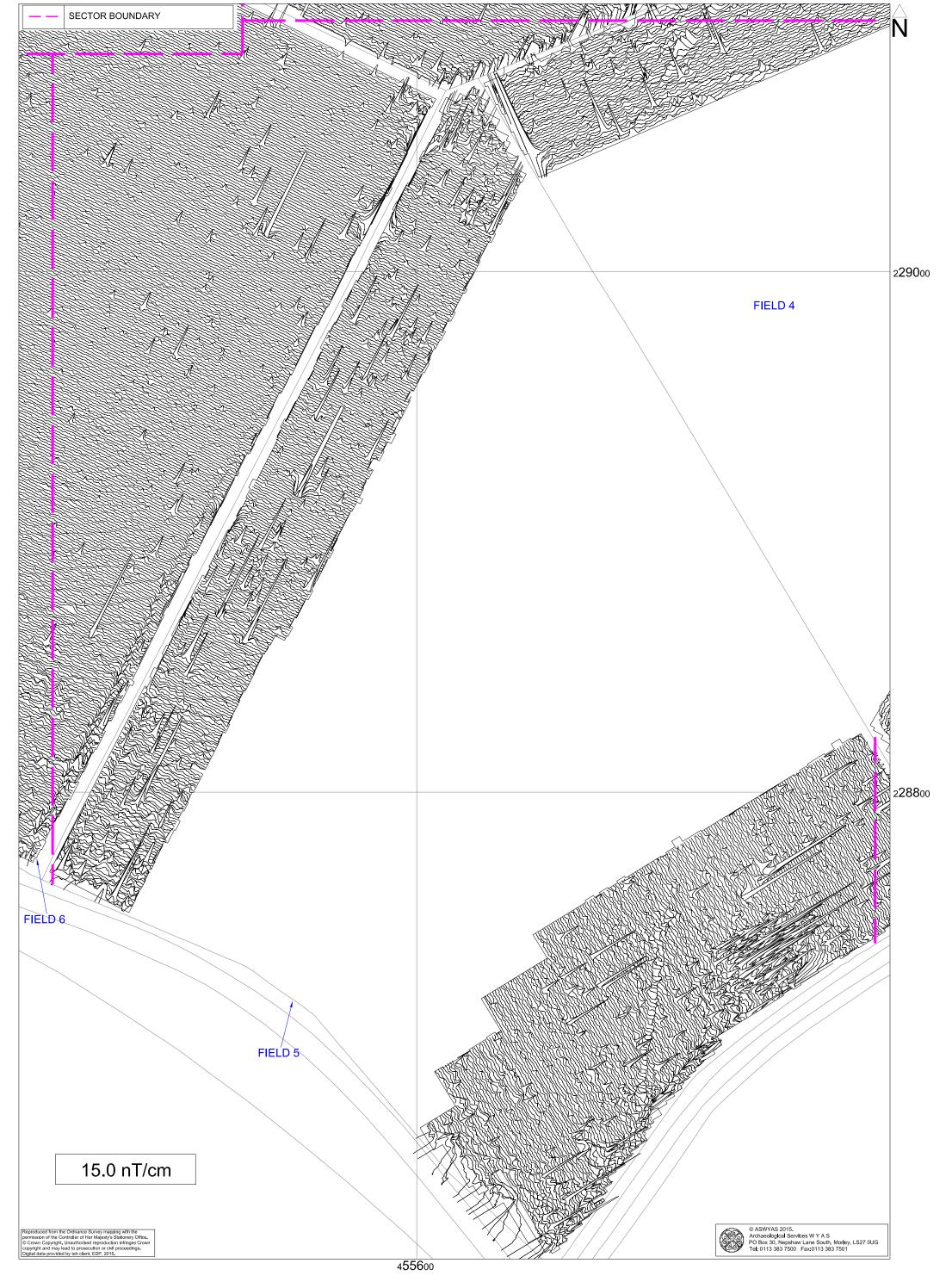
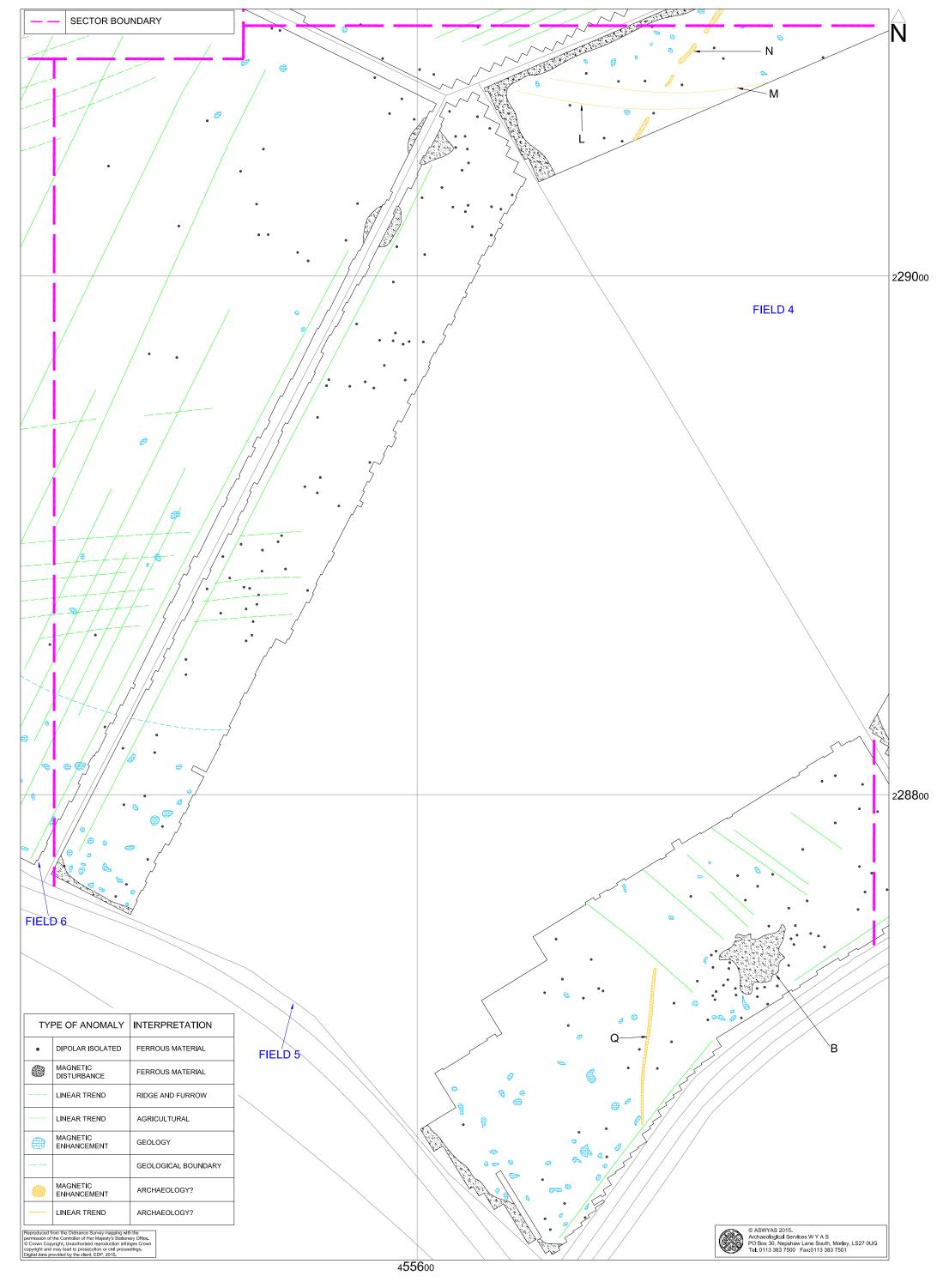


