

**LAND AT MANOR FARM,
PERTENHALL, BEDFORDSHIRE**

**Report on Archaeological Geophysical Survey
2014**

A.D.H. Bartlett

Surveyed by:

**Bartlett-Clark Consultancy
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North Leigh,
Oxfordshire OX29 6PW
01865 200864**

for:

**Oxford Archaeology East
15 Trafalgar Way
Bar Hill
Cambridge
CB23 8SQ**

on behalf of:

Prosolia Solar Energy

Land at Manor Farm, Pertenhall, Bedfordshire

Archaeological Geophysical Survey

Introduction

A geophysical survey has been undertaken as part of an archaeological evaluation of the site of a proposed solar farm at Pertenhall, Bedfordshire. The purpose of the survey was to test for evidence of any previously unrecorded archaeological features or deposits within the evaluation area.

The geophysical survey was commissioned from Bartlett Clark Consultancy, Specialists in Archaeogeophysics of Oxford, by Oxford Archaeology East on behalf of Prosolia Solar Energy. Fieldwork for the survey was done on 17-25 February 2014.

The Site

Location and topography

The survey extends across five arable fields to the south of Manor farm, Pertenhall. The site is centred approximately at NGR TL076644, and is located in a rural area of north Bedfordshire between Rushden and St Neots.

The survey coverage (as indicated by red cross hatching in figure 1a) was adjusted to correspond to the proposed extent of the solar power installation, as shown on the site plan reproduced in figure 1b. (This version of the plan is dated 18 February 2014). The total survey coverage amounts to 28.6ha.

The site is on a bedrock of Oxford Clay Formation mudstone and siltstone. The site is shown on the BGS geological viewer to be partly free of drift material, but there are sand and gravel River Terrace deposits nearby and to the east. Sites on Jurassic bedrock (as here) usually provide favourable conditions for magnetometer surveys, although the response on soils derived from the Oxford Clay may be less reliable than at a site with more solid bedrock.

Magnetic susceptibility readings taken at the site during the survey confirmed that the ground conditions should be suitable for a survey of this kind. The overall range of the readings ($10-40 \times 10^{-5}$ SI) is similar to those seen at numerous sites where productive magnetometry surveys have been undertaken. Variations in the readings appear to relate mainly to the gravel content of the soil (as noted below). There are often variable amounts of natural background magnetic activity on terrace gravels (as is the case in parts of the present survey), and this needs to be taken into account when interpreting the survey findings.

Archaeological background

We have not been told of any previously identified archaeological findings within the present evaluation site, but the area immediately to the north-west has recently been archaeologically trenched, and was found to contain relatively dense settlement remains of Iron Age, Romano-British, Late Saxon and Medieval dates.

Survey Procedure

The site was investigated by means of a recorded magnetometer survey. Readings were collected along transects 1m apart using Bartington 1m fluxgate gradiometers, and are plotted at 25cm intervals along each transect. The results of the survey are presented at 1:2000 scale as a grey scale plot (figures 2-3), and as a graphical (x-y trace) plot at 1:1250 (figures 4-7). Comparison of these alternative presentations allows the detected magnetic anomalies to be examined in plan and profile respectively. An interpretation of the findings is shown superimposed on figures 4-7 (which permits the interpreted outlines to be compared with the underlying data), and is reproduced separately to provide a summary of the findings (figure 8).

The graphical plot in figures 4-7 shows the magnetometer readings after minimal pre-processing [of the kind permitted by English Heritage (2008) *Geophysical Survey in Archaeological Field Evaluation* Section 4.8]. This includes adjustment for irregularities in line spacing caused by variations in the instrument zero setting, and truncation of extreme values. Additional weak 2D low pass filtering has been applied to the grey scale plot to adjust background noise levels. No additional processing of a kind which could modify the anomaly profiles, or influence their interpretation, has been applied to the data.

The magnetometer responds to cut features such as ditches and pits when they are silted with topsoil, which usually has a higher magnetic susceptibility than the underlying natural subsoil. It also detects the thermoremanent magnetism of fired materials, notably baked clay structures such as kilns or hearths, and so responds preferentially to the presence of ancient settlement or industrial remains. It is also strongly affected by ferrous and other debris of recent origin.

