Two 19th century mile markers are also located along the route through Iron Cross.

The map regression exercise shows that site area has been in use as arable fields from at least the 19th century to present, with no significant boundary alterations. The eastern field however is recorded as an orchard in maps from 1885-1905 however this had been removed by 1955.

Methodology

Sample interval

Data collection required a temporary grid to be established across the survey area using wooden pegs at 20m intervals with further subdivision where necessary. Readings were taken at 0.25m intervals along traverses 1m apart. This provides 1600 sampling points across a full 20m × 20m grid (English Heritage 2008), providing an appropriate methodology balancing cost and time with resolution. In the eastern field a number of equestrian obstacles were present.

The Grad 601-2 has a typical depth of penetration of 0.5m to 1.0m. This would be increased if strongly magnetic objects have been buried in the site. Under normal operating conditions it can be expected to identify buried features >0.5m in diameter. Features which can be detected include disturbed soil, such as the fill of a ditch, structures that have been heated to high temperatures (magnetic thermoremnance) and objects made from ferro-magnetic materials. The strength of the magnetic field is measured in nano Tesla (nT), equivalent to 10^{-9} Tesla, the SI unit of magnetic flux density.

Equipment

The purpose of the survey was to identify geophysical anomalies that may be archaeological in origin in order to inform a targeted archaeological investigation of the site prior to development. The survey and report generally follow the recommendations and standards set out by both English Heritage (2008) and the Chartered Institute *for* Archaeologists (2002, 2011, 2014).

Magnetometry was chosen as a survey method as it offers the most rapid ground coverage and responds to a wide range of anomalies caused by past human activity. These properties make it ideal for the fast yet detailed surveying of an area.

The detailed magnetometry survey was carried out using a dual sensor Bartington Instruments Grad 601-2 fluxgate gradiometer. The instrument consists of two fluxgates mounted 1m vertically apart with a second set positioned at 1m horizontal distance. This enables readings to be taken of both the general background magnetic field and any localised anomalies with the difference being plotted as either positive or negative buried features. All sensors are calibrated to cancel out the local magnetic field and react only to anomalies above or below this base line. On this basis, strong magnetic anomalies such as burnt features (kilns and hearths) will give a high response as will buried ferrous objects. More subtle anomalies such as pits and ditches, can be seen from their infilling soils containing higher proportions of humic material, rich in ferrous oxides, compared to the undisturbed subsoil. This will stand out in relation to the background magnetic readings and appear in plan following the course of a linear feature or within a discrete area.

A Trimble Geo7x handheld GPS system with sub-decimetre real-time accuracy was used to tie the site grid into the Ordnance Survey national grid. This unit offers both real-time correction and post-survey processing; enabling a high level of accuracy to be obtained both in the field and in the final post-processed data.

Data gathered in the field was processed using the TerraSurveyor software package. This allows the survey data to be collated and manipulated to enhance the visibility of anomalies, particularly those likely to be of archaeological origin. The table below lists the processes applied to this survey, full survey and data information is recorded in Appendix 1.

Process	**Effect**
Clip from -1.80 to 2.20 nT	Enhance the contrast of the image to improve the appearance of possible archaeological anomalies.
Interpolate: *y* doubled	Increases the resolution of the readings in the *y* axis, enhancing the shape of anomalies.
De-stripe: median, all sensors	Removes the striping effect caused by differences in sensor calibration, enhancing the visibility of potential archaeological anomalies.
De-spike: threshold 1, window size 3×3	Compresses outlying magnetic points caused by

	interference of metal objects within the survey area.
De-stagger: all grids, both by -1 intervals	Cancels out effects of site's topography on irregularities in the traverse speed.