Fig. 17. Processed greyscale magnetometer data; Sector 5 (1:1250 @ A3)





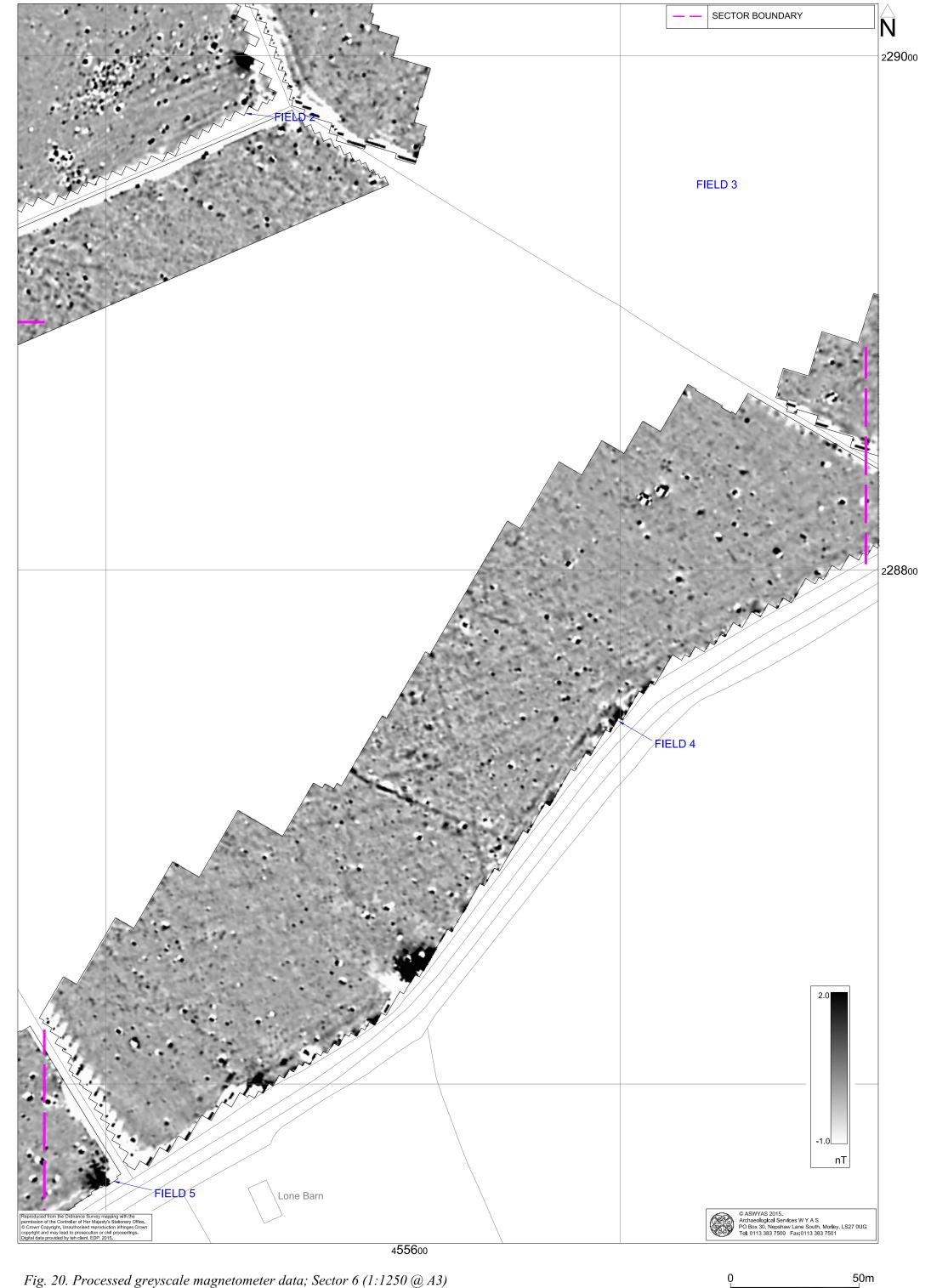
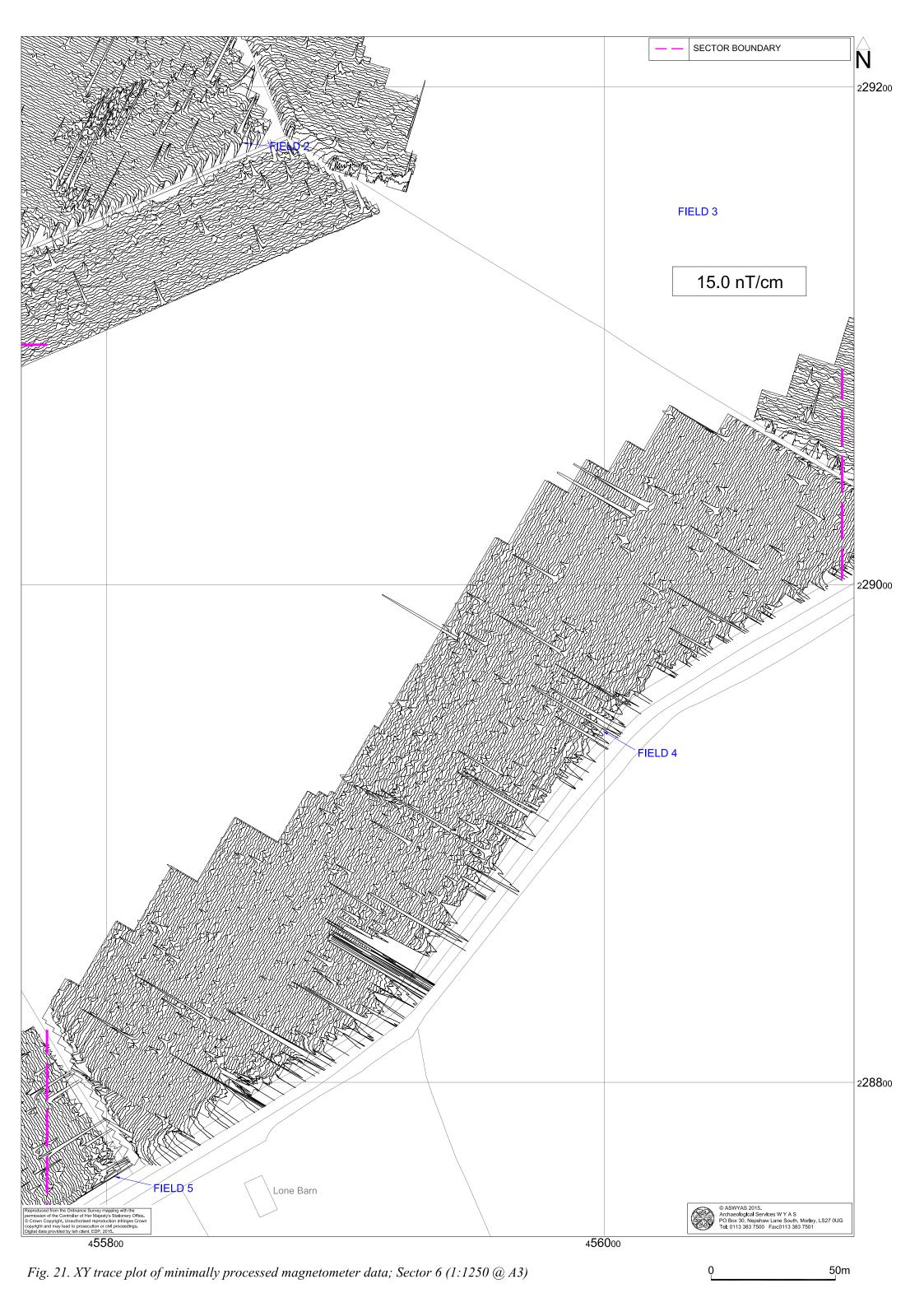