Colour coding has been used in the interpretation to distinguish different effects. Magnetic anomalies which may show characteristics to be expected from features of potential archaeological interest are outlined in red. Variations in the density of background magnetic activity are indicated by the concentration of small magnetic anomalies outlined in light brown. Stronger (and perhaps recent) disturbances are outlined in grey. Possible cultivation effects are in green, and some of the more conspicuous ferrous objects (identifiable as narrow spikes in the graphical plots) are marked in light blue. Drains and pipes are also indicated.

Magnetic susceptibility tests

Magnetic susceptibility readings were taken (using a Bartington MS1 meter) at c. 90m intervals across the survey area. This information provides an indication of the strength of magnetic response to be expected from the site, with conclusions as noted above.

Survey location

The survey grid was set out and tied to the OS grid using a Trimble ProXRT GPS system (with VRS correction to give accuracy of c. 0.1m). The plans are therefore geo-referenced, and OS co-ordinates of map locations can be read from the AutoCAD version of the plans, which can be supplied with this report.

Not all the existing field boundaries are marked on the site plans showing the prospective development. Some of the boundaries (as marked in grey on the survey plans) were therefore traced approximately from OS mapping, and should be seen as indicative rather than accurate.

Results

Fields within the evaluation area have been numbered (1-5, as indicated on figures 1 and 8) for reference in this report.

The survey has detected one distinct and well-defined group of findings of clear archaeological relevance. There are also a few other nearby features of less certain significance, but there is no evidence for the presence of detectable archaeological features (other than possible traces of ridge and furrow) from the remainder of the site.

Fields 1-2

The main finding is a group of rectilinear ditched enclosures (as marked in red and labelled A) in field 1. Other associated individual magnetic anomalies could indicate the presence of settlement remains within or around the enclosures. Findings of this kind could typically represent remains of a Romano-British settlement site, and they could therefore represent a continuation of the multi-period site found by trenching nearby to the north-west.

North-south linear markings at B and C in field 1 could perhaps indicate traces of a field system associated with the settlement, but they do not align with the main enclosure ditches at A, and so may be ditches or boundaries of a different date. There may be other smaller and more irregular ditch-like features or enclosures at D and E in field 2.

Other findings include linear markings which could be cultivation effects, or traces of ridge and furrow, in the north-west corner of field 1 (green broken lines in figure 8), a pipe (blue), and land drains (blue/purple broken lines). Drains are typically indicated in the data plots by linear sequences of small magnetic anomalies corresponding to sections of clay pipe.

Fields 3-5

There are several strongly responsive land drains in fields 3 and 5, and perhaps some less clearly distinguishable examples in field 4. Findings otherwise are limited to cultivation effects, which are particularly clearly marked (around F) in the centre of field 3, but may also be visible to the east of field 5, and elsewhere.

There is a well-defined band of increased magnetic background activity which extends across the site from field 4, is most concentrated (around G) in the southern half of field 2, and continues along the southern side of field 3. This is indicated by an increase in the density of the small irregularly distributed magnetic anomalies which are outlined in light brown. These disturbances correspond to some of the higher magnetic susceptibility values, as mentioned, and probably represent a localised increase in the proportion of gravel in relation to clay in the topsoil.

There are magnetic disturbances from a nearby oil pipe (indicated by yellow markings outside the survey area) along the southern edge of the survey in field 5.

Conclusions

The survey has detected a clearly defined system of enclosures probably representing an ancient settlement site in the north-western corner of the evaluation area in field 1. Other smaller and less distinct ditches or enclosures may be present near the western boundary of field 2.

Findings from the remainder of the survey are limited to linear markings perhaps indicating localised traces of ridge and furrow cultivation. Various land drains, and a band of increased magnetic activity probably indicating an area of gravel soil were also detected.

Report by:

A. Bartlett BSc MPhil

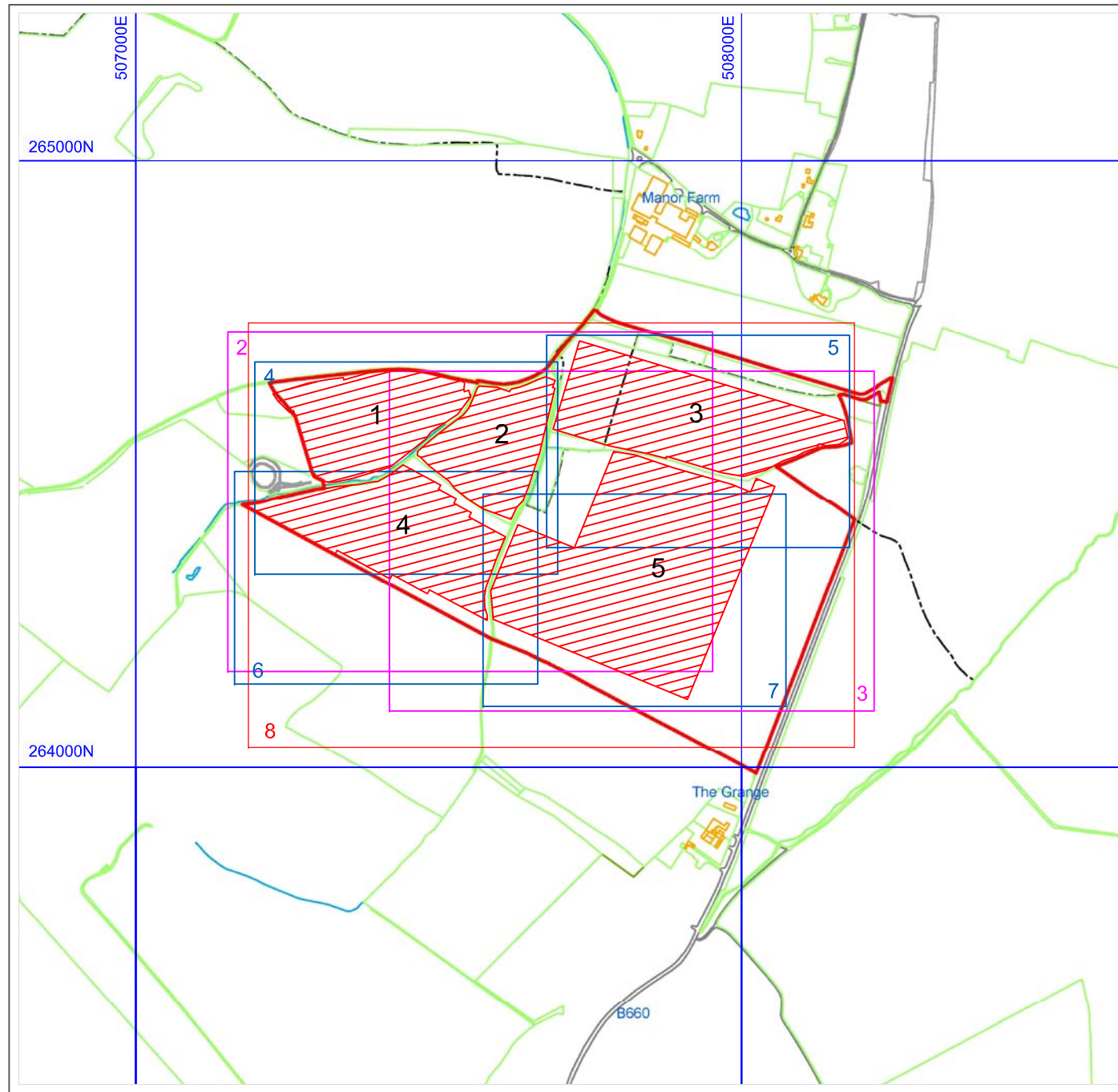
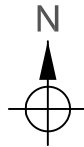
