ARCHAEOLOGICAL EVALUATION REPORT:

GEOPHYSICAL SURVEY BY MAGNETOMETRY ON LAND EAST OF VINE FARM,

EDWORTH ROAD, LANGFORD, BEDFORDSHIRE

Planning Reference: CB/15/00096/FULL
NGR: TL 2078 3894
AAL Site Code: LAVF 15
OASIS Reference Number: allenarc1-228822

Report prepared for A.E. and W.A. Farr

By
Allen Archaeology Limited
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Document Control

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Cover image: General view of the site looking west

Executive Summary

- An archaeological evaluation by geophysical survey was undertaken by Allen Archaeology Limited for E.A. and W.A. Farr, on land off Edworth Road, Langford, Bedfordshire. The survey was undertaken to support a planning application for the construction of a biomass boiler, eight chicken sheds and assorted ancillary structures.

- Prehistoric activity in the area is represented by flint scatters, cropmark enclosures, and a number of metal detected finds in the surrounding landscape, and Roman activity is also indicated by cropmarks of a possible villa complex and numerous finds scatters.

- Possible Anglo-Saxon burials have been recorded in the area, but otherwise evidence for activity of this date is scarce. Medieval activity is represented by a number of deserted medieval villages in the surrounding area.

- Evidence for recent land drainage, a modern field boundary, modern ploughing and the occurrence of detritus within the soil was identified. No anomalies of archaeological interest were discovered, suggesting a negligible archaeological potential for the site.

1.0 Introduction

1.1 An archaeological evaluation by geophysical survey was undertaken by Allen Archaeology Limited for A.E. and W.A. Farr, on land off Edworth Road, Langford, Bedfordshire, to support a planning application for construction of a proposed poultry unit.

1.2 The site works and reporting conform to current national guidelines, as set out in '*Geophysical Survey in Archaeological Field Evaluation*' (English Heritage 2008), '*The Use of Geophysical Techniques in Archaeological Evaluations*' (Gaffney et. al. 2002) and The Institute for Archaeologists '*Standard and guidance for archaeological geophysical survey*' (CIfA 2014).

2.0 Site Location and Description

2.1 Langford is located in the administrative district of Central Bedfordshire Council, approximately 16km southeast of central Bedford. Vine Farm is c.2.5km southeast of the village, with the site located in agricultural land east of the farm, centred on NGR TL 2078 3894. The land comprised a stubble field and sloped gently from north to south.

2.2 The site is situated on a bedrock geology of Gault Formation Mudstone, with no superficial deposits recorded (http://mapapps.bgs.ac.uk/geologyofbritain/home.html).

3.0 Planning Background

3.1 The proposed development entails the construction of new poultry units and associated access on former agricultural land to the east of Vine Farm. Planning permission has been granted subject to conditions (Reference CB/15/00096/FULL) including for a programme of archaeological investigation in advance of development. Prior to undertaking these works, the client opted to commission a programme of geophysical survey in order to inform any subsequent intrusive works that may be necessary.

3.2 The approach adopted is consistent with the recommendations of the National Planning Policy Framework (NPPF), with the particular chapter of relevance being 'Chapter 12: Conserving and enhancing the historic environment' (Department for Communities and Local Government 2012).

4.0 Archaeological and Historical Background

4.1 A desk-based assessment has been undertaken for this site (Eadie 2014), and the results of this document are summarised below.

4.2 Prehistoric activity is represented by flint scatters, cropmark enclosures, and a number of metal detected finds in the surrounding landscape, and Roman activity is also indicated by cropmarks of a possible villa complex and numerous finds scatters.

4.3 Possible Anglo-Saxon burials have been recorded in the area, but otherwise evidence for activity of this date is scarce. Medieval activity is represented by a number of deserted medieval villages in the surrounding area.

5.0 Methodology

5.0.1 The geophysical survey consisted of a detailed gradiometer survey of the site, an area of approximately 4 hectares.

5.0.2 The fieldwork was carried out over a period of two working days, Wednesday 28th to Thursday 29th October 2015. The site was divided into 30m by 30m grids, established on site with reference to local fixed boundaries and accurately tied into the National Grid with Ordnance Survey base mapping, using a Leica GS08 Netrover receiving RTK corrections.