Fig. 20. Processed greyscale magnetometer data; Sector 6 (1:1250 @ A3)



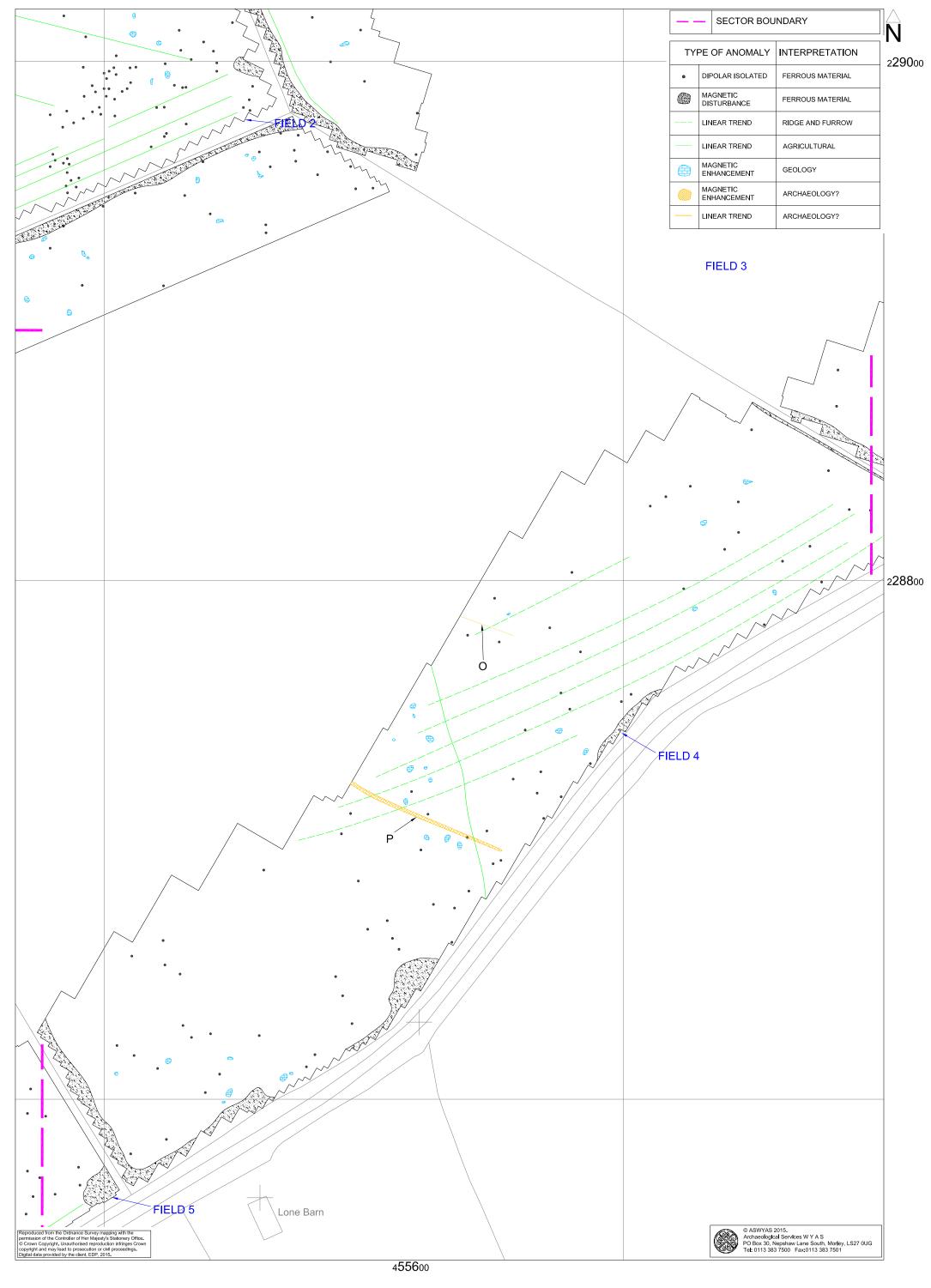


Fig. 22. Interpretation of magnetometer data; Sector 6 (1:1250 @ A3)