The raw data plot is presented as a greyscale plot shown in relation to the site (Fig. 3) with the processed data then presented as a second figure (Fig. 4), followed by a third plan to present the abstraction and interpretation of the magnetic anomalies (Fig. 5). Anomalies are shown as colour-coded lines, points and polygons. The grid layout and georeferencing information (Fig. 2) is prepared in EasyCAD v.7.58.00, producing a .FC7 file format, and printed as a .PDF for inclusion in the final report.

The greyscale plot of the processed data is exported from TerraSurveyor in a georeferenced portable network graphics (.PNG) format, a raster image format chosen for its lossless data compression and support for transparent pixels, enabling it to easily be overlaid onto an existing site plan. The data plot is combined with grid and site plans in QGIS 2.16.2 and exported again in .PNG format in order to present them in figure templates in Adobe InDesign CS5.5, creating .INDD file formats. Once the figures are finalised they are exported in .PDF format for inclusion within the finished report.

Results

A number of anomalies have been identified within the gradiometer survey data (Figs. 3 and 4). The majority of these consist of readings consistent with magnetic disturbance and ferrous items however a number of positive linear anomalies were also identified.

The linear anomalies identified in the data are consistent in their positive magnetic properties, spacing, width and alignment. These are aligned north-west to south-east, approximately 1.5 – 2m in width and all spaced approximately 4-5 m apart. Given the consistency of these features and the archaeological background of the Site, it is likely that these are the remaining evidence of former ridge and furrow agriculture.

No further anomalies of likely archaeological origin have been detected.

In the eastern field a number of equestrian obstacles have caused ferrous spikes and disturbances in the dataset and it should be noted that any weakly magnetised features also present in these areas will be masked by the higher magnetic readings of the metalwork. Further disturbance has been recorded along the field boundaries in relation to the gates and metal and electric fencing.

Conclusion

In conclusion, very little of archaeological potential aside from ridge and furrow evidence has been detected in the dataset, however it is possible that weaker features have been masked by the elevated magnetic responses caused by the metal items on Site, evident throughout the dataset. The anomalies interpreted as ridge and furrow identified are likely contemporary with surrounding records and are likely to have form part of the much larger medieval landscape of the area.

References

BGS, 1974, *British Geological Survey*, 1:50,000, Sheet 200, Solid and Drift Edition, Keyworth

CIfA, 2014, *Standard and Guidance: for archaeological geophysical survey*, Reading

English Heritage, 2008, *Geophysical Survey in Archaeological Field Evaluation*, English Heritage, Portsmouth (2nd edn)

IfA, 2002, *The Use of Geophysical Techniques in Archaeological Evaluation*, IFA Paper No. 6, Reading

IfA, 2011, *Standard and Guidance: for archaeological geophysical survey*, Reading

Ordnance Survey, 1885, County Series Warwickshire 1885, Southampton

Ordnance Survey, 1905, County Series Warwickshire 1905, Southampton

Ordnance Survey, 1955, Plan Warwickshire 1955, Southampton

Appendix 1. Survey and data information

Programme:
Name: TerraSurveyor
Version: 3.0.25.0

West field
Raw data
Survey corner coordinates (X/Y):
Northwest corner: 405659.06, 252485.42 m
Southeast corner: 405759.06, 252405.42 m
Direction of 1st Traverse: 307.9717 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 2047.5

Dimensions
Composite Size (readings): 400 x 80
Survey Size (meters): 100 m x 80 m
Grid Size: 20 m x 20 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 96.41
Min: -100.00
Std Dev: 18.23
Mean: -1.59
Median: -0.08
Composite Area: 0.8 ha
Surveyed Area: 0.3114 ha

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

Processed data
Stats
Max: 2.20
Min: -1.80
Std Dev: 1.41
Mean: 0.08
Median: 0.04

Processes: 6
1 Base Layer
2 DeStripe Median Sensors: Grids: All
3 De Stagger: Grids: All Mode: Both By: -1 intervals
4 Despike Threshold: 1 Window size: 3x3
5 Interpolate: Y Doubled.
6 Clip from -1.80 to 2.20 nT