5.0.3 The survey was undertaken using a Bartington Grad601-2 Dual Fluxgate Gradiometer with an onboard automatic DL601 data logger. This instrument is a highly stable magnetometer which utilises two vertically aligned fluxgates, one positioned 1m above the other. This arrangement is then duplicated and separated by a 1m cross bar. The 1m vertical spacing of the fluxgates provides for deeper anomaly detection capabilities than 0.5m spaced fluxgates. The dual arrangement allows for rapid assessment of the archaeological potential of the site. Data storage from the two fluxgate pairs is automatically combined into one file and stored using the onboard data logger.

5.0.4 Data collection was undertaken in a zigzag traverse pattern, using a sample interval of 0.25m and a traverse interval of 1m.

5.0.5 The fieldwork and reporting were carried out in accordance with the procedures in 'Geophysical Survey in Archaeological Field Evaluations' (English Heritage 2008) and 'The Use of Geophysical Techniques in Archaeological Evaluations: IfA Paper 6' (Gaffney et al. 2002).

5.1 Summary of Survey Parameters

5.1.1 Fluxgate Magnetometers

Instrument 1:	Bartington Grad601-2 Dual Fluxgate Gradiometer
Sample interval:	0.25m
Traverse interval:	1.00m
Traverse separation:	1.00m
Traverse method:	Zigzag
Resolution:	0.01 nT
Processing software:	Terrasurveyor 3.0.27
Surface conditions:	Stubble
Area surveyed:	4 ha
Date surveyed:	Wednesday 28th to Thursday 29th October 2015
Geophysical Surveyor:	Laurence Savage
Survey Assistant:	Craig Carvey
Data interpretation:	Laurence Savage

5.2 Data Collection and Processing

5.2.1 The grids were marked out using pre-programmed coordinates on the Leica GS08 Netrover. The collection of magnetic data using a north – south traverse pattern is preferable as the fluxgate gradiometer is set up and balanced with respect to the cardinal points. Since the data is plotted as north-south traverses there is considerable merit sampling the north – south response of a magnetic anomaly with as many data points as is possible, this is accomplished as the density

collected along the traverse line is greater than that between traverses (Aspinall 2008). On this occasion magnetic data was collected on a north – south alignment due to the orientation of the pre-programmed survey grids.

5.2.2 The data collected from the survey has been analysed using the current version of Terrasurveyor 3.0.27. The resulting data set plots are presented with positive nT/m values and high resistance as black and negative nT/m values and low resistance as white.

The data sets have been subjected to processing using the following filters:

- De-stripe
- Clipping
- De-staggering

5.2.3 The de-stripe process is used to equalise underlying differences between grids or traverses. Differences are most often caused by directional effects inherent to magnetic surveying instruments, instrument drift, instrument orientation (for example off-axis surveying or heading errors) and delays between surveying adjacent grids. The de-stripe process is used with care however as it can sometimes have an adverse effect on linear features that run parallel to the orientation of the process.

5.2.4 The clipping process is used to remove extreme data point values which can mask fine detail in the data set. Excluding these values allows the details to show through.

5.2.5 The de-staggering process compensates for data correction errors caused by the operator varying in pace over the course of a traverse. It shifts each traverse forward or backwards by a specified number of intervals.

5.2.6 Plots of the data are presented in processed linear greyscale (smoothed) with any corrections to the measured values or filtering processes noted, and as separate simplified graphical interpretations of the main anomalies detected.

6.0 Results

6.1 For the purposes of interpreting the anomalies, the geophysical survey data has been processed to the values of -3 to 3 nT/m (Figure 3). This enhances faint anomalies that may otherwise not be noted in the data. The survey results revealed a number of anomalies across the data set, and these are discussed in turn and noted as single digit numbers in square brackets.

6.2 The positive linear anomaly towards the eastern side of the site, running west-northwest to east-southeast [1] measured 0.5 to 2.5nT/m. The appearance and measurements of the anomaly are consistent with a field boundary ditch. To the south, the continuation of the ditch is masked by an area of magnetic noise [4] measuring from -2 to 2nT/m. Such noise is often caused by modern detritus and is consistent with the use of rubbish or rubbish laden soil to backfill a feature. If left close to the surface this detritus would then be spread outside of the original bounds of deposition by ploughing. The ditch measures a minimum of 67m in length or a minimum of 146m in length if it extends underneath [4].