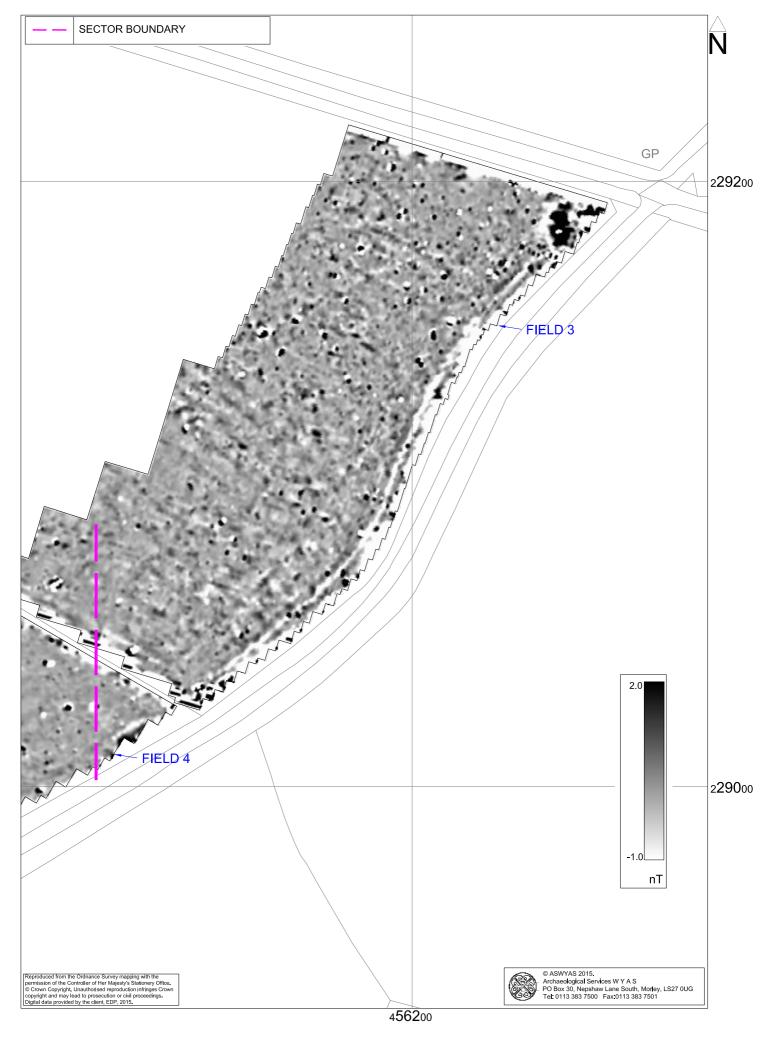
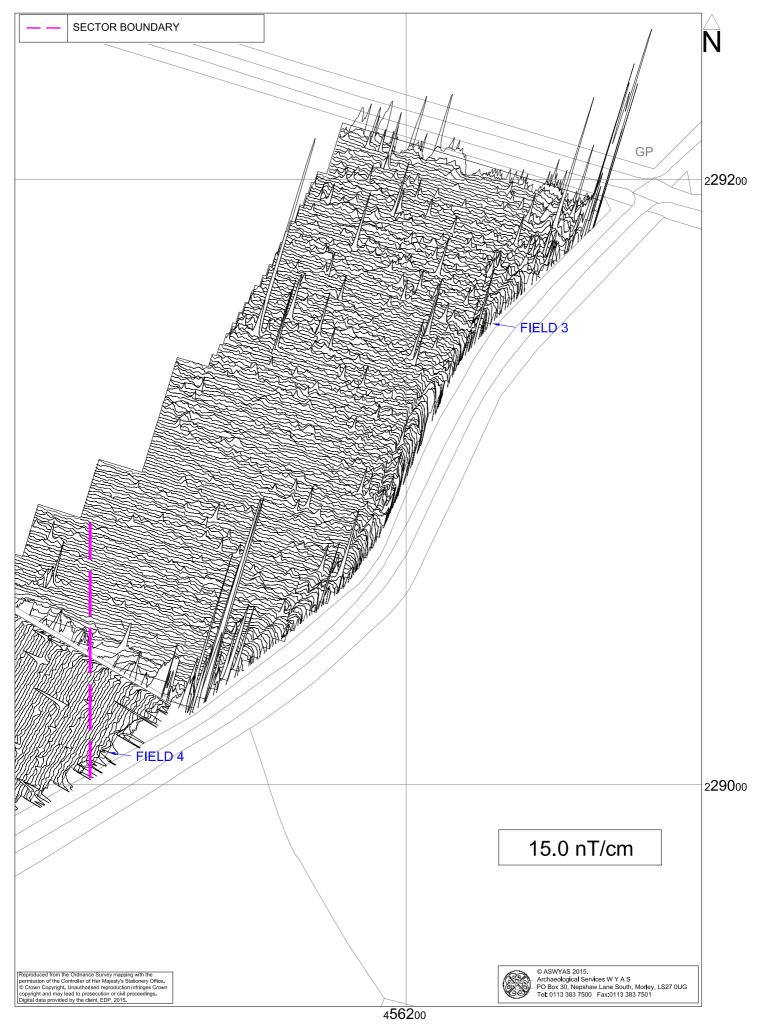


Fig. 23. Processed greyscale magnetometer data; Sector 7 (1:1250 @ A4) 0______50m



50m

Fig. 24. XY trace plot of minimally processed magnetometer data; Sector 7 (1:1250 @ A4)