East field
Raw data
Survey corner coordinates (X/Y):
Northwest corner: 405688.83, 252569.85 m
Southeast corner: 405768.83, 252489.85 m
Direction of 1st Traverse: 117.77148 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 2047.5

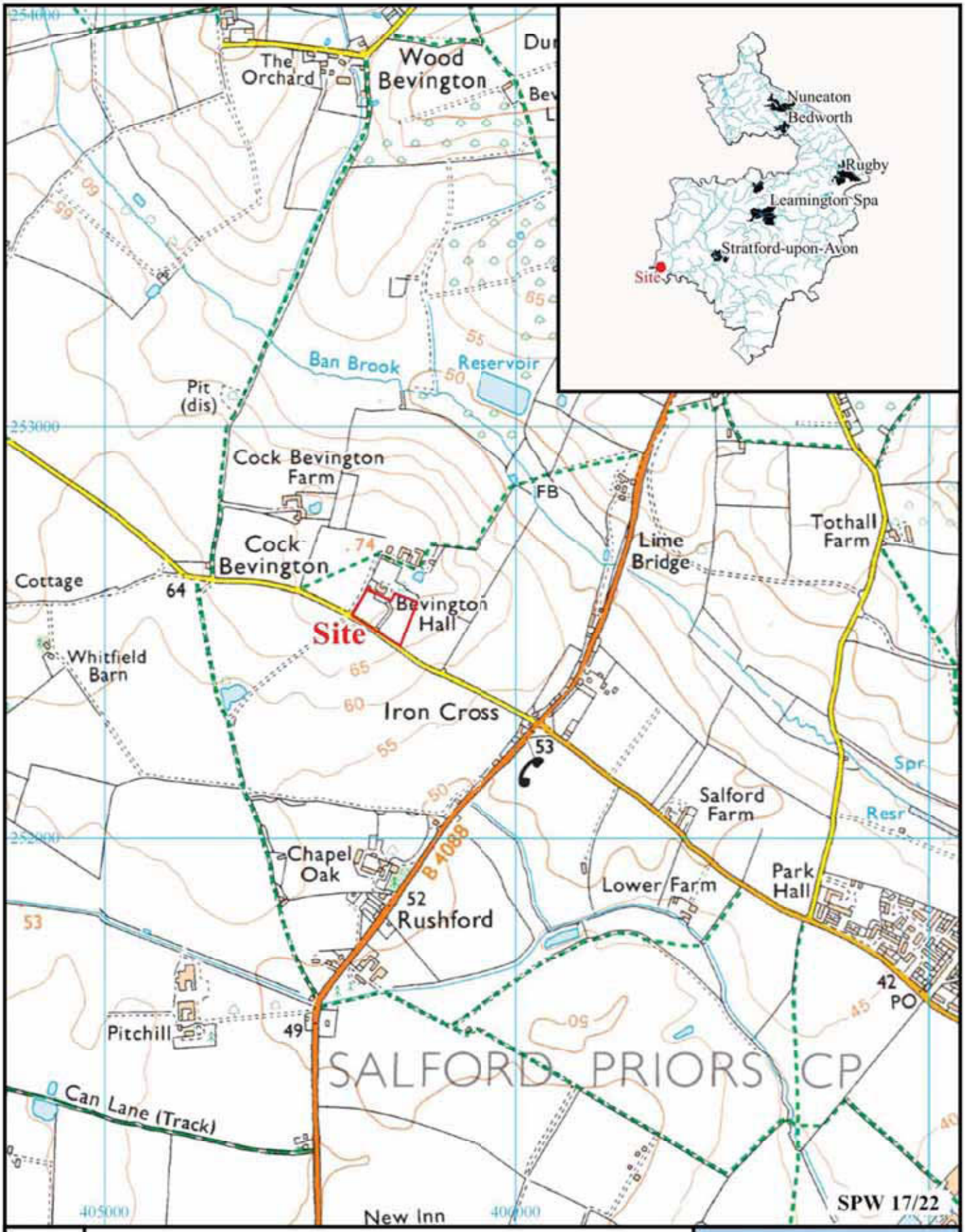
Dimensions
Composite Size (readings): 320 x 80
Survey Size (meters): 80 m x 80 m
Grid Size: 20 m x 20 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 96.41
Min: -100.00
Std Dev: 18.01
Mean: -2.36
Median: -0.56
Composite Area: 0.64 ha
Surveyed Area: 0.27435 ha