6.3 The positive linear anomalies in the centre of the site, running west-northwest to east-southeast [2] measured 0 to 1nT/m. The appearance and measurements of the anomaly are consistent with modern cultivation trends. The anomalies measure approximately 45m in length.

6.4 The positive linear anomaly towards the western side of the site, running west-northwest to east-southeast [3] measured 0 to 1nT/m. The appearance and measurements of the anomaly are consistent with an interpretation as a field drain. The anomaly measures a minimum of 150m in length.

6.5 The amorphous, dipolar anomalies [5] and [6] on the eastern side of the site to the west of [1] measured between -0.5 and 0.5nT/m and are typical of a response caused by geological variation. The anomalies covered an area of approximately 750m² and 400m² respectively.

6.6 Throughout the site are a number of weak dipolar responses [7] typically measuring from -4 to 4nT/m but occasionally measuring as high as -8 to 8nT/m. The characteristic dipolar response of pairs of positive and negative spikes suggest near surface ferrous metal or other highly fired material in the soil.

7.0 Discussion and Conclusions

7.1 The geophysical survey did not identify any anomalies of archaeological interest suggesting marginal archaeological potential for the site.

7.2 A single ditch was identified [1], corresponding with a modern field boundary which was removed within in the last few years. It is still present on current OS mapping.

7.3 The geophysical survey also identified two modern agricultural features: Modern cultivation trends are faintly visible towards the centre of the site and a drain runs from north-northwest to south-southeast on the western side of the site. Their alignment is consistent with both modern boundaries and former boundary [1].

7.4 Sporadic dipolar anomalies were encountered throughout the site, likely representing scattered scrap and detritus. These dipolar spikes are concentrated towards the southern site boundary. This pattern is consistent with the deposition of detritus on and around the extant track, later spread northwards by cultivation.

8.0 Effectiveness of Methodology

8.1 The non-intrusive evaluation methodology employed was appropriate to the scale and nature of the site surveyed, and has identified minimal archaeological potential for the proposed development area. Magnetometry surveying was the prospection technique best suited to the identification of archaeological remains on the site. Other non-intrusive survey techniques would have required justification and may have proved too time consuming or cost-prohibitive.

9.0 Acknowledgements

9.1 Allen Archaeology Limited would like to thank A.E. and W.A. Farr for this commission, and for their cooperation during the fieldwork.

10.0 References

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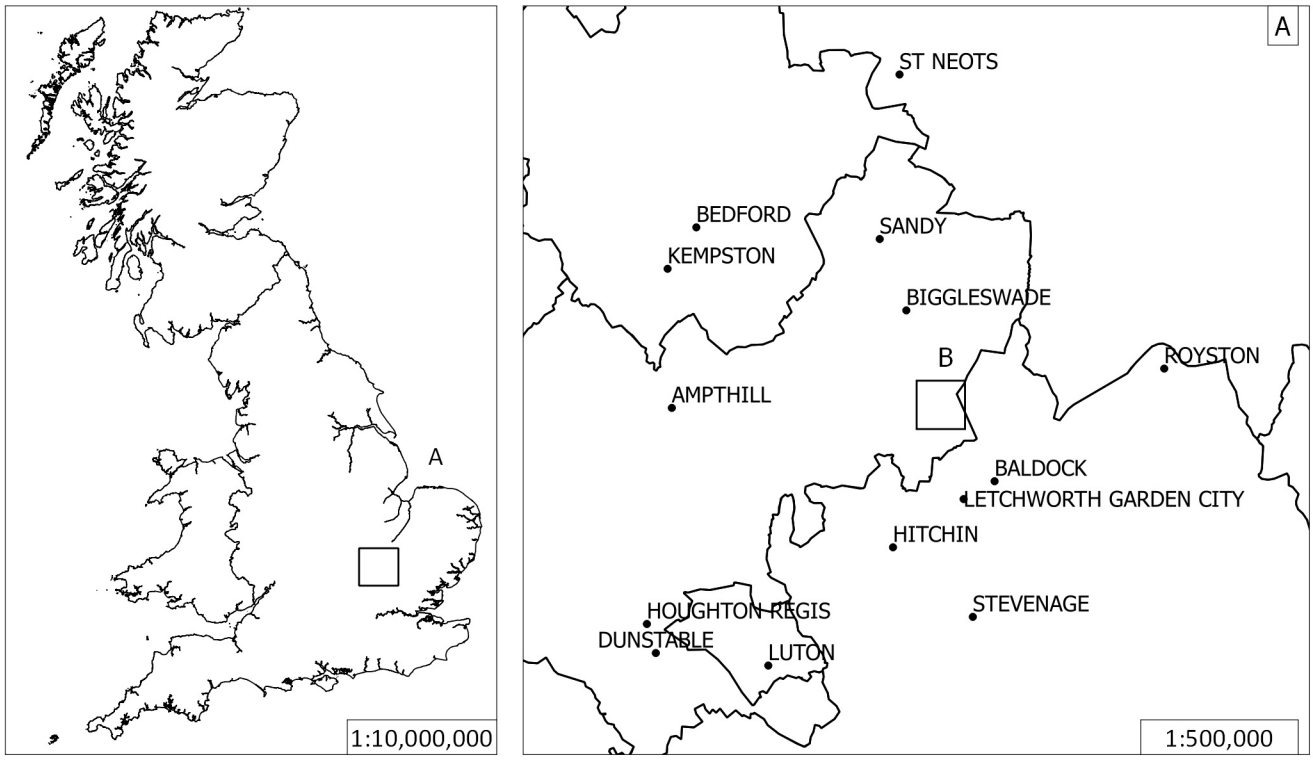