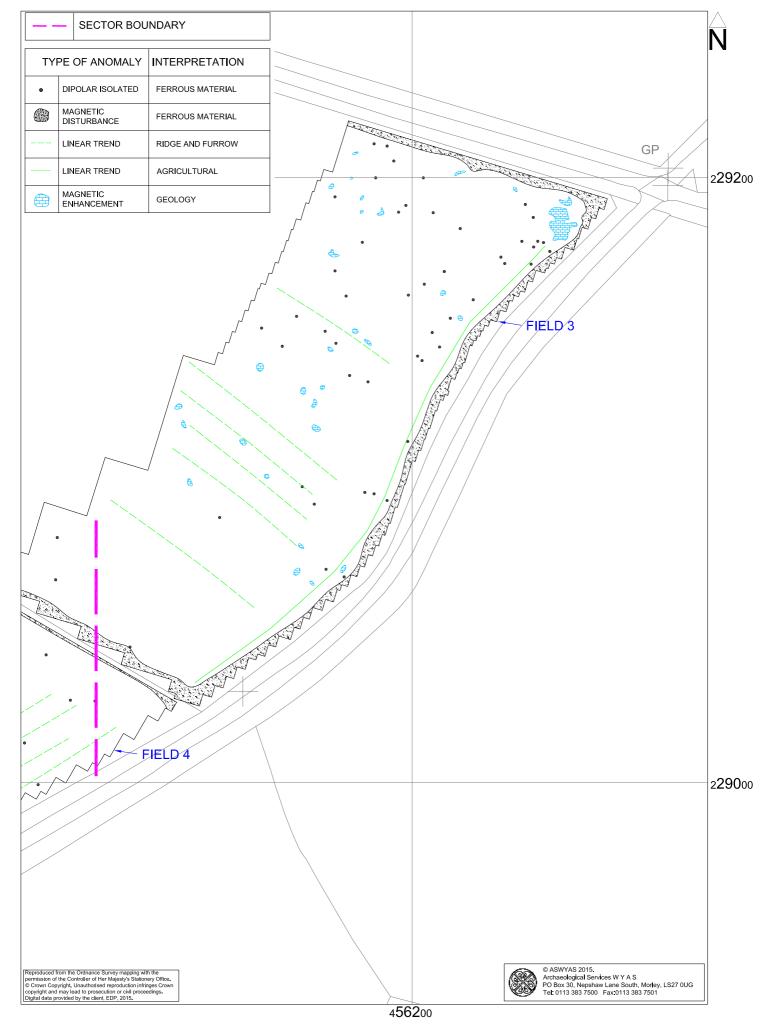


Fig. 25. Interpretation of magnetometer data; Sector 7 (1:1250 @ A4)



Plate 1. View of the area unsuitable for survey in Field 1, looking north-east



Plate 3. General view of Field 2, looking north-west



Plate 2. General view of Field 1, looking north-east



Plate 4. General view of Field 3, looking south-west



Plate 5. General view of Field 3, looking south-west



Plate 7. General view of Field 5, looking north-east



Plate 6. General view of Field 4, looking north-east



Plate 8. General view of Field 6, looking north-east

Appendix 1: Magnetic survey - technical information

Magnetic Susceptibility and Soil Magnetism

Iron makes up about 6% of the Earth's crust and is mostly present in soils and rocks as minerals such as maghaemite and haemetite. These minerals have a weak, measurable magnetic property termed magnetic susceptibility. Human activities can redistribute these minerals and change (enhance) others into more magnetic forms. Areas of human occupation or settlement can then be identified by measuring the magnetic susceptibility of the topsoil because of the attendant increase (enhancement) in magnetic susceptibility. If the enhanced material subsequently comes to fill features, such as ditches or pits, localised isolated and linear magnetic anomalies can result whose presence can be detected by a magnetometer (fluxgate gradiometer).

In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of topsoils, subsoils and rocks into which these features have been cut, which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected. The magnetic susceptibility of a soil can also be enhanced by the application of heat and the fermentation and bacterial effects associated with rubbish decomposition. The area of enhancement is usually quite large, mainly due to the tendency of discard areas to extend beyond the limit of the occupation site itself, and spreading by the plough. An advantage of magnetic susceptibility over magnetometry is that a certain amount of occupational activity will cause the same proportional change in susceptibility, however weakly magnetic is the soil, and so does not depend on the magnetic contrast between the topsoil and deeper layers. Susceptibility survey is therefore able to detect areas of occupation even in the absence of cut features. On the other hand susceptibility survey is more vulnerable to the masking effects of layers of colluvium and alluvium as the technique, using the Bartington system, can generally only measure variation in the first 0.15m of ploughsoil.

Types of Magnetic Anomaly

In the majority of instances anomalies are termed 'positive'. This means that they have a positive magnetic value relative to the magnetic background on any given site. However some features can manifest themselves as 'negative' anomalies that, conversely, means that the response is negative relative to the mean magnetic background.

Where it is not possible to give a probable cause of an observed anomaly a '?' is appended.

It should be noted that anomalies interpreted as modern in origin might be caused by features that are present in the topsoil or upper layers of the subsoil. Removal of soil to an archaeological or natural layer can therefore remove the feature causing the anomaly.

The types of response mentioned above can be divided into five main categories that are used in the graphical interpretation of the magnetic data:

Isolated dipolar anomalies (iron spikes)

These responses are typically caused by ferrous material either on the surface or in the topsoil. They cause a rapid variation in the magnetic response giving a characteristic 'spiky' trace. Although ferrous archaeological artefacts could produce this type of response, unless there is supporting evidence for an archaeological interpretation, little emphasis is normally given to such anomalies, as modern ferrous objects are common on rural sites, often being present as a consequence of manuring.

Areas of magnetic disturbance

These responses can have several causes often being associated with burnt material, such as slag waste or brick rubble or other strongly magnetised/fired material. Ferrous structures such as pylons, mesh or barbed wire fencing and buried pipes can also cause the same disturbed response. A modern origin is usually assumed unless there is other supporting information.

Linear trend

This is usually a weak or broad linear anomaly of unknown cause or date. These anomalies are often caused by agricultural activity, either ploughing or land drains being a common cause.

Areas of magnetic enhancement/positive isolated anomalies

Areas of enhanced response are characterised by a general increase in the magnetic background over a localised area whilst discrete anomalies are manifest by an increased response (sometimes only visible on an XY trace plot) on two or three successive traverses. In neither instance is there the intense dipolar response characteristic exhibited by an area of magnetic disturbance or of an 'iron spike' anomaly (see above). These anomalies can be caused by infilled discrete archaeological features such as pits or post-holes or by kilns. They can also be caused by pedological variations or by natural infilled features on certain geologies. Ferrous material in the subsoil can also give a similar response. It can often therefore be very difficult to establish an anthropogenic origin without intrusive investigation or other supporting information.

Linear and curvilinear anomalies

Such anomalies have a variety of origins. They may be caused by agricultural practice (recent ploughing trends, earlier ridge and furrow regimes or land drains), natural geomorphological features such as palaeochannels or by infilled archaeological ditches.

Appendix 2: Geophysical archive

The geophysical archive comprises:-

- an archive disk containing compressed (WinZip 8) files of the raw data, report text (Microsoft Word 2000), and graphics files (Adobe Illustrator CS2 and AutoCAD 2008) files; and
- a full copy of the report.

At present the archive is held by Archaeological Services WYAS although it is anticipated that it may eventually be lodged with the Archaeology Data Service (ADS). Brief details may also be forwarded for inclusion on the English Heritage Geophysical Survey Database after the contents of the report are deemed to be in the public domain (i.e. available for consultation in the Oxfordshire Historic Environment Record).

Appendix 3: OASIS Form

OASIS DATA COLLECTION FORM: **England**

List of Projects | Manage Projects | Search Projects | New project | Change your details | HER coverage | Change country | Log out

Printable version

OASIS ID: archaeol11-207409

Project details

Project name Ardley

Short description of the project

A geophysical (magnetometer) survey, covering approximately 50 hectares, was carried out on agricultural land near Ardley, prior to the proposed development of the site. Anomalies indicative of changes in the bedrock geology, possible localised stone extraction and post-medieval and modern cultivation have been identified. Several linear anomalies of uncertain origin have also been identified in the eastern part of the site. Given the extensive evidence for prehistoric activity in the area around the site, including a possible banjo enclosure outside the development footprint, an archaeological origin for these anomalies cannot be dismissed. However, on the basis of the survey, the archaeological potential of the majority of the site is considered to be low, with a moderate potential in the eastern third of the site, closest to the possible location of the banjo enclosure.

