

ARCHAEOLOGICAL EVALUATION REPORT:
GEOPHYSICAL SURVEY BY MAGNETOMETRY
ON LAND ADJACENT TO BEANSTALK FARM, DORDON, WARWICKSHIRE

Planning Reference: Pre-Planning
NGR: SP 26040 99850
AAL Site Code: DOBE 12
Oasis ID: allenarc1-134402



Report prepared for Prospect Archaeology on behalf of IM Properties

By
Allen Archaeology Limited

Report Number 2012087

September 2012



Allenarchaeology



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Element	Name	Date
Report prepared by:	Robert Evershed	26/09/2012
Illustrations prepared by:	Robert Evershed	26/09/2012
Report edited by:	Mark Allen	27/09/2012
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Cover image: View of site taken from the Beanstalk Farm looking south

Executive Summary

- A geophysical survey by magnetometer was undertaken by Allen Archaeology Limited on land to the south of Dordon and the A5, and to the west of Gypsy Lane, around Beanstalk Farm, Warwickshire for Prospect Archaeology on behalf of IM Properties to support a future planning application for a business park development on the land.
- The survey has revealed some evidence of archaeological activity throughout the site, the majority of which appears to relate to boundary features and footpaths shown on earlier mapping of the study area.
- Some linear anomalies were identified that do not appear to relate to the current system of boundaries or other linears identified on previous mapping. These may reflect an earlier complex of boundaries, although the weak magnetic signature of these anomalies suggests that they probably relate to field systems rather than settlement.
- Several possible pits or infilled ponds were also identified, and an area of dipolar response may be indicative of a former bonfire area adjacent to the Beanstalk property.
- A number of large dipolar responses are likely to be ferrous or highly fired material within the ploughsoil.
- None of the anomalies identified appear to relate to anything other than agricultural activities on the site. Based on the evidence of the geophysical survey, it is concluded that the potential or significant archaeology to exist on this site is low.

1.0 Introduction

- 1.1 A geophysical survey by magnetometer was undertaken by Allen Archaeology Limited on land to the south of Dordon and the A5, and to the west of Gypsy Lane around Beanstalk Farm, Warwickshire. The works were commissioned by Prospect Archaeology on behalf of IM Properties to support a future planning application for a business park development on the site.
- 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*' (IFA Paper 6) and the Institute for Archaeologists '*Standard and guidance for archaeological geophysical survey*' (IfA 2011).
- 1.3 The site is archaeologically sensitive, lying in an area of archaeological interest and potential.

2.0 Site Location and Description

- 2.1 Dordon is situated approximately 6.6km southeast of Tamworth in North Warwickshire. The site is c.0.5km south of Dordon, and comprises two fields of c.10.3 hectares, located around Beanstalk Farm. The site is centred on NGR SP 26040 99850.
- 2.2 The local geology comprises bedrock deposits of Halesowen formation sandstone and Pennine middle coal measures with an overlying superficial geology of Grey Marl (<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>). The fields recently contained a wheat crop that had been harvested so the ground cover at the time of the survey comprised wheat stubble and straw.

3.0 Planning Background

- 3.1 A planning application will shortly be submitted for a business park development of land at Dordon.
- 3.2 The purpose of the current works is to provide detailed information that will aid the determination of the nature and extent of the potential archaeological resource within the proposed development area.
- 3.3 The approach adopted is consistent with the guidelines that are set out in the National Planning Policy Framework (Department for Communities and Local Government 2012).

4.0 Archaeological and Historical Background

- 4.1 The archaeological and historical background is discussed in depth in a cultural heritage assessment for the site (PA 2012), so is not reproduced here. Previous investigations have shown a limited density of prehistoric and Romano-British activity, although a cropmark complex has been noted to the northwest of the survey area.
- 4.2 A map regression exercise as part of the cultural heritage assessment has identified a number of boundaries running across the development area which have since been removed.

5.0 Methodology

- 5.0.1 The geophysical survey consisted of a detailed gradiometer survey of the entirety of the proposed development area that is available for survey, totalling approximately 12.9 hectares.
- 5.0.2 The fieldwork was carried out by a team of two experienced geophysicists from AAL over a period of four working days. 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 Net rover 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.

5.1 Summary of Survey Parameters

5.1.1 Fluxgate Magnetometer

Instrument:	Bartington Grad601-2 Dual Fluxgate Gradiometer
Sample interval:	0.25m
Traverse interval:	1.00m
Traverse separation:	1.00m
Traverse method:	Zigzag
Resolution:	0.1 nT
Processing software:	ArchaeoSurveyor 2.5
Surface conditions:	Wheat stubble and straw
Area surveyed:	10.3 ha
Date surveyed:	Tuesday 11 th – Friday 14 th September 2012
Surveyor:	Robert Evershed
Survey assistants:	Iain Pringle
Data interpretation:	Robert Evershed, Dave Hibbitt and Mark Allen

5.2 Data Collection and Processing

5.2.1 The grids were marked out using tapes from the southwest corner of the site. The collection of magnetic data using a north – south traverse pattern is preferable for a magnetic survey, as enhancements to the magnetic field caused by buried features is mapped increasingly stronger the closer the traverse direction can get to a magnetic north – south direction (Breiner 1999). On this occasion magnetic data was collected close to the preferred alignment due to the orientation of the survey grids. Data was collected by making successive parallel traverses across each grid in a zigzag pattern. Several key points of the survey grids were accurately tied into the National Grid with Ordnance Survey base mapping using a Leica GS08 Net rover receiving RTK corrections.