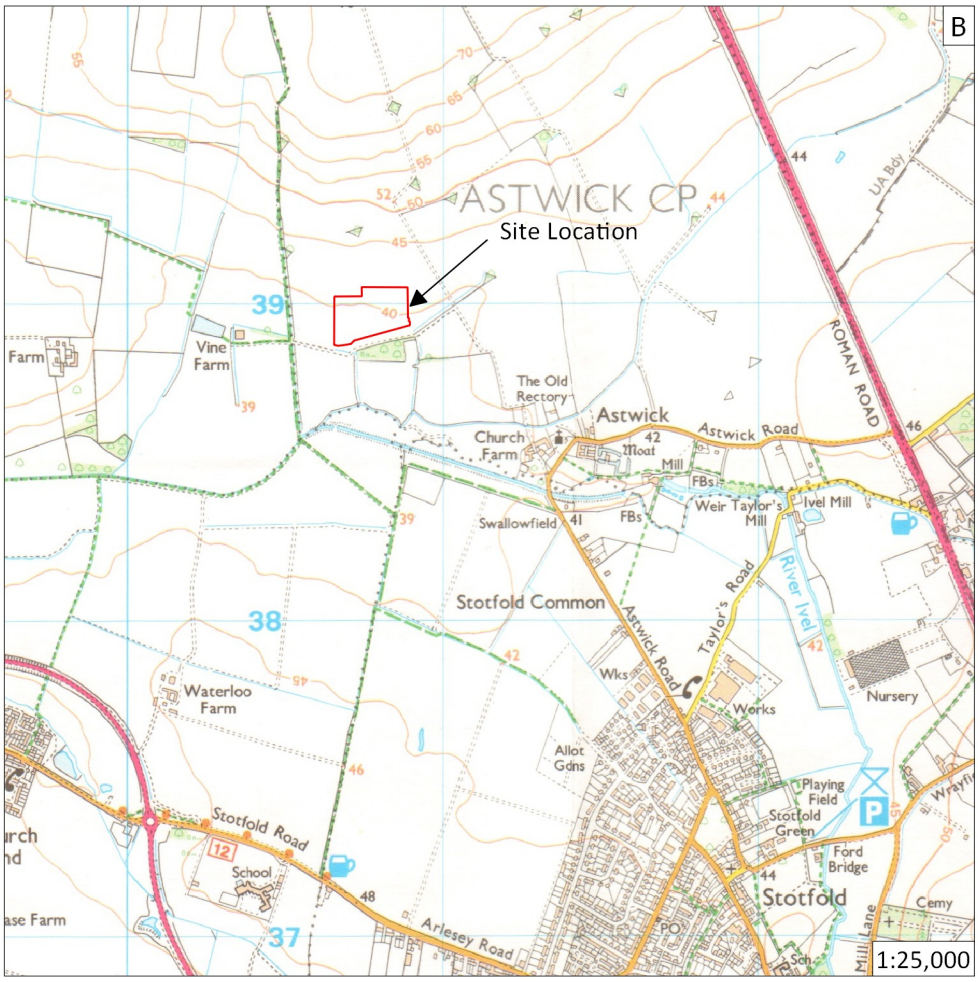

Figure 1: Site location outlined in red

Site Code	LAVF 15
Scale	1:25,000 @ A4
Drawn by	L Savage