Source Grids: 15
1 Col:0 Row:0 grids\20.xgd
2 Col:0 Row:1 grids\21.xgd
3 Col:0 Row:2 grids\22.xgd
4 Col:0 Row:3 grids\23.xgd
5 Col:1 Row:0 grids\24.xgd
6 Col:1 Row:1 grids\25.xgd
7 Col:1 Row:2 grids\26.xgd
8 Col:1 Row:3 grids\27.xgd
9 Col:2 Row:0 grids\28.xgd
10 Col:2 Row:1 grids\29.xgd
11 Col:2 Row:2 grids\30.xgd
12 Col:2 Row:3 grids\31.xgd
13 Col:3 Row:1 grids\32.xgd
14 Col:3 Row:2 grids\33.xgd
15 Col:3 Row:3 grids\34.xgd

Processed data
Stats
Max: 2.20
Min: -1.80
Std Dev: 1.12
Mean: -0.05
Median: 0.03

Processes: 6
1 Base Layer
2 DeStripe Median Sensors: Grids: All
3 De Stagger: Grids: All Mode: Both By: -1 intervals
4 Despike Threshold: 1 Window size: 3x3
5 Interpolate: Y Doubled.
6 Clip from -1.80 to 2.20 nT

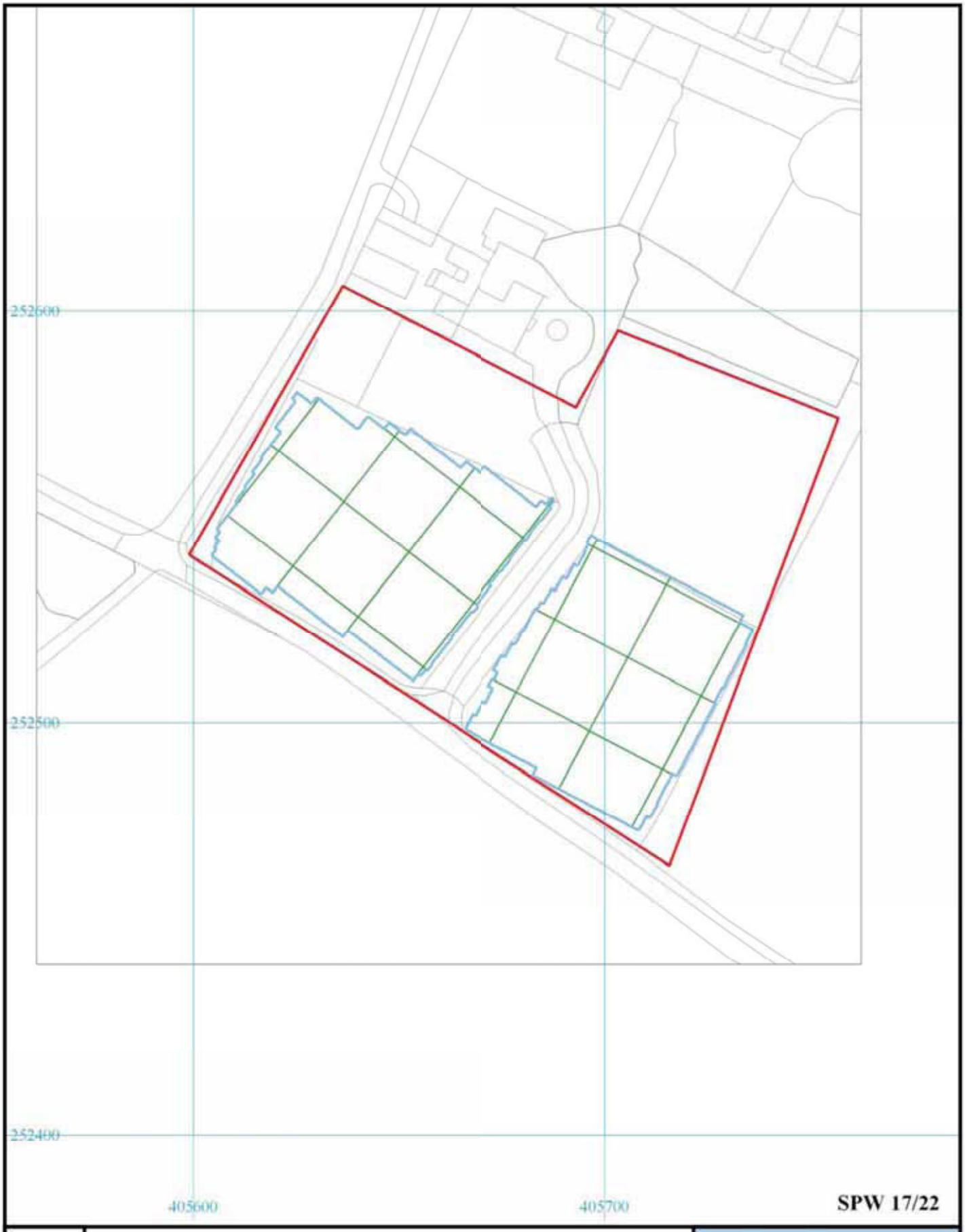


N

Bevington Hall,
Salford Priors, Warwickshire, 2017
Geophysical Survey

Figure 1. Location of site within Warwickshire.