5.2.2 The data collected from the survey has been analysed using the current version of ArchaeoSurveyor 2.5. 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 (also known as Zero Mean Traverse or ZMT)
- Clipping

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 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 Magnetometer Survey Results (Figures 3 – 6)

- 6.1 For the purposes of interpreting the anomalies, the 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; however it also includes all ferrous and other magnetically enhanced material within the study area, making the resulting greyscale image particularly 'noisy'. The survey results revealed a number of anomalies across the data set, and these are discussed in turn and noted as two digit numbers in square brackets.
- 6.2 The survey has shown a broadly north – south trend (shown as double-ended arrows on Figure 3), and these reflect the current ploughing regime.
- 6.3 Immediately noticeable in the data set are the repeating linear dipolar anomalies [01] and [02] running broadly north – south between the two survey areas. These are likely to reflect modern services, and with respect to anomaly [01] represent a telegraph pole and power line running broadly southwards towards The Beanstalk property.
- 6.4 An area of dipolar activity along the eastern edge of the main area, [03], is suggestive of a location of highly-fired material or ferrous material, such as within an infilled pond or hollow, or perhaps reflecting an area of burning. A pond is shown within the field on the Tithe map dated 1850 (PA 2012, Figure 3), although it does not appear to be quite at this location so may be a further unknown pond, or perhaps more likely the location of a former bonfire adjacent to the Beanstalk property.
- 6.5 The linear anomalies running north – south in the western field [04] and northeast – southwest on the western edge of the eastern field [05] almost certainly reflect modern field drains.
- 6.6 A number of positive linear anomalies are apparent in the survey data that are shown on earlier mapping, anomalies [06] – [08]. These produced magnetic readings of up to 12 nT/m. Former field boundary [06] was removed between 1938 and 1956 (PA 2012, Figures 7 and 8), [07] was removed between 1976 and 1990 (PA 2012, Figures 9 and 10) and [08] was removed between 1956 and 1976 (PA 2012, Figures 8 and 9).
- 6.7 Further linear anomalies, almost all with weak magnetic signatures of up to 6 nT/m, have also been identified in the data, [09] – [22]. Of these, anomalies [09] – [11] appear to respect the sinuous former boundary [06] and may therefore have been associated, although if so then they appear to have been removed prior to the creation of the 1850 Tithe map (PA 2012, Figure 3). Within the southern half of the western field positive linear anomalies [12] – [15] appear to form elements of a field system, although it is unclear if this relates to the 19th century boundary or if it relates to an earlier landscape system. A series of other positive linear anomalies, [16] – [20] may also be elements of former field systems that do not correlate with the existing system of boundaries, with anomaly [16] peaking at 17 nT/m.
- 6.8 A further series of weak positive linear anomalies (4-9 nT/m) are evident along the western and southern boundaries of the site, [21] and [22]. These appear to mirror a footpath depicted on a 1990 map of the site (PA 2012, Figure 10).
- 6.9 There are two amorphous positive anomalies within the data set, [23] and [24]. Both have a slightly higher magnetic signature than the surrounding deposits, and are indicative of soil-filled hollows, large pits or former ponds.

- 6.10 A number of dipolar responses with some examples highlighted as yellow circles on the interpretative plot (Figure 3), were detected across the survey area. These are likely to be associated with ferrous waste or highly fired material within the ploughsoil.

7.0 Discussion and Conclusions

- 7.1 The site conditions proved receptive to geophysical surveying, and have identified limited evidence for anthropogenic activity across the study area predating the creation of the Tithe Map of 1850.
- 7.2 Evidence of archaeological activity was identified by the magnetometer survey, with many of the anomalies correlating with landscape features identified during the preceding map regression exercise (PA 2012). Most clear in the data is a sinuous boundary running broadly north – south, noted on the 1850 Tithe Map for the area (*ibid.*, Figure 3). Several linear anomalies were noted that may respect the main north – south boundary; these are not shown on early mapping which would perhaps indicate that this sinuous boundary predated the compilation of the Tithe Map. A number of other ephemeral linear anomalies did not appear to respect the sinuous boundary and therefore may reflect an earlier system. None of the linear anomalies produced particularly highly magnetic readings, suggesting they are probably field systems away from settlement areas. There is also no evidence that the remains relate to the undated cropmark enclosure identified to the northwest (PA 2012).
- 7.3 Several weakly positive linear anomalies along the western and southern boundaries of the survey area appear to correlate with footpaths shown on 1976 and 1990 OS mapping (PA 2012, Figures 9 and 10). These are considered to be of limited archaeological value.
- 7.4 There are a small number of irregularly-shaped positive anomalies that may represent earth-filled hollows, large pits or ponds. One of these produced a dipolar response and may reflect the location of a former bonfire adjacent to the Beanstalk property.
- 7.5 Scattered randomly throughout the site are a number of strong and weak dipolar responses. The characteristic dipole response of pairs of positive and negative ‘spikes’ suggests near-surface ferrous metal or other highly fired material.
- 7.6 None of the anomalies identified appear to relate to anything other than agricultural activities on the site. Based on the evidence of the geophysical survey, it is concluded that the potential or significant archaeology to exist on this site is low.

8.0 Effectiveness of Methodology

- 8.1 The non-intrusive evaluation methodology employed was particularly appropriate to the scale and nature of the site to be surveyed. Magnetometry surveying was the prospection technique best suited to the identification of archaeological remains on the site. Other techniques would have required justification and may have proved too time consuming or cost-prohibitive.