Date	03/11/15

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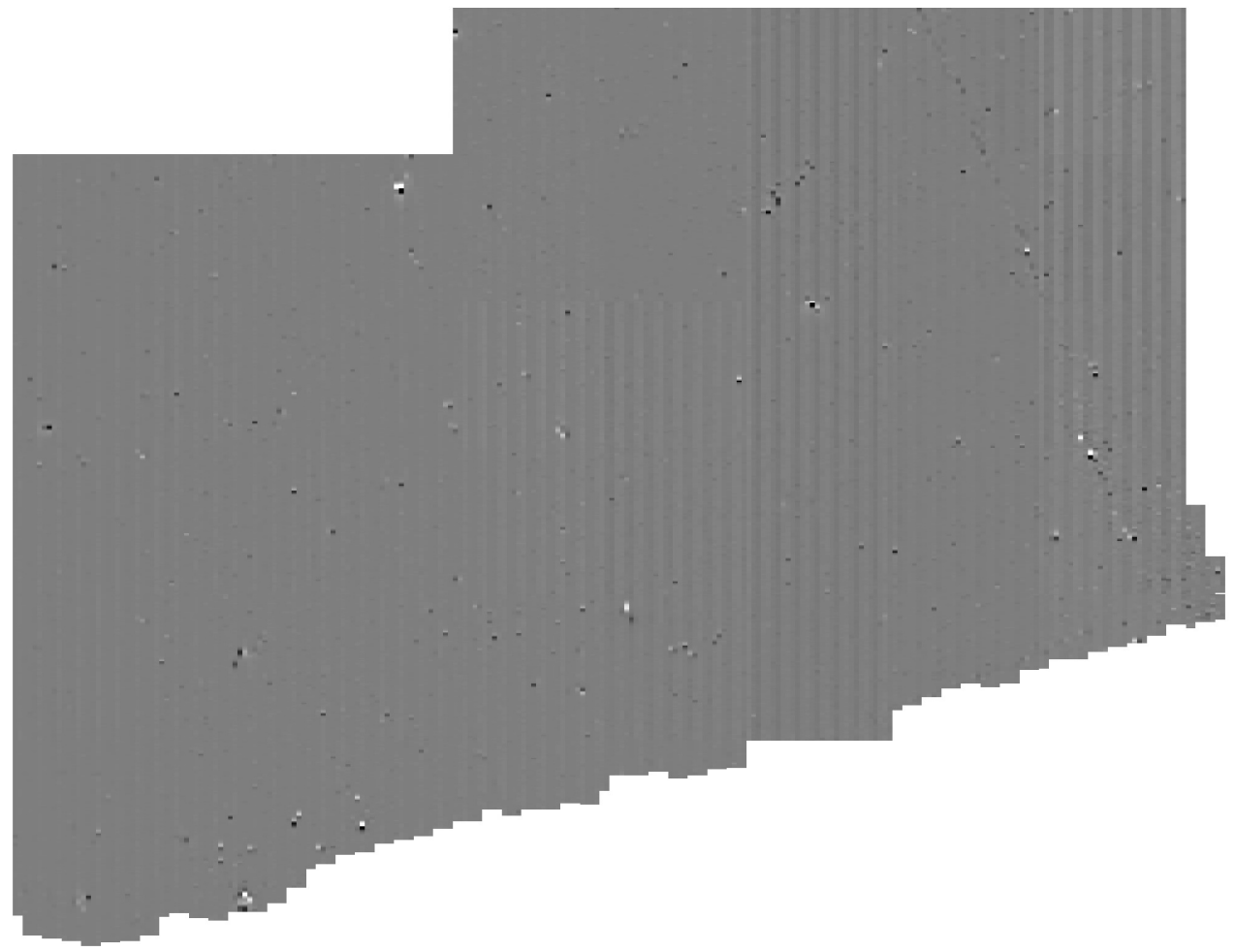
Raw data (clipped to +/- 40 nT)