TVAS
NORTH MIDLANDS



SPW 17/22

N

Bevington Hall,
Salford Priors, Warwickshire, 2017
Geophysical Survey

Figure 2. Detailed Site Location and Grid Map

TVAS
NORTH MIDLANDS

SPW 17/22

N

+100 nT

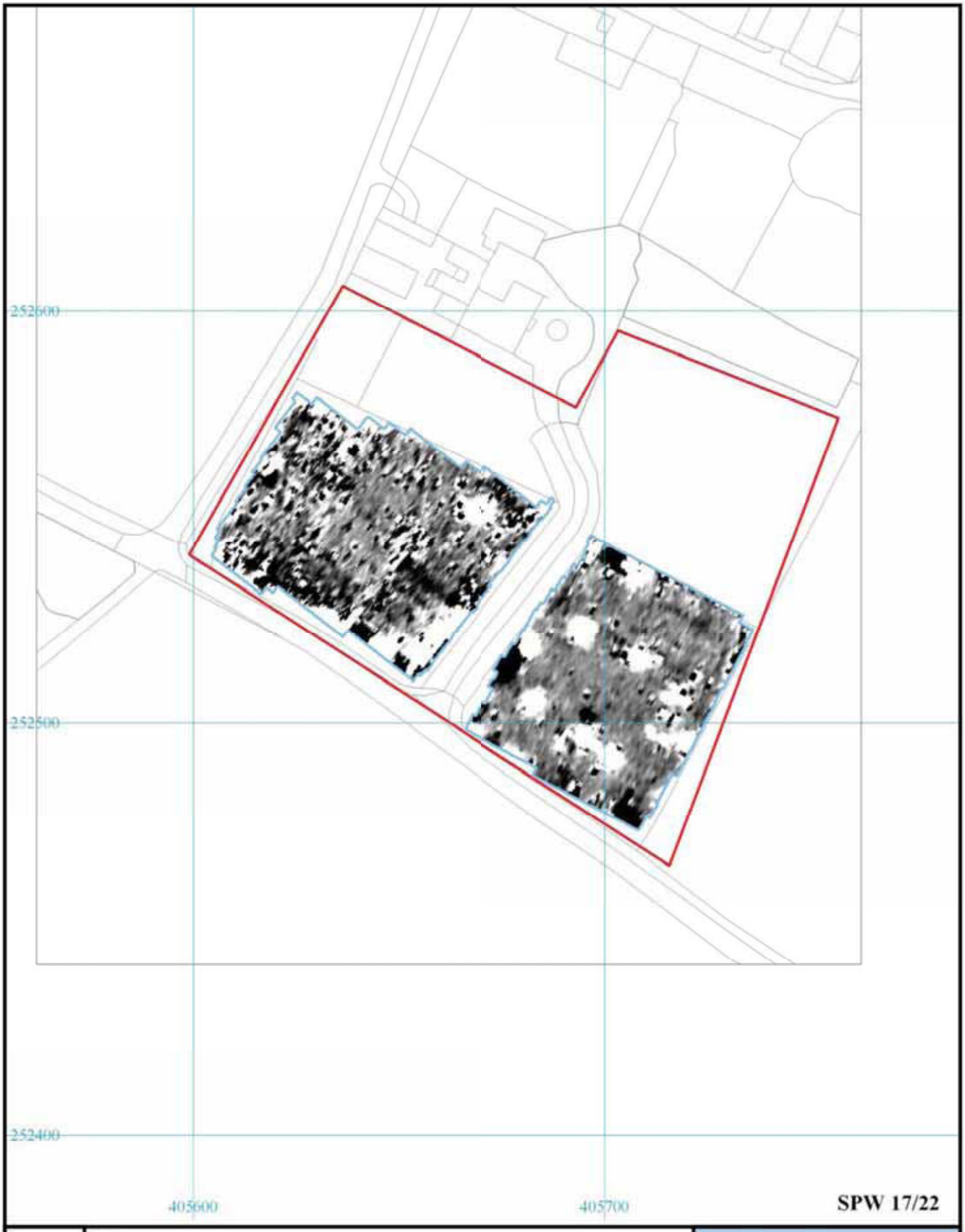
-100 nT

Bevington Hall,
Salford Priors, Warwickshire, 2017
Geophysical Survey

Figure 3. Plot of raw gradiometer data.