9.0 Acknowledgements

9.1 Allen Archaeology would like to thank Prospect Archaeology on behalf of IM Properties for this commission.

10.0 References

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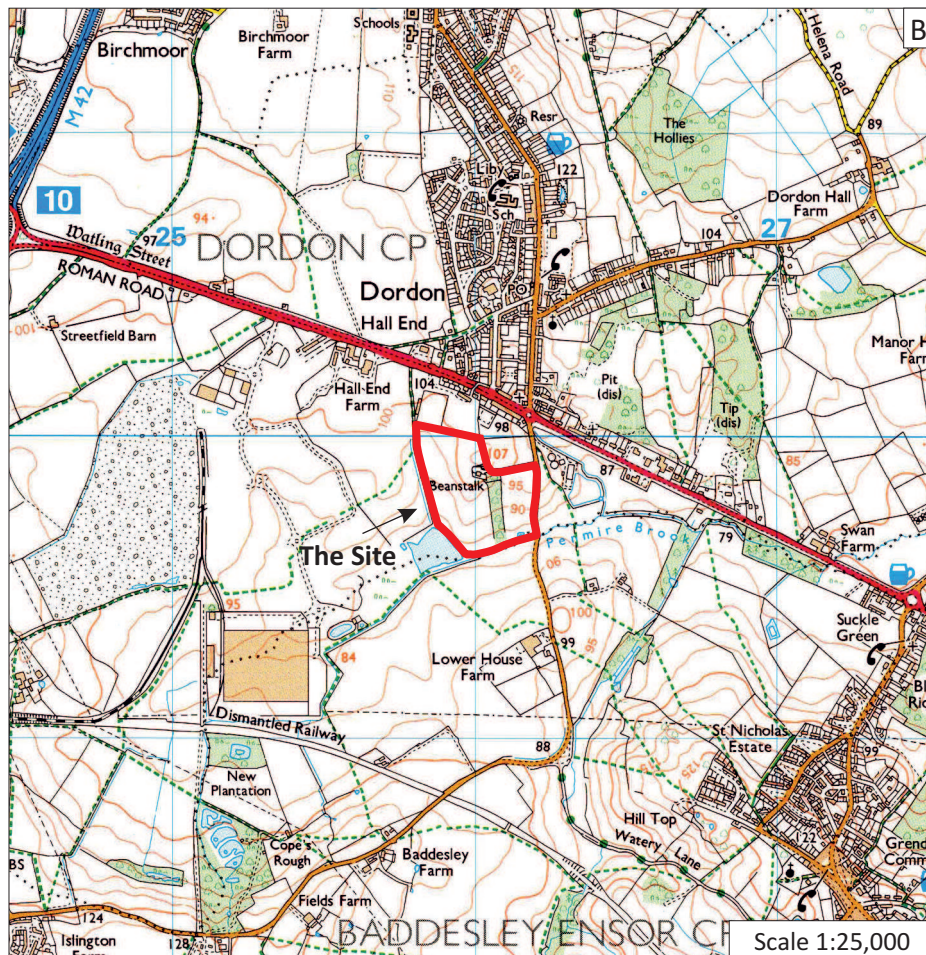
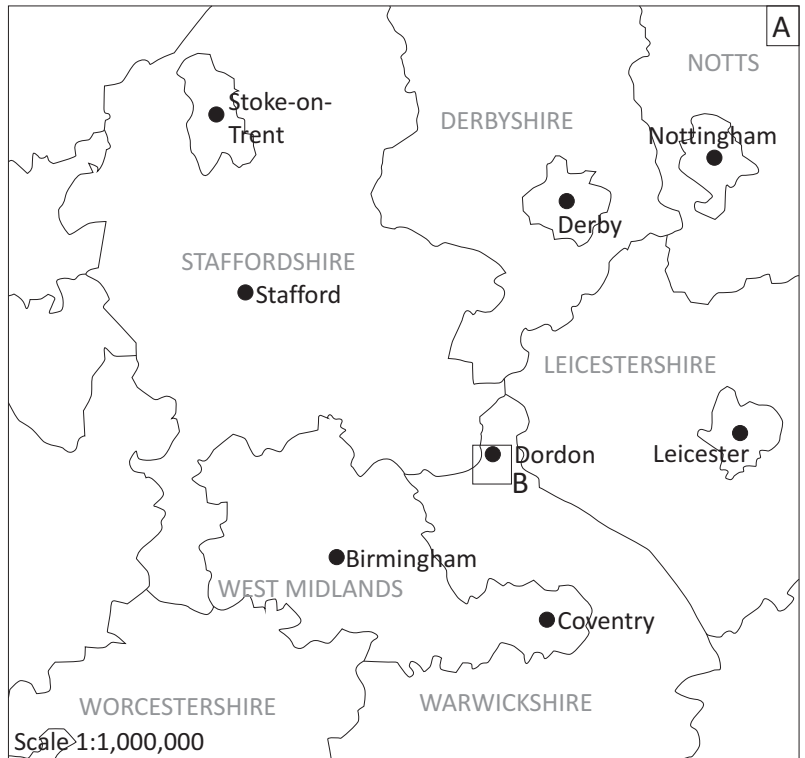
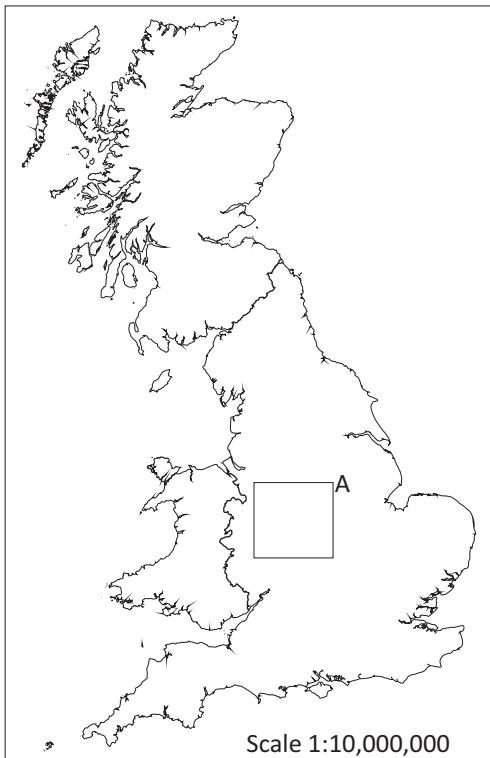
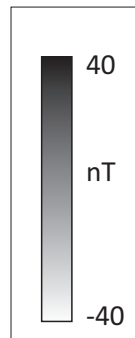
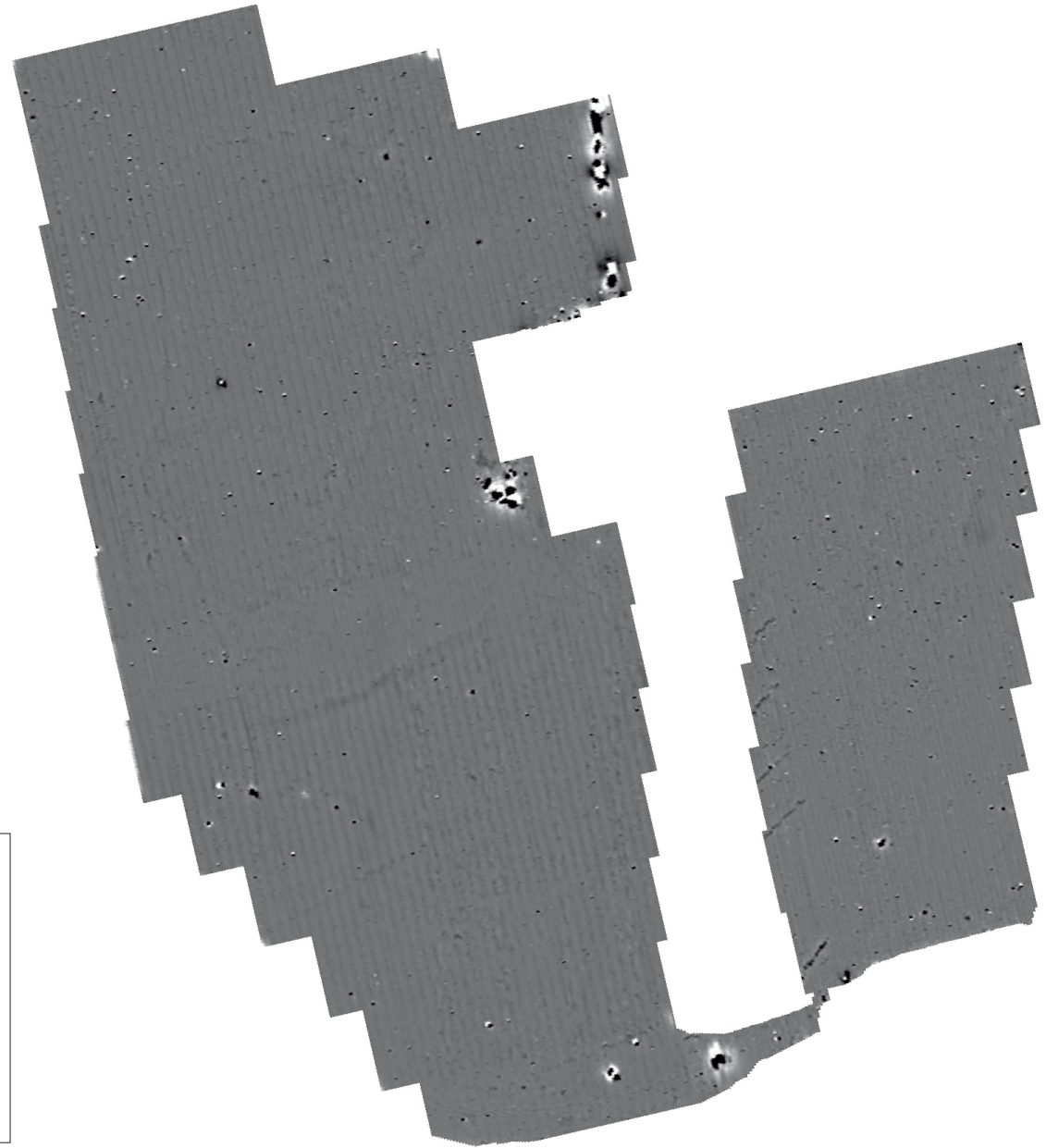