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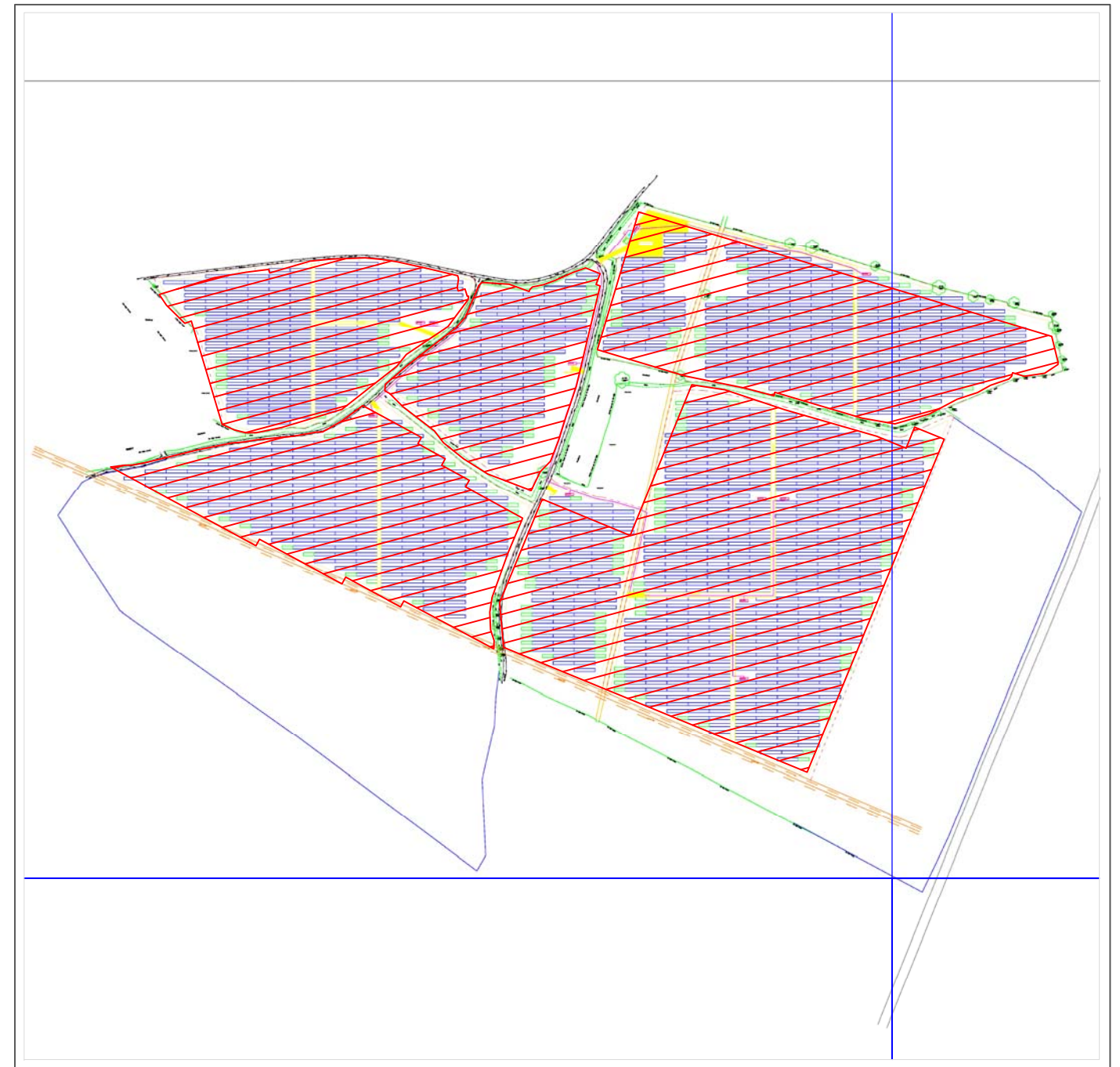
25 March 2014