Trace Plot (ZMT and clipped to +/- 25nT)

Site Code	LAVF15
Scale	1:1500 @ A3
Drawn By	LS
Date	03/11/2015

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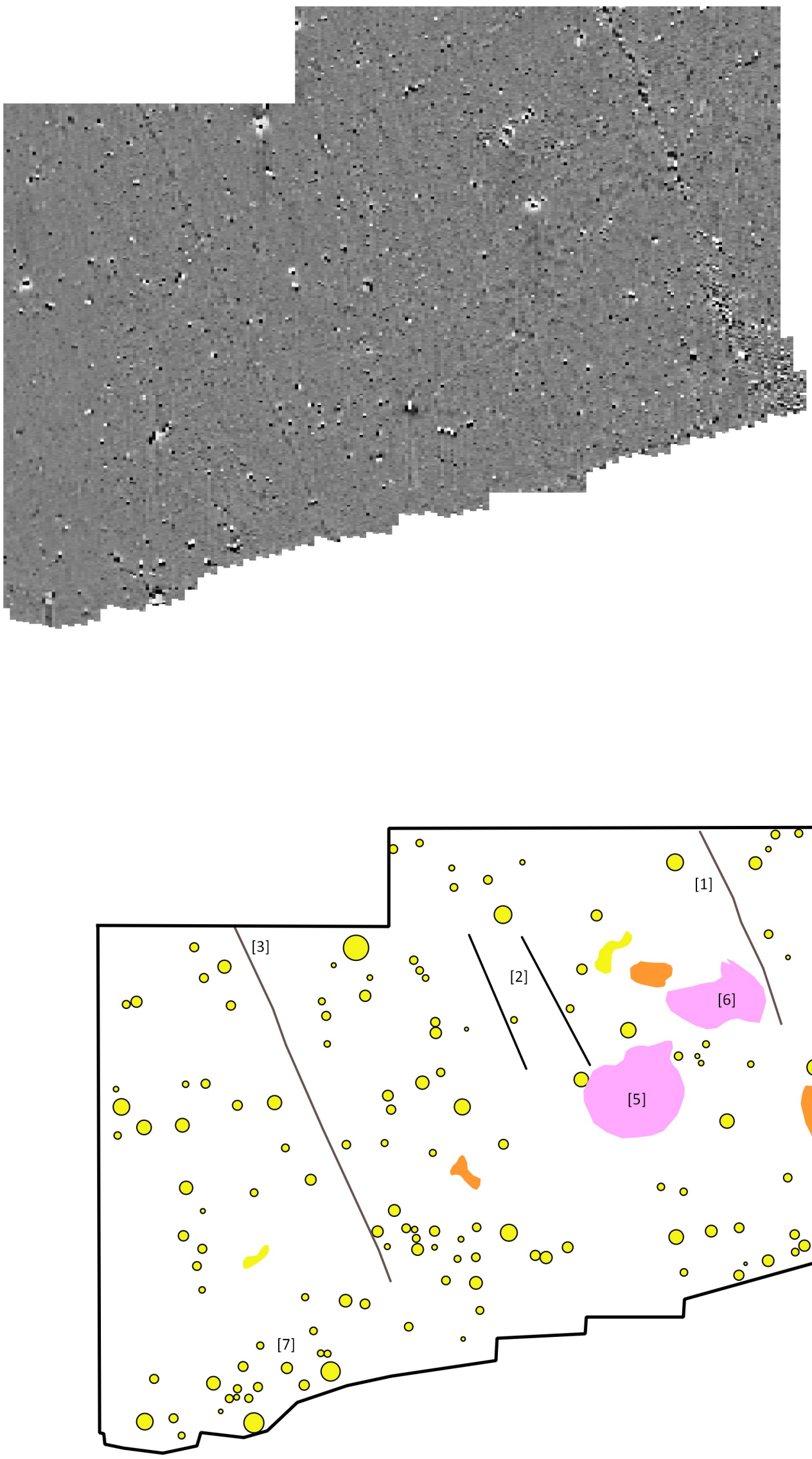
Figure 2: Greyscale raw data and processed trace plot