Figure 1: Site location with proposed development site shown in red
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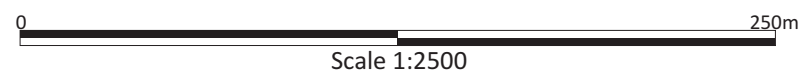
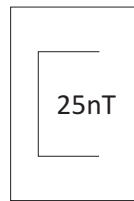
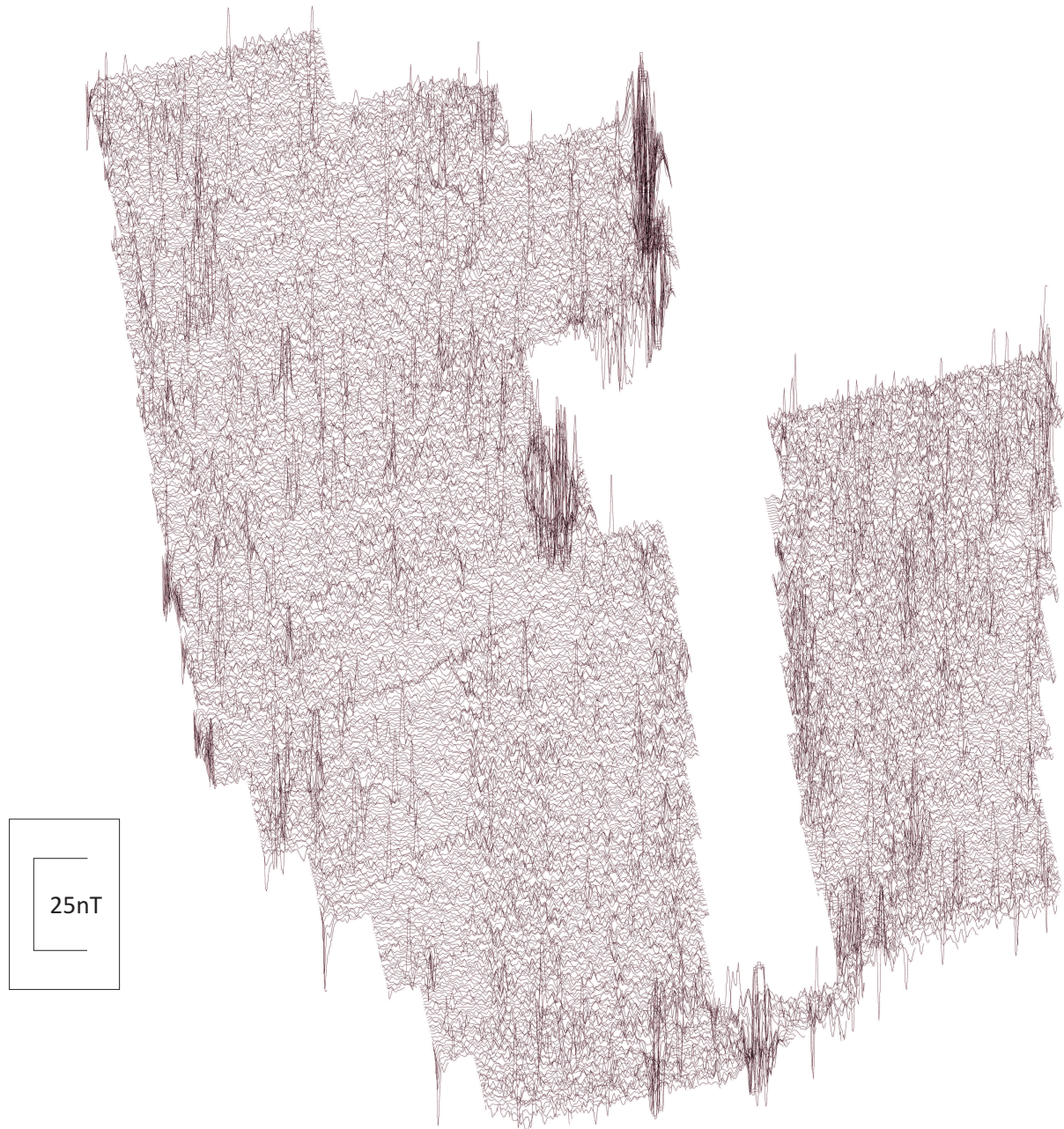
Site Code	DOBE 12	 Allenarchaeology Lincoln Birmingham Cambridge Southampton www.allenarchaeology.co.uk
Scales	1:10,000,000 1:1,000,000 1:25,000 @ A4	
Drawn by	R. Evershed	
Date	26/09/12	