The fieldwork for this survey was done by P. Cottrell, R. Organ and N. Dawson.



1a: Location of survey (and figures 2-8)

1:10000



1a: Survey coverage (red cross hatch) in relation to proposed development (blue)

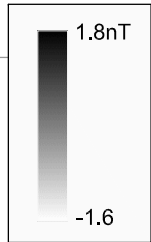
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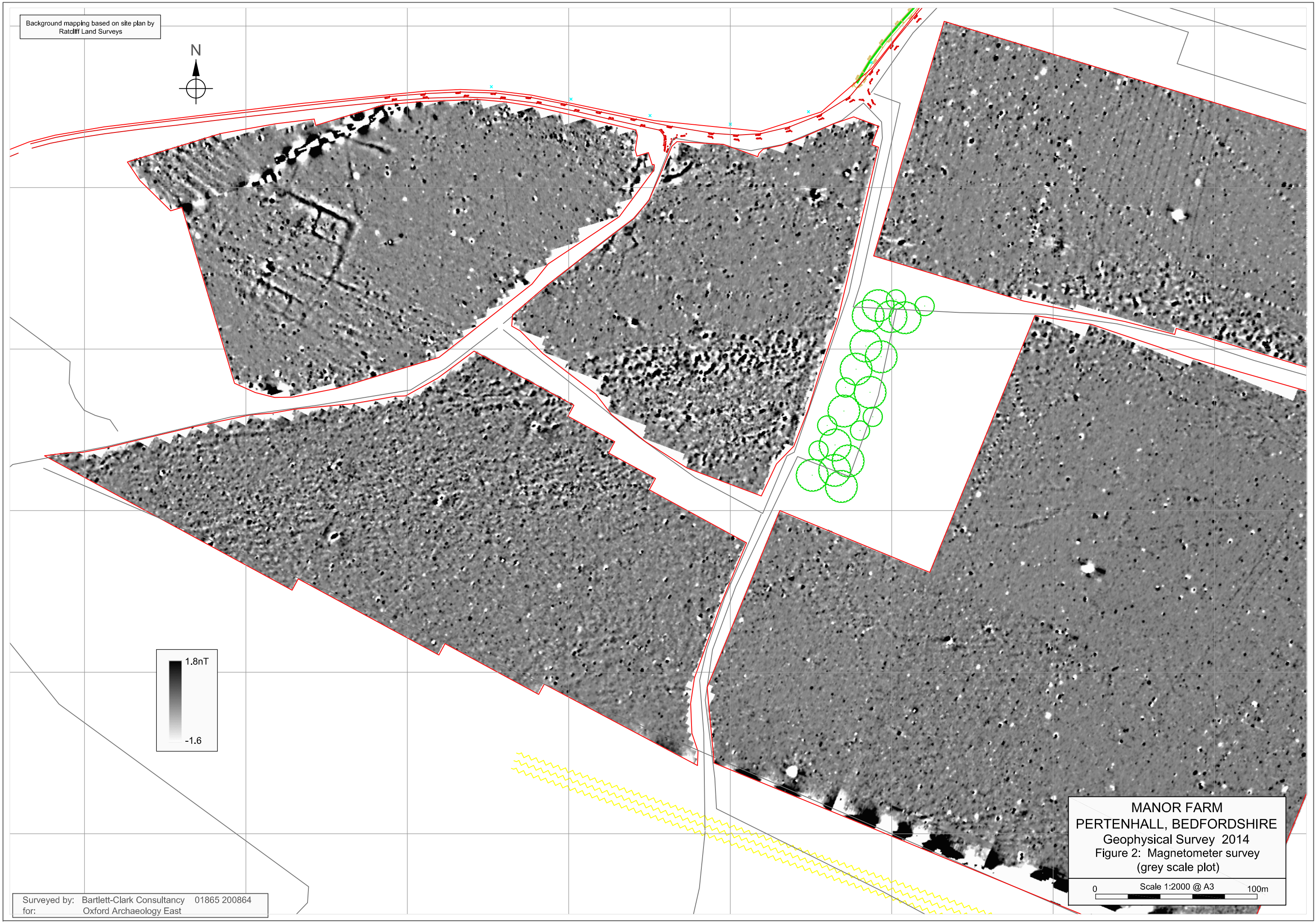
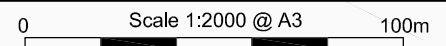
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Background mapping based on site plan by
Ratcliff Land Surveys