Start: 09-03-2015 End: 13-03-2015 Project dates

Previous/future

work

No / Not known

Any associated project reference

codes

ARB15 - Sitecode

4385 - Contracting Unit No.

Any associated project reference

codes

Type of project Recording project

Site status None

Monument type NONE None NONE None Significant Finds

Investigation type "Geophysical Survey"

Prompt National Planning Policy Framework - NPPF

Solid geology

(other)

White Limestone with Bladon Member and Forest Marble Formation

Drift geology (other)

Aberford association

Magnetometry Techniques

Country **England**

Site location **OXFORDSHIRE CHERWELL BICESTER Ardley**

Study area 50.00 Hectares

Site coordinates SP 554 291 51.9571920315 -1.19369930869 51 57 25 N 001 11 37 W Point

Height OD /

Depth

Min: 110.00m Max: 120.00m

Project creators

Name of Organisation Archaeological Services WYAS

Project brief originator

Environmental Dimension Partnership

Project design originator

Archaeological Services WYAS

Project

D. Harrison

director/manager

Project supervisor

C. Sykes Developer

Type of sponsor/funding

body

Name of sponsor/funding

body

DB Symmetry Ltd

Project archives

Physical Archive

Exists?

No

Digital Archive

recipient

N/A

Digital Contents

"none"

Digital Media available

"Geophysics"

Paper Archive

Exists?

No

Project bibliography 1

Grey literature (unpublished document/manuscript)

Publication type

Title Junction 10, M40 Ardley Oxfordshire: Geophysical Survey

Author(s)/Editor(s) Webb, A.

Other

bibliographic details

Report No. 2736

2015 Date

Issuer or publisher Archaeological Services WYAS

Place of issue or

publication

Morley

Description A4 Bound Report

Entered by zoe horn (zhorn@aswyas.com)

Entered on 26 March 2015

OASIS:

Please e-mail Historic England for OASIS help and advice © ADS 1996-2012 Created by Jo Gilham and Jen Mitcham, email Last modified Wednesday 9 May 2012 Cite only: http://www.oasis.ac.uk/form/print.cfm for this page

Bibliography

- British Geological Survey, 2015. www.bgs.ac.uk/discoveringGeology/geology OfBritain/viewer.html. (Viewed March 20th 2015)
- Chartered Institute for Archaeologists, 2014. *Standard and Guidance for archaeological geophysical survey*. CIfA
- David, A., N. Linford, P. Linford and L. Martin, 2008. *Geophysical Survey in Archaeological Field Evaluation: Research and Professional Services Guidelines (2nd edition)* English Heritage
- DCLG, 2012. *National Planning Policy Framework*. Department of Communities and Local Government
- Harrison, D. 2015. *Junction 10, M40, Ardley, Oxfordshire: Geophysical Survey Project Design*. Unpublished ASWYAS document
- Soil Survey of England and Wales, 1983. Soil Survey of England and Wales: Soils of South-East England, Sheet 6



Land at Symmetry Park

Ardley

Oxfordshire

Geophysical Survey

Report no. 3526 December 2021

Client: Tritax Symmetry





Land at Symmetry Park, Ardley, Oxfordshire

Geophysical Survey

Summary

A geophysical (magnetometer) survey was undertaken on approximately 30 hectares of land located to the north east of Ardley, Oxfordshire. Anomalies of both a definite and a possible archaeological origin have been detected including a complex of settlement features which may include a banjo enclosure along with trackways, pits and field systems dating to the later Iron Age and Roman periods. Medieval or later ridge and furrow cultivation have also been detected along with modern ploughing. Geological responses can be seen within the south of the Site in which some relate to a former quarry. Based on the interpretation of the geophysical survey the archaeological potential of this Site is deemed to be high.



Report Information

Client: Tritax Symmetry

Address: Unit B, Grange Park Court, Roman Way, Northampton,

England, NN4 5EA

Report Type: Geophysical Survey

Location: Land at Symmetry Park, Ardley, OX27 8SF

County: Oxfordshire
Grid Reference: SP 5555 2872

Period(s) of activity: Prehistoric - modern

Report Number: 3526
Project Number: XD98
Site Code: SYM21

OASIS ID: archaeol11-503400

Date of fieldwork: November and December 2021

Date of report: December 2021

Project Management: Emma Brunning BSc MCIfA

Fieldwork: Jake Freeman BA

Marina Rose BA
Jet Jansen MA MSc
Haydn Evans BA MSc

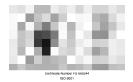
Illustrations: Alastair Trace BSc MSc

Photography: Jake Freeman Research: Alastair Trace

Report: Alastair Trace/Emma Brunning

Authorisation for

distribution: ------



© Archaeological Services WYAS 2021 Nepshaw Lane South, Morley, Leeds LS27 7JQ

Telephone: 0113 535 0163 Email: admin@aswyas.com



Document Issue Record

Ver	Author(s)	Reviewer	Approver	Date
1.0	AT/EB	ЕВ	DW	December 2021

Contents

Repo	ort information	ii
Docu	ument Issue Record	iii
Cont	ents	iii
	of Figures	
List	of Plates	iv
1	Introduction	1
	Site location, topography and land-use	1
	Soils and geology	1
2	Archaeological Background	1
3	Aims, Methodology and Presentation	2
	Magnetometer survey	
	Reporting	3
4	Results and Discussion	
	Ferrous anomalies and magnetic disturbance	3
	Geological anomalies	
	Agricultural anomalies	4
	Possible and definite archaeological anomalies	
5	Conclusions	

Figures

Plates

Appendices

Appendix 1: Magnetic survey - technical information

Appendix 2: Survey location information

Appendix 3: Geophysical archive

Appendix 4: Oasis form

Bibliography

List of Figures

- 1 Site location (1:50000)
- 2 Survey location showing processed greyscale magnetometer data (1:5000 @ A3)
- 3 Overall interpretation of magnetometer data (1:5000 @ A3)
- 4 Processed greyscale magnetometer data; Sector 1 (1:1500 @ A3)
- 5 XY trace plot of minimally processed magnetometer data; Sector 1 (1:1500 @ A3)
- 6 Interpretation of magnetometer data; Sector 1 (1:1500 @ A3)
- 7 Processed greyscale magnetometer data; Sector 2 (1:1500 @ A3)
- 8 XY trace plot of minimally processed magnetometer data; Sector 2 (1:1500 @ A3)
- 9 Interpretation of magnetometer data; Sector 2 (1:1500 @ A3)
- 10 Processed greyscale magnetometer data; Sector 3 (1:1500 @ A3)
- 11 XY trace plot of minimally processed magnetometer data; Sector 3 (1:1500 @ A3)
- 12 Interpretation of magnetometer data; Sector 3 (1:1500 @ A3)
- 13 Processed greyscale magnetometer data; Sector 4 (1:1500 @ A3)
- 14 XY trace plot of minimally processed magnetometer data; Sector 4 (1:1500 @ A3)
- 15 Interpretation of magnetometer data; Sector 4 (1:1500 @ A3)
- Survey location showing processed magnetometer data from previous and recent surveys (1:7500 @ A3)