Raw data (clipped to +/- 40 nT)



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

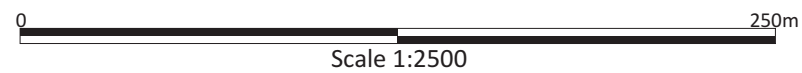
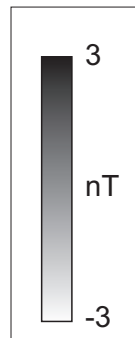
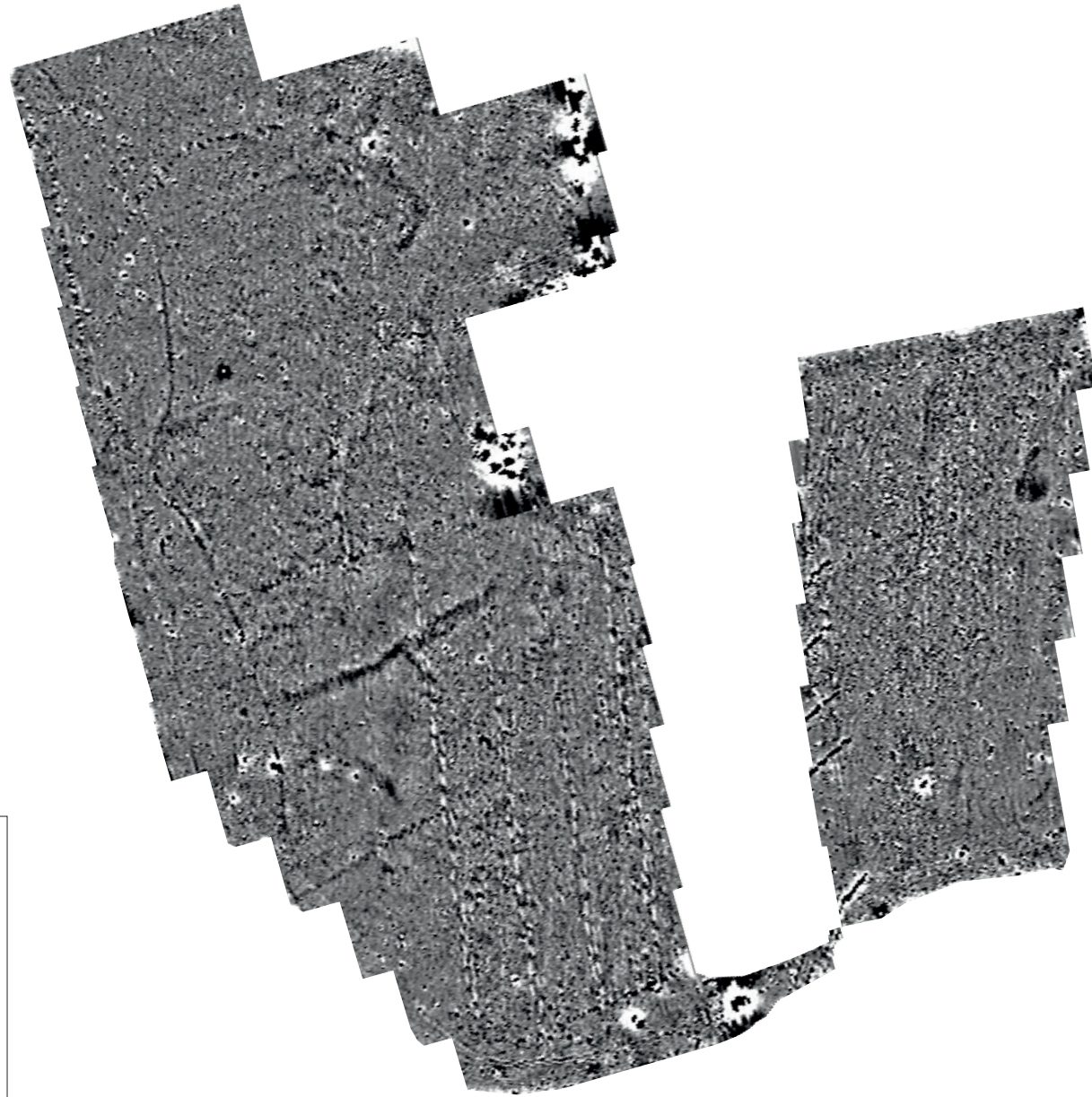


Site Code	DOBE 12
Scale	1:2500 @ A3
Drawn by	Mark Allen
Date	26/09/12

Figure 2: Greyscale raw data and processed trace plot



Processed (ZMT and clipped to +/- 3 nT)