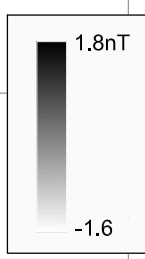
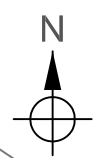
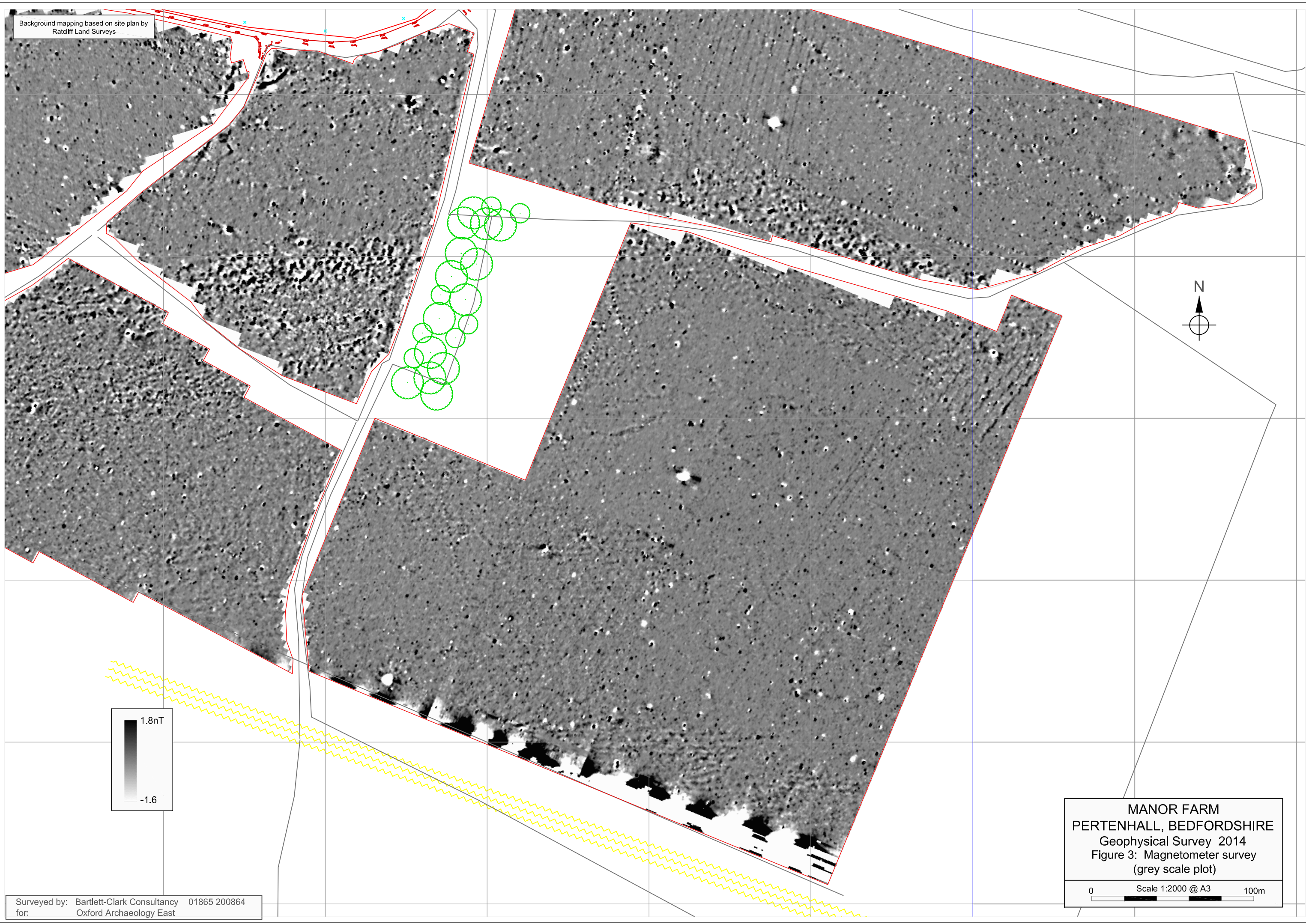


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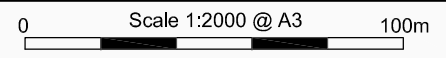
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Figure 2: Magnetometer survey
(grey scale plot)



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Figure 3: Magnetometer survey
(grey scale plot)