Site Code	LAVF 15
Scale	1:1500 @ A3
Drawn By	Laurence Savage
Date	01/11/2015

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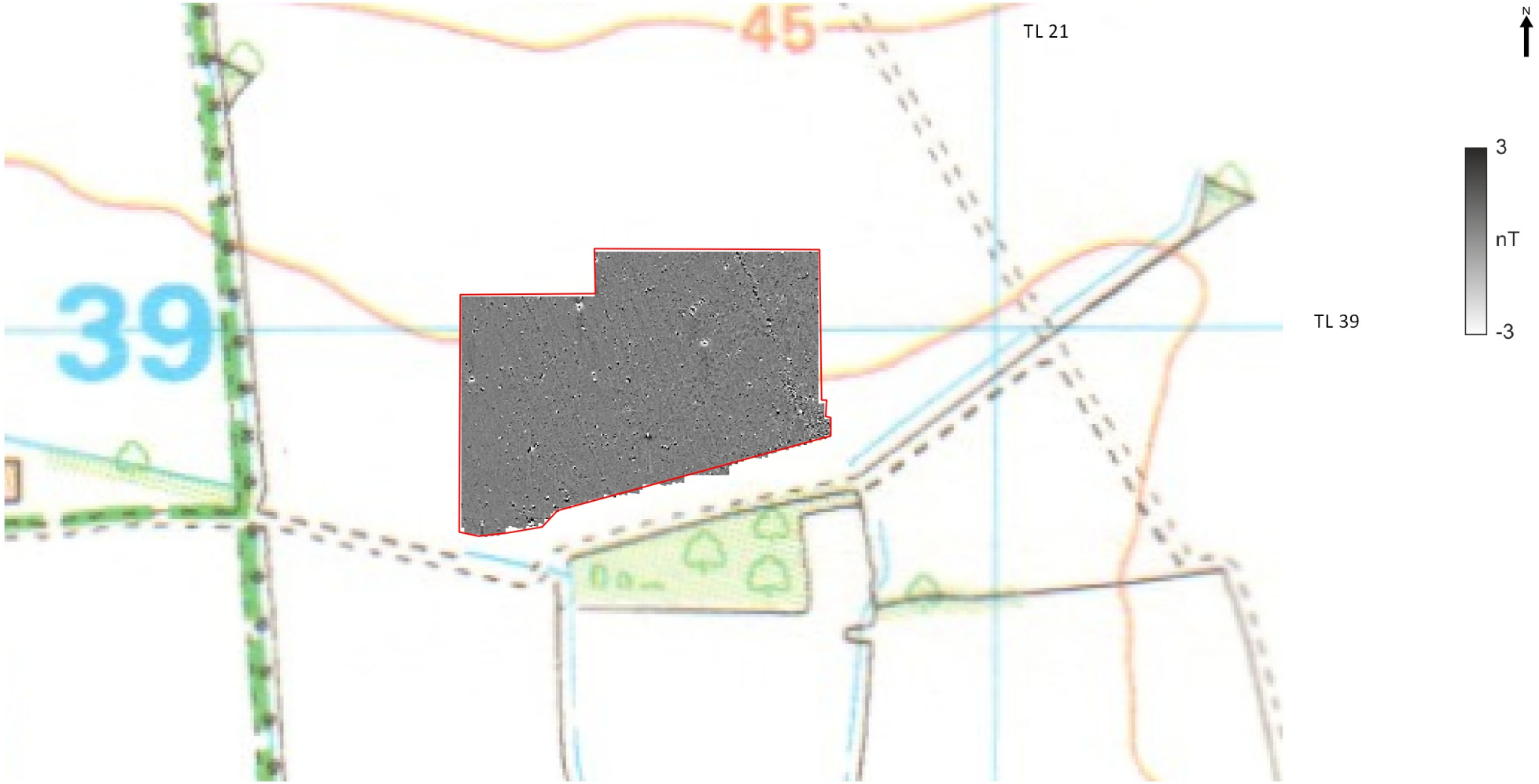
Figure 3: Processed greyscale plot and interpretation



Site Code	LAVF 15
Scale	1:3000 @ A4
Drawn By	L Savage
Date	03/11/15

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0 50 100 150 200 m

Figure 4: Processsed greyscale location

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