Interpretation of Survey Results

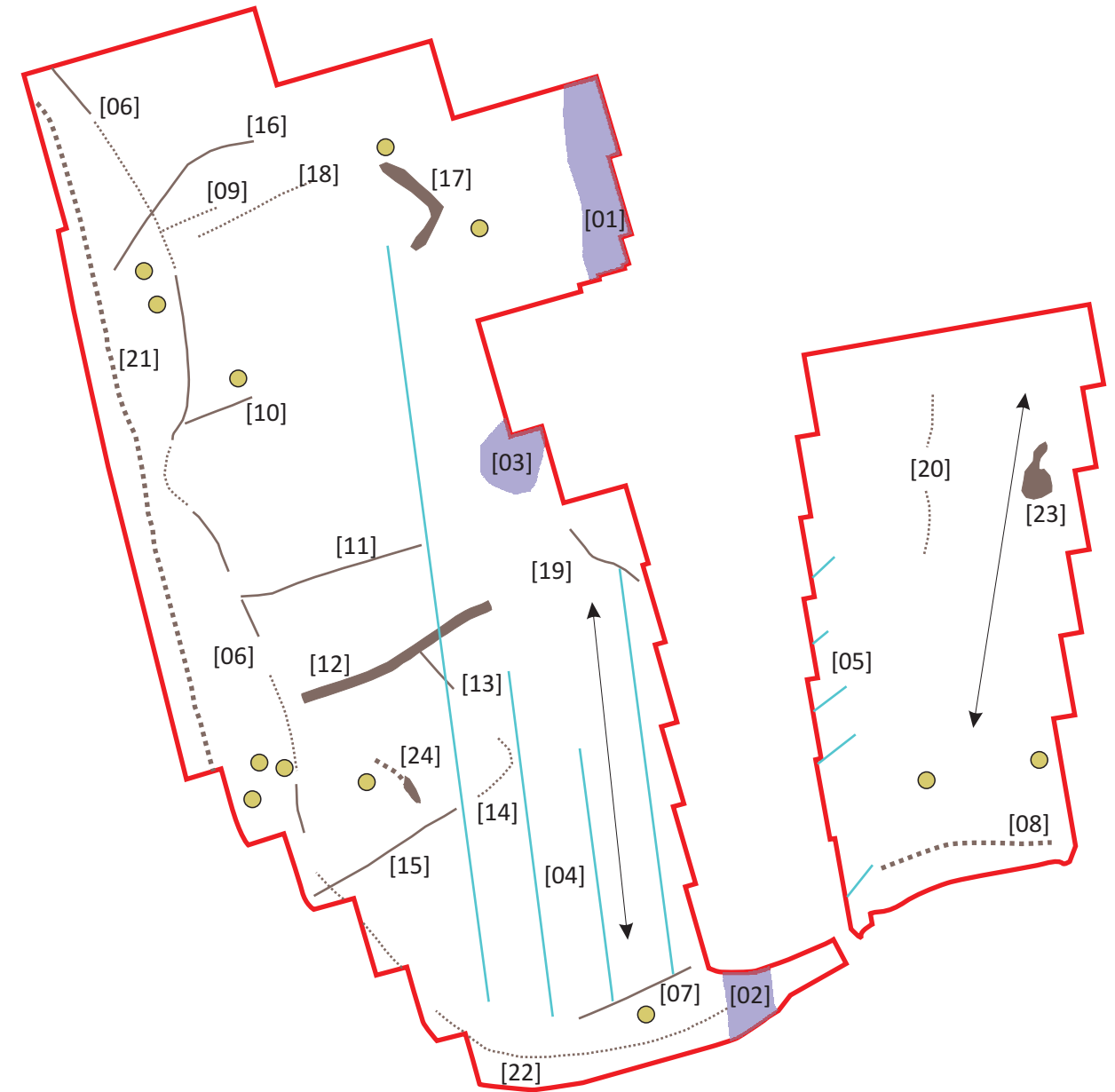







Figure 3: Processed greyscale plot of survey area with interpretation outlined in red

Site Code	DOBE 12
Scale	1:2500 @ A3
Drawn by	Mark Allen
Date	26/09/12

- | | |
|---|--|
|  Dipolar linear anomaly |  Field drain |
|  Positive magnetic anomaly |  Examples* of individual dipolar responses
Indicative of ferrous or highly fired material
<small>*smaller responses omitted for clarity</small> |
|  Current ploughing trend | |