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45 nT

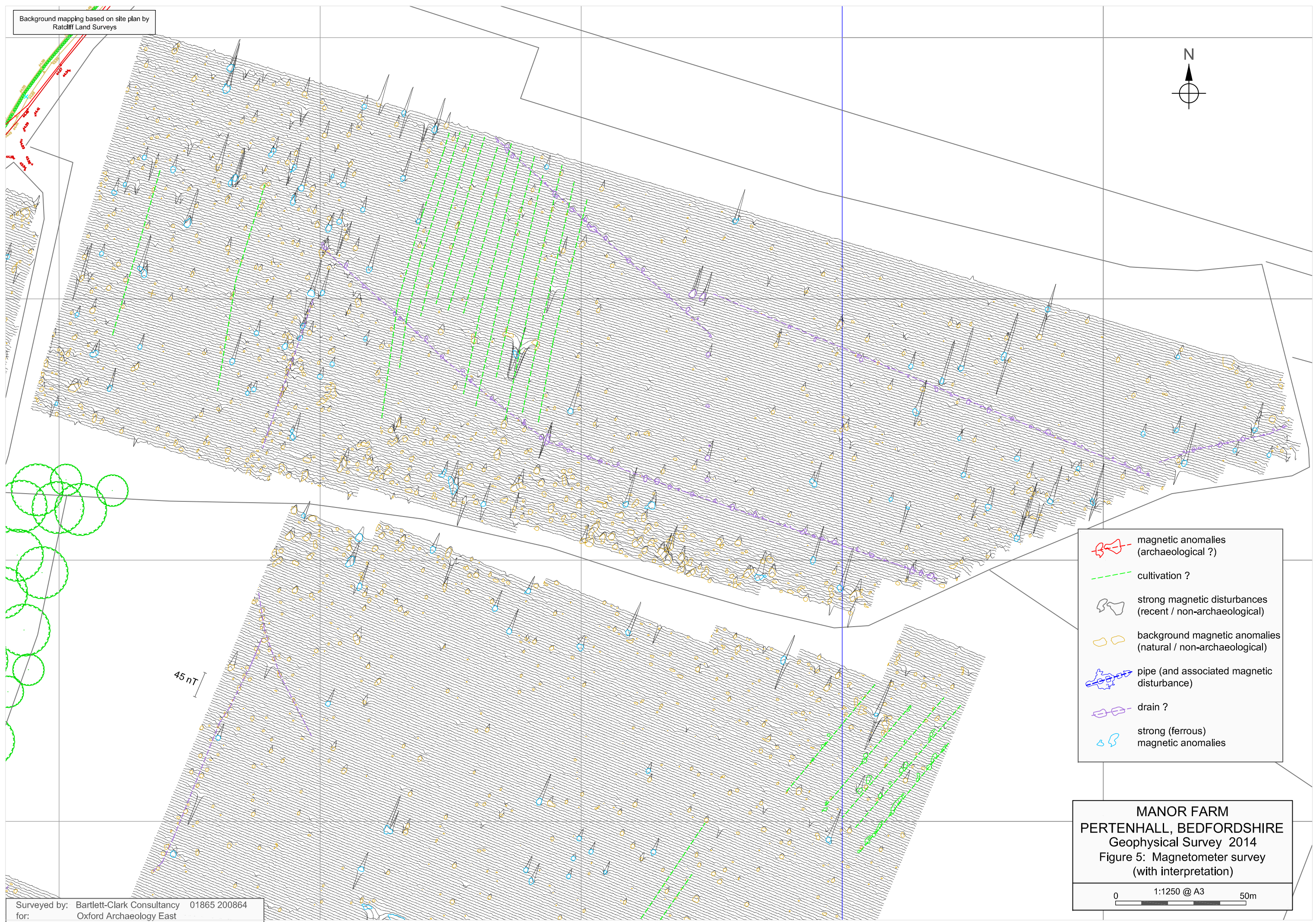
-  magnetic anomalies
(archaeological ?)
-  cultivation ?
-  strong magnetic disturbances
(recent / non-archaeological)
-  background magnetic anomalies
(natural / non-archaeological)
-  pipe (and associated magnetic
disturbance)
-  drain ?
-  strong (ferrous)
magnetic anomalies








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Figure 4: Magnetometer survey
(with interpretation)

0 1:1250 @ A3 50m

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-  magnetic anomalies (archaeological ?)
-  cultivation ?
-  strong magnetic disturbances (recent / non-archaeological)
-  background magnetic anomalies (natural / non-archaeological)
-  pipe (and associated magnetic disturbance)
-  drain ?
-  strong (ferrous) magnetic anomalies

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Figure 5: Magnetometer survey
(with interpretation)








0 1:1250 @ A3 50m

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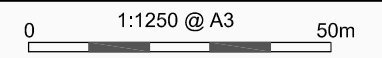
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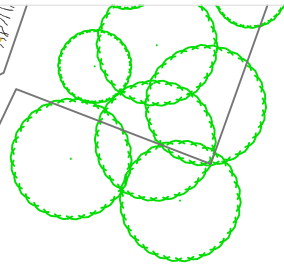
-  magnetic anomalies
(archaeological ?)
-  cultivation ?
-  strong magnetic disturbances
(recent / non-archaeological)
-  background magnetic anomalies
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-  pipe (and associated magnetic
disturbance)
-  drain ?
-  strong (ferrous)
magnetic anomalies

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Figure 6: Magnetometer survey
(with interpretation)