0 100 m

TVAS
NORTH MIDLANDS



SPW 17/22

N

+3 nT

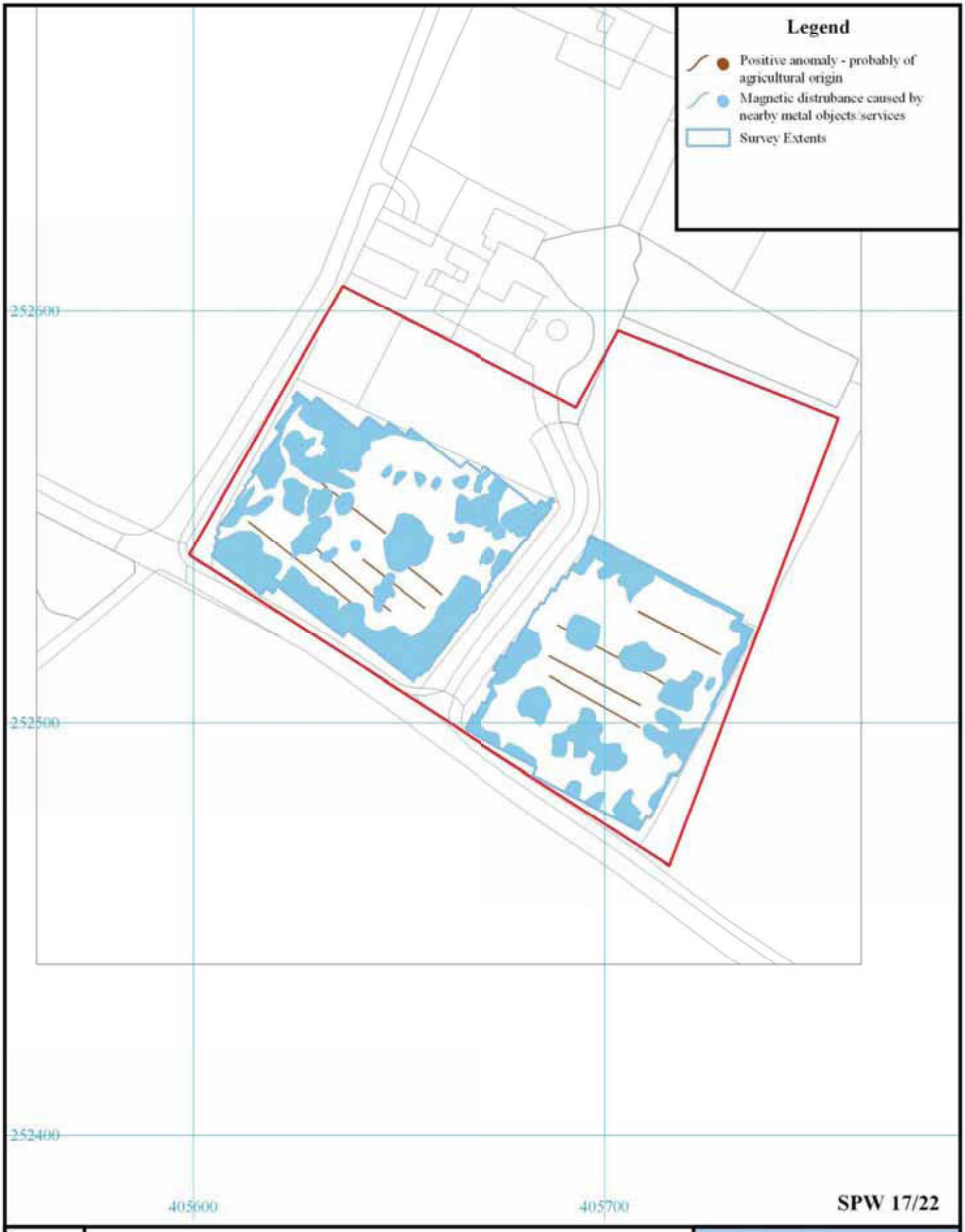
-2 nT

Bevington Hall,
Salford Priors, Warwickshire, 2017
Geophysical Survey

Figure 4. Plot of minimally processed gardiometer data.

0 100 m

TVAS
NORTH MIDLANDS



N

Bevington Hall,
Salford Priors, Warwickshire, 2017
Geophysical Survey

Figure 5. Archaeological Interpretation Plot.

0 100 m

TVAS NORTH MIDLANDS

TIME CHART

	Calendar Years
Modern	AD 1901
Victorian	AD 1837
Post Medieval	AD 1500
Medieval	AD 1066
Saxon	AD 410
Roman	AD 43
Iron Age	BC/AD 750 BC
Bronze Age: Late	1300 BC
Bronze Age: Middle	1700 BC
Bronze Age: Early	2100 BC
Neolithic: Late	3300 BC
Neolithic: Early	4300 BC
Mesolithic: Late	6000 BC
Mesolithic: Early	10000 BC
Palaeolithic: Upper	30000 BC
Palaeolithic: Middle	70000 BC
Palaeolithic: Lower	2,000,000 BC

TVAS (North Midlands),
2B Stanton Road, Meir
Stoke-on-Trent, ST3 6DD

Tel: 01782 595648
Email: northmidlands@tvas.co.uk
Web: www.tvas.co.uk/northmidlands