List of Plates

- 1 General view of Field 1, looking east
- 2 General view of Field 2, looking west
- 3 General view of Field 3, looking west
- 4 General view of Field 4, looking east

1 Introduction

Archaeological Services ASWYAS has been commissioned by Environmental Dimension Partnership Ltd (EDP) on behalf of Tritax Symmetry (the client) to undertake a geophysical survey at land at Symmetry Park, Ardley, Oxfordshire. This was undertaken in line with current best practice (CIfA 2020; Schmidt *et al.* 2016). The survey was carried out between November and December 2021 to provide additional information on the archaeological resource of the Site.

Site location, topography and land-use

The Site is located at SP 5555 2872 (approximate centre), comprising c. 30ha over four irregularly shaped parcels of land situated approximately 1km north east of Ardley (see Fig. 1). At the time of survey the field conditions consisted of a young crop (see Plates 1-4).

The Site is situated either side of the B4100, with the northern fields being almost entirely constrained by agricultural land apart from the B4100 to the south. The southern field is constrained by the B4100 to the north, Cherwell Valley services to the south and agricultural land to the east and west. The Site is flat and situated approximately 120m above Ordnance Datum (aOD).

Soils and geology

The underlying bedrock mainly comprises White limestone with Bladon Member and Forest Marble Formation – formed approximately 166 to 168 million years ago in the Jurassic period. No superficial deposits are recorded (BGS 2021). Soils are classified in the Aberford association, characterised as shallow, well-drained loams (SSEW 1983).

2 Archaeological Background

Information presented by EDP as part of a Desk-Based Assessment (Oakley 2015) has confirmed that there may be a possible 'banjo enclosure' located in the northern portion of the survey area (identified in the Oxfordshire Historic Environment Record (HER 17456)). In addition there is extensive cropmark evidence in the wider landscape interpreted as prehistoric activity, the nearest of which lie 0.5km to the north of the site and comprise of undated enclosures (HER 23340) and a possible Bronze Age round barrow (HER 4920) approximately 0.6km to the north east of the site.

Roman coins (HER 4747), first recorded in 1939 were collected approximately 0.7km to the north east of Site.

The HER records Baynard's Green, recorded 0.2km to the west of the Site, as an open area associated with medieval tournaments and subsequently a race course (HER 4853). The

record cites that it may have been a camping ground or meeting place. Given the temporary nature of the activity here it seems unlikely that any below ground archaeological features would manifest from this activity and regardless it is unlikely that this activity extended onto the Site.

Two milestones (HER 4902 and 4836) are recorded close to the course of the A43 to the north and southwest of the Site. These were recorded in 1976, and there is no information that would suggest they survived the dualling of the A43.

A geophysical survey (Webb 2015) was undertaken by ASWYAS in conjunction with the DBA. Although no definitive archaeological features were identified, the survey detected some possible 'boundary type features' in the eastern part of the site which may be associated with the 'banjo enclosure'. These may represent peripheral features and are well beyond the main enclosure itself or may equally represent late medieval or post-medieval land division or trackway. The survey also revealed evidence for past agricultural in the form of ridge and furrow, former field boundaries and post-medieval extraction pits. No other anomalies of archaeological origin were identified within the Site.

3 Aims, Methodology and Presentation

The aims and objectives of the programme of geophysical survey were to gather sufficient information to establish the presence/absence, character and extent, of any archaeological remains within the specific area and to inform an assessment of the archaeological potential of the site. To achieve this aim, a magnetometer survey covering all amenable parts of the Site was undertaken (see Fig. 2).

The general objectives of the geophysical survey were:

- to provide information about the nature and possible interpretation of any magnetic anomalies identified;
- to therefore determine the presence/absence and extent of any buried archaeological features; and
- to prepare a report summarising the results of the survey.

Magnetometer survey

The site grid was laid out using a Trimble VRS differential Global Positioning System (Trimble R6 model). The survey was undertaken using Bartington Grad601 magnetic gradiometers. These were employed taking readings at 0.25m intervals on zig-zag traverses 1.0m apart within 30m by 30m grids, so that 3600 readings were recorded in each grid. These readings were stored in the memory of the instrument and later downloaded to computer for

processing and interpretation. Bespoke in-house software was used to process and present the data. Further details are given in Appendix 1.

Reporting

A general site location plan, incorporating the 1:50000 Ordnance Survey (OS) mapping, is shown in Figure 1. Figure 2 displays processed magnetometer data at a scale of 1:5000 whilst Figure 3 shows an overview of the interpretation at the same scale. Processed and minimally processed data, together with interpretation of the survey results are presented in Figures 4 to 15 inclusive at a scale of 1:1500. Figure 16 shows the current and previous surveys at a scale of 1:7500.

Technical information on the equipment used, data processing and survey methodologies are given in Appendix 1. Technical information on locating the survey area is provided in Appendix 2. Appendix 3 describes the composition and location of the archive. A copy of the completed OASIS form is included in Appendix 4.

The survey methodology, report and any recommendations comply with guidelines outlined by the European Archaeological Council (Schmidt *et al.* 2016) and by the Chartered Institute for Archaeologists (CIfA 2020). All figures reproduced from Ordnance Survey mapping are with the permission of the controller of Her Majesty's Stationery Office (© Crown copyright).

The figures in this report have been produced following analysis of the data in processed formats and over a range of different display levels. All figures are presented to most suitably display and interpret the data from this site based on the experience and knowledge of Archaeological Services staff.

4 Results and Discussion (see Figures 4 to 15)

Ferrous anomalies and magnetic disturbance

Ferrous anomalies, as individual 'spikes', or as large discrete areas are typically caused by ferrous (magnetic) material, either on the ground surface or in the plough-soil. Little importance is normally given to such anomalies, unless there is any supporting evidence for an archaeological interpretation, as modern ferrous debris or material is common on rural sites, often being present as a consequence of manuring or tipping/infilling. There is no obvious pattern or clustering to their distribution in this survey to suggest anything other than a random background scatter of ferrous debris in the plough-soil.