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45 nT



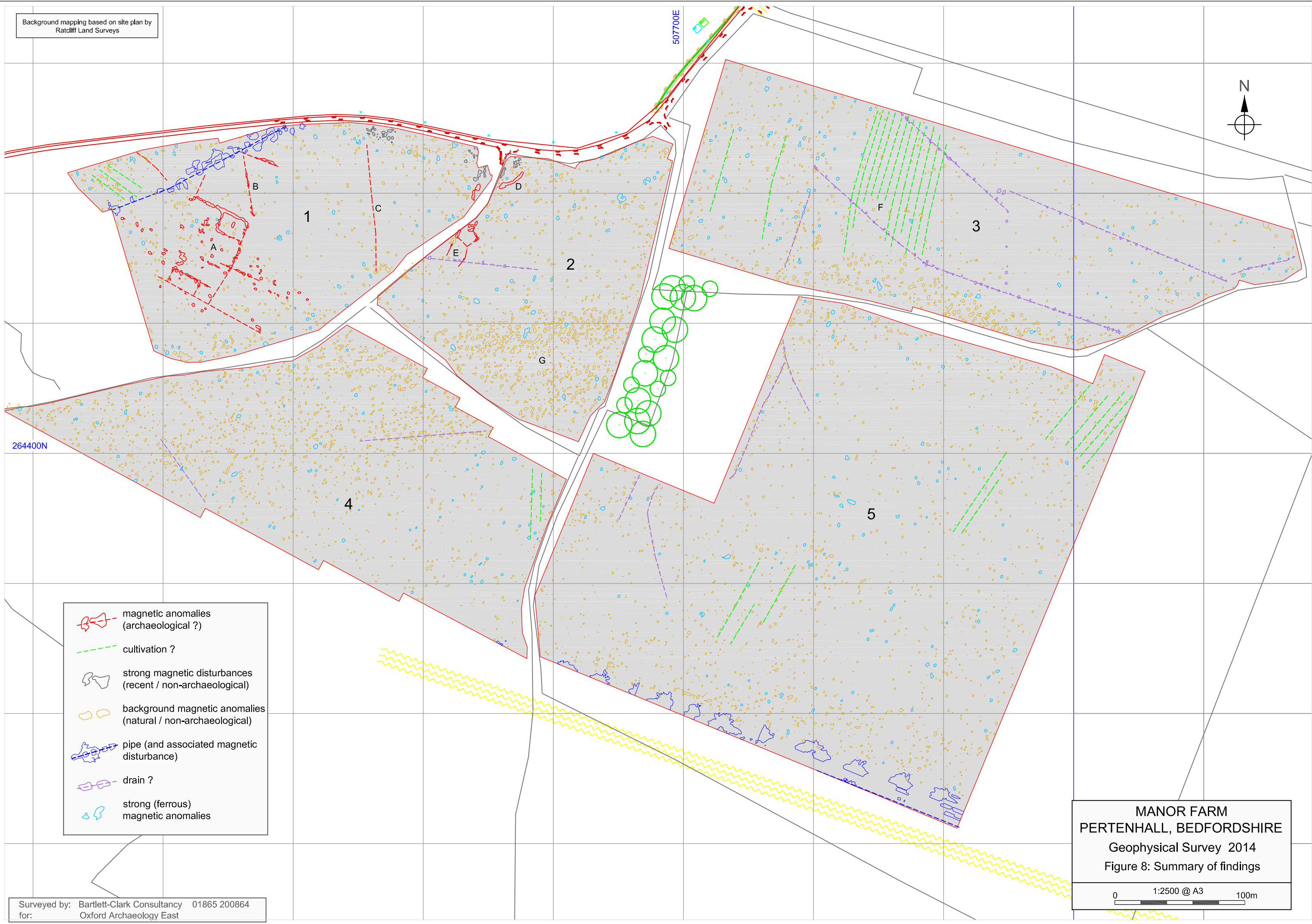
-  magnetic anomalies (archaeological ?)
-  cultivation ?
-  strong magnetic disturbances (recent / non-archaeological)
-  background magnetic anomalies (natural / non-archaeological)
-  pipe (and associated magnetic disturbance)
-  drain ?
-  strong (ferrous) magnetic anomalies

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Figure 7: Magnetometer survey
(with interpretation)

0 1:1250 @ A3 50m

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- magnetic anomalies (archaeological ?)
- cultivation ?
- strong magnetic disturbances (recent / non-archaeological)
- background magnetic anomalies (natural / non-archaeological)
- pipe (and associated magnetic disturbance)
- drain ?
- strong (ferrous) magnetic anomalies

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Figure 8: Summary of findings

0 1:2500 @ A3 100m

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