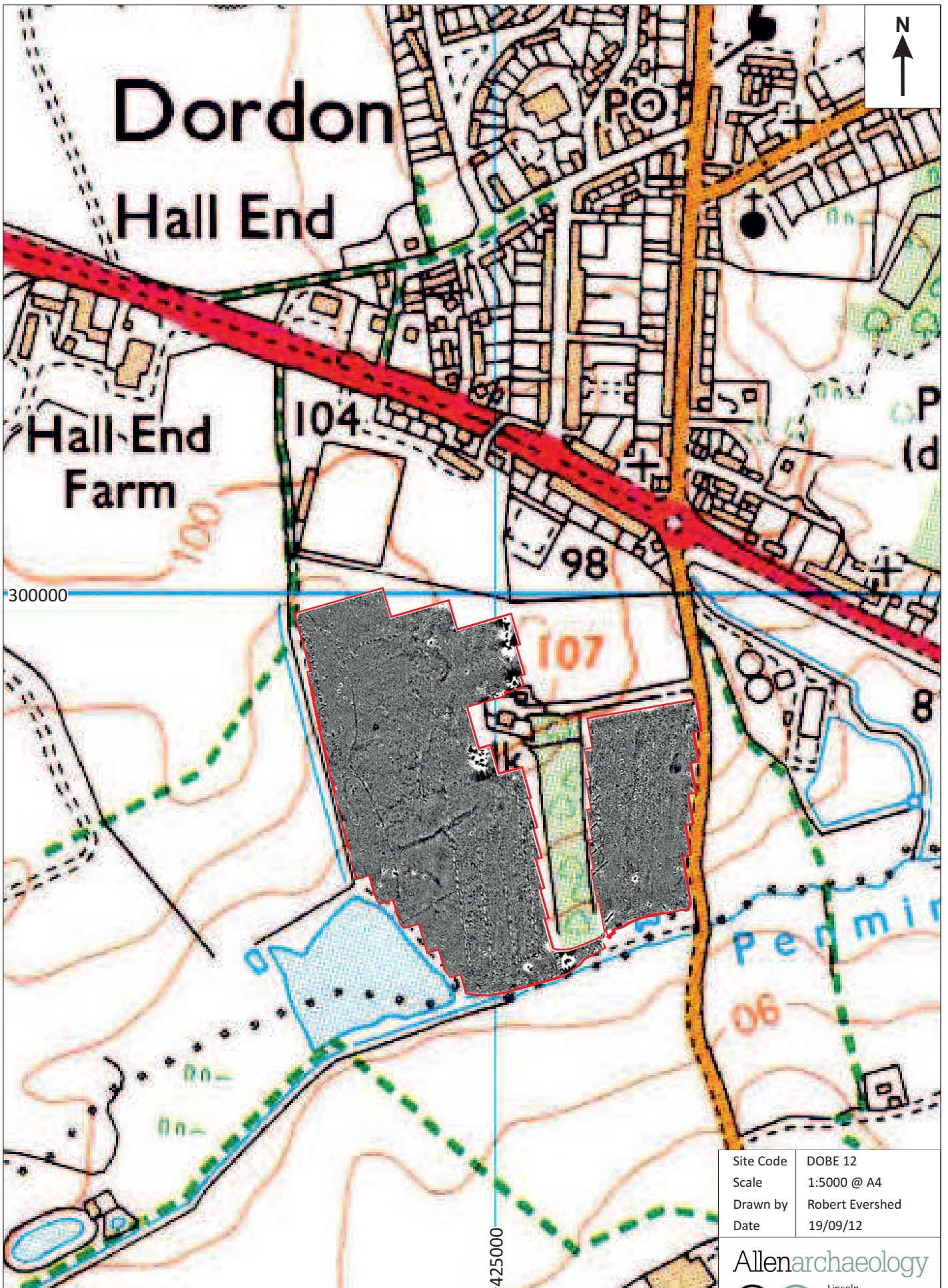


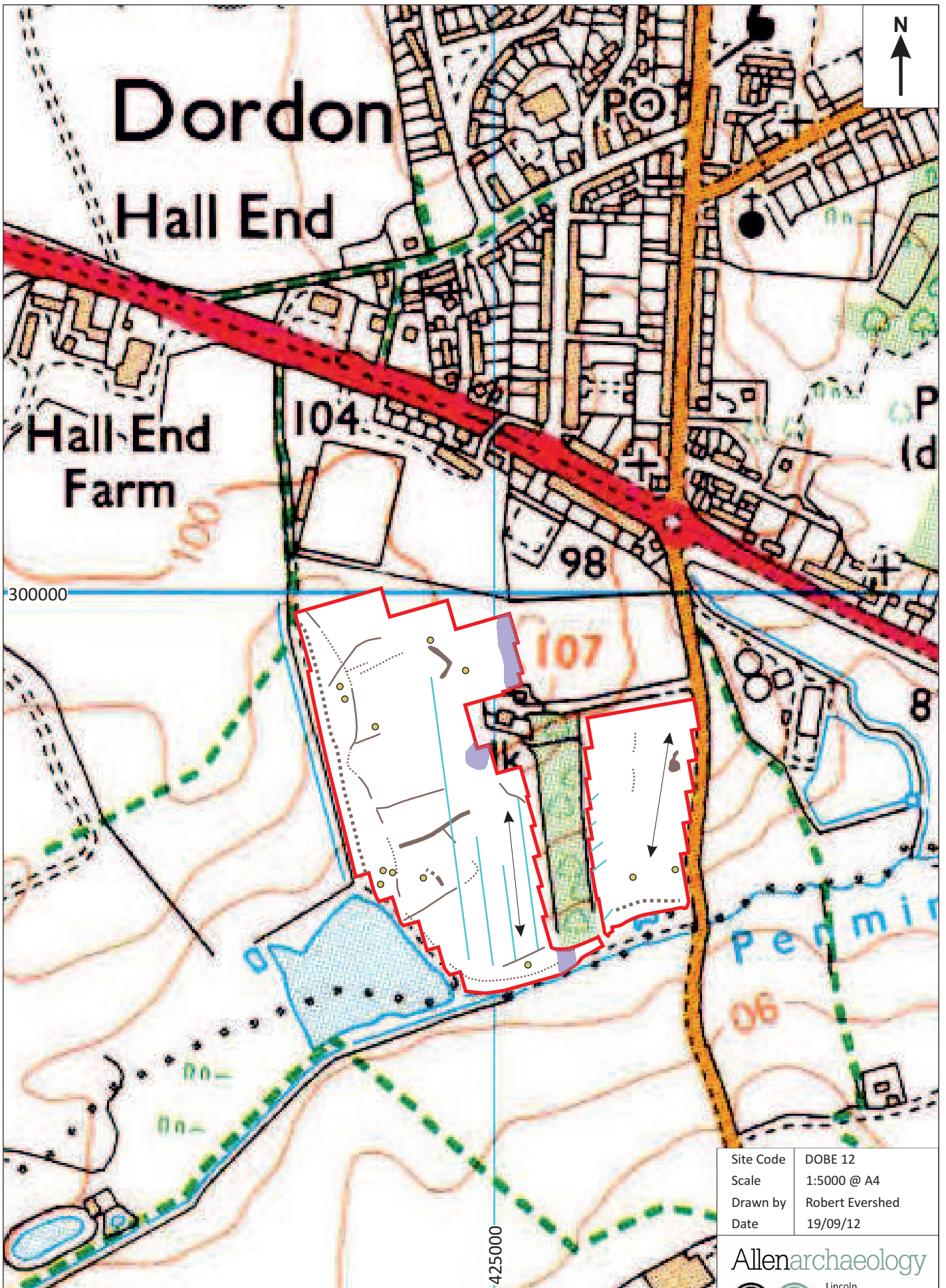
Figure 4: Processed greyscale plot in real space at scale 1:5,000

Site Code	DOBE 12
Scale	1:5000 @ A4
Drawn by	Robert Evershed
Date	19/09/12

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Date	19/09/12

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Figure 5: Interpretative plot in real space at scale 1:5,000



Allen Archaeology Limited
Website: www.allenarchaeology.co.uk

Company Registered in England and Wales No: 6935529

Lincoln
Unit 1C
Branston Business Park
Lincoln Road
Branston
Lincolnshire LN4 1NT

Birmingham
Arion Business Centre
Harriet House
118 High Street
Birmingham
B23 6BG

Cambridge
Wellington House
East Road
Cambridge
CB1 1BH

Southampton
International House
Southampton International Business Park
George Curl Way
Southampton
SO18 2RZ

Tel/Fax: +44 (0) 1522 794400
Email: info@allenarchaeology.co.uk

Tel/Fax: +44 (0) 800 610 2545
Email: birmingham@allenarchaeology.co.uk

Tel/Fax: +44 (0) 800 610 2550
Email: cambridge@allenarchaeology.co.uk

Tel: +44 (0) 800 610 2555
Email: southampton@allenarchaeology.co.uk