Magnetic disturbance along the limits of the survey areas are due to be linked to metal fencing within the field boundaries and interference from the adjacent roads.

Geological anomalies

The survey has detected a number of anomalies that have been interpreted as geological in origin. It is thought that the responses have been detected because of the variation in the composition and depth of the deposits of superficial material in which they derive. These are particularly evident in the southern most area and most likely to be associated with topography in which bands can be seen running on an approximate north to south alignment.

The response in the northeast of Area 4 correlates to a former quarry and is marked on the 1898 Ordnance Survey as 'Old Quarry' (NLS 2021).

Agricultural anomalies

Parallel linear trends can be seen within all areas and are associated with both modern ploughing and medieval or later ridge and furrow cultivation. The interpretation figures show the direction of the modern ploughing, but not all have been digitised, unless especially prominent within the dataset.

Possible and definite archaeological anomalies

Anomalies of both a definite and possible archaeological origin have been recorded within the dataset. The most prominent of these lie in the centre of the Site in Area 2 and comprise a complex of features which are suggestive of settlement. The HER records a possible banjo enclosure (HER 17456) in this vicinity but the magnetic survey has detected many more anomalies that suggest a more complex and extensive settlement. The anomalies likely represent multiple phases of use of the site and span the later Iron Age and Roman period.

There are possible signs of this banjo enclosure with ditch responses (A1) making the enclosure. Although, with so many different responses, of likely different phases, within this area it is difficult to determine if this is indeed the banjo.

To the west of A1 a rectilinear enclosure (A2) has been recorded. This measures approximately 62m by 43m and shows internal features. A smaller, partial square enclosure (A3) can be seen in the southeast corner measuring approximately 15m by 15m. Further square enclosures (A4 and A5) can be seen to the south of A2 in which A4 appears to be cut or cuts through the southern ditch of A2. Whereas A5 appears to append A2. Both the latter two enclosures are on the same alignment as each other but a slightly different one to A2 and A3 suggesting a different phase of occupation.

Archaeological responses to the south of A1 appear to show multiple phases with ditches bisecting each other consisting of both straight and curving responses which makes it difficult to unravel the phases. A ditch in the east of the complex (A6) is magnetically strong and appears to be connected with A1.

A handful of magnetically strong pit-like features (A7) have been recorded surrounding the complex, these can be seen to the northeast of A1 and in the southeast of the complex.

A long ditch (A8) to the east of the majority of the archaeological responses is most likely to be a boundary ditch. The feature weakens at its northern and southern ends but may continue in the south towards the weaker linear response P1.

Surrounding the main complex a number of magnetically weaker responses have been recorded that have been interpreted as possible archaeology. It is likely that they are associated with the occupational features, but due to the weaker magnetic strength caution has been taken. This lower magnitude of response could be as a result of less burnt and magnetic material entering ditches and suggests an area away from occupation and more likely to be field systems associated with the main settlement areas.

Linear trend (P1) can be seen running through Areas 3 and 2, possibly connecting up to the boundary ditch A8. It is possible that P1, along with P2 further north represent prehistoric field systems as do not appear on any historic mapping and are not aligned to any of the current field boundaries or ploughing regimes.

In Area 4, a long double ditched response (A9) can be seen. The feature begins as a single ditch in the northwest leading to a second ditch approximately 200m from the start of this recorded feature. This response may represent a trackway and is approximately 15m in width. At its southern end the feature turns to the east and is represented by a single ditch. It is likely that A10 is a continuation of A9.

A cluster of anomalies (P3) in the northwest of Area 4 may be of some archaeological interest and lie close to the possible trackway as mentioned above. It is also possible that they are of a geological or natural origin given the other geological anomalies in this area.

Linear trends (P4) in the south of Area 4 have been a possible archaeological interpretation and may represent part of a larger prehistoric field system.

5 Conclusions

The geophysical survey has detected a number of magnetic anomalies associated with archaeological and possible archaeological origins in the forms of a large settlement complex, a trackway, pits, field systems and a probable boundary ditch.

Geological anomalies have been recorded throughout due to variations within the soils and topography. A former quarry has also been detected which correlates to historic mapping.

Medieval or later ridge and furrow cultivation has been recorded along with modern ploughing. Magnetic disturbance around the periphery of the fields are due to metal fencing within the boundaries.

Based on the geophysical survey the archaeological potential of the Site especially in the centre of the surveyed area is deemed to be high.

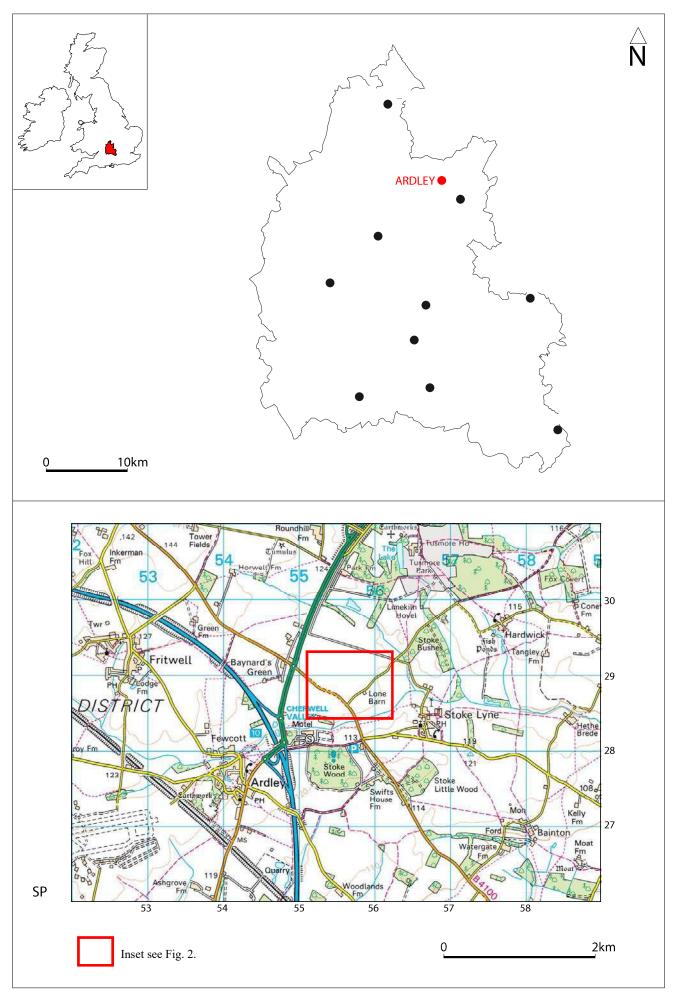


Fig. 1. Site location

@ Crown Copyright. All rights reserved 100019574, 2021.

